

Multi-Hazard Mitigation Plan



December 2019

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ADOPTION OF REVISED KITSAP COUNTY MULTI-HAZARD MITIGATION PLAN

WHEREAS, the Kitsap County Department of Emergency Management has reported the completion of the revision of the Kitsap County Multi-Hazard Mitigation Plan to the Board of County Commissioners; and

WHEREAS, the plan has been updated to be in compliance with the Disaster Mitigation Act 2000 and in accordance with 44 CFR 201.6; and

WHEREAS, the Multi-Hazard Mitigation Plan contains Hazard Mitigation Strategy Goals and Objectives and proposed strategies and actions to reduce short and long term vulnerability to the identified hazards; therefore,

NOW THERFORE, BE IT RESOLVED BY THE COUNTY BOARD OF COMMISSIONERS:

That the revised Kitsap County Multi-Hazard Mitigation Plan is hereby adopted.

DATED this 27th day of January, 2020.



BOARD OF COUNTY COMMISSIONERS KITSAP COUNTY, WASHINGTON

CHARLOTTE GARRIDO, Chair

ATTEST:

Dana Daniels, Clerk of the Board

DVCSENT LDER, Commissioner ROBERT

EDWARD E. WÖLFE, Commissioner

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Record of Changes

Element	Description	Date of Change	Changed By
Revision 2019	Update to the 2013 Mitigation Plan.	August- September 2019	KCDEM
Overall	 Rebranded the document to complement the HIVA and to better reflect the colors and style of the new Kitsap County Department of Emergency Management logo. Reformatted entire document for better readability, navigation, and flow. General grammar and spelling review and proofreading. Labeled all tables, figures, and graphics. Updated graphics, maps, tables, and statistical data. 	August 2019	KCDEM
Executive Summary	 Updated Executive Summary text to better reflect the Multi-Hazard Mitigation Plan. Reviewed and revised grammar and spelling. Moved Participant/Stakeholder lists to The Planning Process Section. 	August 2019	KCDEM
Introduction	 Changed section name from Section One to Introduction. Revised text for better grammar and flow. Updated Federal, State, and Local authorities and ordinances. 	August 2019	KCDEM
The Planning Process	 Changed section name from Section Two to The Planning Process. Heavily updated Planning Process section. Removed update history from 1998 to 2013 and inserted it into Appendix C. Updated new stakeholder and public engagement processes. Updated information about the recent 2019 Kitsap County Hazard Identification & Vulnerability Assessment (HIVA) update. 	August 2019	KCDEM
Kitsap County Profile	 Created new Kitsap County Profile section to better capture and outline the Kitsap County population, economy, built environment, and natural environment and how the County may be impacted by hazards. Updated section with the most recent 2019 HIVA information. Updated emergency/disaster history information. 	August 2019	KCDEM

Element	Description	Date of Change	Changed By
Mitigation Strategies & Recommendations	 Changed section name from Section Three to Mitigation Strategies & Recommendations. Combined Section Three and Section Four (PRIORITY ONE and PRIORITY TWO) to include all mitigation strategies in the document. Moved mitigation strategies from City Profiles into this section. Updated maps, tables, and statistics. Created tables to house mitigation strategies for easier readability and reference. Reviewed and updated mitigation strategies. 	September 2019	KCDEM
Future Actions & Goals	 Changed section name from Section Four: Future Actions and Goals to Future Actions & Goals. Reviewed and updated goals. 	August 2019	KCDEM
Appendices	 Changed former Appendix A: Kitsap County Mitigation Planning Committee Records to Appendix D: Stakeholder and Engagement Records. Updated section with all stakeholder and public engagement records. Updated Appendix D list of references. 	August 2019	KCDEM

Table 1: Record of Changes

Executive Summary

In 2000, the federal government enacted the Disaster Mitigation Act (DMA 2000; P.L. 106-390) requiring states, local jurisdictions, and tribal governments to have an approved mitigation plan in place to be eligible for mitigation funding. In 2004, Kitsap County and its Department of Emergency Management (KCDEM) committed to providing coordination to identify potential alternatives for mitigation projects and to help to secure risk reduction funding for the benefit of the County and its Cities.

The Kitsap County Multi-Hazard Mitigation Plan (MHMP) is a living document and is now undergoing its first major update since 2013. KCDEM acknowledges that the update process was delayed due to challenges leading up to the formal approval and promulgation in 2014 and securing grant funding for a 2019 update.

In 2019, under a new Director, KCDEM initiated a complete review, update, and reformatting of the Kitsap County Hazard Identification and Vulnerability Assessment (HIVA) along with the MHMP to better capture the most recent hazard and mitigation information to best inform the County and to integrate the effects of Climate Change throughout the plan. The HIVA, which identifies and describes the hazards that may impact the County, informs the actions in the MHMP and was completed at the beginning of July 2019. All hazard-specific information in this MHMP is based on the new 2019 Kitsap County HIVA. A note of interest, Kitsap County was impacted by its first significant tornado, a high F2, in December 2018.

The County initiated the project by hosting a kickoff meeting with a broad stakeholder meeting and two-day Impacts of Climate Change on Emergency Management workshop conducted by the University of Hawaii Climate Change Center. KCDEM conducted the formal Kitsap County MHMP Stakeholder Steering Committee Kick-off Meeting on July 10, 2019, after completion of the HIVA. This MHMP is the culmination of a cooperative Stakeholder Steering Committee effort and required participation from Kitsap Countv internal aovernment departments/agencies, local government city jurisdictions, fire and utility districts, special purpose districts, school districts, KCDEM, State of Washington Emergency Management Division (State EMD), and the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA). The underlying regional mitigation plan goal is to implement the regional strategy through mutually beneficial and cost-effective regional projects.

This MHMP meets the requirement for a Hazard Mitigation Plan under the amended Stafford Act (44 CFR, Part 201). Many local jurisdictions, communities, governmental agencies, and the public were involved in the MHMP development and critical review process.

It is vital for the County to have a proactive, coordinated approach to mitigation.

Mitigation measures save lives, reduce injuries, and prevent or decrease financial losses from the many hazards our region faces. The 2019 MHMP examines efforts that can be applied to reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs through prevention and mitigation efforts. As additional funding sources become available, the county-wide plan will guide the selection of eligible projects from the criteria set forth in the Hazard Mitigation Grant Program (HMGP) and from other mitigation

funding sources such as the Pre Disaster Mitigation (PDM) Grant which was utilized to fund this plan development initiative.

While many elements of the 2013 MHMP have retained their integrity, statistics, strategies, studies, and research information were heavily reviewed in order to use the most recent and up-to-date information and to incorporate impacts of climate change throughout the potential hazard impacts narration. General updates, documented FEMA declarations, and other significant hazard incidents have been updated and included from the years 2004 to 2019. All footnotes/endnotes and links have been reviewed, verified, and updated as needed or possible. This entire document has been reviewed in detail.

The Record of Changes section on page 1 details all major changes made to this MHMP. Additional changes are indicated within each MHMP section and are referenced accordingly. During the development of this plan, some duplicative language, graphics, and narrations have been removed in order to enhance formatting and improve readability.

The Kitsap County MHMP 2019 is a reflection of Kitsap County and its emergency management program partner cities. Upon approval by FEMA, this document will be due for its next formal review in 2023 for submission to FEMA and Promulgation by December 2024.

Contact

Questions and comments about this MHMP can be directed to the:

Director of Kitsap County Department of Emergency Management 911 Carver St, Bremerton, WA 98312 360-307-5871 dem@co.kitsap.wa.us

Introduction

Definition of Hazard Mitigation

Hazard mitigation is the effort to reduce the loss of life and property by lessening the impact of hazards or disasters.¹ For mitigation to be effective, the whole community needs to take action now—before the next disaster—to reduce human and financial consequences later (analyzing risk, reducing risk, and insuring against risk). Disasters can happen at any time and any place, and if the community isn't prepared, consequences can be fatal. Hazard mitigation may occur before, during, or after any phase of a threat, emergency, or disaster.

Effective mitigation requires that all stakeholders understand local risks, address the hard choices, and invest in long-term community well-being. Without mitigation actions, safety, financial security, and self-reliance may be adversely affected during an incident or disaster.

Mission Statement

The mission of the Kitsap County Department of Emergency Management (KCDEM) is to prepare for, mitigate against, respond to, and recover from any emergency or disaster that affects Kitsap County and its Emergency Management Program Cities (Bremerton, Port Orchard and Poulsbo) and when called upon in a Countywide or regional impacting disaster, the City of Bainbridge Island who currently manages their own Emergency Management Program.

Authority

Federal Laws

1. "The Federal Civil Defense Act of 1950"²

Provides general information to mitigation planners on the history of emergency planning response in the United States. Although it does not focus on natural mitigation strategies, it provides a background read on threats and the protection of life and property in the U.S.

2. Public Law 96-342 "The Improved Civil Defense Act of 1980" ³

Provides general information to mitigation planners on the history of emergency planning response in the United States. Although it does not focus on natural mitigation strategies, it provides a background read on threats and the protection of life and property in the U.S. This bill enhanced the Federal Civil Defense Act of 1950 to improve emergency warning systems, establishment of better command and control through emergency operations, and improvements in preparing for potential threat (mostly hostile). The document provides a background in the history of mitigation measures in the U.S.

¹ <u>https://www.fema.gov/what-mitigation</u>

² https://www.ssa.gov/policy/docs/ssb/v14n4/v14n4p11.pdf

³ https://uscode.house.gov/statutes/pl/96/342.pdf

3. Public Law 91-606 "Disaster Relief Act"⁴

Public Law 91-606 was enacted in 1970 and a prelude to the Stafford Act. It provided provision for public relief after a disaster and provided Federal support from agencies to respond during disasters. The document provides general background information on disaster relief and assists locals in understanding the history and provision of disaster relief.

4. Public Law 93-288 "The Robert T. Stafford Disaster Relief Act of 1988"⁵

The Disaster Act of 1974 was amended in 1988 as the Robert T. Stafford Act which provided provision for disaster relief to include pre-disaster mitigation plans and strategies. This document sets the stage in defining this mitigation plan for local and its mitigation strategists. The Robert T. Stafford Act was amended in 2016.

5. "Disaster Mitigation Act of 2000"⁶

This document amended the Robert T. Stafford Relief Act of 1988 to include among other revisions, "encouraging hazard mitigation measures to reduce losses from disasters, including the development of land use and construction regulations." Along with the Robert T. Stafford Act, these documents are essential to local planners in defining mitigation strategies for their jurisdictions.

6. "FEMA's Multi-Hazard Mitigation Planning Guidance under the Disaster Mitigation Act of 2000-Revision 2008"⁷

FEMA's guide on multi-hazard mitigation planning is designed to help interpret the rules in the Disaster Mitigation Act of 2000. It defines requirements of original and updated plans to ensure rules are met. This guidance is essential for mitigation planning and the core document for processing the development and adoption of the plan.

7. Post-Katrina Emergency Management Reform Act of 2006

This act amended the Homeland Security Act and modified the Stafford Act with respect to the organizational structure, authorities, and responsibilities of the Federal Emergency Management Agency (FEMA). Following this Act, FEMA now leads the coordination of and supports the Nation in a risk-based, comprehensive emergency management system of preparedness, protection, mitigation, response, and recovery. Further this act amended the HAZARD MITIGATION GRANT PROGRAM FORMULA by striking "7.5 percent" and inserting "15 percent for amounts not more than \$2,000,000,000, 10 percent for amounts of more than \$2,000,000,000 and not more than \$10,000,000,000, and 7.5 percent on amounts of more than \$10,000,000,000 and not more than \$35,333,000,000".

Kitsap County Multi-Hazard Mitigation Plan (MHMP) 2019

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⁴ <u>https://www.govinfo.gov/content/pkg/STATUTE-84/pdf/STATUTE-84-Pg1744.pdf#page=14</u>

⁵ <u>https://www.fema.gov/media-library/assets/documents/15271</u>

⁶ https://www.fema.gov/media-library/assets/documents/4596

⁷ https://www.fema.gov/media-library-data/1424878409827-

c19165ee0d13e65f864b85f8c00546e5/State_Mitigation_Planning_Guidance_2008.pdf

State Laws

1. Revised Code of Washington (RCW) 34.05 Administrative Procedure Act ⁸

The legislature intends, by enacting this 1988 Administrative Procedure Act, to clarify the existing law of administrative procedure, to achieve greater consistency with other states and the federal government in administrative procedure, and to provide greater public and legislative access to administrative decision making. Used as a proceeding for administrative law in such areas as rulemaking, adoption rules, plan format, and public participation.

2. Revised Code of Washington (RCW) 38.52⁹

Defines the roles and responsibilities of Emergency Management to include hazard mitigation planning. It requires the adoption of the Comprehensive Emergency Management Plan, which includes provides for hazard mitigation planning. These measures are the foundation of the Kitsap County MHMP.

3. RCW 37.70A.040/050/120 "Regulations and Implementation Guidance for Comprehensive Plans¹⁰

Define the requirements for jurisdictions' comprehensive planning to include classifying agriculture, forest, mineral lands, and critical areas. Comprehensive planning begins with defining critical to ensure areas can be mitigated to reduce natural hazard risks.

4. Washington Administrative Code (WAC) 246-290 "Public Water Supplies"¹¹

Governs the main regulations for water systems in the State of Washington. Provides regulations for engineering requirements, ownership, variances, and planning. Essential to land use and critical area reviews. Locals use this document for mitigating risks to water systems.

Local Codes & Ordinances

- Kitsap County, 1980. Ordinance No. 80 Flood Damage Prevention Regulations¹²
 Assist local and define flood and stormwater mitigation measures. Used to evaluate flood
 risk and mitigation strategies to prevent public and private damage during flooding events.
- 2. Kitsap County Ordinance No. 109, March 24, 1986¹³ Ordinance No. 109 provided for the inception of the Department of Emergency Management and the Emergency Management Council, defining the department's roles and responsibilities to include hazard mitigation and prevention.
- 3. Kitsap County Critical Areas Ordinance, December 2017¹⁴

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⁸ <u>https://app.leg.wa.gov/RCW/default.aspx?cite=34.05&full=true</u>

⁹ https://apps.leg.wa.gov/RCW/default.aspx?cite=38.52

¹⁰ https://apps.leg.wa.gov/RCW/default.aspx?cite=36.70A

¹¹ https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-010.pdf

¹² <u>https://www.codepublishing.com/WA/KitsapCounty/html/KitsapOT.html</u>

¹³ https://www.codepublishing.com/WA/KitsapCounty/html/KitsapOT.html

¹⁴ <u>https://www.codepublishing.com/WA/KitsapCounty/#!/Kitsap19/Kitsap19100.html#19.100</u>

City of Bainbridge Island Critical Area Ordinance, January 2019¹⁵

City of Poulsbo Chapter 16.20 Critical Area Ordinances, July 2007¹⁶

Port Orchard Critical Ordinance, December 2009¹⁷

City of Bremerton Critical Lands Ordinance, June 2016¹⁸

Critical Area Ordinances define areas with potential risks or hazardous to the public. These areas may require mitigation efforts for land use. Strategies are defined at the city or county level to improve these areas for developers. These plans will define such hazards as flood plain areas, hazardous materials to include defined superfund sites, and those areas known for ancient ground movement. These plans are essential to mitigation strategies and developing long term land use plans.

4. Kitsap County Codes

Kitsap County Code Title 14 – Building Kitsap County Code Title 17 – Zoning Kitsap County Code Title 12 – Stormwater Management Kitsap County Code Title 2 – Emergency Management

5. Kitsap County Comprehensive Emergency Management Plan, 2015¹⁹

Adopted as the basis for the MHMP and strategy in Kitsap County. Each City and the County have an adopted plan which defines the importance of mitigation and includes as an Annex, the Hazard Identification and Vulnerability Assessment 2019.

Purpose

According to FEMA, developing hazard mitigation plans enables state, tribal, and local governments to:²⁰

- Increase education and awareness around threats, hazards, and vulnerabilities;
- Build partnerships for risk reduction involving government, organizations, businesses, and the public;
- Identify long-term, broadly supported strategies for risk reduction;
- Align risk reduction with other state, tribal, or community objectives;
- Identify implementation approaches that focus resources on the greatest risks and vulnerabilities; and
- Communicate priorities to potential sources of funding.

¹⁵

https://www.codepublishing.com/WA/BainbridgeIsland/#!/BainbridgeIsland16/BainbridgeIsland1620.html# 16.20

¹⁶ <u>https://cityofpoulsbo.com/wp-content/uploads/2017/02/AdoptionDocumentallsections.pdf</u>

¹⁷ https://www.codepublishing.com/WA/PortOrchard/html/PortOrchard20/PortOrchard20162.html

¹⁸ <u>https://www.bremertonwa.gov/401/Critical-Area-Ordinance</u>

¹⁹ <u>https://www.bremertonwa.gov/DocumentCenter/View/3215/2015-Comprehensive-Emergency-Management-Plan-PDF</u>

²⁰ <u>https://www.fema.gov/hazard-mitigation-planning</u>

The purpose of the Kitsap County MHMP is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from all hazards using hazard/threat information identified in the 2019 Hazard Identification and Vulnerability Assessment (HIVA). This can be achieved by increasing public awareness of hazards, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide the county towards building a safer, more sustainable community.

In order to prepare for and mitigate against hazards that have the potential to strike the County, it is necessary to understand the history and projected future activity within Kitsap County, and how vulnerable the citizens may be to hazards within that context. The HIVA describes the hazards with the greatest potential threat to Kitsap County and its citizens, environment, personal and public property, and economy. This analysis serves as a basis from which Kitsap County can develop plans, educate the public, provide training for first responders, and develop exercises to practice the skills and apply knowledge to better prepare for the hazards that may occur within the County. *The MHMP takes the hazard information from the HIVA and makes it actionable through mitigation strategies.*

Kitsap County has an active mitigation program working with County, City, and special purpose districts to identify and mitigate hazards in Kitsap. An approved MHMP is in place to benchmark mitigation strategies and take advantage of mitigation funding or local resources to improve Kitsap's protection from hazards. Mitigation strategies are standard in many counties, and city land use and management plans to make the best use of land vulnerable to hazards.²¹

The plan identifies and evaluates specific hazard mitigation strategies to be considered by Kitsap County and its political subdivisions, agencies, and organizations. The strategies presented are deemed appropriate and effective by recommendation of the Kitsap County Stakeholder Steering Committee. Upon acceptance by the participating jurisdictions' governing bodies, the selected strategies will be further developed for funding and implementation by the lead agencies. It is understood the mitigation strategies adopted in this plan are recommendations only, as they must be approved and funded to be designated as official Hazard Mitigation Strategies to be implemented by Kitsap County and its political subdivisions.

The 2019 HIVA of Kitsap County covers both natural and technological hazards, although including technological and human-caused threats in this assessment was not mandatory according to the Federal Emergency Management Agency (FEMA) Local Mitigation Plan guidance. Such hazards are generally covered by the Threat and Hazard Identification and Risk Assessment (THIRA) process, which is conducted at the State level, and in local public planning specific to those threats. However, in its HIVA, Kitsap County identifies and discusses a select number of technological and human-caused hazards to better inform public officials, emergency managers, private partners, and community members about the potential risks and effects of technological and human-caused threats. This MHMP focuses on the *natural hazards* that affect Kitsap County and also takes into consideration the possible future impacts of Climate Change.

²¹ Kitsap County Comprehensive Emergency Operations Plan (2015)

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The Planning Process

Mitigation Planning Defined

Hazard mitigation planning identifies and prioritizes sustained measures that if enacted, will reduce or eliminate long-term risk to people and property from natural hazards and their effects. This plan briefly discusses human-made hazards, like terrorism, but will generally focus on natural hazards. Mitigation measures can reduce personal loss, save lives, and reduce the cost to local, State, and Federal governments for response and recovery actions. In the long run, mitigation, whether preparing citizens for disasters, training responders, or infrastructure protection, takes the burden off responders to concentrate on problems that cannot be mitigated, and/or reduces the effect on social and economic recovery.

Internationally the focus on adaptation for climate change is focused on making hard and soft adaptive measures. Hard mitigation measures involve costly, large, and complex technology and infrastructure, whereas soft mitigation measures prioritize human capital, community engagement, simplicity, and appropriateness such as outreach and education programs. The Kitsap County MHMP Strategies engage in a mixed approach of both hard and soft mitigation strategies which dovetail directly into the FEMA model for natural hazard mitigation as defined below.

FEMA identifies four broad categories of actions that constitute natural hazard mitigation:²²

- **1.** Local Planning and Regulations (soft mitigation)
- 2. Education and Awareness Programs (soft mitigation)
- 3. Structure and Infrastructure Projects (hard mitigation)
- 4. Natural Systems Protection (hard mitigation)

These categories become the core competencies for developing an effective mitigation program. Planners use the competencies to assess organizational mitigation efforts, develop processes that include these efforts, and select mitigation projects. As part of this assessment, it must involve other pertinent information that defines risk assessments and the value of mitigation to a jurisdiction and/or Kitsap County.

Integration with Other Plans

The MHMP is a support annex to the Kitsap County Comprehensive Emergency Management Plan. As part of the planning process, information related to hazards, risk, vulnerability, and mitigation was obtained from various plans used by Kitsap County such as the Kitsap County Comprehensive Emergency Management Plan and the Washington State Enhanced Mitigation Plan.

The development of the MHMP involves reviewing and updating existing land use policies and regulatory ordinances while considering new policies and ordinances that improve and extend protection of the public health, safety and welfare.

²² FEMA Mitigation Ideas: A Resource to Reducing Risk to Natural Hazards (January 2013)

The hazard, risk, vulnerability, and mitigation information in this plan and the HIVA can be integrated in various local plans such as emergency operations plans and hazard mitigation plans for Bainbridge Island, Bremerton, Port Orchard, and Poulsbo, as well as other special districts as applicable. Businesses, schools, and other community elements can also take advantage of the information provided in the HIVA and MHMP for their own emergency and mitigation plans.

Lead Agency and Stakeholder Steering Committee Participation

Comprised of one county commissioner, the mayors of Bremerton, Port Orchard, and Poulsbo, and one City council member from Bainbridge Island, the Kitsap County Emergency Management Council was established in 1986 to provide direction, control, and oversight of the Department of Emergency Management.²³ KCDEM acts as the lead agency in coordinating the efforts of the Kitsap County MHMP Stakeholder Steering Committee in formulating and supporting the Kitsap County Hazard Mitigation Strategy Identification and Plan promulgation and maintenance. As the largest of the joint emergency management program members, Kitsap County is responsible for the financial administration of the joint emergency management program.

KCDEM identified various stakeholders to be involved in the planning and development process and invited them via webinar during the HIVA and MHMP Kickoff Meetings.

KCDEM acknowledges the contribution of many individuals for their hard work and dedication that made this 2019 Kitsap County MHMP update possible. Grateful appreciation is extended to the Kitsap County MHMP Update Stakeholder Steering Committee members and agencies named in Table 2 who were invited or participated in the HIVA and MHMP review, update, and planning process. Although Special District representation was present during the HIVA and MHMP processes regarding review, research, and strategy during MHMP development, this Plan will not include individual chapters for each. The Plan focuses on Kitsap County and the Cities of Bainbridge Island, Bremerton, Port Orchard, and Poulsbo.

Participating Jurisdictions, Agencies, & Organizations				
Representative	Agency/Organization	Title	Participation Status (Invited/Participating)	
Kitsap County				
Elizabeth (Lis) Klute	KCDEM	Director	Participating	
Randy Unger	KCDEM	Project Manager	Participating	
Linda Tsubaki	KCDEM	EMAT	Participating	
Force Tolar	KCDEM	EMAT	Participating	
Jim Wilson	KCDEM	Public Volunteer	Participating	
Michele Moen	KCDEM	EMAT	Participating	

²³ <u>http://mrsc.org/getmedia/6e07cf5b-85da-4e70-9ca2-4c570caf701b/k54emsILA.pdf.aspx</u>

Participating Jurisdictions, Agencies, & Organizations			
Representative	Agency/Organization	Title	Participation Status (Invited/Participating)
Dave Rasmussen	KCDEM	Public Information Officer	Participating
Tom Malley	KCDEM	EMAT	Participating
David Tucker	KCDEM	DCD	Participating
Jacques Dean	KCDEM	Public Works Department, Roads	Participating
Herb Jewell	KCDEM	EMAT	Participating
Eric Quitslund	KCDEM	EMAT	Participating
Jay Lovato	KCDEM	EMAT	Participating
Joe Vlach	Central Kitsap School District	Director of Operations	Participating
Hanna Shockley	Human Services	Supervisor	Participating
Stephanie George	Kitsap 911 - CENCOM	Training Manager	Participating
Mike Prothero	Kitsap Transit	Operations Supervisor	Participating
Jason Rhoads	North Kitsap School District	Executive Director of Business, Finance, and Operations	Participating
Amy Anderson	Public Health District	Emergency Preparedness, Public Health Educator	Participating
Jessica Guidry	Public Health District	Emergency Preparedness Manager	Participating
Bob Hunter	Public Utility District	General Manager	Participating
P. Campbell	Public Utility District	Public Works Department, Solid Waste	Participating
Andy Nelson	Public Works	Public Works Director	Participating
Alexis McKinnion	Public Works	Public Works Department, Solid Waste	Participating
Darryl Johnson	South Kitsap School District	Director for Safety, Security & Emergency Management	Participating
Bainbridge Island			
Morgan Smith	City of Bainbridge Island	City Manager, Emergency Management Director	Participating
Erin Bischoff	Bainbridge Island School District	Public Relations Officer	Participating

Participating Jurisdictions, Agencies, & Organizations			
Representative	Agency/Organization	Title	Participation Status (Invited/Participating)
Anne Lesage	City of Bainbridge – Emergency Management	Emergency Management Coordinator	Participating
	Bre	merton	
Pat McGanney	Bremerton Fire Department	Fire Chief, Emergency Management Coordinator	Participating
Karen Bevers	Bremerton School District	Director of Communications & Community Engagement	Participating
Patty Glaser	Bremerton School District	Supervisor of School Safety & Support	Participating
Axel Strakeljahn	Port Districts	Port Commissioner	Participating
	Port	Orchard	
Nick Bond	Community Development	Community Development Director	Participating
Zack Holt	Public Works	Stormwater Programs Manager	Participating
Mark Dorsey	Public Works	Public Works Director	Participating
Chief Matt Brown	Police Department	Police Chief, Emergency Management Coordinator	Participating
Poulsbo			
Helen Wytko	Planning & Economic Development	Planning Technician	Participating
Karla Boughton	Planning & Economic Development	Planning Director	Participating
Mike Pleasants	Planning & Economic Development	Assistant City Engineer	Participating
Silverdale			
Jeannie Screws	Silverdale Water District	Fiscal Manager	Participating
Morgan Johnson	Silverdale Water District	General Manager	Participating
	Jeffers	on County	
Willie Bence	Department of Emergency Management	Director	Participating

Participating Jurisdictions, Agencies, & Organizations							
Representative	Agency/Organization	Title	Participation Status (Invited/Participating)				
Tribal							
Misty A. Ives	Port Gamble S'Kallam Tribe	Emergency Management Director	Participating				
Cherrie May	Suquamish Tribe	Emergency Management Director	Participating				
	S	State					
Lit Dudley	Washington Department of Transportation	Regional Emergency Manager	Participating				
Dan Banks	Washington Department of Transportation	Emergency Management Supervisor	Participating				
Michael Levkowitz	Washington Division of Emergency Management	Mitigation Strategist	Participating as reviewer				
Susan Enders	Washington Division of Emergency Management	Mitigation Specialist	Participating as reviewer				
	М	ilitary					
Mike Simpkins	US Navy/ Naval Base Kitsap and Naval Magazine Indian Island	Lt. Commander, Emergency Manager Naval Base Kitsap	Participating				
Bob Hubbard	US Navy NW Region	Radiological Emergency Planner	Participating				
Dan Shinners	Puget Sound Naval Shipyard	105.6 Nuclear	Participating				
Chad Delaney	Puget Sound Naval Shipyard	105.6 Nuclear	Participating				
Matthew Miller	Puget Sound Naval Shipyard	105.6 Nuclear	Participating				
Russ Blackstock	Puget Sound Naval Shipyard	105.6 Nuclear	Participating				
Private							
Mary Hobday	Puget Sound Energy	Emergency Planning Manager	Participating				
Non-Governmental/Non-Profit Organizations							
Stephen Finley	American Red Cross	Disaster Program Manager	Participating				
Jacob Hausdorf	CHI Franciscan	Emergency Management Specialist	Participating				

Participating Jurisdictions, Agencies, & Organizations					
Representative	Agency/Organization	Title	Participation Status (Invited/Participating)		
Jennifer Kriedler- Moss	Peninsula Community Health SVCS	Chief Executive Officer	Participating		
Daniel Paquette Team Rubicon		Manager	Participating		
Chief Keith Wright Washington State Chief Keith Wright Association of Fire Chiefs		Vice President	Participating		

Table 2: Participating Jurisdictions, Agencies, & Organizations

Multi-Hazard Mitigation Planning Stakeholder Committee Tasks Overarching Mitigation Tasks

Stakeholder Steering Committee members were responsible for several overarching mitigation activities:

- 1. Coordinate with the Department of Emergency Management to oversee the planning process.
- 2. Prioritize hazards vs. resources.
- 3. Select the highest estimated return on investment mitigation recommendations.
- 4. Review planning drafts, recommendations, and updates.
- 5. Identify and implement long and short-term goals.
- 6. Integrate the plan with all phases of Comprehensive Emergency Management Planning.
- 7. Provide for the implementation of committee decisions.
- **8.** Encourage, coordinate, and provide a methodology for the implementation of input from the public, elected officials, and agency personnel.
- 9. Establish committee tasks.
- **10.** Determine implementation ability and constraints for proposed Hazard Mitigation planning steps and measures.
- **11.** Bring forward community concerns.
- **12.** Identify implementation resources.
- **13.** Provide for the update of Comprehensive Emergency Management Plans on a scheduled basis.
- 14. Evaluate and carry out mitigation activities.
- **15.** Assist in the identification of funding sources and the procurement of funds to support hazard mitigation.

2019 Plan Review & Update

Specific to the 2019 MHMP development process:

- All City and Special Purpose District planning partners were contacted in May 2019 to advise them of the review and update of the Kitsap County HIVA leading up to the update of the MHMP. All were asked to review and update their County and jurisdictional profile information.
- The HIVA Kick-Off meeting was held on April 8, 2019, and the attending partners agreed on the deadlines for agency-specific documentation delivery. The Request For Information (RFI) Collection Process for the review and update was presented to the stakeholders via webinar using Google Sheets. This RFI Process was also used for the information collection during the MHMP update.
- HIVA/MHMP Stakeholder Steering Committee meetings took place on April 17, June 3, and July 10, 2019, and August 14, 2019. Monthly MHMP update meetings with stakeholders began to take place from July through October 2019. These meetings took place in person and via webinar in order to discuss the MHMP process, provide an update on the status of the document, provide guidance on the RFI process, discuss strategies, and answer any stakeholder questions.
- The final MHMP Stakeholder Steering Committee meeting took place on Sunday 26, 2019 in order to present the final draft of the 2019 MHMP and discuss the next steps regarding approval, budget, and lessons learned from the planning process.

Stakeholder Update Responsibilities

- Review the 2013 MHMP.
- Update their jurisdiction/agency profile and provide updates, revisions, and additions to sections of the MHMP using the Request For Information (RFI) process on Google Sheets.
 - Electronic RFIs were the main source of capturing stakeholder updates, revisions, and additions to the MHMP. A large matrix of requests was created using Google Sheets and Google Docs to fully capture all sections of the MHMP to present the information to stakeholders in an efficient and user-friendly process, as well as to document how they were involved in the planning process. A screenshot and direct link to the HIVA and MHMP RFI Trackers can be found in Appendix C: Stakeholder and Public Engagement Records. Information was also captured through inperson/webinar meetings, conference calls, emails, and electronic surveys. Stakeholders were encouraged to provide information in any method they deemed easiest.
 - This RFI Process was well received, and the Kitsap County Department of Emergency Management feels it and the one utilized for the HIVA process should be recognized as a best practice for facilitating stakeholder input.
- Evaluate and update their profiles to reflect changes in hazard risk assessments.

- Evaluate strategies and update profiles for potential terrorist threats and mitigation strategies.
- Report on completed mitigation strategies.
- Develop new mitigation strategies.
- Report any concerns that may warrant further action or changes to the process.
- Collaborate with other functional organizations on mitigation strategies.

Kitsap County MHMP Development - 2019					
Date	Activity	Subject	Action Items		
December 18, 2018-February 10, 2019	EOC Activated for Local, state and federally declared disaster	"Holiday Twist" Tornado Incident	Declared Disaster		
January 22, 2019	Internal Project Kickoff with key stakeholders	A broad group of key stakeholders was briefed on the critical timeline of the project and committed to meet the said timeline.	Stakeholder buying initiative		
January 23-24, 2019	Impacts of Climate Change on Emergency Management Workshop	Attended by 51 local stakeholders including elected officials, tribal, federal, state, local agencies, non-profits, local businesses and members of the public.	Initial discussions on the data collection for the HIVA element of the MHMP Update project		
February 7-11, 2019	EOC Activated for Local weather emergency	"February Freeze" Snowstorms	Undeclared Emergency Activation		
April 8, 2019	Kitsap HIVA Kickoff Stakeholder Meeting	Review and update current HIVA (2013) and schedule meeting dates.	Team to begin reviewing HIVA and begin on updates to profiles.		
April 12, 2019	Internal Planning Meeting	 Preparation for April 17 call with stakeholders Run through of presentation Discussion of RFI delegation to stakeholders 	KCDEM to assign RFI tasks to stakeholders.		
April 17, 2019	HIVA Update Stakeholder Meeting	 Review HIVA/MHMP process Discuss stakeholder input needs RFI process walkthrough 	Continue review and updating of required elements. Stakeholders to		

Date	Activity	Subject	Action Items
		 Schedule upcoming HIVA meeting dates/deadlines 	answer RFIs and provide input.
May 28, 2019	State-Level MHMP Kickoff Meeting	 Discuss MHMP process with State partners at WA DEM. Discuss grant needs and requirements Extra staff needs Past challenges Administrative questions Available resources 	Continue development of HIVA. Utilize provided State resources.
June 3, 2019	HIVA/MHMP Stakeholder Meeting	 Review the project timeline Discuss next steps Discuss stakeholder needs 	Continue development of MHMP and KCDEM stakeholder outreach.
July 9, 2019	Internal Planning Meeting	 Preparation for July 10 call with stakeholders Run through of the presentation 	Prepare for stakeholder call.
July 10, 2019	MHMP Stakeholder Meeting	 Present the updated 2019 HIVA Discuss next steps as the MHMP is drafted Discuss community engagement strategy Present RFI process Identify upcoming dates/deadlines 	KCDEM to assign RFIs to stakeholders. Continue review and update of the plan as stakeholders provide information. Start of Monthly Stakeholder MHMP calls.
August 14, 2019	MHMP Stakeholder Meeting	 Presented the status of the MHMP update. Identified gaps, strategies, and items that needed to be reviewed and addressed. 	Stakeholders were sent current drafts of the documents and were asked to review and update, specifically focusing on mitigation strategies.
August 14 – August 21, 2019	Stakeholder Review	Stakeholder Steering Committee review of MHMP first draft.	Review and provide feedback on the first draft of the MHMP before public dissemination.

Date	Activity	Subject	Action Items
August 21-25, 2019	Public Engagement & Outreach	KCDEM had a booth at the Kitsap County Fair and Stampede to gather feedback from the public regarding their perception of hazards. The MHMP was presented and the public was engaged.	Public provided feedback on their perception of hazards.
August 29, 2019	Public Review of MHMP Second Draft	Second draft of MHMP was shared with the public electronically with accompanying feedback survey.	Public to review the document and provide any feedback via survey.
September 3, 2019	Public Engagement & Outreach	Public Town Hall in Poulsbo (North Kitsap) to present the MHMP and provide an opportunity for public feedback.	Public provided feedback on the document and its findings.
September 4, 2019	Public Engagement & Outreach	Public Town Hall in Port Orchard (South Kitsap) to present the MHMP and provide an opportunity for public feedback.	Public provided feedback on the document and its findings.
September 16, 2019	Stakeholder Review	Stakeholders to review third draft of the MHMP.	Provide feedback on the third draft.
September 30, 2019	Final Draft Review	Final review by KCDEM.	Corrections as needed
October 1, 2019	Draft Plan Delivery	Delivery of Draft Plan to WA EMD .	Await approval and forwarding to FEMA for final approval.

Table 3: Kitsap County MHMP Development - 2019

Update History

An in-depth review of the update history of the Kitsap County MHMP can be found in Appendix A: MHMP Update History discussing changes from 1998 until 2019.

Funding

The MHMP update was funded through KCDEM and a Pre-Disaster Mitigation (PDM Grant received through the State of Washington as a sub-recipient in December 2018. Agencies and jurisdictions who participated in this plan used their staff time and resources to make this update possible.

The Kitsap County Emergency Management Council greatly appreciates the effort and time everyone devoted to this update.

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Hazard Identification & Vulnerability Analysis (HIVA) Process

Overall, risk assessment is difficult to quantify, so the utilization of both qualitative and quantitative methods promotes a more comprehensive approach and process. The conditional and variable nature of hazards precludes risk analysis from being entirely objective or quantitative, and some subjectivity and variance are to be expected.

In order to identify, plan for, and respond to any hazard in a community, a risk assessment can provide information on the types of hazards, the location of hazards, the value of existing land and property in hazard locations, and an analysis of risk to life, property, and the environment that may result from any hazardous event. Specifically, the three levels of a risk assessment are as follows:

- 1. **Profiling Hazard Events:** describes the causes and characteristics of each hazard, how it has affected Kitsap County in the past (disaster history), and how the community's population, infrastructure, and environment has been impacted by the hazard.
- 2. Vulnerability Assessment: explains those factors that make the hazard a threat to the community or increase the threat and define those areas most susceptible to the threat.
- **3. Probability of Occurrence:** An adjective description (High, Medium, or Low) of the probability of a hazard's impacts Kitsap County within the next 25 years.

The MHMP Stakeholder Steering Committee, led by KCDEM, reviewed the 2019 Hazard Identification and Vulnerability Assessment (HIVA) to determine the hazards that most likely would impact Kitsap County and, based on the disaster history of Kitsap County and its cities, determine the need to address those hazards identified in Table 5: HIVA Risk Ratings 2019. Information from Community Public Surveys, as discussed in the

The 2019 Kitsap County HIVA drew significantly from the FEMA's 2015 Risk Report for Kitsap County including the Cities of Bremerton, Bainbridge, Port Orchard, Poulsbo, the Port Gamble S'Klallam Indian Reservation, the Suquamish Tribe, and Unincorporated Kitsap County. This report aimed to help community members act to reduce their risk regarding coastal flood, earthquake, landslide, and tsunami incidents. The scope included the 246.86 miles of coastline in Kitsap County, of which 136.05 miles were studied using detailed methods and 110.81 miles using approximate methods.

FEMA developed the report using its risk assessment tool, Hazus, which estimates losses that may result from flooding or earthquakes. The Hazus model incorporated a complete list of every building in Kitsap County. Other hazards, including landslides and tsunamis, were assessed through a vulnerability assessment. FEMA collected data on local at-risk assets and resources, the physical features and human activities that contribute to that risk, and the location and severity of the hazard to determine potential community losses. The loss data from Hazus and the exposure analysis highlight areas that would be affected, which provides an opportunity to prioritize mitigation action in these areas.

During the update of the MHMP, a Google Forms survey was disseminated to individuals in the Stakeholder Steering Committee to capture risk rating information on the various hazards and threats that may affect Kitsap County. Stakeholders were asked to rate hazards and their impacts on Area Impacted, Population, Vulnerable Population, Built Environment, Critical Infrastructure, County Facilities, First Responder Facilities, Economic Consequences, and Environmental

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Impacts to mirror the 2018 Washington State Hazard Mitigation Plan. Stakeholders rated impacts on a 1-10 scale, with 1-3 meaning "Low," 4-7 meaning "Moderate," and 8-10 meaning "High." The survey had a total of 154 questions, and nine stakeholders provided input. A public Community Survey (as discussed in the Public Outreach & Engagement section) in electronic and printed form was also created to capture the community's perceptions of hazards and their effect on the County and their homes. The results of the stakeholder and public surveys are found in Appendix C: Stakeholder and Public Engagement Records.

The results from the Stakeholder Risk Rating and printed/electronic Public Community Surveys were studied and compared with the historical and quantitative hazard information reviewed during the 2019 Kitsap County Hazard Identification & Vulnerability Assessment (HIVA) update. Risk assessment is inherently problematic and hard to validate, so utilizing and reviewing both qualitative and quantitative data helped provide an appropriate risk rating to each hazard.

Risk Assessment Overview

Risk assessment in the HIVA provides information regarding the types of hazards, the location of hazards, the value of existing land and property in hazard locations, and an analysis of risk to life, property, and the environment that may result from any hazardous event. Specifically, three levels of risk assessment included in this HIVA are "Low," "Moderate," and "High."

An adjective description (High, Moderate, or Low) summarized the overall threat posed by a hazard over the next 25 years. It is a subjective estimate of the combination of the probability of occurrence and vulnerability.

Adjective	Description
High Major focus of Kitsap disaster preparedness program	There is strong potential for a disaster of major proportions during the next 25 years; or , history suggests the occurrence of multiple disasters of moderate proportions during the next 25 years.
Moderate Modest priority of disaster preparedness	There is moderate potential for a disaster of less than major proportions during the next 25 years.
Low Low priority program	There is little potential for a disaster during the next 25 years.

Table 4: Risk Rating Adjective Descriptions

HIVA Risk Ratings 2019					
Hazard/Threat	Overall Risk	People	Damages	Economy	Environment
Natural Hazards					
Droughts	Low	Low	Low	Low	Moderate
Earthquake	High	High	High	High	High
Flooding	Moderate	Low	Moderate	Low	Low

HIVA Risk Ratings 2019						
Hazard/Threat	Overall Risk	People	Damages	Economy	Environment	
Forest & Urban Fires	Moderate	High	Moderate	Low	Moderate	
Landslides	Moderate	Low	Moderate	Low	Low	
Severe Storms/Tornadoes	Moderate	Low	Moderate	Moderate	Moderate	
Tsunamis	Moderate	Low	High	Moderate	Moderate	
Volcanic Ash Fall	Low	Low	Low	Low	Moderate	
	Technolo	gical & Huma	an-Caused Haza	ards		
Cyber Attack	Moderate	High	Moderate	Moderate	Moderate	
Dam Failures	Low	Low	Low	Low	Low	
Energy Emergencies	Moderate	Moderate	Moderate	Moderate	Moderate	
Hazardous Materials	Moderate	Moderate	Moderate	Moderate	Moderate	
Radiological	Moderate	Low	Moderate	High	High	
Search & Rescue	Low	Moderate	Low	Low	Low	
Terrorism	Moderate	Moderate	Moderate	Moderate	Moderate	
Transportation- MCI	Moderate	Moderate	Moderate	Moderate	Moderate	
Epidemics	Moderate	Moderate	Moderate	Moderate	Moderate	

Table 5: HIVA Risk Ratings 2019

The overall ratings for hazards from the 2013 MHMP remain similar. Two major updates include raising the overall rating for Tsunamis from "Low" to "Moderate" due to studying simulated data and information as well as the addition of ratings for Cyber Attacks, which did not have any ratings previously.

Hazard Mitigation Process for Kitsap County

In Kitsap County, the planning process defines goals and objectives to assist in mitigation planning, evaluation of mitigation strategies, and identification of mitigation projects. The process includes hazard identification and assessment, community identification, and understanding of the geological history and its effects on land use and development.

Capability Assessment

The Capability Assessment is an evaluation of Kitsap County's governmental structure, political framework, legal jurisdiction, fiscal status, policies and programs, regulations and ordinances, and resource availability. The purpose of conducting a capability assessment is to determine the ability of a local jurisdiction to implement a comprehensive mitigation strategy and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs, or projects. As in any planning process, it is important to try to establish which goals, objectives, and/or actions are feasible based on an understanding of the organizational capacity of those

agencies or departments tasked with their implementation. A capability assessment helps to determine which mitigation actions are practical, and likely to be implemented over time, given a local government's planning and regulatory framework, level of administrative and technical support, amount of fiscal resources, and current political climate. The information collected in the survey questionnaires was incorporated into a database for further analysis. A general scoring methodology was then applied to quantify each jurisdiction's overall capability. According to the scoring system, each capability indicator was assigned a point value based on its relevance to hazard mitigation. The Capability Assessment can be found in Appendix B: Capability Assessment.

Goals

Seven goals form the basis for the objectives in the following section. These goals are shown from the highest priority, at the top of the list, to those of lesser importance.

- 1. Protection of life during and after the occurrence of disasters from identified hazards
- 2. Preventing the loss of life and reducing the impact of damage where problems cannot be eliminated
- 3. Protection of emergency response capabilities, including:
 - Communication and warning systems;
 - Emergency medical services and medical facilities mobile resources;
 - Critical facilities; and
 - Government continuity.
- 4. Protection of developed property, homes and businesses, industry, educational opportunities, and the cultural fabric by combining hazard loss reduction with the community's environmental, social, and economic needs.
- 5. Promoting public awareness of community hazards and mitigation measures and encouraging public participation in the planning objectives.
- 6. Preserving or restoring natural mitigation values such as flood plains.
- 7. Protection of natural resources and the environment.

Objectives

The following objectives are meant to serve as a "measuring stick" upon which individual hazard mitigation projects can be evaluated. These criteria for evaluation become especially important when two or more projects are competing for limited resources. Project criteria objectives may include, but are not limited to, ensuring the MHMP is a functional document that identifies short-and long-term strategies and describes each measure, including by:

- Identifying at least one person, agency, or organization responsible for implementation.
- Projecting a time frame for implementation.
- Explaining how the project will be financed, including the conditions for financing and implementation as information is available.
- Being consistent with, supporting, and helping implement the goals and objectives of hazard mitigation plans already in place for the geographic area in question.
- Being based on the Kitsap County Hazard Identification & Vulnerability Assessment.
- Having significant potential to reduce damages to public and/or private property or reduce the cost of Local, State, and Federal recovery from future disasters.
- Being the most practical, cost-effective, and environmentally sound alternative after consideration of the options.
- Addressing a repetitive problem or one that has the potential to have a major impact on an area, reducing the potential for loss of life, loss of essential services and personal property, damage to critical facilities, economic loss, hardship or human suffering.
- Meeting applicable permit requirements.
- Discouragement of development in hazardous areas.
- Contributing to both the short- and long-term solution to the hazard vulnerability risk problem.
- Ensuring the benefits of a mitigation measure are equal to or exceed the cost of implementation.
- Having manageable maintenance and modification costs.
- Being designed, when possible, to accomplish multiple objectives, including improvement of life-safety risk, damage reduction, restoration of essential services, protection of critical facilities, security of economic development, recovery, and environmental enhancement.
- Using existing resources, agencies, and programs, when possible, to implement the project.

With approximately 33 organizations participating in the HIVA/MHMP effort in some capacity, there are other structures of government besides those shown in the previous section.

- Other Factors Impacting Community:
 - Existing Hazard Mitigation/Management/ Damage Reduction Plans.
 - Existing County agencies and programs.
 - Hazard mitigation measures currently implemented.
 - Financial constraints and the ability to implement mitigation strategies.
 - State and Federal lands contained within Kitsap County impacting upon County resources.
 - State and Federal transportation links serving Kitsap County and impacting upon County resources.

Prioritization for Natural Hazard Mitigation

Much of the loss from a natural disaster is a result of property and contents damage, additional living and business interruption costs, and the cost of the response to the disaster itself. The challenge for both governmental entities and the private sector is to determine the economic feasibility of preventive actions (mitigation) that may lessen future losses. The issue often raised

by elected officials is whether the benefits of mitigation exceed the costs, especially if no regulation or standard is required. Conversely, if a minimum standard were in place at the time of the event, through a benefit-cost analysis, it could demonstrate that exceeding such minimums would still be economically defensible.

The goal of each strategy is the reduction or prevention of damage from a hazard event. In order to determine a strategy's effectiveness in accomplishing this goal and prioritizing each strategy, a set of criteria is applied to each proposed strategy.

To support community-wide planning, each Stakeholder Steering Committee member identifies potential strategies for their specific type of agency and prioritizes each strategy, taking the following considerations into account:

• Plan goals and objectives

- How does the mitigation action address the goals and objectives of the plan?
- Does it reduce disaster damage?
- Equity
 - Does the strategy benefit most, if not all the communities within the County?
 - Is there an equitable distribution of strategies by each participating agency?
- Countywide impacts
 - How does it affect Kitsap County as a whole?
- Ease of implementation
 - Can this action be easily implemented first?
 - Does the agency(ies) have the capability (funding, regulatory authority, staff) in place now to implement the strategy?

• Multi-objective strategies

- Does this strategy achieve multiple goals?
- Time
 - Can this strategy be quickly accomplished compared to those that would take a long time to obtain the necessary approvals or funding?

• Post-disaster mitigation

- o Is this strategy more feasible in a post-disaster setting?
- Would the extent of damages, political will, and access to State and Federal mitigation funds dramatically alter the feasibility of implementation?

After each stakeholder completes this process, the recommended strategies are presented to and reviewed by the entire Stakeholder Steering Committee. The Stakeholder Steering Committee rates the strategies in order of overall priority based on the same considerations above and considers the STAPLEE criteria listed below.

- Social
 - Is the proposed strategy socially acceptable to the community?
 - Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- Technical

- Will the proposed strategy work?
- Will it create more problems than it solves?
- Administrative
 - Can the community implement the strategy?
 - o Is there someone to coordinate and lead the effort?
- Political
 - Is the strategy politically acceptable?
 - o Is there public support both to implement and to maintain the project?
- Legal
 - o Is the community authorized to implement the proposed strategy?
 - o Is there a clear legal basis or precedent for this activity?
- Economic
 - What are the cost and benefits of this strategy?
 - o Does the cost seem reasonable for the size of the problem and the likely benefits?
- Environmental
 - How will the strategy impact the environment?
 - Will the strategy need environmental regulatory approvals?

Proposed mitigation strategies were prioritized based on the following factors:

- 1. Ease of implementation
- 2. Effect on overall risk to life and property
- 3. Funding availability
- 4. Kitsap County Hazard Identification and Vulnerability Assessment of 2019
- 5. Political and community support
- 6. A general economic cost/benefit review

Due to previous lack of funding and staffing challenges that delayed or canceled mitigation efforts from the 2013 MHMP, ease of implementation and funding availability were critical factors in prioritizing strategies for this iteration of the plan. Mitigation actions with "high" priority are determined to be the most cost effective and most compatible with the participating jurisdictions' unique needs. Actions with a "moderate" priority were determined to be cost effective and compatible with jurisdictional needs but may be more challenging to complete administratively or fiscally than "high" priority actions. Actions with a "low" priority were determined to be important community needs but may face several potential challenges in terms of implementation (e.g., lack of funding, technical obstacles).

FEMA's Benefit-Cost Analysis

Benefit-Cost Analysis (BCA) is the method by which the future benefits of a hazard mitigation project are determined and compared to its costs. The end result is a Benefit-Cost Ratio (BCR), which is calculated by a project's total benefits divided by its total costs. The BCR is a numerical expression of the "cost-effectiveness" of a project. A project is considered to be cost effective

when the BCR is 1.0 or greater, indicating the benefits of a prospective hazard mitigation project are sufficient to justify the costs.²⁴

FEMA requires a BCA to validate cost effectiveness of proposed hazard mitigation projects prior to funding. There are two drivers behind this requirement: (1) the Office of Management and Budget's (OMB) Circular A-94 Revised, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" and (2) the Stafford Act.

Detailed benefit-cost analyses are conducted using FEMA's BCA methodology prior to scheduled implementation and are considered in the final prioritization of strategies/projects. A more detailed cost/benefit analysis will be applied to particular projects prior to the application for or obligation of funding, as appropriate.

PRIORITY ONE and PRIORITY TWO Mitigation Strategies

In previous iterations of the MHMP, mitigation strategies were classified as PRIORITY ONE, which were recommended for funding and implementation, or PRIORITY TWO, which were suited to serve the community's needs and considered for the future should the opportunity arise, and funding became available. For the 2019 MHMP update, the mitigation strategies were grouped into one section (Mitigation Strategies & Recommendations) and the strategies that were previously in individual City Profiles were added to the section in order to have all mitigation strategy information in one place. If a mitigation strategy had been in previous plans and not completed due to funding or lack of political drive, it was verified if still pertinent and removed if not realistically achievable nor intended to be implemented during the tenure of this 2019 plan. The focus was on identifying appropriate and achievable mitigation strategies to make progress in buying down risk to the public and environment. Some larger unfunded mitigation strategies are still included due to their exigent need and the MHMP Committee will strive to find funding for these initiatives.

Public Outreach & Engagement

The Emergency Management Council, as well as all of the entities that participated in this plan, are committed to continued public involvement and education on risk reduction through mitigation. It is important that all-hazard mitigation becomes integrated into existing programs and becomes part of the way jurisdictions make decisions about land use and facilities planning. Jurisdictions should continue to keep the public engaged via periodic presentations, surveys, and postings on social media. The County provides opportunities to the public both during the MHMP planning process and when a near-to-final draft of the plan is complete for a last round of input before the final draft.

KCDEM facilitated several methods of public engagement during the planning process, including providing printed and electronic surveys in English and Spanish for all members of the community to provide feedback on community hazards and mitigation activities. This was done in person at the Kitsap County Fair and Stampede during August 2019, at town/county meetings, and electronically via the KCDEM website and social media accounts. A whole outreach campaign has been developed around "Put A Big Foot Forward Towards Risk Reduction" which will become apparent further on in the plan.

²⁴ <u>https://www.fema.gov/benefit-cost-analysis</u>

As updates occurred throughout the development process, copies of the plan and any proposed changes were posted on KCDEM's website with an accompanying Google Forms survey to capture the public's feedback on the draft Plan electronically. The KCDEM website had a direct link to a Google Forms survey to allow the public and other interested parties the opportunity to address any comments and/or concerns they have relating to the plan.

Social media platforms such as Nextdoor and Facebook were utilized to inform the community of the opportunity to provide input and direct them to the proper website links.

Public town hall meetings were held on September 3, 2019 (Poulsbo) and September 4, 2019 (Port Orchard) to capture feedback from North and South Kitsap. The meetings provided the public a forum for which they could express concerns, comments, or recommendations regarding the plan. KCDEM was responsible for using County resources to publicize the annual public meetings and maintain public involvement through multiple media platforms including the local cable television station.

Opportunity for Public Input During the Planning Process

The public was engaged in the MHMP development process in various ways, including electronic and in-person methods in order to reach the largest audience possible. Electronic surveys were created and disseminated as well as in-person engagement such as at the Kitsap County Fair and Stampede covering Central Kitsap and two public town halls to cover North and South Kitsap. A visual collection of stakeholder and public engagement materials can be found in Appendix C: Stakeholder and Public Engagement Records.

Online Community Survey: An online Google Form Multi-Hazard Mitigation Plan Community Survey was developed and distributed to the public on August 16, 2019 via the Kitsap County Department of Emergency Management Facebook and KCDEM Nextdoor accounts. There were English and Spanish versions of the survey. The results of this Community Survey can be found in Appendix C: Stakeholder and Public Engagement Records.

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Kitsap County 2019 Multi-Hazard Mitigation Plan Community Survey This survey is assigned to teo the Kitsao County Department of Braganoy Nanagament (Kitsal) learthy the community concerns about national and hume-scalad interes and the immediate Compared that are fully in indicated interest and the mediate Compared that are fully. It indicated interests are briefly confident and as for measure in process one.
Have you taken this survey before either in electronic or printed form? Ves No Not sure
What is your zip code? Your answer How aware are you of the natural hazards that could affect your home?
 Not at all Somewhat Moderately Very much
NECT Page 1 of 4

Figure 1: Figure 1: Screenshot of Online Community Survey

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Screenshots of Facebook posts:

- KCDEM <u>https://drive.google.com/file/d/1VBO3TdruIQPj0QVVS98Lb7r-GZb9AIZf/view?usp=sharing</u>
- Kitsap County Government <u>https://drive.google.com/file/d/12sNjhCTgGa2yIIZEOyktITtBjWP2IqSb/view?usp=sharing</u> <u>https://drive.google.com/file/d/1TqLodnpP2b_Eh42H7oCPbB-ntqWFfaku/view?usp=sharing</u>
 - Link to online English community survey: <u>https://docs.google.com/forms/d/e/1FAIpQLSd4D-</u> 6brCFqv4YhdH5YGBv1ggftTm8tpHt5xBWXliP9bOcZ8Q/viewform?usp=sf_link

 Link to online Spanish community survey: <u>https://docs.google.com/forms/d/e/1FAIpQLSehSeFEuissqykFHgQ8nWGOL8hsa</u> <u>-I-VHMIhFYCL-oMrtoDjg/viewform?usp=sf_link</u>

In-Person Community Survey and Public Outreach at the Kitsap County Fair and Stampede: An in-person survey to capture the community's perception of risk and hazards to Kitsap county was shared by KCDEM and other agency staff at the Kitsap County Fair and Stampede between August 21st and August 25th, 2019 to Kitsap County residents. Staff had a booth where they engaged with the public using the printed survey, informational flyer, posters, and coloring pages for kids. There were also two full copies of the draft MHMP available for public review. There were English and Spanish versions of the surveys and KCDEM staff and volunteers roamed the fair with flyers dressed as BigFoot initiating a draw to the booth for more information and public engagement.

- Link to PDF of English printed survey: <u>https://drive.google.com/file/d/1VTRhQ_fFDRulKGYNH-b5uCekYR9UccGx/view?usp=sharing</u>
- Link to PDF of Spanish printed survey: <u>https://drive.google.com/open?id=1X7iXpyMle2flb2HYaNFRZ0rnYsi1ambo</u>
- Link to PDF of the informational flyer: <u>https://drive.google.com/open?id=10yNGAoPPI4oxJD4PstnJI0AghLgV_vsa</u>
- Link to PDF of poster: <u>https://drive.google.com/file/d/1FeoBfwJ1I0aNf4wU_r4x8q5Lh6UyM3Nv/view?us</u> <u>p=sharing</u>
- Link to PDF of coloring page: <u>https://drive.google.com/file/d/1kQqPqb94IHDTRKYHp2nw8esJINiSe9bH/view?u</u> <u>sp=sharing</u>



Figure 3: Screenshot of Printed Community Survey

Figure 2: Screenshot of Informational Flyer

Figure 4: Screenshot of Poster

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MHMP Draft for Public Review and Town Hall Public Outreach: On August 29, 2019 information was shared on Kitsap County's Department of Emergency Management and Government's Facebook accounts regarding upcoming public town halls for the discussion of the MHMP update scheduled for September 3 and 4, 2019 and included a direct link to the draft

MHMP document for the public to review. The plan and survey were also shared on the kitsapdem.org website.

- Screenshots of Facebook posts:
 - KCDEM <u>https://drive.google.com/file/d/1VrutAJATh9GTJo-ahbXX2bxdgBg-</u> JjAi/view?usp=sharing
 - Kitsap County Government https://drive.google.com/file/d/1aB4mOLp1s2u3k0Az768WICMYFj3gLByb /view?usp=sharing
- Screenshots to Nextdoor posts: <u>https://drive.google.com/file/d/1bRbSLEbfFygi5RwMbcB39Fs-</u> <u>NeM2Ddx/view?usp=sharing</u>

Incorporation of Public Feedback During the Planning/Development Process

Public feedback regarding the perception of the effect of natural and technological/human-made hazards was gathered during the HIVA and MHMP planning/development process via the printed and electronic Community Surveys. Results were compared with the Stakeholder Steering Committee survey results as well as information from past iterations of the MHMP and the qualitative and quantitative data gathered during the update process.

Due to the quick, in-person delivery method, the printed survey asked participants to identify five of the most concerning hazards and to provide them a rating of one through five, with one being the most concerning or important to address. A total of 206 printed surveys were completed by community members at the Kitsap County Fair and Stampede between August 21 to 25th, 2019. Calculations were made based on the Relative Importance Index (RII) formula to find the means.

Relative Importance Index is calculated for each of the indicators and ranked accordingly. The RII is derived to summarize the importance of each indicator using a range from 1 to 5, where 1 =Very Concerned, 2 = Somewhat Concerned, 3 = Neutral 4 = Slightly Concerned and 5 = Least Concerned. The results were weighted against the number of respondents to find the means. The following table shows the results ranked from most to least concerning.

Printed Community Survey Results					
Hazard Average Rating					
Natu	ral Hazards				
Earthquakes	1.96				
Wildfires & Urban Fires	0.99				
Severe Storms/Tornados	0.65				
Landslides & Erosion	0.55				
Floods	0.38				
Tsunami & High Waves	0.38				
Extreme Cold	0.36				
Extreme Heat	0.30				
Drought	0.25				

Printed Community Survey Results				
Hazard Average Rating				
Technological/Human-Made Hazards				
Power/Utility Failure	1.02			
Telecommunication Failure	0.48			
Cyber Attack	0.46			
Terrorism	0.45			
Human & Animal Epidemics	0.42			
Transportation Accident - Vehicle	0.34			
Civil Disturbance	0.35			
Search & Rescue Emergencies	0.28			
HazMat Incident - Radiological	0.27			
HazMat Incident - Chemical	0.26			
Agricultural Pests	0.25			
Hazard Sites/Materials	0.23			
HazMat Incident - Biological	0.22			
Transportation Accident - Ship	0.16			
Transportation Accident - Airplane	0.15			
Dam Failure	0.12			
Transportation Accident - Train	0.11			

 Table 6: Printed Community Survey Results

Due to website limitations, the electronic version of the Community Survey included a Likert Scale for each hazard that participants could select from zero to three with zero meaning they were Not Concerned and three meaning Very Concerned. A total of 536 responses were received. The survey also included several questions on the overall preparedness levels of the respondent and their households.

The electronic survey included an opportunity for the public to provide any additional comments that were not covered in the survey. Many comments discussed non-natural hazards such as increased political tension, the complexities of poverty and drug use, gun control issues, and complications from electromagnetic pulse attacks by terrorists. The 2019 MHMP, by FEMA requirements, focuses on the natural hazards that may affect the county. Some of the issues raised in the comments are discussed in other County and State plans, and the public was made aware that they remain extremely important even if not included or discussed in the MHMP.

Results of the printed and electronic surveys can be found in Appendix C: Stakeholder and Public Engagement Records.

Electronic Community Survey Results			
Hazard Average Rating			
Natural Hazards			
Earthquakes 2.60			
Wildfires & Urban Fires 2.33			

Electronic Community Survey Results			
Hazard Average Rating			
Landslides & Erosion	1.63		
Drought	1.61		
Severe Storms/Tornadoes	1.58		
Extreme Heat	1.56		
Extreme Cold	1.42		
Tsunamis & High Waves	1.42		
Volcanic Ash Fall	1.27		
Floods	1.14		
Technologica	I/Human-Made Hazards		
Cyber Attack	2.27		
Power/Utility Failure	2.21		
Telecommunications Failure	2.01		
HazMat Incident - Radiological	1.67		
Human & Animal Epidemics	1.66		
Terrorism	1.63		
HazMat Incident - Chemical	1.61		
Transportation Accident - Vehicle	1.60		
Hazard Sites/Materials	1.58		
Search & Rescue Emergencies	1.57		
HazMat Incident - Biological	1.55		
Civil Disturbance	1.5		
Agricultural Pests/Diseases	1.25		
Transportation Accident - Airplane	1.06		
Transportation Accident - Ship	0.92		
Transportation Accident - Train	0.63		
Dam Failure	0.48		

Table 7: Electronic Community Survey Results

Feedback on the MHMP Draft

An in-progress draft was presented to the Stakeholder Steering Committee members and public for review and comment via printed copies at the public town halls and online on the kitsapdem.org website with an accompanying MHMP Feedback Survey via Google Forms. Stakeholders primarily provided feedback via email or using the MHMP RFI Tracker. The public was notified via emails from the County, the Community Emergency Response Team (CERT), and via posts on KCDEM and the County's Facebook and Nextdoor accounts.

An overview of public feedback received and how it was incorporated into the MHMP document can be found in the table below.

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Feedback Received	Method Received	Action Taken
Concerns were expressed about declining water tables and roadway liquefaction in the Hansville area. These issues are covered in the HIVA, and those sections were reviewed for the attendees.	Public Town Hall in Poulsbo	These issues are covered in the HIVA, and those sections were reviewed for the attendees. The MHMP includes a comprehensive liquefaction map of the county.
A Poulsbo Yacht Club member stated their organization wanted to help with emergency transportation.	Public Town Hall in Poulsbo	KCDEM discussed current work toward a "flotilla" once the Airborne Disaster Air Response Teams (DART) is fully developed. Other initiatives like "Wheels Across Kitsap" could provide emergency ground services and Hooves Across Kitsap would provide the capability to transport medical or other supplies in the remote areas in the vision. No action was taken on the MHMP.
The public requested a more detailed description of seiches and potential impacts.	Public Town Hall in Poulsbo	More information regarding seiches and their potential impacts was added to the Tsunamis, High Waves, and Seiches section of the HIVA and Mitigation Strategies section in the MHMP regarding tsunamis.
One attendee stated that tsunami planning and potential impacts in the draft plan were insufficient. They requested a Table of Probabilities discussing expected amounts of land subsidence in a Cascadia Subduction Zone event.	Public Town Hall in Poulsbo	KCDEM explained that the Subduction Zone movement study is a very new science and subsidence predictions at that level of detail may be a long way in the future. The Tsunamis, High Waves, and Seiches section in the HIVA and Mitigation Strategies section of the MHMP discussing tsunamis were reviewed. Due to the uncertainty of the current data, the Table of Probabilities was not included.
Remarks about road clearance led to a good general discussion on the importance of neighbor helping neighbor as the first response and may be the only response for some time in a disaster.	Public Town Hall in Poulsbo	No action was taken regarding the MHMP.
One attendee mentioned that the drought hazard assessment was based on Washington State weather data and asked whether there was a significant enough difference between the state average and Kitsap county average to change the accessed risk?	Public Town Hall in Port Orchard/Email	Due to limited information on drought solely affecting Kitsap County, information from the Washington State Hazard Mitigation Plan was used due to the State's research done on drought affecting each county,
there were risk assessments	Orchard/Email	were completed for each hazard

Feedback Received	Method Received	Action Taken
completed for various hazards simultaneously.		separately in order to capture as much information for each hazard as possible due to the shortened timeline.
A comment was received asking if the MHMP will include information on poverty and drug-use impacts on the community.	MHMP Draft Feedback Survey	Due to the MHMP focusing on natural hazards, information on poverty and drug usage will not be included in the MHMP.
A comment was received asking whether electromagnetic pulse attacks by terrorists would be included in the MHMP.	MHMP Draft Feedback Survey	Due to the MHMP focusing on natural hazards, information on EMP attacks will not be included in the MHMP.

Table 8: Public Feedback Incorporation

Plan Review & Adoption Process

Four jurisdictions participated in the review, updating, and promulgation of the Kitsap County MHMP: Bainbridge Island, Bremerton, Port Orchard, and Poulsbo. Each participating jurisdiction is governed by rules for public involvement. The Planning Committee took the following steps to ensure that the public was involved in the development of the plan:

- The public was engaged in the planning process via electronic and in-person methods to include North, Central, and South Kitsap which are referenced in the Opportunity for Public Input During the Planning Process section. Kitsap provided multiple opportunities for the citizens to comment on the plan through surveys, town halls, and at the Kitsap County Fair and Stampede.
- 2. Governmental agencies and participating organizations reviewed the plan as required by their governing bodies during the months of August 2019 through September 2019.
- 3. Kitsap County Department of Emergency Management placed the MHMP on its kitsapdem.org web page for public review and comment, as well as on Facebook and Nextdoor.

Kitsap County MHMP Review Agency Adoptions (2019)				
Organization/Agency	Agency Adopting Authority Past Adoption Date(s)		New Adoption Date(s)	
Emergency Management Authority				
Countywide Emergency Management Program	Kitsap County Emergency Management Council			
Kitsap County Government				
Kitsap County Government	Kitsap County Board of County Commissioners	02/16/2010		

Kitsap County MHMP Review Agency Adoptions (2019)				
Organization/Agency	Adopting Authority	Past Adoption Date(s)	New Adoption Date(s)	
Kitsap County Public Health	Kitsap County Public Health Board of Health	02/02/2010	UPDATE	
Kitsap County Public Works	Kitsap County Public Works		UPDATE	
Kitsap County Regional Library	Kitsap County Rural Library District Board of Directors	01/26/2010	UPDATE	
Kitsap Public Utilities District	Kitsap Public Utilities District Board of Commissioners	01/26/2010	UPDATE	
Kitsap Transit	Kitsap Transit Board of Commissioners	02/16/2010	UPDATE	
Cities				
Bainbridge Island	Bainbridge Island City Council	02/24/2010	UPDATE	
Bremerton	Bremerton City Council	02/10/2010	UPDATE	
Port Orchard	Port Orchard City Council	02/09/2010	UPDATE	
Poulsbo	Poulsbo City Council	02/02/2010		

 Table 9: Kitsap County MHMP Review Agency Adoptions (2019)

Plan Evaluation & Maintenance

GOAL: Establish an ongoing process to accomplish Hazard Mitigation Strategy identification on an annual basis. To be effective, mitigation must be a continuing activity.

The Kitsap County Multi-Hazard Mitigation Plan will be reviewed on an annual basis, (As a part of the pre-budget development process in April/May and prior to the annual FEMA Notice of Funding for Flood and Pre Disaster Mitigation Grants) and after every major emergency/disaster that impacts Kitsap County and/or its cities, to determine the effectiveness of the mitigation strategies, programs or other related activities. Every five years starting in 2025, the plan will be updated and forwarded to the Washington State Division of Emergency Management, Hazard Mitigation Officer for review and subsequently forwarded to the Federal Emergency Management Agency, Region 10 per the requirements of the Disaster Mitigation Act 2000.

Kitsap County Multi Hazard Mitigation Planning Committee

After the annual internal review process, the Department of Emergency Management will meet with the Multi-Hazard Mitigation Planning Committee, to identify new Mitigation Strategies and initiatives to replace those that have been completed or identified during interim disasters and/or emergencies that have impacted the County or its partner Cities. During the annual Multi-Hazard Mitigation Planning Committee review process, KCDEM should facilitate the annual review process with the MHMP Stakeholder Steering Committee and agency participants noted in the Introduction section. The committee will review the current strategies to determine their relevance to changing situations within Kitsap County as well as known changes in State or Federal policy.

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This review should discuss at a minimum:

- Validate jurisdiction/agency representatives and changes to the Stakeholder Steering Committee
- Changes to local policies or strategies that warrant a local revision to the plan
- Updates on overall and jurisdictional/agency strategies
- Changes to federal and state mitigation programs
- Lessons learned from emergencies/disasters; local and national
- Hazard mitigation grants

Following, the KCDEM Mitigation Officer will develop a draft written report describing the review findings and new proposed mitigation recommendations and strategies. This "Annual MHMP Update" will be sent to the governing bodies of participating organizations that developed the plan.

Public Meetings will be held in each of the three (3) Commissioners Districts to present the Annual MHMP Update supported by the Hazard Mitigation Planning Committee. The meetings will provide the public a forum for which they can express their concerns, opinions, or ideas about the Plan status. The Kitsap County Department of Emergency Management will be responsible for using County resources to publicize the annual meetings and maintain public involvement through various media platforms.

Kitsap County Emergency Management Council

The Kitsap County Emergency Management Council will review and adopt portions of or all of the Annual MHMP Update at the first meeting of the calendar year.

- 1. Each member of the Emergency Management Council will support, and bring back to their individual political subdivisions, the recommendations adopted by the Council for implementation and coordination on a local and regional basis as applicable.
- 2. The Emergency Management Council will review and adopt, as necessary, the work of the Multi-Hazard Mitigation Planning Committee.

Related Tasks of The KCDEM Mitigation, Operations, and GIS Officer

- 1. Review the progress made on the identification of resources and implementation of the Hazard Mitigation strategies by the end of May annually.
- 2. Contact and work with each Hazard Mitigation Strategy's Lead Agency for an annual progress report on funding and implementation of the strategies defined in the plan in June.
- 3. Meet annually, with each political subdivision, to identify new Hazard Mitigation strategies to be pursued on a regional basis and review the progress and implementation of those programs already identified in July.
- 4. Meet annually with the Multi-Hazard Mitigation Planning Committee to review the progress of the Hazard Mitigation program and bring forth community input on new strategies in Aug/Sept.
- 5. Coordinate with and support the Department of Emergency Management's efforts to promote and identify resources and grant money for implementation of the recommended Hazard Mitigation Strategies Oct/Nov.
- Submit an annual Update report to the Director, Department of Emergency Management in December in draft for final submission to the Emergency Management Council in January on the status of the strategies adopted, funded and/or and implemented during the previous year.

Historical Plan Review, Evaluation & Update Schedule (2005-2024)			
Activity Date	Required Activity to Be Completed		
April 2005	Annual review, develop and submit findings by September		
April 2006	Annual review, develop and submit findings by September		
April 2007	Annual review, develop and submit findings by September		
April 2008	Annual review, develop and submit findings by September		
April 2009 – June 2009	5-year update begins		
July 2009	Conduct public forum(s) for the review process		
October 2009	Plan revision began		
March 2010	Plan sent to State Mitigation Officer for acceptance (not accepted and returned to meet FEMA's Crosswalk)		
April 2013	Annual review, develop and submit findings by September		
April 2014	Annual review, develop and submit findings by September		
April 2015	Annual review, develop and submit findings by September		
April 2016– June 2016	5-year update begins		
April 2019	Plan review and update process began		
August-September 2019	Conduct public forum(s) for the review process		
September 2019	Final draft complete		
October 2019	Plan sent to State Mitigation Officer for acceptance		
*November 2019	Plan sent to FEMA Region 10 for review		
*December 2019	Plan review completed by FEMA Region 10 and accepted		
*January 2020	Plan approval letter, Adopted and Promulgated by Cities and County		
*April-Nov 2020	Annual review, findings & recommendations drafted by November		
*April-Nov 2021	Annual review, findings & recommendations drafted by November		
*April-Nov 2022	Annual review, findings & recommendations drafted by November		
*April-Nov 2023	Annual review, findings & recommendations drafted by November		
*April-Aug 2024	5-year update cycle		
*Jan 2025	New Plan Adopted and Promulgated by Cities and County		
*Best case projected timeline, the target is to get Mitigation Plan on the same cycle as CEMP			

Table 10: Plan Review, Evaluation & Update Schedule (2005-2024)

Integration with other Local Plans

Information in this MHMP can be integrated into and utilized for various local plans, policies, and efforts such as emergency operations plans, comprehensive plans, land use designation, zoning ordinances, building codes, subdivision regulations, and capital improvement plans.

All Washington counties and cities are required to address critical areas, including frequently flooded and geologically hazardous areas, regardless of whether they are required to adopt a comprehensive plan. Accordingly, the land inventories, data, and other findings from this critical areas planning should be incorporated into local comprehensive plans. Any additional information regarding hazardous areas, past occurrences, vulnerability, potential impacts, and future risk found in the local hazard mitigation plan or hazard identification and vulnerability analysis (required for development of a comprehensive emergency management plan) should also be integrated into the comprehensive plan. Policies that address critical areas should also include mitigation actions to reduce risk.

Natural hazard information and mitigation policies can be integrated into the comprehensive plan. This can include using the background information on natural hazards (including history of past events and potential impacts), identifying any hazard-prone areas located throughout the community, and adding relevant natural hazard mitigation goals, objectives, policies, and projects to the appropriate plan elements.

Another opportunity for integration is through collaborative planning and implementation. Key community officials should be involved in efforts who understand the comprehensive and hazard mitigation policies, as well as their context in local government decision making, and who have the authority to execute the policies and programs in the development and implementation of both plans. This will ensure that all relevant parties are informed and assure plan implementation is feasible. They can help designate overlapping membership of key agency staff for both planning bodies to facilitate the sharing of knowledge and help build relationships that are important to successful implementation of mitigation activities.

Integration can also be facilitated through coordinated plan reviews and updates by reevaluating mitigation policies whenever new information regarding a community's hazard exposure, vulnerability, or risk becomes available and developing collaborative methods for revisions and updates of the natural hazard mitigation and comprehensive plans.

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Kitsap County Profile

This section discusses Kitsap County and its community assets at risk to hazards and was taken from the 2019 Kitsap County Hazard Identification & Vulnerability Assessment. Assets are defined broadly to include anything that is important to the *character and function* of a community and can be described very generally in the following four categories:

- People
- Economy
- Built environment
- Natural environment

Although all assets may be affected by hazards, some assets are more vulnerable because of their physical characteristics or socioeconomic uses.

Profiles for the cities of Bainbridge Island, Bremerton, Port Orchard, and Poulsbo are found in Appendix A: Participating City Profiles.



Figure 5: Map of Kitsap County

Kitsap County

With a total area of 566 square miles, of which 395 square miles (70%) are land, and 171 square miles (30%) are water, Kitsap County is the fourth-smallest county in Washington by land area and third-smallest by total area.²⁵ The County is located between the metropolitan areas of Seattle and Tacoma and the wilderness of the Olympic Mountains and has four incorporated cities: Bainbridge Island, Bremerton, Port Orchard, and Poulsbo.

- Winslow became the City of Bainbridge Island in 1992 after citizens voted to annex the entire island in 1990. Bainbridge Islanders enjoy a beautiful, rural setting just minutes from the cultural and recreational attractions of Seattle. It is also home to the state's most heavily traveled ferry runs.
- Bremerton is Kitsap's most populated city, home to the area's largest employer, the Puget Sound Naval Shipyard.
- Port Orchard lies across Sinclair Inlet from Bremerton and is known for its downtown shops and antiques.
- Poulsbo, on the northern shore of Liberty Bay, is known as "Little Norway" due to its many residents of Norwegian descent.

In Washington, special purpose districts are limited purpose local governments separate from a city, town, or county government. Generally, they perform a single function, though some perform a limited number of functions. They provide an array of services and facilities including electricity, fire protection, flood control, health, housing, irrigation, parks and recreation, library, water-sewer service and more recently stadiums, convention centers, and entertainment facilities that are not otherwise available from city or county governments. Kitsap County currently has 42 special purpose districts which can be found in Appendix C: Special Districts.²⁶

These districts are political subdivisions of the state and come into existence, acquire legal rights and duties, and are dissolved in accordance with statutory procedures. Enabling legislation sets forth the purpose of the district, procedures for formation, powers, functions and duties, the composition of the governing body, methods of finance, and other provisions. The districts are usually quasi-municipal corporations though some are statutorily defined as municipal corporations.²⁷

Although the general provisions for some special district statutes have been consolidated, such as for diking and drainage districts, there is no set of uniform provisions covering all special districts in Washington as there is with cities and counties.²⁸

Other Kitsap County cities have also conducted a number of annexations for urban growth areas.²⁹

The County operates with three commissioners and the following elected officials: Sheriff, Prosecutor, Coroner, County Clerk, Auditor, and Treasurer. Cities of Bremerton, Poulsbo, and Port Orchard operate with an elected Mayor and City Council members. The City of Bainbridge

- ²⁷ Municipal Research and Services Center (MRSC) <u>http://mrsc.org/Home/About-MRSC.aspx</u>
- ²⁸ Municipal Research and Services Center (MRSC) <u>http://mrsc.org/Home/About-MRSC.aspx</u>

²⁵ United States Census Bureau (2012)

²⁶ Municipal Research and Services Center (MRSC) <u>http://mrsc.org/Home/About-MRSC.aspx</u>

²⁹ Kitsap County Department of Community Development (2019)

Island operates with a Mayor *pro tempore*, which rotates among elected City Council members annually. Each city has a City Manager for day-to-day operations. The Port Gamble S'Klallam and Suquamish Tribes have a Tribal Council who oversees their tribal nations, and each has a Tribal Executive Director.

Due to location and topography, Kitsap County can be subject to various hazards such as earthquakes, floods, landslides, severe weather, and tsunamis. The County has seen 14 Federally declared disasters since 1953, including six flood events, four severe storms, two earthquakes, one coastal storm, and one volcano incident. KCDEM and its local, State, and Federal partners work together to prepare for, mitigate against, recover from, and respond to various events and disasters using a whole-community approach.

People

Population Overview

As of 2019, an estimated 273,927 people call Kitsap County their home.³⁰ Thirty-three percent of those citizens reside in the cities of Bainbridge Island, Bremerton, Port Orchard, and Poulsbo. Additional residents live on the four military installations and in the tribes of Suquamish at the Port Madison Reservation and Port Gamble S'Klallam along the Hood Canal. Each City Profile section provides specific population/demographic information.

Out of the other counties in Washington, Kitsap ranks seventh in total population, third in population density, fourth in median household income, and fourth in per capita income according to 2019 Esri Demographics.

Kitsap County Most Recent Population Estimates ³¹					
Location	Population	Population Density	Number of Households	Median Household Income	Under 65 with a Disability
Kitsap County	273,927	694 per sq. mi	105,825	\$75,977	11.3%
	(2019)	(2019)	(2019)	(2019)	(2017)
City of Bainbridge	24,870	901 per sq. mi	10,246	\$118,382	4.8%
Island	(2019)	(2019)	(2019)	(2019)	(2017)
City of Bremerton	43,268	1,520 per sq. mi	16,813	\$54,232	15.6%
	(2019)	(2019)	(2019)	(2019)	(2017)
City of Port	15,163	1,571 per sq. mi	5,775	\$68,278	12.9%
Orchard	(2019)	(2010)	(2019)	(2019)	(2017)
City of Poulsbo	11,121	2,346 sq. mi	4,688	\$69,072	6.9%
	(2019)	(2019)	(2019)	(2019)	(2017)

Table 11: Kitsap County Most Recent Population Estimates

Kitsap County Multi-Hazard Mitigation Plan (MHMP) 2019

 ³⁰ Esri Demographics (July 2019) <u>https://washington.hometownlocator.com/wa/kitsap/</u>
 ³¹ United States Census Bureau (2010-2017) and Esri Demographics (July 2019) <u>https://washington.hometownlocator.com/wa/kitsap/</u>



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Age Distribution

The figures below show the distribution of age and vulnerable population in Kitsap County. Those residents 65 years and older made up 17.3 percent of the county's population in 2017 compared to 15.1 percent of the state's population. There are also proportionately fewer residents under 18 years of age and less than five years of age in Kitsap County compared to the state.



Figure 7: Kitsap County Population Distribution

Functional Needs and Vulnerable Populations

Kitsap County's access and functional needs populations are outlined in the following figure.



Figure 8: Kitsap County Populations with Functional and Access Needs Estimates (2019)

Economy

In 2018, the civilian labor force in Kitsap County averaged 122,885, higher than the 2017 level of 120,148. On an annual average basis, there have been yearly increases in the labor force since 2014, another indicator of a healthy job market. In 2018, the county unemployment rate was 4.6 percent compared to 4.9 percent in 2017. The over-the-year decrease in the rate can be attributed to job gains and lower unemployment.³²

The largest component of Kitsap County nonfarm employment is the government. This sector typically accounts for a third of the nonfarm total with a 2018 total of 32,900 jobs. Of that total, 19,400 was federal government employment. The second-largest group was local government, with 11,400 jobs. Five military installations are located in Kitsap County and are a critical factor in the County's economic balance. The remaining work in the fields of fishing, construction, manufacturing, transportation, public utilities, wholesale, retail, financial, insurance, real estate, and services. Kitsap County is also home to many citizens who consider themselves retired and enjoying the culture and incredible atmosphere of Kitsap County and its four "port" cities.33

Civilian Labor Force, 2017

Kitsap County	56.2%
City of Bainbridge Island	60.3%
City of Bremerton	53%
City of Port Orchard	50.1%
City of Poulsbo	55.8%

Table 12: Civilian Labor Force, 2017 Estimates (US Census)

School District Attendance		
Bainbridge Island	4,023	
Bremerton	5,500	
Central Kitsap	12,174	
North Kitsap	5,700 (2019)	
Olympic College	12,000	
South Kitsap	10,500	
Total Students	49,897	

Table 13: School District Attendance, 2010 Estimates (US Census)

Port Gamble S'Klallam	1,085
Suquamish	4,490

Table 15: Indian Nations, 2019 Esri Demographics

NonFarm Industry Employment ³⁴			
Total Nonfarm	95,900		
Total Private	62,200		
Goods Producing	8,200		
Mining, Logging, & Construction	5,00		
Manufacturing	2,900		
Service Providing	87,700		
Private Service Providing	54,000		
Trade, Transportation, & Utilities	14,200		
Retail Trade	11,600		
Professional and Business Services	8,700		
Leisure & Hospitality	10,400		
Government	33,700		
Federal Government	20,200		
Local Government	11,700		
State Government	1,800		

Table 14: Nonfarm Industry Employment

³² Washington Employment Security Department 2019

³³ Washington Employment Security Department 2019

³⁴ Washington Employment Security Department 2019

Built Environment

As of 2017, Kitsap County has 112,667 housing units and 1,094 building permits issued. Figure 7 (following the text of this section) offers a view of comprehensive land use in the County.

The Hazus risk assessment in the 2015 FEMA Risk Report identifies the buildings most at risk from multiple hazards, as well as specific areas of mitigation interest. The table below highlights some of the buildings in the unincorporated Kitsap County affected by flooding, tsunami, earthquake, and landslide risks. Unincorporated Kitsap County has 30% of its structures built before modern building code and has 766 buildings within the landslide zone, representing \$137 million in value.³⁵

Kitsap County Areas of Mitigation Interest ³⁶					
Community Building Name	Address	Building Value	Loss Value	Loss Ratio	Hazard Type
Multiple Single- Family Homes	NE Twin Spits Rd	\$2.0 million (15 Homes)	\$790,000	40%	Flood
Sunnyslope Elementary School	4183 Sunnyslope Rd. SW, Port Orchard	\$2.6 million	\$1.3 million	50%	Earthquake
Apartment Complex	1623 W. Admiralty Heights Ln.	\$8.1 million (9 Units)	N/A	N/A	Landslide
Tracyton Community Library	351 NW Tracy Ave.	\$85,000	\$53,000	64%	Earthquake
South Kitsap Fire and Rescue	1974 Fircrest Dr. SE	\$994,000	\$651,000	65%	Earthquake

Table 16: Kitsap County Areas of Mitigation Interest

Existing Structures

City/County Public Buildings

The combined City/County public buildings are approximately 2500 units. In the past decade, the Cities and County enjoyed a building boom, which included the construction of a new County Administration Building and four new city halls. Most other critical facilities are relatively new except for older structures used by the fire districts or non-governmental organizations (NGOs) serving Kitsap County. The Kitsap County Housing Authority did not participate in this planning process; most of their buildings are of wood stock with minor exceptions and were not damaged during the Nisqually earthquake.

Residential Structures

Most residential structures in the County are constructed of wood stock. KCDEM offers programs to instruct building contractors and residence on how to "brace and bolt" older structures to improve some of the over 100,000 residential structures that have not been retrofitted to earthquake mitigation standards. The table below contains the number of housing units in Kitsap as of 2017:

³⁵ FEMA Risk Report for Kitsap County (2015)

³⁶ FEMA Risk Report for Kitsap County (2015)

Residential Structures Information			
Туре	Estimate	Percent	
House Occupancy			
Total housing units	110,944	100%	
Occupied housing units	100,484	90.6%	
Vacant housing units	10,460	9.4%	
Homeowner vacancy rate	1.9	(X)	
Rental vacancy rate	6.0	(X)	
Units in Structure			
Total housing units	110,944	100%	
1-unit, detached	76,427	68.9%	
1-unit, attached	5,309	4.8%	
2 units	2,534	2.3%	
3 or 4 units	3,157	2.8%	
5 to 9 units	4,152	3.7%	
10 to 19 units	4,095	3.7%	
20 or more units	6,025	5.4%	
Mobile home	8,953	8.1%	
Boat, RV, van, etc.	292	0.3%	
Year Structure Built			
Total housing units	110,944	100%	
Built 2014 or later	994	0.9%	
Built 2010 to 2013	2,797	2.5%	
Built 2000 to 2009	15,382	13.9%	
Built 1990 to 1999	24,674	22.2%	
Built 1980 to 1989	18,125	16.3%	
Built 1970 to 1979	20,019	18.0%	
Built 1960 to 1969	7,643	6.9%	
Built 1950 to 1959	5,267	4.7%	
Built 1940 to 1949	6,805	6.1%	
Built 1939 or earlier	9,238	8.3%	

Table 17: Kitsap County Housing Characteristics 2013-2017 American Community Survey 5-Year Estimates (US Census



Figure 9: Comprehensive Land Use Map (2018)

Infrastructure

Transportation, Communications, and Utilities

Transportation, communications, and utilities are vulnerable to hazardous events. Transportation corridors are vital to the movement of citizens and the economy, as well as electrical and natural gas grids providing energy in the County. Transportation is provided through state and county roads but limited by the geographic characteristics of Kitsap County shorelines and is subject to ferry systems and bridges. There is no major rail service in the County with some track provided to Naval installations.

The Hood Canal Floating Bridge is critical to Clallam and Jefferson Counties as their main supply route which may be impacted by various hazards.

Transportation Concerns

- The Tacoma Narrows is the major route for commercial traffic into the county and may be affected by various hazards.
- The Gorst area is a choke point that most traffic heading north of this point has to pass through. The bridges in the area are particularly vulnerable to natural disasters such as earthquakes due to liquefaction.
 - Gorst continues to be a transportation chokepoint that becomes impassable with nearly any hazard, including high winds, floods, and car accidents. This issue has the potential to result in delays in emergency response operations and critical transportation.
- All other bridges on SR16 including those in Pierce County.
 - This is the main route for getting things into Kitsap County.
 - The three Ferry Terminals (Bremerton, Bainbridge, and Southworth).
- The Agate Pass Bridge, as it is the only land connection to Bainbridge Island.

Kitsap County enjoys all of the communications available to major Puget Sound cities. These networks—including high-speed internet and cable TV services—are available to its citizens. Kitsap County built a 911 Center in 2004 as a hazard mitigation strategy. Seismic isolation systems were installed to provide better protection of the County and 911 communication networks.

Puget Sound Energy (PSE) provides essential electrical power to most residential and commercial facilities in Kitsap County. This combination of pole and underground service has received hazard mitigation-related upgrades over the years to reduce winter storm outages and improve structural integrity. However, gas lines, public utility, and sewer systems are underground and vulnerable to earthquakes and other causes of moving earth (e.g., landslides).

Transportation Links in Kitsap County			
Туре	Link	Comments	
Air	Bremerton Airport	Limited commercial service	
Highways	Major routes SR 3, 16, 104	No interstate highways in Kitsap	
Bridges	Agate Pass Bridge Tacoma Narrows Bridge Hood Canal Bridge Manette Bridge	Vital links to adjourning counties	

Transportation Links in Kitsap County			
Туре	Link	Comments	
	East Bremerton Bridge		
Transit	Kitsap Transit Access and regular service	Vital service to military installations and ferry docks	
Rail	Puget Sound Pacific Railroad	Service from Mason County to military installations	
Ferries	Kitsap Transit Inter-harbor service Ferry Terminals	Service to Bremerton/Port Orchard and Bremerton/Annapolis	
WA State Ferries	Service from Bremerton, Bainbridge Island, Kingston, and Southworth	Service to Edmonds, Seattle, and King County	

Table 18: Transportation Links in Kitsap County

Critical Facilities & Cultural Resources

Following is a table of an overview of the more critical facility and cultural elements of the County. More in-depth information regarding critical facilities, cultural resources, and locations can be found in each City Profile following this section.

Kitsap County Critical Facilities & Cultural Resources			
City/Jurisdiction	Type/Name	Notes	
Kitsap County/ Bremerton	Department of Emergency Management/Kitsap911	Location of County Emergency Operations Center (EOC) & Consolidated Emergency Dispatch	
Kitsap County/ Port Orchard	Community Development		
Kitsap County/ Silverdale	Emergency Medical Services		
Kitsap County/ Port Orchard	Sheriff		
Kitsap County	Public Works	 Critical KCPW Infrastructure: Central Kitsap Treatment Plant: Provides sewer service to Poulsbo, Navy (Bangor, Keyport), Silverdale and Central Kitsap Kingston Treatment Plant: Provides Sewer Service to Kingston UGA Suquamish Treatment Plant: Provides Sewer Service to Port Madison Reservation/Suquamish Tribe and Suquamish LAMIRD Manchester Treatment Plant: Provides Sewer Service to EPA/USN Fueling Station and Manchester LAMIRD Main PW Building in Port Orchard: Houses Finance, Engineering, Construction Management functions 	

Kitsap County Critical Facilities & Cultural Resources			
City/Jurisdiction	Type/Name	Notes	
		 Randy W Casteel PW Annex in Olympic View Industrial Park (OVIP): Houses Stormwater, Sewer and Solid Waste staff functions Household Hazardous Waste Facility in OVIP: Handles low-level hazardous waste for community Olympic View Transfer Station in OVIP: Serves as the centralized collection point for all solid waste generated within Kitsap County including tribal land and USN/Federal. Garbage and Recycling Facilities in Silverdale (Dickey Road), Olalla, Hansville provide household garbage and recycling drop off spots for the community Road Maintenance Facilities (South Road Shop, Central, and North): House the road maintenance functions for Kitsap County Numerous Sewer Pump Stations (over 50) bring sewage from community to the <i>A</i> KCPW operated Treatment plants 	
Kitsap County/ Port Orchard	Human Resources		
Kitsap County/ Port Orchard	Information Services		
Bainbridge Island	Police Station		
Bainbridge Island	Fire Stations	Fire Stations 21, 22, and 23.	
Bainbridge Island	City Hall		
Bainbridge Island	Public Works facilities		
Bainbridge Island	Main Wastewater Treatment Facility		
Bainbridge Island	Reservoir Facilities	Located at High School Road, Old Creosote Road, and Knechtel and Grand.	
Bainbridge Island	Well Fields	Located at the Head of the Bay, Fletcher Bay, and Rockaway Beach.	
Bainbridge Island	Pump Stations	17 sewage pump stations total.	
Bainbridge Island	Agate Pass bridge and Winslow Ferry Terminal		
Bainbridge Island	Elementary schools	5 total	
Bainbridge Island	Middle/Intermediate Schools	3 total	
Bainbridge Island	High Schools	2 total	
Bainbridge Island	Alternate Schools	3 total	
Bainbridge Island	Medical Clinics	4 total	
Bainbridge Island	Senior Assistance Center		
Bainbridge Island	Parks & Nature Reserve	Bainbridge Island has several parks, learning centers, religious centers, and a nature preserve.	

Kitsap County Critical Facilities & Cultural Resources			
City/Jurisdiction	Type/Name	Notes	
Bainbridge Island	Historic Properties	The City of Bainbridge Island has seven historic properties registered with the federal register and 35 historic properties. registered with the local historic register. There are 19 heritage trees on the island. ³⁷	
Bainbridge Island	Museums	The island has two museums: Kids Discovery Museum (KiDiMu) and the Bainbridge Island Historical Museum. ³⁸	
Bainbridge Island	Japanese American Exclusion Memorial	This museum is an outdoor exhibit commemorating the internment of Japanese Americans from Bainbridge Island in the state of Washington.	
Bremerton	Police Station		
Bremerton	Fire Stations	Both fire stations in Bremerton are brick, are not retrofitted, and show significant damage in earthquake Hazus models.	
Bremerton	Courthouse		
Bremerton	The Norm Dicks Building	Houses City Government and Kitsap Public Health.	
Bremerton	Public Works Campus		
Bremerton	Olympic College		
Bremerton	Bremerton School District	hool District As of 2019, the Old East High/Junior High School was demolished, and 10,000 square feet was added to the STEM West Hills Elementary School.	
Bremerton	Casad Dam		
Bremerton	American Red Cross		
Port Orchard	Police Station		
Port Orchard	Fire Stations	Fire District #7 – Fire Station #31.	
Port Orchard	City Hall		
Port Orchard	Public Works Shop		
Port Orchard	Port Orchard School District	South Kitsap School District: South Kitsap High School, Cedar Heights Jr. High	
Port Orchard	Givens Community Center		
Port Orchard	Kitsap County Courthouse Complex and county jail		
Port Orchard	Health Facilities	Group Health Coop of Puget Sound, Harrison Memorial.	
Port Orchard	Joint Wastewater Treatment Facility Wells:	5 wells and one transmission main from the City of Bremerton.	
Port Orchard	Emergency Operations Center (EOC)	Port Orchard's Emergency Operations Center (EOC) has been relocated to South Kitsap Fire and Rescue, Station 31, which	

 ³⁷ City of Bainbridge Island - Planning Department (2019)
 ³⁸ City of Bainbridge Island - Planning Department (2019)

Kitsap County Critical Facilities & Cultural Resources			
City/Jurisdiction	Type/Name	Notes	
		resolves the critical vulnerabilities that were inherent with the previous EOC location.	
Port Orchard	The Masonic Hall on the National Register of Historic Places		
Port Orchard	The Sidney Museum and Arts Association	Includes cultural assets such as a gallery, art museum, and log cabin museum	
Port Orchard	The Western Washington Center for the Arts	Acts as a community theater.	
Port Orchard	The Veteran's Living History Museum		
Port Orchard	The Fathoms 'O' Fun Festival	Considered a valued community tradition.	
Poulsbo	Police Station		
Poulsbo	Fire Stations	Fire District #18 Headquarters/Fire Station #71	
Poulsbo	City Hall		
Poulsbo	Public Works Office & Shop		
Poulsbo	North Kitsap School District	 Administration Building North Kitsap Senior High School Poulsbo Junior High School Poulsbo and Vinland Elementary Schools The building formerly known as Spectrum Alternative School has been repurposed after being closed in 2010. As of 2019, it is a new alternative learning program. 	
Poulsbo	Olympic College Poulsbo Branch Campus		
Poulsbo	Health Facilities	 Poulsbo Village Medical Center with Regional Hospitals as backup North Kitsap Medical Center 	
Poulsbo	Wastewater Treatment Plan	Brownsville via pressurized pipe under Liberty Bay	
Poulsbo	Wells	6 total operational and one not online at this time	
Poulsbo	Water Tanks	9 water tanks wastewater lift stations	

Table 19: Kitsap County Critical Facilities & Cultural Resources

Culturally Sensitive Areas

Kitsap Peninsula is rich with arts and culture, from museums showcasing the region's diverse people, creations, and history to dozens of venues featuring live theater, dance, and music. Various groups, societies, and associations enrich Kitsap County's cultural environment and these entities bring benefits to residents and visitors in many ways.

- Kitsap Historical Society & Museum
- Kitsap Maritime Heritage
- Kitsap Regional Library

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- Military Historic Sites & Memorials
- Puget Sound Navy Museum
- South Kitsap Arts Association
- West Sound Arts Council

Some of the best artists in the region call Kitsap County home and a number of programs throughout the county support established and emerging artists and provide the public with ample opportunities to view the work of old favorites and talented newcomers. Bainbridge Island, Bremerton, and Silverdale all host regular art walks, where area businesses stay open late and serve as temporary art galleries for local painters, sculptors, photographers, and other artisans. Kitsap is known for its superior art galleries such as the Amy Burnett Fine Art Gallery in Bremerton, the Bainbridge Arts and Crafts Gallery on Bainbridge Island, and The Front Street Gallery in Poulsbo and The Lisa Stirrett Glass Art Gallery in Silverdale.

The beautifully restored Admiral Theater in Bremerton brings a variety of performances to the area, and the Bremerton Symphony delivers classical music offerings throughout the year. In addition, a number of local and regional theater groups exist in the county and perform everything from Shakespeare to show tunes. Kitsap is home to two beautiful new museums, The Bainbridge Island Museum of Art and the Suquamish Museum and Cultural Center. Other popular museums offering unique experiences include The Naval Undersea Museum, the Kids Discovery Museum, and touring the historic Navy Destroyer the U.S.S. Turner Joy.

Kitsap is home to several world-class gardens including the internationally renowned Bloedel Reserve, the legendary Heronswood Gardens, and Elandan Garden's Bonsai Collection.

The strong cultural influences of the Suquamish and Port Gamble S'Klallam tribes are integral to the Kitsap Peninsula. Suquamish is the ancestral home of the great Chief Seattle and hosts the annual Chief Seattle Days festival in his honor. Another cultural highlight is the annual Tribal Canoe Journey, a gathering of 90 Northwest Native tribes with scheduled landings in Suquamish and Port Gamble. The Suquamish Clearwater Casino and Resort and The Point Casino offer a wide variety of entertainment options and are major economic drivers in the County.

Tribal Lands

Founded in its deep cultural values, the Suquamish People consider all lands and waters on our Reservation and U&A to be sacred and sensitive. Therefore, it's important to note that in accordance with Federal government criteria, the Tribe has identified 20 specifically culturally sensitive areas within the Port Madison Indian Reservation. Sixteen resources are on or directly adjacent to the contemporary marine shoreline and may be affected by wave action during severe storms, by oil spills and other toxic substances that enter marine waters, or by tidal waves caused by earthquakes on the Seattle Fault Zone. Again, based on the Tribe's cultural values, these specific areas only represent a portion of those lands and waters considered culturally sensitive.

The following map illustrates where each of the culturally sensitive sites is located. They are labeled on the map by numbers that correspond with their assigned identification names.



	Figure 11: Map of	
Site ID Number	Resource Description	Culturally Sensitive
1	Archaeological Site 45KP32 - Shell Midden	Sites Port Madison
2	Archaeological Site 45KP33 - Shell Midden	Indian Reservation
3	Archaeological Site 45KP34 - Shell Midden	
4	Archaeological Site 45KP40 - Shell Midden	
5	Archaeological Site 45KP41 - Shell Midden	
6	Archaeological Site 45KP42 - Shell Midden	
7	Archaeological Site 45KP43 - Shell Midden	
8	Archaeological Site 45KP44 - Shell Midden and Adams Marsh Complex	
9	Archaeological Site 45KP45 - Petroglyph	
10	Archaeological Site 45KP48 - Petroglyph	
Table 2.1: Culturally Sensitive Sites, continued		
Site ID Number	Resource Description	
11	Doe-Kag-Wats Marsh Complex	
12	House of Awakened Culture Complex	
13	Kiana Lodge Complex	
14	Marsh Complex Inland	
15	Miller Bay Spit Complex	
16	Old Man House Archaeological Site (45KP2) and Historic Village	
17	Sacred Place	
18	Sacred Place	
19	St. Peter Mission	
20	Suquamish Cemetery	

Kitsap County Multi-Hazard Mitigation Plan (MHMP) 2019

Development Since the 2015 MHMP

In June 2015, the third Buildable Lands Report was completed by Kitsap County and its cities per requirement of the Washington State Growth Management Act (GMA) in RCW 36.70A.215. The Report further identifies that identified buildable lands are guided by the Critical Areas (as shown in Figure 12) identified within the county which reflects natural hazards impact areas.

As of 2016, Kitsap County Code required vacant large lots (over 18,000 square feet) located in the Urban Low Residential and Urban Cluster Residential zones to subdivide the land to a maximum lot size of 9,000 square feet prior to development occurring on the property per Ordinance 559-2018.

In 2018, the County developed the following amendments to the Comprehensive Plan: change the land use designation to Mineral Resource Overlay (MRO) on property outside urban growth areas (UGAs), change the land use designation to Forest Resource Lands (FRL) on property outside urban growth areas, and change the land use designation on property within an Urban Growth Area for the purpose of infill and redevelopment.

In 2019, the County clarified edits to the plan and developed Public Facility Map Amendments (e.g. utility and park lands), the Fircrest & Mile Hill Neighborhood Map Amendment (located in the Port Orchard UGA), the Comprehensive Plan and Kitsap County Code Amendment Process, as well as removed the Mineral Resource Overlay (MRO) from parcels that do not meet designation criteria and created a 20-year Capital Facilities Plan (Parks & Recreation, Law Enforcement, South Kitsap Schools).

Future Development

The Kitsap County Comprehensive Plan describes the 20-year vision for unincorporated Kitsap County and how that vision will be achieved. The plan covers land use, economic development, environment, housing and human services, transportation, capital facilities and utilities as well as parks, recreation, and open space. The Comprehensive Plan is mandated by the Washington State Growth Management Act (RCW 36.70A). A full copy of the plan can be found at https://www.kitsapgov.com/dcd/Pages/Kitsap County Comprehensive Plan.aspx.

Figure 9 is a Comprehensive Land Use Map that shows the land uses that are permitted by the Comprehensive Plan. The Land Use Map is adopted as part of the Plan. It designates the proposed general distribution, locations and extent of the uses of land for urban and rural uses, where appropriate, for housing, commerce, industry, recreation, open spaces, public utilities and facilities, agriculture, forestry, and other uses. The Land Use Map guides growth consistent with Urban Growth area boundaries and provides the capacity to accommodate adopted growth targets.

Kitsap County Public Works (KCPW) plans to build a new North Kitsap Road Maintenance Facility and Household Hazardous Waste Collection Facility near the intersection of Gunderson Road and State Route 307 in the next three to five years. The current North Road Maintenance Facility located at the corner of SR 305 and SR 307 will be closed.

Natural Environment

Kitsap County is bound by Hood Canal to the west, Admiralty Inlet to the north, Puget Sound to the east, and Mason and Pierce counties to the south. Its landmass totals 393 square miles,

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ranking 36th in area among counties in Washington. Kitsap County has 228 miles of saltwater frontage, more than any other county in Washington.

Most of the land area consists of remnants of a glacial drift plain. The surface is composed generally of flat-topped rolling hills separated by valleys and bays. The land rises from sea level to maximum elevations of 400 to 600 feet, except for Green Mountain and Gold Mountain west of Bremerton. These hills, formed from ancient volcanic rocks, cover about 20 square miles and rise to an elevation of 1,761 feet. The County occupies lowlands in the shadow of the Olympic Mountains.

Kitsap has a moderate climate with mild, wet winters and cool, dry summers. Mean annual precipitation ranges from 26 inches in the north to nearly 80 inches in the vicinity of Green and Gold Mountains, with a yearly average of 41.2 inches of rain and 3.5 inches of snow countywide. Kitsap County has an average of 161 precipitation days per year. The average low temperature in January is 33.8 degrees F, and the average high temperature in July is 75.1 degrees F.³⁹

Topography

The Kitsap Peninsula area is geologically the remnant of a glacial drift plain. The peninsula is extensively carved by inlets, giving the County roughly 33 miles of freshwater waterfront and 228 miles of saltwater coastline. Landslide and marine bluff failures are relatively common in the low hills on the perimeter of Puget Sound, particularly in unsheltered bluff areas subjected to wave cutting.

Four main geologic units exist in the subsurface: (1) fill; (2) younger alluvium, including beach deposits; (3) alluvium associated with the Vashon Glacier; and (4) basaltic bedrock. Low areas have filled with peat and very loose soils over time, and some may have been artificially filled during periods of development.

Creeks and Freshwater Ways

Although Kitsap County has the propensity to flood, it does not have any rivers. Rather, it has 39 known creeks that can swell from significant rainfall and flood downstream structures. Kitsap County and its Cities have been proactive in managing runoff and reducing the impacts of low area flooding during significant rainfall events. Mitigation efforts have reduced common flooding areas in cities through innovative means to manage rainfall such as improved stormwater systems.

Saltwater Landmarks

Saltwater landmarks include Admiralty Bay, Dyes Inlet, Sinclair Inlet, Port Washington Narrows, Liberty Bay, Miller Bay, and Hood Canal. FEMA's flood map and the National Flood Insurance Program (NFIP) define those areas that are affected by boat wakes, low-lying flooding from high tides, or potential tsunamis.

Landslides

Kitsap has a history of fatal landslides. Landslide and marine bluff failures are common on low hills and the perimeter of Puget Sound. Significant rainfall and ground saturation affect these

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³⁹ http://kitsapeda.org/life-work/enviable-quality-of-life/location-and-climate/

areas. Many areas in Kitsap County are defined as "geological critical" areas with soft soil and a higher risk of shaking during earthquakes.

Lakes

Kitsap County has several lakes fed by the numerous creeks and streams in the County. Some lakes have dams to manage lake water levels and protect waterfront residence. The Casad

Watershed provides drinking water to the residents of Bremerton. Other lakes provide recreational fishing and boating managed by private residences or County/City Governments.

Critical Areas

The following page shows a map of the Critical Areas of Kitsap County with an accompanying map legend to the right of this text. The map depicts Critical Areas, as defined in Title 19 Kitsap County Code (Critical Areas Ordinance) and is for informational and illustrative purposes (WAC 365-190-080). It includes wetlands, fish and wildlife habitat conservation areas (streams, lakes. waterbodies). and geologically hazardous areas, and frequently flooded areas.





Figure 12: Critical Areas of Kitsap County

Kitsap County Multi-Hazard Mitigation Plan (MHMP) 2019
Kitsap County Hazard & Disaster History

The frequency of historic events determines the prioritization of mitigation strategies and recommendations. Some general conclusions arise out of Kitsap County's disaster history:

- During severe winter weather in December 2018, an EF-2 tornado caused catastrophic damage to homes and commercial buildings. Tornadoes in Kitsap County are rare due to irregularities in geography and elevation of the area. The geography is not typically conducive to forming tornadoes large enough to be destructive.
- Since 1962, earthquakes have had the biggest economic impact on the county relative to costs and community disruptions.
- Winter storm events represent 77% of historical declarations at the local level. Some significant events have occurred, but, in most cases, probably did not create disruptions in the entire county or cause substantial damages.
- The Mount St. Helens catastrophic incident in 1980 is listed, but Kitsap County was not significantly affected, nor was Kitsap County part of the Presidential Declaration. It is a reminder, like the incidents of 9/11, that catastrophes outside the county can affect the local area. For example, an eruption of Mt. Rainier would affect Kitsap County.
- From a historical perspective, mitigation efforts should concentrate on reducing the impact of winter storms, flooding, and earthquakes.

Over time, projects to mitigate winter storm events had a significant impact on future damages from storms and improve the quality of life in Kitsap. Historically, winter storms and their impact are more predictable; therefore, the cause, effect, and mitigation can be quantified and therefore justified for improvements. As such, in the last 10 years, the numbers of declarations have declined due to these minor mitigation efforts to control flooding, runoff, and other issues caused by winter storms.

Kitsap County Emergency/Disaster History 1962-2019					
Date of Incident	Туре	Declared	Comments		
February 2019	Severe Winter Storm	Local (was undeclared locally), State	Local Public Assistance threshold not met.		
December 2018	Severe Winter Storms - Tornado	Local, State, Federal	Local Public Assistance threshold not met. Local SBA declaration.		
December 2016	Windstorm with Severe Rain	Local	Did not meet State declaration threshold.		
December 2016	Windstorm with Severe Rain	Local	Did not meet State declaration threshold.		
November 2010	Severe Winter Storm	Local	Local Public Assistance threshold not met		
December 2008	Severe Winter Storm	Local, State, Federal	Local Public Assistance threshold not met		
August 2008	Hurricane Katrina Evacuation	State, Federal	State: \$1.7 million. Local: None		

Kitsap County Emergency/Disaster History 1962-2019					
Date of Incident	Туре	Declared	Comments		
December 2007	Severe Winter Storm	Local, State, Federal	State: \$82.5 million. Local: \$3.13 million.		
December 2006	Severe Storm	Local, State	Local Public Assistance threshold not met.		
November 2006	Severe Storm	Local, State	Local Public Assistance threshold not met.		
January 2006	Severe Storm	Local, State	Local: \$544,775		
December 2005	Severe Winter Storm	Local, State, Federal	Local Public Assistance threshold not met.		
January 2004	Severe Winter Storm	None	Freezing rain, ice, flooding. No record of assistance on file.		
October 2003	Severe Winter Storm	Local, State, Federal	State: \$11.9 million. Local Public Assistance threshold not met. Individual Assistance received.		
May-Sept 2003	Drought	Local, State	No assistance requests. Losses to pasture.		
January 2003	Flooding	Local, State	Local Public Assistance threshold not met.		
January 2002	Flooding	Local, State	Presidential declaration denied.		
September 2001	9/11 Attack on the U.S.	Local, State	No record of requests for assistance on file.		
February 2001	Earthquake – Nisqually	Local, State, Federal	State \$66.7 million. Local: \$832,926		
February 1999	Flooding, Slides	Local, State	Federal public assistance threshold not met. SBA declaration.		
June 1997	Earthquakes	None	Series of small earthquakes between June 23 and June 27, ranging in magnitude from 3.1 to 4.9.		
March 1997	Flooding	Local, State, Federal	Local Public Assistance threshold not met. Individual Assistance received.		
December 1996	Severe Storm	Local, State, Federal	Total Public Assistance: \$20 million. Local: \$1.96 million.		
April 1996	Mudslide	Local (City of Bainbridge Island)	Rolling Bay Mudslide. Local (City) declaration; no record of assistance on file.		
January 1996	Flooding	Local, State, Federal	Received Public Assistance. No Individual Assistance received. Bainbridge Island heavily impacted.		
November 1995	Severe Storm – Wind/flooding	Local, State	Local Public Assistance threshold not met.		
December 1994	Flooding	Local	Local declaration; no record on file.		
January 1993	Windstorm	Local, State	No record on file.		
January 1992	Severe Storm	No declaration	No record on file.		

Kitsap County Emergency/Disaster History 1962-2019					
Date of Incident	Туре	Declared	Comments		
December 1990	Severe Storm	Local, State, Federal	State: \$785k.		
November 1990	Severe Storm	Local, State, Federal	No record on file.		
December 1986	Severe Storm	Local, State	No record on file.		
December 1982	Severe Storm	Local, State	No record on file.		
May 1980	Mount St. Helens Volcano	State, Federal	No record on file.		
December 1979	Severe Storm	Local, State, Federal	No record on file.		
January 1974	Severe Storm	Local, State, Federal	No record on file.		
May 1965	Earthquake	Local, State, Federal	No record on file.		
October 1962	Severe Storm – Wind	Local, State, Federal	No record on file.		
PA=Public Assistance IA=Individual/Household Assistance *No records maintained on event No FEMA financial data were available online for Federal declarations prior to 2000, only records of declarations. Unable to verify reimbursements.					

Hazard Losses for Kitsap County

Kitsap County Hazard Losses 1960-2017 ⁴⁰							
Number Events	of	Hazard	Number of Casualties	Property Damage	Crop Damage		
298	298 68 \$309,860,381 \$703,234						

Table 21: Kitsap County Hazard Losses 1960-2017

⁴⁰ Washington State Enhanced Hazard Mitigation Plan (2018)

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Mitigation Strategies & Recommendations

Introduction

In this section, the natural hazards most likely to affect Kitsap County are identified, defined, and assessed in terms of location, extent, history, probability of future events, climate change impacts, and vulnerability, and the County-wide mitigation strategies are discussed. Hazard assessment information from the 2019 Hazard Identification & Vulnerability Assessment was provided in order to build a comprehensive narrative on each specific hazard to present the mitigation strategies. The hazards and their mitigation strategies are discussed in the following order:

- 1. Earthquakes
- 2. Landsides & Erosion
- 3. Tsunamis
- 4. Wildfires & Urban Fires
- 5. Floods
- 6. Severe Storms/Tornados
- 7. Drought

Each section notes lead agencies that guide that define the mitigation strategies for affected jurisdictions. The only hazard to not be included in the MHMP that was identified in the HIVA is volcano ash fall. This hazard was omitted due to the low probability of occurrence and lack of mitigation needs in the next 25 years. Terrorism was included as a hazard in the 2013 MHMP, but it is not included in the 2019 Plan due to focusing on natural hazards.

Mitigation Strategy Updates from 2013 MHMP

A collection of completed Mitigation Strategies since the last MHMP update (2013) can be found at the end of this section and at the beginning of each City-Specific Mitigation Strategies section.

However, not mentioned in this section are the ongoing programs or advancements to eliminate or reduce the long-term risk from identified hazards. Such programs include:

- Kitsap "Bolt and Brace" program to train contractors and citizens to retrofit older residences.
- Kitsap Prepares Responsibly for Emergencies" Program KPREP, programs designed to train schools, businesses, non-profit organizations, and citizens, to mitigation, prepare for, respond, and recover from disasters, specifically earthquakes.
- Kitsap Pre/Post Evaluation of Building Affected by Seismic Events training; teaching building evaluations for potential retrofitting and mitigates effects on earthquakes.
- Kitsap ongoing and robust training and exercise program.

Implementing advances in technology to improve communication and warning systems, conduct damage assessments, and analyze results. Kitsap's Damage Assessment software program integrates County files (i.e., property assessments), GIS, and collection coordination to bring in information regarding public and private damage and provide information and mapping tools to assess citizen safety and structural damage throughout the County. This information becomes vital to understanding at-risk areas in the county and adds to our mitigation planning efforts.

These are but a few examples of the ongoing mitigation programs in Kitsap County. Successful mitigation programs, like those mentioned above, or others like stormwater initiatives, have reduced the risks to citizens and properties. Although risk assessment tells us what we need to mitigate, it does not predict the size and complexity of the next catastrophic event in Kitsap. As such, mitigation planning will continue to improve the County's position to reduce risk and take the burden off first responders and the potential loss to businesses and governments.

Funding/Financial Resources

Kitsap County, including the Cities of Bainbridge Island, Bremerton, Port Orchard, and Poulsbo, will seek funds, when available, for hazard mitigation studies and implementation of programs. Potential funding sources include (but are not limited to) programs administered by or through Washington Department of Emergency Management and through local, state, and federal mitigation support resources outlined in Appendix B: Capability Assessment.



Earthquake Mitigation Strategies

Lead Agencies	Support Agencies
Kitsap County Emergency Management Council	Kitsap County Geographic Information System (GIS) Department
City/County Public Works Departments	US Geological Survey (USGS)
Kitsap County Department of Emergency Management	University of Washington (UW) Geology Department

Hazard Overview

An earthquake is the motion or trembling of the ground produced by sudden displacement of rock, usually within the upper 10-20 miles of the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. Kitsap County is vulnerable to earthquakes due to its location in the Puget Sound region, which features numerous seismogenic geologic faults.⁴¹ Washington has dozens of active faults and fault zones. Some of these faults are in remote areas. Others, like the Seattle fault and southern Whidbey Island fault zone, cross under major cities and pose a significant hazard. In general, larger faults make larger earthquakes. All faults, regardless of size, can be dangerous if they rupture.

Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric and phone service; and, sometimes, trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis).



Figure 13: Puget Sound Faults

Location

Kitsap County is vulnerable to earthquakes due to its location in the Puget Sound region, which features numerous seismogenic geologic faults. Kitsap County is susceptible to subduction as well as to fracture faults. The Puget Sound region is entirely within Seismic Risk Zone 3, requiring that buildings be designed to withstand major earthquakes measuring 7.5 in magnitude. It is anticipated, however, that earthquakes caused by subduction zone plate stress can reach a magnitude greater than 8.0.⁴²

With recent studies greatly enhancing scientists' ability to focus on active faults, scientists have paid particular attention to seven active faults in the Puget Lowland capable of generating damaging earthquakes. These faults include the Seattle Faults (2), Tacoma Fault, Darrington Devils Mountain Fault, Utsalady Point Fault, and two Whidbey Island Faults.

The Puget Lowland faults are of particular concern because a considerable portion of the area is heavily urbanized and populated. The four-county central Puget Sound area

⁴² FEMA Risk Report for Kitsap County (2015)

⁴¹ FEMA Risk Report for Kitsap County (2015)

https://www.bainbridgewa.gov/DocumentCenter/View/6701/Final_Kitsap_Risk_Report_UpdateStrategies? bidId=

encompassing King, Kitsap, Pierce, and Snohomish Counties, where a number of the faults are located, has a population base of approximately 3.8 million people, or about 60 percent of the state's population, and much of the state's economic base.⁴³

WHAT IS AN 'ACTIVE' FAULT?

The term 'active' can have different meanings. At the Washington Geological Survey, 'active' means that a fault has evidence for movement within the Holocene time period (since about 12,000 years ago). It usually also means that there are earthquakes (even small ones) on the fault.



figure modified from USGS Cascadia earthquake graphics at http://geomaps.wr.usgs.gov/pacnw/pacnweq/index.html

Normal faults⁴⁴

A normal fault occurs when two blocks are pulled away from each other. Washington has few large normal faults because it is mostly in a region of compression. Small normal faults are found along the top of folds in eastern Washington in the Saddle Mountain graben. The Eastern Sierra fault along the east side of the Sierra Nevada mountains in California is a good example of an active normal fault.

Kitsap County Multi-Hazard Mitigation Plan (MHMP) 2019

⁴³ United States Census Bureau (2017)

⁴⁴ Washington Department of Natural Resources (2019)

'Shallow' Faults⁴⁵

Shallow faults produce earthquakes in the upper 18 miles (30 kilometers) of the Earth's crust. These types of faults are common but usually small. Larger crustal faults, such as the Seattle fault and southern Whidbey Island fault zone, can produce earthquakes up to magnitude 7.5. Earthquakes on shallow faults typically last 20 to 60 seconds, and the shaking is localized to the general area of the fault. Earthquakes on faults like these may cause tsunamis in the Puget Sound region.

'Deep' Faults⁴⁶

Deep faults can occur where two tectonic plates collide, and one of the plates is forced beneath the other. The plate that is forced down can have faults within it that still rupture and produce earthquakes. These faults and earthquakes usually occur at great depth (tens to hundreds of miles). Because they rupture at such great depth, their seismic energy is distributed over a large area. This means that a large area feels the shaking, but the intensity is less than a similar shallow earthquake. The shaking usually lasts less than a minute and doesn't generally cause a tsunami or have many aftershocks.

Subduction Zone Faults⁴⁷

A special type of shallow fault called a subduction zone or 'megathrust,' occurs where an oceanic plate moves beneath a continental plate. The boundary between the two plates covers a large area and can lock together. Like other faults, when enough stress builds up, the 'megathrust' will rupture. What makes these faults 'mega' is that the amount of energy released is hundreds to thousands of times more than almost any other type of fault. The ground shaking from these earthquakes can last for several minutes. The 2011 Tohoku earthquake in Japan occurred on this type of fault and released enough energy to slightly change the Earth's axis of rotation. Additionally, because the continent moves up and over the ocean plate, large amounts of seawater are displaced and cause damaging tsunamis. The Cascadia subduction zone just off the Washington coast is this kind of fault and is one of the largest geologic hazards to our state.

Effects

The effects of a major earthquake in Kitsap County could be catastrophic. Hundreds of residents could be injured or killed, and a multitude of others would be left homeless. Depending on the time of day and time of year, a catastrophic earthquake could cause hundreds of injuries and deaths and millions of dollars in critical infrastructure and private property damage (WADNR, 2012-2013). A severe earthquake could level or severely damage older buildings, especially those constructed of non-reinforced masonry. Newer structures, which were built under recent building codes, would probably sustain less damage but would remain vulnerable to the soil conditions of the building site. A severe earthquake would also cause major damage to County and City utilities.

The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Most casualties result from falling materials. Other effects include, but are not limited to:

- Broken water and sewer mains
- Downed electric lines
- Downed or damaged bridges

⁴⁵ Washington Department of Natural Resources (2019)

⁴⁶ Washington Department of Natural Resources (2019)

⁴⁷ Washington Department of Natural Resources (2019)

- Cracked and partially displaced roadbeds and rail lines
- Loss of telephone or other telecommunications services
- Houses knocked off their foundations
- Partial or complete collapse of buildings, building facades, cornices, or chimneys
- Fires including urban conflagration
- Chemical spills
- Ruptured gas and oil pipelines
- Riverbeds disrupted
- Broken or cracked dams with possible flooding
- Injury and death
- Psychological trauma
- Economic disruption
- Large numbers of displaced persons

The effects of a major earthquake in the Puget Sound basin area could be catastrophic, providing the worst-case disaster short of drought-induced wildfire sweeping through a suburban area. Hundreds of residents could be killed, and a multitude of others left homeless.

The following figure shows FEMA's determination of building damage during a 7.2 magnitude earthquake on the Seattle Fault.⁴⁸



Figure 14: Building Damage Percent during a 7.2M Earthquake on the Seattle Fault

⁴⁸ <u>http://mediaassets.kitsapsun.com/html/data/earthquakes/0110_Earthquake-HousingLosses_KS.jpg</u>

An earthquake with such a magnitude (7.0+) would cause tremendous damage and economic disruption throughout the central Puget Sound region. 2012 regional estimates of damage and loss for a magnitude 7.2 incident on the Seattle Fault showed such a quake would result in extensive or complete damage to more than 38,000 buildings, more than 31,000 displaced households, and more than 17,500 injured persons. The figure above shows the possible building damage percentage from this magnitude of earthquake. Although losses would likely be less from similar earthquakes on other Puget Sound faults away from the core of the Seattle urban area, all of the newly defined active faults represent the possibility of very high damage, loss of life, and major economic impact.

A severe earthquake would also cause major damage to County and City utilities. Depending on the earthquake epicenter and duration of the earthquake, major damage or failure of the Casad Dam could occur. Water systems in the county would suffer ruptured mains and possible failure of local water reservoirs. Electrical and natural gas utilities would also suffer major damage. Failed transformers and downed electrical lines would create massive power failures in the county. Ruptured gas lines would create conditions for large fires and explosions. Public communication facilities (i.e., radio, television, and telephone systems) would be damaged. Surviving telephone systems would likely be overloaded almost instantly. Radio and television services may take days or weeks to recover. Emergency services (i.e., fire, medical, SAR) would be immediately overwhelmed by the amount of damage and injury throughout the county.

County and City Public Works Departments would be very hard-pressed to establish a working road net for essential services, especially if bridges become damaged. At a minimum, bridges in an affected area would have to be inspected before use. Emergency food and shelter would be needed for possibly thousands of persons forced from their homes or isolated by damaged roads and bridges. Because a catastrophic earthquake would likely affect more communities than Kitsap County, the likelihood of immediate assistance from sources outside the county would be remote.

The following bridges in Kitsap County either on or over State Routes (SR) are expected to experience MODERATE damage during a Cascadia scenario.						
Location	Feature In	Facility				
PIERCE CO	MULLENIX ROAD	SR 16				
4.5 N PIERCE CO	MULLENIX ROAD	SR 16				
4.5 N PIERCE CO	BURLEY CREEK	SR 16 RAMP				
0.6 E JCT SR 303	PORT WASH NARROWS CITY STREET					
3.5 N JCT SR 304	SR 310/KITSAP WAY	SR 3				
6.8 N BAINBRIDGE FY	AGATE PASSAGE	SR 305				
1.7 N JCT SR 308	SR 3	SHERMAN HILL RD				
4.3 N JCT SR 308	SR 305	SR 3				
4.3 N JCT SR 308	SR 305	SR 3				
7.7 N JCT SR 304	RIDGETOP ROAD N.W.	SR 303				
7.7 N JCT SR 304	RIDGETOP ROAD N.W.	SR 303				
0.1 N JCT SR 305	Dogfish Creek	SR307				
0.3 W SR 3	SR 3 ACCESS - LUOTO ROAD	CLEAR CREEK RD NW				

The table below shows the impacts of a Cascadia Scenario on SR bridges in Kitsap County per the Washington Department of Transportation (DOT). It is important to note that all bridges may experience some level of damage.

2.6 N ICT SR 303		SD 3
2.6 N ICT SR 303	SR 308 (LUOTO RD)	SR 3
0.7 N ICT SR 304		
		SP 104
4.6 N JCT SR 302		NB SR 16
4.6 N ICT SR 302		SB SD 16
4.011 301 311 302		3B 3R 10
The following bridges in	Kitsap County either on or ove	er State routes are expected to
experience S	GIGNIFICANT damage during a G	Cascadia scenario.
Location	Feature In	Facility
7.6 N PIERCE CO	SIDNEY ROAD	SR 16
7.6 N PIERCE CO	SIDNEY ROAD	SR 16
8.3 N PIERCE CO	TREMONT ST	SR 16 NB
8.3 N PIERCE CO	TREMONT ST	SR 16 SB
6.2 N MASON CO	SR 16	SR 3 NB
1.3 N JCT SR 304	CALLAHAN DRIVE	SR 303
5.6 N JCT SR 304	ERLAND POINT RD	SR 3
5.6 N JCT SR 304	ERLAND POINT RD	SR 3
0.2 S JCT SR 3	SILVERDALE WAY NW	SR 303
5.6 N PIERCE CO	SR 16	BETHEL RD
6.3 N MASON CO	GORST CREEK	SR 3
JCT SR 3	SB SR 16	NB SR 16 SPUR
6.6 N JCT SR 304	SR 303	CENTRAL VALLEY RD.
4.0 E JCT SR 16	SR 166	MITCHELL AVE
JCT SR 16	SR 16	SR160
0.7 N JCT SR 304	PORT WASHINGTON	SR 303
	NARROWS	
3.5 N JCT SR 304	SR 310/KITSAP WAY	SR 3
4.5 N JCT SR 304	SR 3	AUSTIN DRIVE
7.2 N JCT SR 304	SR 3	ELDORADO BLVD
3.8 N JCT SR 308	SR 3	FINN HILL ROAD
6.3 N JCT SR 304	CHICO WAY NW	SR 3
8.7 N JCT SR 304	NEWBERRY HILL RD	SR 3
8.7 N JCT SR 304	NEWBERRY HILL RD	SR 3
9.9 N JCT SR 304	ANDERSON HILL RD	SR 3
9.9 N JCT SR 304	ANDERSON HILL RD	SR 3
1.0 N JCT SR 303	SR 3	TRIGGER AVE
2.1 N JCT SR 303	SR 3	MOUNTAIN VIEW RD
2.6 N JCT SR 303	SR 3	N-W RAMP TO LUOTO
JCT SR 3	SR 3	SR 303 (WAAGA WAY)
JCT SR 3	SR 3	SR 303/CLEAR CK RD
9.8 N PIERCE CO	SR 166	SR 16 NORTHBOUND
JCT SR 3	SR 3	SR 304 W-S RAMP
3.1 E JCT SR 3	DOGFISH BAY	SR 308
6.3 N JCT SR 304	CHICO WAY NW	SR 3
***The Hood Canal Floating B	Bridge was not evaluated as part of the	his study due to its classification as a
special bridge.		

Earthquakes of lesser magnitude or farther from the county would cause less damage and displacement, but the county could find itself faced with a large influx of displaced persons. Depending on the damage and injuries caused by an earthquake, businesses may close, unemployment may rise, and economic loss might occur.

Volcanic earthquakes, often centered within or beneath the volcano, are usually one of three kinds: (1) pre-eruption earthquakes caused by explosions or steam or underground magma movements, (2) eruption earthquakes caused by explosions and collapse of walls inside the volcano, or (3) post-eruption earthquakes caused by magma retreat and interior structural collapse. Although volcanic earthquakes are strong near the volcano, they are generally confined there. There are some exceptions, as with the "St. Helens Fault Zone," where a tectonic fault (earth's crustal structure) is closely associated with the volcano. Tremors may cause large rockfalls, snow avalanches, landslides, and building collapse. Since all Pacific Northwest volcanoes are in a regular seismic zone, tremors should be evaluated for their volcanic potential by qualified geophysicists or seismologists.

The following page shows a map of seismic hazards such as fault hazard zones, liquefaction susceptibility, and site classes in Kitsap County. Liquefaction susceptibility describes the likelihood of saturated sediments to liquefy during an earthquake, resulting in permanent ground deformations. When liquefaction occurs, the ability of soil to support buildings and infrastructure is diminished.

Legend Kitsap Fault Hazard Zone High Geologic Hazard Moderate Geologic Hazard Kitsap Seimogenic Faults Kitsap Liquefaction Susceptibility High; Moderate-High Moderate; Low-Moderate Kitsap Site Class . High Geologic Hazard Tax Parcels Unincorporated Urban Growth Area Incorporated City Reservation Boundaries Limited Areas of More Intense Rural Development Type I Type III Street Center Lines State Highway Major Road Collector / Arterial Local Access; Local Road Railroad Lines Ferry Terminals Ferry Routes Waterbodies (defined in WAC 222-16-030) WaterBody Cartographic Feature Code Bay, estuary, Puget Sound Lake, Pond, Reservoir, Gravel pit or quarry filled with water Marsh, wetland, swamp, bog Watercourses (defined in WAC 222-16-030) Fish Habitat Water Type Code (S) Designated Shoreline of the State (F) Fish Habitat (N) Non-fish Habitat (U) Unknown, unmodeled hydrographic feature 21 Geologically Hazardous Map SEISMIC HAZARDS **KITSAP COUNTY**

Figure 16: Seismic Hazards

Extent

Earthquakes caused by subduction zone plate stress can reach a magnitude greater than 8.0. Below is a table that discusses earthquake effects at each magnitude.

		Comparison of Earthquake Measurements
Magnitude Richter	Degree Mercalli	Description
<3.5	I	People do not feel any earth movement.
3.5	II	Few people notice movement if they are at rest or on the upper floors of tall buildings.
4.2		Many people indoors feel movement. Hanging objects swing back and forth.
4.5	IV	Most people indoors feel movement. Hanging objects swing. Dishes, windows, and doors rattle. The earthquake feels like a heavy truck hitting the walls. A few people outdoors may feel movement. Parked cars rock.
4.8	V	Almost everyone feels movement. Sleeping people are awakened. Doors swing open or closed. Dishes are broken. Pictures on walls move. Small objects move or are turned over. Trees might shake. Liquids might spill.
5.4	VI	Everyone feels movement. People have trouble walking. Objects fall from shelves, off walls. Furniture moves. Plaster walls might crack. Trees and bushes shake. Slight damage in poorly built buildings.
6.1	VII	People have difficulty standing. Drivers feel cars shaking. Some furniture breaks. Loose bricks fall from buildings. Considerable damage in poorly built buildings, slight to moderate in well-built buildings.
6.5	VIII	Drivers have trouble steering. Houses that are not bolted down may shift on their foundations. Towers and chimneys may twist and fall. Poorly built structures suffer severe damage, well-built suffer slight damage. Tree branches break. Wet ground hillsides may crack. Water levels in wells may change.
6.9	IX	Well-built buildings suffer considerable damage. Houses that are not bolted down move off their foundations. Some underground pipes are broken. The ground cracks. Reservoirs suffer serious damage.
73	X	Most buildings and foundations are destroyed. Some bridges are destroyed. Dams are seriously damaged. Large landslides occur. Water is thrown on the banks of canals, rivers, and lakes. The ground cracks in large areas. Railroad tracks are bent slightly.
8.1	XI	Most buildings collapse, some bridges are destroyed. Large cracks appear in the ground. Underground pipelines are destroyed. Railroad tracks are badly bent.
>8.1	XII	Almost everything is destroyed. Objects are thrown into the air. The ground moves in waves or ripples. Large amounts of rock may move.

Table 22: Comparison of Earthquake Measurements

Maps depicting shaking intensity and ground motion following an earthquake, called "ShakeMaps," can be produced in near-real-time for incidents or created for specific scenarios by regional seismic network operators in cooperation with the USGS. These ShakeMaps can be used for response, land use, and emergency planning purposes. The following map shows a ShakeMap modeled after a Seattle Fault 7.2 magnitude incident showing the shaking intensity for this scenario. The central and eastern portions of Kitsap County, including Bainbridge Island, Port

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Orchard, and Bremerton, are located in the severe (instrumental intensity VIII) to extreme (instrumental intensity X+) shake zones.⁴⁹



Figure 17: Shaking Intensity for a 7.2 Seattle Fault Earthquake

All communities in Kitsap County would be affected if a Seattle Fault incident were to occur. The Cities of Bainbridge Island and Port Orchard have the most significant percentage of buildings located in the moderate-high liquefaction zone, while unincorporated areas of the county have the highest total number of buildings located in these zones. The total building dollar loss in Kitsap County for an earthquake of this magnitude is estimated at \$3.6 billion.

Hazus Earthquake Results for a Seattle M 7.2 Earthquake ⁵⁰							
Community	Total Est. Building Value	Total Number of Buildings	Number of Buildings in the Moderate- High Liquefaction Zone	Percentage of Buildings in the Moderate- High Liquefaction Zone	Building Dollar Loss for a Seattle 7.2 Incident	Loss Ratio (Dollar Losses /Total Building Value)	
Bainbridge	\$2.6 billion	9,094	384	4%	\$538 million	21%	
Bremerton*	\$1.7 billion	10,899	116	1%	\$760 million	45%	
Port Gamble S'Klallam Tribe**	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	

⁴⁹ FEMA Risk Report for Kitsap County (2015)

⁵⁰ FEMA Risk Report for Kitsap County (2015)

Hazus Earthquake Results for a Seattle M 7.2 Earthquake ⁵⁰						
Community	Total Est. Building Value	Total Number of Buildings	Number of Buildings in the Moderate- High Liquefaction Zone	Percentage of Buildings in the Moderate- High Liquefaction Zone	Building Dollar Loss for a Seattle 7.2 Incident	Loss Ratio (Dollar Losses /Total Building Value)
Suquamish Tribe	\$474 million	3,093	97	3%	\$29.8 million	6.3%
Port Orchard	\$966 million	4,076	258	6%	\$377 million	39%
Poulsbo	\$865 million	3,160	50	2%	\$67.5 million	7.8%
Unincorporated County	\$9.7 billion	57,801	1,921	3%	\$1.8 billion	18%
Total	\$16.3 billion	88,123	2,826	3%	\$3.6 billion	18%

Table 23: Hazus Earthquake Results for a Seattle M 7.2 Earthquake

Note: The above table shows the total estimated building value by community, total number of buildings by community, total number of buildings within the moderated to high liquefaction zone, and percentage of buildings within the moderate to high liquefaction zone. In addition, building losses are reported for a Seattle Fault 7.2 magnitude incident as well as a loss ratio. A loss ratio is calculated by dividing the dollar loss by the total building value. The loss values are for building losses only; additional damages to infrastructure and building contents are not captured in this table. *Information from the military base was not included in the assessment for the City of Bremerton. **No building data was available for the Port Gamble S'Klallam Indian Reservation from Kitsap County, so the results are shown as unknown.

In addition to the building analysis in the 2015 FEMA Risk Report, essential facilities (schools, fire, police, and medical facilities) were analyzed to determine if they would experience damage from the earthquake incident. Anything labeled greater than 50 percent would be considered damaged. For the entire study area, 155 schools buildings of 292 are expected to have a greater than 50 percent chance of being damaged; 93 medical facilities out of 184 are expected to have a greater than 50 percent chance of being damaged; and 19 fire stations out of 48 are expected to have a greater than 50 percent than 50 percent chance of being damaged. Transportation damage is not shown in the report.

Pre-Code versus Moderate Code Building in Kitsap County ⁵¹							
Community	Number of Pre- Code Buildings (before 1975)	Percent Pre-Code Buildings	Number of Moderate Code Buildings (after 1975)	Percent of Moderate Code Buildings			
Bainbridge Island	3,082	34%	6,012	66%			
Bremerton	8,698	80%	2,201	20%			
Port Orchard	1,415	35%	2,661	65%			
Poulsbo	725	23%	2,435	77%			
Squamish Tribe	780	25%	2,313	75%			
Port Gamble S'Klallam Tribe	Unknown	Unknown	Unknown	Unknown			

⁵¹ FEMA Risk Report Kitsap County 2015

Unincorporated County	17,278	30%	40,523	70%			
Total	31,978	36%	56,145	64%			
Note: Pre-code bu	Note: Pre-code buildings are those that are built prior to 1975. Moderate code are those built after 1975.						
These dates were chosen based on when the seismic provisions were incorporated into the building							
code statewide which was 1975. Please note that the analysis in Hazus used the following dates: Pre-							
code are any buildings prior to 1941. Moderate Code were any buildings after 1941, which is the default							
Hazus methodolog	gy. Please refer to t	he appendix f	or additional information.				
Table 24: Pre-Code v	ersus Moderate Code	Building in Kit	san County				

Table 24: Pre-Code versus Moderate Code Building in Kitsap County

History

Since 1962, earthquakes have had the most significant impact of any hazard on the county in terms of monetary costs and disruptions to daily life.

In the Puget Sound region, the most dramatic earthquake identified so far is associated with the Seattle Fault, which runs from the east side of King County across West Seattle and the south end of Bainbridge Island, extending into Central Kitsap.

When the ground broke free about 1,100 years ago, geologic forces pushed the ground upward about 20 feet from Restoration Point on Bainbridge Island to Alki Point in West Seattle. Tideflats were left high and dry, and a tsunami drowned low-lying estuaries throughout Puget Sound. Evidence suggests that the tremendous earthquake caused forested slopes to slide into Lake Washington and Lake Sammamish. Farther away, the guake may have unleashed rockslides that blocked streams and created new lakes in the Olympic Mountains.⁵²

Researchers believe the earthquake probably measured around magnitude 7.2, yet the shaking was far greater than deep earthquakes of the same size. In fact, for residents of Kitsap and King counties, a Seattle earthquake today like the one 1,100 years ago would probably cause more damage than the largest Cascadia subduction earthquake.

The Nisqually earthquake of 2001 was the most recent earthquake incident that caused significant damage to Kitsap County and the Puget Sound region and is the last major deep earthquake. This 6.8 magnitude earthquake struck the Puget Sound region on February 28, 2001, and created minor to moderate damage to the properties of over 750 Kitsap County residents.⁵³ According to the U.S. Geological Survey (USGS) Earthquake Hazards Program, damage estimates from this incident amounted to \$1 billion to \$4 billion dollars throughout the region.⁵⁴Previous deep earthquakes included a 6.5-magnitude quake near Des Moines in King County in 1965 and a 7.0magnitude quake near Olympia in 1949.55

The part of Washington State east of the Cascades has historically been subject to shallow, though infrequent, smaller earthquakes up to a magnitude of 6.0. The western part of Washington State is vulnerable to the following earthquake risks:

• A magnitude of 7.5 incident of 40 or more kilometers in depth.

⁵² http://archive.kitsapsun.com/earthquake/multiple-geologic-forces-make-region-vulnerable-to-guakes-26673853-0bb3-5925-e053-0100007f83d4-364560781.html

⁵³ Kitsap County Department of Emergency Management, 2012 ⁵⁴ USGS. 2012

⁵⁵ http://archive.kitsapsun.com/earthquake/multiple-geologic-forces-make-region-vulnerable-to-guakes-26673853-0bb3-5925-e053-0100007f83d4-364560781.html

- A magnitude of 6.5 incident at a shallow depth in the vicinity of Mount St. Helens.
- A magnitude of 7.5 incident at a shallow depth anywhere in western Washington of uncertain probability.

Washington State Significant Earthquakes						
Date	Time (PST)	Latitude Longitude	Depth (Km)	Mag	Location	
December 14, 1872	2140	48°48' 121°24'	shallow	7.4	North Cascades	
December 12, 1880	2040	47°30' 122°30'		5.5	Puget Sound	
April 30, 1882	2248	47°00' 123°00'	deep	6.0	Olympia area	
November 29, 1891	1521	48°00' 123°30'		5.0	Puget Sound	
March 6, 1893	1703	45°54' 119°24'	shallow	4.9	Southeast Washington	
January 3, 1896	2215	48°30' 122°48'		5.7	Puget Sound	
March 16, 1904	2020	47°48' 123°00'		5.3	Olympics eastside	
January 11, 1909	1549	48°42' 122°48'	deep	6.0	Puget Sound	
August 18, 1915	0605	48°30' 121°24'		5.6	North Cascades	
January 23, 1920	2309	48°36' 123°00'		5.5	Puget Sound	
July 17, 1932	2201	47°45' 121°50'	shallow	5.2	Central Cascades	
July 15, 1936	2308	46°00' 118°18'	shallow	5.7	Southeast Washington	
November 12, 1939	2346	47°24' 122°36'	deep	5.7	Puget Sound	
April 29, 1945	1216	47°24' 121°42'		5.5	Central Cascades	
February 14, 1946	1914	47°18' 122°54'	40	6.3	Puget Sound	
April 13, 1949	1155	47°06' 122°42'	54	7.1	Puget Sound	
August 5, 1959	1944	47°48' 120°00'	35		Northwest Cascades	
April 29, 1965	0728	47°24' 122°24	63	6.5	Puget Sound	
February 13, 1981	2209	46°21' 122°14'	7	5.5	South Cascades	
April 13, 1990	2133	48°51' 122°36'	5	5.0	Deming	
January 28, 1995	1911	47°23' 122°21'	16	5.0	17.6 km NNE of Tacoma	
May 2, 1996	2104	47°46' 121°57'	7	5.3	10.2 km ENE of Duvall	
June 23, 1997	1113	47°36' 122°34'	7.4	4.9	5.5 km NE of Bremerton	
July 2, 1999	1743	47°05' 123°28'	41	5.1	8.2 km N of Satsop	
February 28, 2001	1054	47.19°N 122.66°W	57	6.8	Southern Puget Sound, NE of Olympia	

• Subduction plate earthquakes of magnitudes greater than 8.0.

Table 25: Washington State Earthquakes



Figure 18: Historical Earthquake Damage

Probability of Future Events

The largest active fault that will affect Washington (and the whole Pacific Northwest) is the Cascadia subduction zone. This fault produces some of the largest and most damaging earthquakes in the world (M9). A damaging earthquake is inevitable on this fault, but we do not

know exactly when it will happen.56

According to the Washington State Department of Natural earthquakes Resources, occur nearly every day in the Like other counties, state. Kitsap County takes of advantage various available technologies to assess the likelihood and effect of earthquakes in the Such region. technology includes GIS mapping, Hazus, and evaluation of LIDAR (Light, Detection, and Ranging) and USGS studies about the county.



Figure 19: Frequency of Damaging Earthquake Shaking Around the US

⁵⁶ Washington Department of Natural Resources (2019)

Programs available from the USGS, such as the Washington State Earthquake Scenario Catalog, provide a variety of HAZUS modeling studies on different faults. These studies provide valuable insight into vulnerability and exposure modeling of earthquakes that can be used in mitigation planning and as a training and exercise tools.

Climate Change Impacts

There is debate over how climate change impacts earthquake activity explicitly, and there is currently no substantial and universally accepted information to provide in this section.

Vulnerability Summary

- The overall risk rating for earthquakes is "**high**." Damages are also considered "high" as the incident will affect the county's infrastructure. The rating is defined as a strong potential for a disaster of major proportions in the next 25 years. Although the 2018 Washington State HIVA rated earthquake risk in Kitsap County as "moderate-high," it rated area, population, and critical infrastructure with "high" and state and first responder facilities with "moderate-high" exposure risks. Due to high ratings and potential damage to people, infrastructure, and critical facilities, Kitsap County views earthquakes as a high-risk hazard.
- Earthquakes are the number one catastrophic threat to Kitsap County. The largest estimated magnitude is 8.0, which would be catastrophic. Although less damaging earthquakes similar to Nisqually in 2001 are more likely, they can still cause damage in the millions across the county.
- The damaging shaking from an earthquake could cause minor tsunamis, liquefaction in Kitsap County's small cities, and building and infrastructure damage that would take years of recovery. Small businesses may not survive, and damages to ferry systems, bridges, and highways will impact the economy.
- All of the critical infrastructure facilities, fire stations, and EMS facilities are located in areas with moderate or higher exposure to earthquake hazards. Mitigation efforts will help lessen the potential impact, but a significant earthquake will still create substantial damage to infrastructure, and potentially to the economy
- Damage to highway infrastructure outside Kitsap County could have a direct impact on Kitsap County's economy. In particular, damage to Highway 16 and I-5 in Pierce County will directly impact access to Kitsap County. Also, damage to the Junction of I-5 and US 101 in Thurston County could also directly impact Kitsap County, especially if they were affected at the same time.
 - The State Ferries routinely operate at near capacity. If an incident caused damage to critical transportation infrastructure, the ferry system would be challenged to pick up the slack.

Conclusions

Kitsap County will experience major earthquake effects. Mitigation efforts must be instituted and maintained to decrease potential problems from major earthquakes. They are:

- Examination, evaluation, and enforcement of effective building and zoning codes.
- Public education on what to do before, during, and after an earthquake.
- Development of appropriate County and City government response plans. Response should include detailed, immediate action to save resources such as water and gas supplies. Plans should be realistically exercised at the County and City levels to ensure workability and relevance to disaster response.

Mitigation Strategies

Earthquake Mitigation Strategy 1				
Promote public seismic risk retrofit for residential sector to include educational workshops on foundation bolting, tie downs, and necessary bracing actions.				
 Lead agency will continue to be KCDEM with support from industry subject matter experts. Free workshops for homeowners will be provided twice each year. Special Resources considered for this project could include volunteer groups, matching grant applications, private donations, and Housing Authority support. Propose the utilization of Small Business Administration pre-disaster mitigation loans for a portion of the funding needed. 				
Lead	KCDEM			
Priority High				
Implementation Time	Ongoing/1 to 5 years			
Implementation Cost	Advertising workshops in local newspapers - \$1000-2000/year			
Potential Funding Source	Local, State, Federal			
Status To be completed.				

Earthquake Mitigation Strategy 2

Develop a three-mile vehicle width recreation trail from Jarstad Park near Gorst to the Kitsap Lake area.

• Goals: Capacity and Resiliency

	-
Lead	Washington Department of Transportation and KCDEM
Priority	Moderate
Implementation Time	1-5 years
Implementation Cost	Estimated \$100,000-\$500,000
Potential Funding Source	Local, State
Status	To be completed.

Earthquake/Tsunami Mitigation Strategy 3

Develop a plan to address resiliency and redundancy, including identifying gaps in the transportation network.

- Goals: Capacity and Resiliency
- Add SR 16/3

Lead	Washington Department of Transportation and KCDEM
Priority	Moderate
Implementation Time	By 2024
Implementation Cost	Estimated up to \$100,000
Potential Funding Source	Local, State
Status	To be completed.

Earthquake/Tsunami Mitigation Strategy 4

Mitigate for Agate Passage Bridge closure: utilize maritime alternatives to move passengers and freight.

- Goal: Exercise maritime alternatives
- Last done in 2008
- Can be completed as an exercise

Lead	Washington Department of Transportation and KCDEM
Priority	Moderate
Implementation Time	1-5 years
Implementation Cost	Estimated \$50,000
Potential Funding Source	Local, State, Federal
Status	To be completed.

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Landslide & Erosion Mitigation Strategies



Lead Agencies	
Kitsap County Conservation District	
City/County Community Development Departments	
City/County Public Works Departments	
Kitsap County Department of Emergency Management	
Tribal Nations (where appropriate)	

Hazard Overview

The term landslide refers to the down-slope movement of masses of rock and soil. Slides range in size from thin masses of earth a few yards wide to deep-seated bedrock slides. The form of initial failure commonly categorizes them, but they may travel in a variety of ways along their paths. This travel rate may range in velocity from a few inches per month to many feet per second, depending largely on the slope, material, and water content. The recognition of ancient, dormant slide masses is essential, as they can be reactivated by earthquakes or unusually wet winters. Also, because they consist of broken materials and disrupted groundwater, they are more susceptible to construction-triggered sliding than adjacent undisturbed material.

Erosion refers to the gradual removal of soil through wind or water action. Erosion may be induced or increased by failure to use ground covers to protect soil from wind or drainage systems that allow effective dispersal of stormwater. Slopes on waterfronts can also be severely undercut by regular wave action or large waves produced by storms. The following factors contribute to landslides and earth movements:

- Erosion caused by rivers, glaciers, or ocean/sound waves.
- Earthquakes shaking the ground and creating stress in vulnerable soils.
- Increased loads from man-made structures like roads and the weight of rain/snow and/or vegetation.
- Hydrologic issues caused by high water tables, freezing, and thawing of ground or weak soils.
- Development of land, grading of roads, and the removal of vegetation
- Increases in lateral pressures like tree roots, crystallizations weakening slopes.

Location/Extent

Kitsap County is subject to landslides and soil erosion due to wind, water, and flooding at all times of the year. Landslides can cause deaths, significant damage to properties and infrastructure, and in some cases, losses of the use of land for many years due to the extensive cost of restoration. Earthquakes also have the potential to trigger landslides. The 2001 Nisqually earthquake caused approximately \$34.3 million in damage due to earthquake-induced landslides throughout the region. Landslide occurrences in Kitsap County have been concentrated along its coastal bluffs as well as within river valleys near the coastline.

Over 1,000 buildings are located in the defined landslide zone, which have a total estimated value of approximately \$211 million. The majority of these buildings are located in unincorporated areas; these 766 buildings have an estimated value of \$137 million and comprise nearly 72 percent of all buildings that are susceptible to landslides in the county. These buildings are concentrated in the northeastern part of the county along Puget Sound, in the southwestern section of the county along Hood Canal, and in the southeastern portion of the county along Colvos Passage. Bainbridge Island also contains a significant number of buildings that are exposed to the effects of landslides, and Port Orchard contains 66 buildings near the Sinclair Inlet that are in the landslide zone⁵⁷.



Figure 20: Shallow Landslide Susceptibility Zones and Building Impacts

Effects

Landslides typically and primarily cause damage to roads, railroads, sewer, and water lines, homes, and commercial buildings. They can occur as a result of flooding areas or can cause localized flooding if they impact the drainage system within the slope or bluff. The most significant effects of landslides are injury or death, disruption of transportation, and the destruction of property.

Severe slides may affect shipping and travel routes to the extent that economic loss results. This loss can be particularly severe for tourism and recreational businesses. Uncontrolled water flow creates an erosion effect, which in turn can cause landslides. Erosion can also result in gullies, which ruins land and deltas by covering the more valuable ground. The effects of erosion are usually much less dramatic than landslides, but the final results may be more costly. Soil erosion can be a slow process that continues relatively unnoticed or can occur at an alarming rate, causing

⁵⁷ FEMA Risk Report of Kitsap County 2015

severe loss of topsoil. Soil compaction, low organic matter, loss of soil structure, poor internal drainage, salinization, and soil acidity problems are other serious soil degradation conditions that can accelerate the soil erosion process.

Kitsap County continues to be impacted by landslides and erosion issues with each new winter storm. Soil erosion continues to occur, especially at steep slopes and construction sites during wind and rainstorms.

Building Exposure to Landslides ⁵⁸			
Community	Buildings within Landslide	Building Value with Landslide	
	Zone	Zone	
Bainbridge Island	177	\$55 Million	
Port Orchard	66	\$8.1 Million	
Poulsbo	40	\$9.8 Million	
Squamish Tribe	21	\$1.9 Million	
Port Gamble S'Klallam Tribe	Unknown	Unknown	
Unincorporated County	766	\$137 Million	
Total	70	on	

Table 26: Building Exposure to Landslides

History

Several landslides have impacted Kitsap County over the last 20 years. Landslides can cause deaths, significant damage to properties, and in some cases, losses of the use of land for many years due to the extensive cost to restoration. The deadly landslide on Bainbridge Island is probably the one single event that demonstrates the unpredictability and destructiveness of a landslide. In the winter of 1996, a landslide in the Rolling Bay area of Bainbridge Island forced a house off its foundation and down a hill into Puget Sound.⁵⁹ It caused the death of a family of four and destroyed millions of dollars in both public and private property. The tragedy of Oso Landslide of 2014 was a slide that left 43 people dead, many injured, devastating the town of Oso, the Stillaguamish River, and surrounding infrastructure.⁶⁰

Kitsap County LIDAR Defined Landslides (2012) ⁶¹				
Jurisdiction	Number of Landslides	% of Total Landslides	Affected Area per Jurisdiction in Sq. Mi.	
Unincorporated Kitsap County	137	76.5	24.5	
Bainbridge Island	27	15	4.8	
Bremerton	6	3.4	1.1	
Port Orchard	3	1.7	0.54	
Poulsbo	0	0	0	
Port Madison Suquamish Reservation	4	2.2	0.7	
Port Gamble S'Klallam Reservation	2	1.1	0.35	
Totals	179	100%	32	

Table 27: Kitsap County LIDAR Defined Landslides (2012)

⁵⁸ FEMA Risk Report Kitsap County 2015

⁵⁹ <u>https://www.bainbridgewa.gov/767/Hazard-and-Risk-Info</u>

⁶⁰ https://www.usgs.gov/news/revisiting-oso-landslide

⁶¹ Kitsap County GIS figures 2012

Probability of Future Events

Washington is one of the most landslide-prone states in the country and annually experiences hundreds to thousands of events across the state. It is difficult to predict precisely when and where a landslide will occur. There are, however, seasonal predictions in locations commonly affected by heavy rains near shorelines. In some cases, the amount of precipitation that falls over a particular period of time can predict the vulnerability of a slope. The severity of any landslide is the loss of life and the destruction of property. LIDAR technology, ongoing studies, and managing land use helps improve mitigation practices. Although the County no longer has the LIDAR program, the studies during its implementation created comprehensive maps and valuable hazard information.

Landslide events often occur within the boundaries of pre-existing deep-seated landslide deposits. In a 2008 study using LIDAR, a total of 231 landslides were identified, all of which were assigned a confidence interval of high or moderate to indicate how confident the USGS was that the event occurred. According to this study, landslides represented 0.8% of the land area of Kitsap County. Landslide events in Kitsap County were concentrated in the coastal areas on Puget Sound, Port Orchard Channel, Hood Canal, and Colvos Passage. The largest cluster of landslide deposits appeared near Holly and Hoods Point along Hood Canal, as well as near Kingston in the northeastern part of Kitsap County along Puget Sound.⁶²

City	Buildings within Landslide	Building Value with Landslide
	Zone	Zone
Bainbridge Island	177	\$55 million
Port Orchard	66	\$8.1million
Poulsbo	40	\$9.8 million
Unincorporated County	766	\$137 million
Suquamish Tribe	21	\$1.9 million
Total	1070	\$211 million

Table 28: Building Exposure to Landslides

Landslides are common in areas with steeper slopes and wet environments, which are also often locations of greater ecological diversity. Landslides mobilize soil and often stress rehabilitative regeneration processes within upland denuded areas. This soil loss is often permanent. Also, landslide debris can block watercourses, damming flows resulting in flooding and extreme surges when these blockages fail. These impacts often result in long-term changes. These changes can be beneficial to fluvial habitats while, as a result of soil losses, detrimental to upland ones.

The Landslide Hazard map on the following page shows detailed information on deep and shallow landslides, as well as limited areas of more intense rural development, waterbodies, and watercourses of Kitsap County. Figure 21 is an Erosion Hazard map moderate to severe land and coastal erosion.

⁶² FEMA Risk Report for Kitsap County (2015)



Figure 21: Landslide Hazard Map

Legend

Erosion Hazard Very severe

Severe Moderate

Channel Migration Zone

High Geologic Hazards Big Beef Creek, Chico Creek, Curley Creek and Tahuya

Coastal Erosion

High Moderate Low Tax Parcels Unincorporated Urban Growth Area Incorporated City Reservation Boundaries

Limited Areas of More Intense Rural Development

Type I

Limited Area of More Intense Rural Development - Type I RCW 35.706.705(5)(d)()) Mixed use areas or small communities intensively developed by 1990, where limited infill development is appropriate.

Type III Umited Area of More Intense Rural Development - Type III RCW 36.704.070(5)(0)() Lots containing isolated non-residential uses of new developmen

Street Center Lines

- State Highway
- Major Road
- Collector / Arterial
 Local Access; Local Road
- Local Access; Local Road
- --- Railroad Lines
- Ferry Terminals
- --- Ferry Routes

Waterbodies (defined in WAC 222-16-030) WaterBody Cartographic Feature Code

- Bay, estuary, Puget Sound
- Lake, Pond, Reservoir, Gravel pit or quarry filled with water Marsh, wetland, swamp, bog
- Watercourses (defined in WAC 222-16-030)

Fish Habitat Water Type Code

(S) Designated Shoreline of the State

- (F) Fish Habitat
- (N) Non-fish Habitat

Geologically Hazardous Map EROSION HAZARDS KITSAP COUNTY

Figure 22: Erosion Hazard Map

Canal

Climate Change Impacts

Climate change is increasing landslides and sediment transport through changes in rainfall, snowpack, and streamflow. Climate change is also increasing the probability of wildland fires, which, in turn, contribute to increases in the likelihood of landslides.

The Puget Sound region is expected to experience increases in the frequency of landslides and the rate of erosion and sediment transport in winter and spring, primarily as a result of continued declines in snowpack and projected increases in the frequency and intensity of heavy rain events. In summer, these processes are expected to become less important in the future, due to diminishing streamflow and drier soils. Both natural climate variability and human modification to the landscape have a strong effect on landslide and sediment processes and will continue to influence these processes in the future. While a lack of direct observations makes it challenging to make robust projections, communities in the Puget Sound region are preparing for changing landslide and sediment risk through targeted regulations, climate-informed design, and floodplain infrastructure aimed at mitigating anticipated impacts.⁶³

Observations show a clear warming trend, and all scenarios project continued warming during this century. Most scenarios project that this warming will be outside of the range of historical variations by mid-century. Increasing air temperatures can facilitate soil breakdown, allow more water to penetrate soils, reduce snow accumulation, and increase the risk of wildfire and other threats to forest health, all of which can affect the rates of erosion and sediment transport and the likelihood of landslides. ⁶⁴

Heavy rain events are projected to become more intense. Current research is consistent in projecting an increase in the frequency and intensity of heavy rain events.9 These changes could result in greater erosion, higher sediment transport in rivers and streams, and a higher likelihood of landslides, primarily as a result of higher soil water content. ⁶⁵Most models are consistent in projecting a substantial decline in summer precipitation. Projected changes in other seasons and for annual precipitation are not consistent among models, and trends are generally much smaller than natural year-to-year variability. Declining precipitation in summer could result in decreased erosion, a reduced rate of sediment transport, and a lower probability of landslides. ⁶⁶Higher seas could limit the transport of sediment from rivers to Puget Sound and increase the rate of erosion in some coastal areas.

Although climate is a major driver of erosion, sediment transport, and landslide hazards, there are other factors that can have an important effect on these processes. In particular, changes in land use and land cover – both due to development and forest management – can dramatically affect the likelihood of a landslide, the exposure of sediments to erosion, and the rate of streamflow and sediment transport.⁶⁷

Kitsap County Multi-Hazard Mitigation Plan (MHMP) 2019

⁶³ Climate Impacts Group, Collect of the Environment, University of Washington <u>https://cig.uw.edu/wp-content/uploads/sites/2/2014/11/ps-sok_sec05_sediment_2015.pdf</u>

⁶⁴ Climate Impacts Group, Collect of the Environment, University of Washington

⁶⁵ Climate Impacts Group, Collect of the Environment, University of Washington

⁶⁶ Climate Impacts Group, Collect of the Environment, University of Washington

⁶⁷ Climate Impacts Group, Collect of the Environment, University of Washington <u>https://cig.uw.edu/wp-content/uploads/sites/2/2014/11/ps-sok_sec05_sediment_2015.pdf</u>

Vulnerability Summary

- Landslide/erosion vulnerability and effect on Kitsap is considered **"moderate,"** meaning there is moderate potential for a disaster of less than major proportions during the next 25 years.
- The State of Washington rates landslide losses second to flood losses for the state as a whole. The Puget Sound basin has the greatest vulnerability because of increased population density and development on and below bluffs and slopes. The county has several landslide hazard areas ranging from low to very high hazard rating. Areas with the largest landslide risk are generally at some distance from development, although an event would likely impact roads and lifelines.
- More than 50% of the county critical infrastructure facilities are located in areas exposed to landslides. (This does not include indirect impacts that may be caused by damaged road segments.) There are residential areas that could be affected by these slide areas, as well as roads and other utility infrastructure.
- The most significant effects of landslides are injury or death, disruption of transportation, and the destruction of property.
- Kitsap County continues to be impacted by landslides and erosion issues with each new winter storm. Soil erosion continues to occur, especially at steep slopes and construction sites during wind and rainstorms.
- Landslides mobilize soil and often stress rehabilitative regeneration processes within denuded areas. This soil loss is often permanent. Also, landslide debris can block watercourses, damming flows resulting in flooding and extreme surges when these blockages fail. These impacts often result in long-term changes. These changes can be beneficial to fluvial habitats while, as a result of soil losses, detrimental to upland ones.
- In conjunction with the Growth Management Act (RCW 36.70A), Kitsap County and its local jurisdictions have identified slide hazard areas and require geotechnical investigation and preventative improvements before development can take place on top of or below slopes subject to sliding through the various Critical Areas Ordinances passed within each city.
- Despite the difficulty in predicting landslides, recent research conduct by USGS in Kitsap County has been instrumental in mapping landslide areas. Using LIDAR provides essential information about Kitsap County landmass and geological history.

Conclusions

The most significant effects of landslides are injury or death, disruption of transportation, and the destruction of property. Future studies and effective land use management will help to mitigate landslide-prone areas and minimize the effect on the public and infrastructure.

Kitsap County has identified slide hazard areas and required geotechnical investigation and preventative improvements before development can take place on top of or below slopes subject to sliding through the:

- Kitsap County Critical Areas Ordinance, December 2017⁶⁸
- City of Bainbridge Island Critical Area Ordinance, January 2019⁶⁹
- City of Poulsbo Chapter 16.20 Critical Area Ordinances, July 2007⁷⁰
- Port Orchard Critical Ordinance, December 2009⁷¹
- Port Orchard Municipal Code, June 11, 2019
- City of Bremerton Critical Lands Ordinance, June 201672

However, the County needs to conduct more public education concerning the construction of single-family structures in slide hazard areas and to reduce efforts to develop these areas. Human-caused erosion at building sites must be controlled through good engineering and construction practices, i.e., the removal of trees from slopes in or near residential areas. Farming must conform to established erosion control practices to conserve topsoil.

Mitigation Strategies

Landslide Mitigation Strategy 1 Given the transition of the state LIDAR program from Kitsap County to the Department of Natural Resources: the county will be working to coordinate with State agencies to identify new funding streams and technical assistance to support local planning and LIDAR maintenance efforts. Lead Department of Community Development with support from KCDEM **Priority** High **Implementation Time** 3 years Implementation Cost Estimated \$1,000-\$5,000 **Potential Funding Source** Local, State Status To be completed.

Landslide & Erosion Mitigation Strategy 1

Utilize Public Access Television to educate on the causes of erosion and how to mitigate further erosion.			
Lead	The lead agency would be Community Development in coordination		
Priority	High		
Implementation Time	Ongoing/1-5 years		
Implementation Cost	No initial cost.		
Potential Funding Source	Covered by an agreement for public education through Bremerton		
	Kitsap Access Television (BKAT), Public Education and		
	Government (PEG) Access television station airing programming on		
	Comcast Channel 12 and WAVE Broadband channel 3.		
Status	To be completed.		

⁶⁸ <u>https://www.codepublishing.com/WA/KitsapCounty/#!/Kitsap19/Kitsap19100.html#19.100</u>

https://www.codepublishing.com/WA/BainbridgeIsland/#!/BainbridgeIsland16/BainbridgeIsland1620.html# 16.20

⁷⁰ <u>https://cityofpoulsbo.com/wp-content/uploads/2017/02/AdoptionDocumentallsections.pdf</u>

⁷¹ https://www.codepublishing.com/WA/PortOrchard/html/PortOrchard20/PortOrchard20162.html

⁷² <u>https://www.bremertonwa.gov/401/Critical-Area-Ordinance</u>

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Tsunami Mitigation Strategies



Lead Agencies	Support Agencies
Kitsap County Emergency Management Council	Washington State Division of Emergency Management
Kitsap County Department of Emergency Management	Area Chambers of Commerce
City/County Public Works Departments	City/County GIS Departments
	Washington State Department of Transportation

Hazard Overview

A tsunami consists of a series of high-energy waves that radiate outward like ripples from the area in which the generating incident occurred. These waves can travel 500 miles per hour in the open ocean. As they approach the coast, their speed decreases, and their amplitude increases, potentially reaching heights of over 100 feet. All tsunamis are potentially dangerous, even though they may not damage every coastline they strike. Damaging tsunamis are very rare. Typically, they are triggered by earthquakes, volcanic activity, and submarine landslides or, in the case of Puget Sound, most often by local landslides from surrounding bluffs. Unlike regular ocean waves, which are generated by wind or tides, a tsunami is generated by the displacement of water.

Seiches are a series of standing waves in an enclosed or partially enclosed body of water. Seiches are normally caused by an earthquake and can affect harbors, bays, lakes, rivers, and canals. Seiches are created when strong winds and rapid changes in atmospheric pressure push water from one end of a body of water to the other. When the wind stops, the water rebounds to the other side of the enclosed area. The water then continues to oscillate back and forth for hours or even days. Similarly, earthquakes, tsunamis, or severe storm fronts may also cause seiches along ocean shelves and ocean harbors.

Location

Kitsap County's coastlines are vulnerable, but tsunamis are infrequent. Areas at highest risk are generally 25 feet from sea level, and above to 25 feet, and within one mile of the shoreline. Most deaths are caused by drowning. Associated risks include flooding, contamination of drinking water, and fire from ruptured tanks and gas lines. Earthquakes or landslides can also cause inland tsunamis. Landmasses falling into the water can create a wave that would affect low-lying areas such as Dyes Inlet and Sinclair Inlet. Waves created by inland tsunamis can cause damage to ports, marinas and other structures or businesses on the waterfront. The figures on the following page show maximum inundation depths and potential inundation zones.



Figure 23: Maximum Inundation Depths for the Tsunami Generated by the Seattle Fault Scenario



Figure 24: Potential Tsunami Inundation Zone showing the Cities of Bremerton and Port Orchard (Kitsap County GIS 2011)

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Effects

Much of Kitsap County is surrounded by water, from the Puget Sound to the Hood Canal. With so much shoreline in the county, a tsunami, high waves, or a seiche would have a devastating effect on Kitsap County residents. Flooding would occur, property damage would be sustained, and residents would be displaced.

Aside from the tremendous hydraulic force of the tsunami waves themselves, floating debris carried by a tsunami can endanger human lives and batter inland structures. Ships moored at piers and in harbors often are swamped and sunk or are left battered and stranded high on the shore. Breakwaters and piers collapse, sometimes because of scouring actions that sweep away their foundation material and sometimes because of the sheer impact of the waves.

Port facilities, naval facilities, ferry terminals, fishing fleets, and public utilities are frequently the backbone of the economy of the affected areas, and these are the very resources that generally receive the most severe damage. Until debris can be cleared, wharves and piers rebuilt, utilities restored, and the fishing fleets reconstituted, communities may find themselves without fuel, food, transportation, and employment. Wherever water transport is a vital means of supply, disruption of coastal systems caused by tsunamis can have far-reaching economic effects. Seiches create a "sloshing" effect on bodies of water and liquids in containers. This primary effect can cause damage to moored boats, piers, and facilities close to the water. Secondary problems, including landslides and floods, are related to accelerated water movements and elevated water levels.

Extent

Simulated wave heights of 13-17 feet indicate that tsunamis are not only a threat to the infrastructure in Gorst but also the naval base at Bremerton. Even an order-of-magnitude smaller Tacoma fault-generated tsunami would generate strong currents in the narrow straits and harbors near Gorst. Further tsunami simulations in the Puget Lowland, including different fault scenarios, would help determine the degree of hazard posed by locally generated tsunamis. A tsunami can significantly affect the Cities of Bremerton and Port Orchard as well as the Puget Sound Naval Shipyard.

Building Stock and Critical Facilities by Jurisdiction Affected by Tsunami ⁷³						
Jurisdiction	Total Building Stock	Building Stock in Hazard Area	% Building Stock in Hazard Area Jurisdiction	Total Critical Facilities	Total Critical Facilities in Hazard Area	% Critical Facilities in Hazard Area Jurisdiction
Unincorporated Kitsap County	87,985	3826	4.3	249	12	4.8
Bainbridge Island	12,639	1238	9.7	83	5	6.0
Bremerton	13,683	739	5.4	64	4	6.2
Port Orchard	6,708	194	2.9	39	2	5.1
Poulsbo	3,516	115	3.3	66	3	4.5
Port Madison Suquamish Reservation	4,579	265	5.9	7	1	1.4

73 Kitsap County GIS figures 2012

Building Stock and Critical Facilities by Jurisdiction Affected by Tsunami ⁷³						
Jurisdiction	Total Building Stock	Building Stock in Hazard Area	% Building Stock in Hazard Area Jurisdiction	Total Critical Facilities	Total Critical Facilities in Hazard Area	% Critical Facilities in Hazard Area Jurisdiction
Port Gamble S'Klallam Reservation	270	4	1.5	5	0	0
Totals (Kitsap)	129,380	6377	4.9%	513	27	5.2

Table 29: Building Stock and Critical Facilities by Jurisdiction Affected by Tsunami

Figure 25 describes the four main types of tsunami risk in Washington and their areas of greatest risk. Each type affects different parts of the State. Emergency planners and hazard geologists are working hard to learn more about these risks. The Seattle Fault presents the biggest know tsunami threat to Kitsap County.⁷⁴

Types of tsunami risk		
Type of tsunami	Description	Area of greatest impact
Distant	A tsunami is created by a distant earthquake or landslide and travels across the ocean	Pacific coastal communities
Cascadia subduction zone	Tsunami created by large Magnitude 8–9 earthquake off the Washington, Oregon, or British Columbia coasts	Pacific coastal communities
Local earthquake (for example, the Seattle or Tacoma faults)	Tsunami created in large body of water from an earthquake on local faults	Communities close to the body of water
Landslide-caused tsunami	Large landslide occurs underwater or slides from land into water	Depends on where the landslide occurs

Figure 25: Types of Tsunami Risk (WADNR)

⁷⁴ Washington Department of Transportation

Washington has three major earthquake sources that have the potential to cause tsunamis: subduction zone earthquakes, deep (Benioff Zone) earthquakes, and shallow crustal fault earthquakes.

Deep (Benioff zone) earthquakes do not produce tsunamis. However, they may trigger landslides that could generate tsunamis. Image adapted from USGS.

Cascadia Subduction Zone Earthquakes⁷⁵

The Cascadia subduction zone off the coast of Washington, British Columbia, Oregon, and northern California is the biggest tsunami hazard for Washington State. subduction zone earthquakes are capable of generating some of the largest and most damaging earthquakes in the world, the Cascadia Subduction Zone off our coast is one of these faults. These earthquakes also cause very large and damaging tsunamis. The following series of diagrams show how tsunamis are created along the Cascadia subduction zone.

Areas uplifted offshore will create a tsunami wave that will inundate coastal areas that have already subsided from the earthquake as seen in the graphic to the right (Zones of uplift and subsidence during a Cascadia subduction zone earthquake. Image modified from a diagram by Carrie Garrison-Laney (WA SeaGrant).

Crustal Faults

Other faults in Washington, such as the Seattle Fault, can also move the ocean floor and cause tsunamis. The Seattle Fault is known to have had an earthquake event that directly produced a tsunami and other crustal faults (Tacoma Fault and Darrington-Devils Mountain fault zone, for example) could produce tsunamis (Williams and others, 2000).

Additionally, there are numerous landslidegenerated tsunami deposits that were triggered by

Plate Figure 27: Schematic diagram of the sequence of events in a Cascadia Subduction Zone earthquake.

local earthquakes found throughout Puget Sound. For this reason, we consider all active crustal faults that are near to Puget Sound to be a possible direct or indirect source of future tsunamis. Models for tsunami inundation in parts of the Puget Sound exist for the Seattle and Tacoma faults and can be found on the Geologic Information Portal.

Distant Events

Tsunamis generated from earthquakes at other subduction zones and faults around the Pacific Ocean have the potential to impact our shores. Of the numerous historical events that have occurred, only the 1964 Alaska earthquake-generated tsunami has caused damage to the Washington coast. Most tsunami alert messages received for Washington are related to earthquakes in Alaska.



⁷⁵ https://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards/Tsunamis#tsunamis-inwashington.4

Kitsap County Multi-Hazard Mitigation Plan (MHMP) 2019



History

It is believed that the magnitude 7.0 earthquake that occurred on the Seattle fault 1,100 years ago caused a tsunami. Recent studies suggest historical evidence of a 13-17-foot tsunami hitting the Gorst area of Sinclair Inlet. The tsunami may have been an outcome of a Seattle fault earthquake or possibly other incidents cataclysmic enough to cause an 18-foot tidal wave in the Puget Sound.⁷⁶ The study reiterates the threat of multiple hazards associated with earthquakes in the Puget Lowland, of which tsunamis are prominent in the case of Sinclair Inlet.

An earthquake-induced landslide in 1949 at Salmon Beach in the Tacoma Narrows generated a 6-8-foot tsunami that hit Gig Harbor. It moved both directions within the Narrows probably reaching portions of south Kitsap County. East Passage and Colvos Passage form a direct connection from the area where the Seattle Fault crosses Puget Sound and Kitsap County. Because of this, it is highly likely that any tsunami generated by the large earthquake on that fault approximately 1100 years ago propagated south to at least some portions of the county.⁷⁷ The following figure is a graphic depiction of the history of tsunamis in Washington by the Washington Department of Natural Resources.



Figure 28: Tsunamis in Washington

 ⁷⁶ The A.D. 900–930 Seattle-Fault-Zone Earthquake with a Wider Coseismic Rupture Patch and Postseismic Submergence: Inferences from New Sedimentary Evidence, Maria Arcos.
 <u>http://faculty.washington.edu/cpetroff/wordpress/wp-</u> <u>content/uploads/2012/10/Arcos_2012_Seattle_fault.pdf</u>
 ⁷⁷ Kitsap County Hazard Identification & Vulnerability Assessment (2015)

Probability of Future Events

Tsunamis generated elsewhere on the Pacific Rim are the ones that strike Washington most often, although effects on Kitsap County are lessened due to the location of the County's shoreline in the Puget Sound. The Seattle Fault presents the biggest know tsunami threat to Kitsap County. Impacts would be diminished due to not being located directly on the Pacific Coast. It is therefore difficult to estimate the future probability of tsunamis. It is estimated that an earthquake (M8 or M9) in the Washington portion of the Cascadia Subduction Zone would likely produce a significant tsunami with major damaging and life-threatening impacts along the coastal shoreline communities. According to the Pacific Northwest Seismic Network, there is a 10-20% chance of a Cascadia Subduction Zone earthquake in the next 50 years.⁷⁸

The Seattle fault is active and capable of generating a large earthquake with a magnitude greater than 7.0. A 2005 study by Koshimura and Mofjeld modeled the potential effects of a tsunami caused by a 7.0 magnitude earthquake at major ports and harbors in Puget Sound as well as at several communities in Kitsap County, such as Bremerton and Port Orchard. The model indicated that at Bremerton and Port Orchard, the local seismic uplift would generate a 1.5m tsunami at the moment of the earthquake, with inundation occurring primarily along the southern shore of Sinclair Inlet and the northern and southern shore of Dyes Inlet. The estimated flow depths range between two meters at the shore of Port Orchard, 4m at the northern shore of Dyes Inlet, and two meters at the southern shore of Dyes Inlet. The results of this model are shown in the following figure. A tsunami in these developed areas would affect homes, schools, businesses, ports, harbors, shipyards, marinas, transportation infrastructure, utilities, and coastal ecosystems.

Great earthquakes in the North Pacific or along the Pacific coast of South America historically generate tsunamis that sweep through the entire Pacific basin occur at a rate of about six every 100 years.⁷⁹ Local earthquakes and landslides that generate tsunamis occur more frequently, although scientists have not calculated a specific rate of occurrence. The communities within the county that are potentially at risk are Bainbridge Island, Navy Yard City, Silverdale, Bremerton, Parkwood, Suquamish, Erlands Point, Port Orchard, Tracyton, Manchester, and Poulsbo.

A tsunami cannot be precisely predicted, even if the magnitude and location of an earthquake are known. Geologists, oceanographers, and seismologists analyze each earthquake and, based on many factors, may issue a tsunami warning. However, there are some warning signs of an impending tsunami, and automated systems can provide warnings immediately after an earthquake in time to save lives. One of the most successful systems uses bottom pressure sensors, attached to buoys, which constantly monitor the pressure of the overlying water column.

⁷⁸ Washington State Enhanced Hazard Mitigation Plan (2018)

⁷⁹ International Tsunami Information Center <u>http://itic.ioc-</u> <u>unesco.org/index.php?option=com_content&view=article&id=1163:where-and-how-frequently-are-</u> <u>tsunamis-generated&catid=1340&Itemid=2055</u>

Kitsap County Multi-Hazard Mitigation Plan (MHMP) 2019

Climate Change Impacts

In the coastal zone, the effects of sea-level rise, erosion, inundation, threats to infrastructure and habitat, and increasing ocean acidity collectively pose a significant threat to the region.

With diverse landforms (e.g., beaches, rocky shorelines, estuaries), the Northwest coast may experience a wide range of climate impacts. Global sea levels have risen about 8 inches since 1900, with about 3 of those inches (about 7 cm) occurring since 1993. Much of the Pacific Northwest coastline is rising due to tectonic uplift, which raises the land surface. A major earthquake along the Cascadia subduction zone would immediately reverse centuries of uplift and potentially increase relative sea level by a meter or more.⁸⁰ Changes to sea level have an inherent impact on the potential reach of a tsunami.

Vulnerability Summary

- Tsunami vulnerability and effect on Kitsap County is considered "moderate," meaning there is a moderate potential for a disaster of less than major proportions during the next 25 years. The tsunami threat to the County comes from local earthquakes, rather than distant ones. The 2018 Washington State Hazard Mitigation Plan rates tsunami risk in Kitsap County as "low," but the plan's tsunami risk analysis is limited to the coastal shoreline counties in Washington State. It also does not address distant tsunami impacts or incidents caused by crustal shallow zone earthquakes.⁸¹
- Kitsap County is vulnerable to tsunamis, high waves, and seiches due to its vulnerability to storms and earthquakes. Among the most susceptible elements of the community are the marine enterprises, public port facilities, defense establishments and the hundreds of private residences lining the shorelines of Sinclair and Dyes Inlets; these entities either need or prefer a shore location. Located on filled ground, over water, or at the foot of steep shoreline bluffs, the structures housing employees, customers, military personnel, visitors, or residents are in harm's way for tsunami inundation and strong currents, landslides, and soil failure during and after strong ground shaking.
- Vulnerability issues include loss of life, debris, natural resources damage, transportation infrastructure, utilities, and shoreline development.
- Earthquakes will occur and could cause a tsunami. Earthquakes and other underwater disturbances could occur and cause general or localized damage from a tsunami or a seiche. Damage from a tsunami or a seiche may range from insignificant to catastrophic.
- In the past few years, Kitsap County GIS has developed maps and data on the potential for a worst-case tsunami scenario defined as a 25-foot wave height hitting anywhere along the coastline of Kitsap County. In the future, updates to this HIVA will continue to revise the shoreline analysis and evaluate tsunamis based on more credible data.

Kitsap County Multi-Hazard Mitigation Plan (MHMP) 2019

⁸⁰ National Research Council,

http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=13389 ⁸¹ Washington State Enhanced Hazard Mitigation Plan (2018)

Conclusions

Earthquakes will occur and could cause a tsunami. Earthquakes and other underwater disturbances could occur and cause general or localized damage from a tsunami or a seiche. Damage from a tsunami or a seiche may range from insignificant to catastrophic.

Education of the affected populations, proper zoning, and suitable structural design can aid in reducing the disastrous effect of this natural hazard. If the warning is received early enough (2 to 5 hours), which is possible for tsunamis generated at a distance, hasty preventive action can be taken: people can be evacuated, ships can clear harbors or seek safer anchorage, and buildings can be closed, shuttered, and sandbagged. For tsunamis generated by local earthquake or landslide events, however, the time from initiation of a tsunami to its arrival at the shore can be less than a minute. Residents in areas susceptible to tsunamis should be made aware of the need to seek high ground if they feel strong ground shaking.

Tsunamis or seiches that occur in Kitsap County have the potential to cause property damage and casualties. Public education on tsunamis and seiches is normally included in disaster preparedness classes as a subset of earthquake damage. Although much work has been done on disaster preparedness for the public, local governments, emergency planners and the citizenry need to recognize the dangers and effects of tsunamis and seiches as a component of the earthquake hazard.

Mitigation Strategies

Tsunami Mitigation Strategy 1		
Training: Design and schedule a series of workshops to train local waterfront facilities and businesses in the development of appropriate evacuation plans.		
 Workshops should serve the tsunami threat, infor assessing their particula Tsunami Preparedness Training, and (3) Evacua This strategy should be Plan Washington State Washington Sea Grant f Ports & Harbors project. 	to educate local waterfront facilities and businesses to the nature of m them of all available options for evacuation, and train them in r facility. This project will require a minimum of 3 workshops: (1) and Mitigation for Waterfront Businesses, (2) Facility Assessment tion Planning for Waterfront Businesses. approached in a manner consistent with the Education & Outreach EMD and its Inner Coastal Tsunami Workgroup, proposed by or the Reducing Earthquake Tsunami Hazards in Pacific Northwest	
Lead	The lead agency for this strategy should be the Department of Emergency Management with additional support required from Inner Coastal Tsunami Workgroup. Additionally, involvement by the Local Chambers of Commerce and local business owners should be requested. Additional resources may be available through the Washington Sea Grant Program	
Priority	High	
Implementation Time	1 to 2 years	
Implementation Cost	Minimal costs will be associated with the man-hours needed to design and plan for the workshops. Additionally, costs may be incurred in securing appropriate venues for holding the workshops and/or materials provided. Total costs should not exceed \$5000.	
Potential Funding Source	Local	

Status	In progress. This is an ongoing project but has been added to every
	presentation done by Emergency Management

Tsunami Mitigation Strategy 2

Education & Outreach: Develop informational brochures to be placed at waterfront businesses (e.g., ferry terminals, marinas, hotels) to educate and inform visitors and tourists. Brochures should focus on being non-threatening and informative in nature.

- Washington State Emergency Management Division currently offers an informational tsunami brochure (free of cost) to the public.
- Recommend working with State EMD to tailor existing brochure to local needs.

Lead	The lead agency should be KCDEM in coordination with the Washington State Emergency Management Division, Local Chambers of Commerce and Emergency Management Council.
Priority	High
Implementation Time	1 to 2 years
Implementation Cost	The estimated cost per brochure is \$1.50. A total of 1500 brochures will be needed. Total cost: \$3000.
Potential Funding Source	Local
Status	This strategy should be implemented with WA State partnership in the next biennium.

Tsunami Mitigation Strategy 3

Debris/Hazardous Materials: Conduct a tabletop exercise to simulate a large-scale debris removal effort associated with a significant earthquake-tsunami event to assess the current state of readiness to respond to such a need.

- This exercise should consider the involvement of individuals outside of the local jurisdictions for the purposes of mutual aid and resource allocation discussions.
- Exercise should have a strong focus on the presence of hazardous materials on both land and water and test the effects this would have on debris removal.
- The exercise will be based on the 2019 Debris Management Plan and utilized to validate the plan.

Lead	Public Works, Public Health, and KCDEM
Priority	High
Implementation Time	1 to 2 years
Implementation Cost	In kind
Potential Funding Source	In kind/Local
Status	To be completed.

Tsunami Mitigation Strategy 4

Public Outreach and Education: Provide public outreach and education regarding the potential impact of tsunamis and high waves on Kitsap County using maps and information from historical and simulated events.

Lead	KCDEM Outreach and Education
Priority	High
Implementation Time	Ongoing

Implementation Cost	No immediate cost
Potential Funding Source	Local
Status	In progress. This is an ongoing initiative.

Tsunami Mitigation Strategy 5

Public warning and education regarding tsunami hazards.

• Warning times for tsunami within Puget Sound are significantly less (30 seconds – 5 minutes) than warnings for the outer coast.

Lead	KCDEM Outreach and Education
Priority	High
Implementation Time	1 year
Implementation Cost	Total cost: \$5,000
Potential Funding Source	Local, State
Status	In progress. The strategy is the focus on education to the public with both State and County education materials adapted to Kitsap County and its risk from Tsunami. Key messaging is: "The Shaking is the Warning."

Earthquake/Tsunami Mitigation Strategy 6

Develop a plan to address resiliency and redundancy, including identifying gaps in the transportation network.

- Goals: Capacity and Resiliency
- Add SR 16/3

Lead	Washington Department of Transportation and KCDEM
Priority	Moderate
Implementation Time	By 2024
Implementation Cost	Estimated up to \$100,000
Potential Funding Source	Local, State, Federal
Status	To be completed.

Earthquake/Tsunami Mitigation Strategy 7

Mitigate for Agate Passage Bridge closure: utilize maritime alternatives to move passengers and freight.

- Goal: Exercise maritime alternatives
- Last done in 2008
- Can be completed as an exercise

Lead	Washington Department of Transportation and KCDEM
Priority	Moderate
Implementation Time	1 to 5 years
Implementation Cost	Estimated \$50,000
Potential Funding Source	Local, State, Federal
Status	To be completed.

Wildfire & Urban Fire Mitigation Strategies

Lead Agencies	Support Agencies
Kitsap County Fire Marshall	Kitsap County Department of Emergency Management
Kitsap County Fire Agencies	
Special Fire Districts	

Hazard Overview

Wildfires and urban fires are unplanned fires that burn in a natural area such as a forest, grassland, or prairie, or in an urban setting such as a town or city. They can be caused by humans, lightning, machinery, and utilities. Fires can disrupt transportation, gas, power, and communications, and the risk increases during periods of little rain and high winds.

Location



Figure 29: Federal Fire Occurrence Map 1980-2016 (USGS)

With much of the county in various stages of forestation, all nearly areas are vulnerable to fire. Humancaused fires in both urban and wild environments can happen during all times of the year. More prevalent use of building synthetic and furniture materials can also significantly accelerate fires once ignited.

Effects

Many individual homes and developments border forestland. Drought conditions often increase the fire danger in early fall. Urban forest fires can be caused by a number of different scenarios, but are most likely to be started by campfires, along highways from sparking sources or careless drivers, or electrical fires from high wind events. Most recent fires in Kitsap County were human-caused and extinguished before major damage occurred.

Forest fires may result in the loss of timber resources, wildlife habitats, watersheds, and recreational areas, as well as increased vulnerability to flooding and landslides. It would take a significant fire to cause severe effects on Kitsap County, but an urban fire affecting an economic corridor could also be detrimental.

In Kitsap County, approximately \$4.2 million worth of general building stock lies in areas with moderate or higher wildfire exposure.⁸²

Extent

Historically, wildland fire burns approximately 23,000 acres of State-owned or protected land annually. The cost of wildland fire on these lands is more than \$28 million annually in firefighting and damage to tinder, habitat, property, soil mobilization, landslides, and flooding. Between 1960 and 2017, the state experienced 170 wildfire incidents.⁸³

History

It is difficult to trace the fire history of this area back more than 350 years. However, old-growth trees and fire scars suggest fires about 450, 480, 540, and 670 years ago. Fire is a normal part of most forest and range ecosystems, so fires historically burned on a fairly regular cycle. The latest forest fires to occur took place in Kitsap and Mason Counties in 2013. These fires were contained but required the response of State Fire Mobilization to help in this effort. As of 2019, there have been no more recent forest/urban fires that have required State Fire Mobilization.

The burning cycle in western Washington appears to have occurred about every 100-150 years. Logging of old-growth trees, old trees felled by major windstorms, and more recent fires in the area have erased or compromised evidence of historic forest fires in Kitsap County, making it difficult to determine if the historic burning cycle remains true today. However, recorded information indicates Kitsap County has had an active history of fire. As communities expand farther into forested lands, and there is a desire to maintain the wilderness ambiance, urban interface fires are becoming a significant hazard. Urban interface fires create the potential for loss of life and destruction of property.

Probability of Future Events

Wildfires and urban interface fires are possible and will occur in Kitsap County. Sources of ignition include lightning, arson, recreational activities, debris burning by individuals or logging companies, and carelessness with fireworks. Human negligence causes about 84% of forest fires,⁸⁴ such as failing to extinguish smoking materials or campfires properly.

Washington State's fire season usually runs from July through October,⁸⁵ although large fires can occur during the winter. The probability of an interface fire in any one locality on a particular day

https://www.pnas.org/content/114/11/2946

⁸² Washington State Enhanced Hazard Mitigation Plan (2018)

⁸³ Washington State Enhanced Hazard Mitigation Plan (2018)

⁸⁴ Human-started wildfires expand the fire niche across the United States (2017)

⁸⁵ Washington State Enhanced Hazard Mitigation Plan (2018)

depends on any of the following activities and events: fuel conditions, topography, time of year, past and present weather conditions, construction, and human activities (e.g., debris burning, land clearing, camping). Any prolonged period of lack of precipitation presents a potentially dangerous impact. Prolonged periods of strong winds can also create dry conditions.

Population by Jurisdiction Affected by Fire in Kitsap County (2012) ⁸⁶					
Jurisdiction	Total Population	Population in Hazard Area	% Population Affected by Hazard		
Unincorporated Kitsap County	164,595	164,595	100		
Bainbridge Island	22,010	22,010	100		
Bremerton	37,729	37,729	100		
Port Orchard	11,144	11,144	100		
Poulsbo	9,200	9,200	100		
Port Madison Suquamish Reservation	5600	5600	100		
Port Gamble S'Klallam Reservation	1200	1200	100		
Totals	258,278	258,278	100%		

Table 30: Population by Jurisdiction Affected by Fire in Kitsap County (2012

Building Stock and Critical Facilities by Jurisdiction Affected by Fire ⁸⁷						
Jurisdiction	Total Building Stock	Building Stock in Hazard Area	% Building Stock in Hazard Area Jurisdiction	Total Critical Facilities	Total Critical Facilities in Hazard Area	% Critical Facilities in Hazard Area Jurisdiction
Unincorporated Kitsap County	87,985	87,985	100	249	249	100
Bainbridge Island	12,639	12,639	100	83	83	100
Bremerton	13,683	13,683	100	64	64	100
Port Orchard	6,708	6,708	100	39	39	100
Poulsbo	3,516	3,516	100	66	66	100
Port Madison Suquamish Reservation	4,579	4,579	100	7	7	100
Port Gamble S'Klallam Reservation	270	270	100	5	5	100
Totals (Kitsap)	129,380	129,380	100%	513	513	100%

Table 31: Building Stock and Critical Facilities by Jurisdiction Affected by Fire

⁸⁶ Kitsap County GIS figures 2012

⁸⁷ Kitsap County GIS figures 2012

Climate Change Impacts

Climate change, coupled with the current high fuel and vegetation status of the forest, suggests that high-intensity fires will continue to degrade the landscape. Winters are becoming shorter and wetter with less snow, while summers are becoming drier and more protracted. This process is resulting in the generation of flash fuels (highly combustible fine fuels such as grass, leaves, draped pine needles, fern, tree moss and some kinds of slash, which ignite readily and are consumed rapidly when dry⁸⁸), and uncharacteristically denser forests and are stressing normal regenerative processes and increasing wildfire risk.

The ecosystem in Kitsap County thrives from its rainfall each year. Kitsap County water supply is based on large aquifers that are replenished each year with rain. Rain fills many creeks and rivers in Kitsap. Less rain and drier conditions may produce an increase in forest fires and potentially residential communities as well. The combined impacts of increasing wildfire, insect outbreaks, and tree diseases are already causing widespread tree die-off and long-term transformation of forest landscapes. More effort in managing forested areas including ground thinning of potential fuel sources will help to mitigate forest fires, as well as reducing the thinning of forest canopies and surfaces.

Vulnerability Summary

- Forest and urban fire vulnerability and effect on Kitsap are considered **"moderate,"** meaning there is moderate potential for a disaster of less than major proportions during the next 25 years.
- Kitsap County's forests will remain vulnerable to forest and wildland fires. The probability of forest and wildland fires will continually change depending on variables such as drought effects, lightning strikes, careless campers, etc.
- The existence of large forested areas, increasing population and recreational activities, and the uncertain impact of a changing climate combine to suggest a moderate probability of occurrence. The destruction of large tracts of forest land would have an immediate economic impact to the community through lost jobs, reduced taxes, and increased public support while collateral economic and social effects could impact the county for years, suggesting moderate vulnerability.

Conclusions

The following steps should be accomplished to preclude major loss of life and reduce the actual number of fires and hazard areas:

• Since the vast majority of forest and wildland fires are started by humans, fire prevention education and enforcement programs can significantly reduce the total number of forest fires.

⁸⁸ National Wildfire Coordinating Group <u>https://www.nwcg.gov/term/glossary/flash-fuels</u>

- Urban wildfires can be extremely hazardous if not contained, causing loss of life and property. Increasing public education on wildland fires and improving agency response will help to minimize the spread of fires.
- An effective early fire detection program and emergency communications system are essential. The importance of immediately reporting any forest fire must be impressed upon local residents and people utilizing the forest areas.
- An effective warning system is essential to notify local inhabitants and visitors in the area of the fire. An evacuation plan detailing primary and alternative escape routes is also essential.
- Fire-safe development planning by County and City government planners is essential.
- Encourage citizens to incorporate defensible space planning when landscaping their property.
- Road criteria should ensure adequate escape routes for new sections of development in forest areas with both ingress and egress planned.
- Road closures should be increased during peak fire periods to reduce access to fire-prone areas.

Mitigation Strategies

As of the end of October 2019, there is one identified wildfire and urban fire mitigation strategy for this iteration of the Plan. Kitsap County may add mitigation strategies during the annual review process as guided by the Fire Districts and State Emergency Management Division. The Fire Districts are currently finalizing a Fire Management and Evacuation plan that includes the Ready Set Go protocol for fire evacuation. This plan and protocol will be evaluated for county implementation as a part of the new Community Warning Systems Technical Advisory Committee in early 2020.

Wildfire & Urban Fires Mitigation Strategy 1 In coordination with local stakeholders and Fire Districts, review the current wildfire evacuation plan and perform a tabletop exercise to identify potential gaps in cooperation, coordination and cohesiveness with the State fire service mobilization				
1	plan as noted in RCW 43.43.961.			
 Incorporate the Ready, Set, Go notification protocol in the Community Warning Systems Program. Review and revise the Wildfire Evacuation Plan to reflect lessons learned and close knowledge gaps. 				
Lead	Fire Special Districts with support of KCDEM			
Priority	High			
Implementation Time 2 years				
Implementation Cost \$2,000				
Potential Funding Source Local, State				
Status	To be completed.			

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Flood Mitigation Strategies

Leading Agencies	Support Agencies
City/County Public Works Departments	City/County/Regional Organizations
City/County Community Development/Building Departments	Tribal Nations
	Conservation District
	Kitsap County Department of Emergency Management (Public Education/Recovery)

Hazard Overview

Flooding is the most common hazard occurring in Kitsap County, affecting all of the county. Approximately 10-15% of the county area lies within flood zones with a 1% and 0.2% percent chance of flooding annually. Heavy, prolonged rain in the fall, winter, or spring months often results in saturated ground, and high stream flows. Due to ground saturation, Kitsap County businesses and homes located in low-lying areas may flood during prolonged periods of rain. Wind-driven tidal flooding is also possible along the inland waters. Flooding is due to runoff, ground saturation, or tidal flooding. Structures located within floodplain areas also are susceptible to frequent flooding.

Special Flood Hazard Area Assessment ⁸⁹						
Community	Total Estimated Building Value	Percentage of Buildings in the Special Flood Hazard Area	Building Dollar Loss for a 1% Annual Chance Flood Event	Loss Ratio (Dollar Losses/To tal Building Value)	Number of Buildings in Zones AE, A	Number of Building s in Zone VE
Bainbridge Island	\$2.6 Billion	1.5%	\$3.6 Million	1.4%	136	8
Bremerton*	\$1.7 Billion	<1%	\$404,000	<1%	21	0
Port Gamble S'Klallam Tribe**	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Suquamish Tribe	\$474 Million	<1%	\$175,000	<1%	3	0
Port Orchard	\$966 Million	<1%	\$579,000	<1%	24	0
Poulsbo	\$865 Million	<1%	\$3.4 Million	<1%	7	0
Unincorporated County	\$9.7 Billion	<1%	\$5.2 Million	<1%	164	175

Location/Extent

⁸⁹ FEMA Risk Report for Kitsap County 2015

Special Flood Hazard Area Assessment ⁸⁹						
Community	Total Estimated Building Value	Percentage of Buildings in the Special Flood Hazard Area	Building Dollar Loss for a 1% Annual Chance Flood Event	Loss Ratio (Dollar Losses/To tal Building Value)	Number of Buildings in Zones AE, A	Number of Building s in Zone VE
Total	\$16.3 Billion	<1%	\$13.4 Million	<1%	355	183
Note: Loss information is included for communities in the coastal floodplain. The table includes both dollar losses and a loss ratio, which is calculated as total losses/total building value. Also included is a						

dollar losses and a loss ratio, which is calculated as total losses/total building value. Also included is a count of the buildings in Zone VE, which is the 1-percent-annual-chance coastal flood zone with wave action, and in Zones A and AE, which are riverine or coastal 1-percent-annual-chance floodplains. The loss information for the county is only for coastal SFHAs; the rest of the county's SFHAs are identified as Zones AE or A. *Information from the military base was not included in the assessment for the City of Bremerton. **No building data was available from Kitsap County for the Port Gamble S'Klallam Indian Reservation, so the results are listed as unknown.

Table 32: Special Flood Hazard Area Assessment

Flooding is the most common hazard occurring in Kitsap County, affecting its entirety. The City of Bainbridge has the largest number of buildings in the Special Flood Hazard Area (1% annual chance flood zone, also known as a 100-year flood zone) and has the highest loss ratio, which compares the losses due to flooding to the overall building value within the community. However, not all buildings within the floodplain experience damage because of flooding level and current floodplain regulations.⁹⁰ Figure 32 shows the Flood Hazard Areas of Kitsap County.

Kitsap County Public Works is currently updating the Stormwater Comprehensive Plan to identify areas that may require additional flood mitigation or water quality improvements. The update is planned to be completed in 2020 with areas of emphasis including climate change, coastal flooding, and severe storm impacts.

In 2015, FEMA created new Flood Insurance Rate Maps (FIRMSs) for Kitsap County, which included updated flood modeling for the coastline for Bainbridge, Bremerton, Port Orchard, Poulsbo, Port Gamble S'Klallam Tribe, Suquamish Tribe, and the unincorporated areas of Kitsap County. In addition to new FIRMs, flood risk assessment products were developed and used in this risk report. Depth grids for the 1%t annual chance flood were created for the coastal areas and show the level of flooding in feet for each pixel. Depth grids were used in this risk assessment to determine which properties would be affected by flooding. The figure on the next page shows the 1% annual chance depth grid for the Bremerton area.

In addition to the depth grid, a Base Flood Elevation (BFE)+ grid the following figures show the locations where flooding is 1, 2, and 3 feet above the elevation of the 1-percent-annual-chance flood (BFE). This grid can be used to represent flood events greater than the 1% annual chance flood, including potential sea-level rise. The BFE+ grid can be used to identify areas affected by increased storm surge, storms greater than the 1% annual chance event, and areas potentially

⁹⁰ FEMA Risk Report for Kitsap County (2015)

affected by sea-level rise. This dataset can be used for future land use and comprehensive planning.



Effects

The types of floods in Washington State are primarily river and creeks, surface water, flash, and tidal. Floods may result in loss of life as well as damage to residences, business establishments, public buildings, roads and bridges, utilities, agricultural land, fish and shellfish habitats, stream banks, and flood control structures.

History

Kitsap County issued disaster or emergency declarations for flooding in 1990, 1994, 1995, 1996, 1997, 1999, 2003, 2006, and 2007. Historically, flooding occurs to some extent in Kitsap County every year, especially in floodplain zones of streams. In 2007, significant rainfall following a snow event caused creeks to turn into rivers and high tides to create flooding along Kitsap's shoreline. The event resulted in a Presidential Declaration with damages to over 400 residences and \$1 million in public infrastructure damage. Hood Canal and Puget Sound beaches are often affected by flood tides compounded by heavy rainfall and high tides.⁹¹

The information in the following figures highlights communities that are already affected by flooding, including those with repetitive loss properties and flood claims, and summarizes characteristics at the community level. Data were obtained from FEMA and the U.S. Census and were current as of 2015.

⁹¹ Kitsap County HIVA (2015)



Figure 32: FEMA Flood Zone Designation



Figure 33: Watercourse and Surface Water

Probability of Future Events

Flooding will continue to occur in Kitsap County. Heavy rains are projected to intensify, increasing flood risk to all Puget Sound watersheds. The potential for major floods exists in any year and may occur at any time during the flood season. In snow accumulating watersheds, winter floods will increase as the snow line recedes. Summer flows will reduce, and the corresponding flooding will become less likely as Cascade drainages change from rain-snow systems to rain-dominant ones. It is unusual for a flood to occur without warning due to the sequential pattern of meteorological conditions needed to cause severe flooding.

The table below highlights the building value and percentage of buildings within the Special Flood Hazard Area by community. Losses for the mapped coastal floodplains are highlighted by community, and a count of buildings within the 1% annual chance floodplain is included.

Special Flood Hazard Area Assessments ⁹²						
Community	Total Estimated Building Value	Percentage of Buildings in the Special Flood Hazard Area	Building Dollar Loss for a 1% Annual Chance Flood Event	Loss Ratio (Dollar Losses/Total Building Value)	Number of Buildings in Zones AE, A	Number of Buildings in Zone VE
Bainbridge	\$2.6 billion	1.5%	\$3.6 million	1.4%	136	8
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Port Gamble S'Klallam Tribe**	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Suquamish Tribe	\$474 million	<1%	\$175,000	<1%	3	0
Port Orchard	\$966 million	<1%	\$579,000	<1%	24	0
Poulsbo	\$865 million	<1%	\$3.4 million	<1%	7	0
Unincorporated County	\$9.7 billion	<1%	\$5.2 million	<1%	164	175
Total	\$16.3 billion	<1%	\$13.4 million	<1%	355	183

Table 33: Special Flood Hazard Area Assessments

Note: Loss information is included for communities in the coastal floodplain. The table includes both dollar losses and a loss ratio, which is calculated as total losses/total building value. Also included is a count of the buildings in Zone VE, which is the 1% annual chance coastal flood zone with wave action, and in Zones A and AE, which are riverine or coastal 1-percent-annual-chance floodplains. The loss information for the county is only for coastal SFHAs; the rest of the county's SFHAs are identified as Zones AE, or A. *Information from the military base was not included in the assessment for the City of Bremerton. **No building data was available from Kitsap County for the Port Gamble S'Klallam Indian Reservation, so the results are listed as unknown.

⁹² FEMA Risk Report for Kitsap County (2015)

National Flood Insurance Program (NFIP)

Kitsap County and its four cities participate in the National Flood Insurance Program (NFIP). Each community entered into the Program at various times. Below is a brief history of Kitsap County's participation in the NFIP.

NFIP Information ⁹³								
Community	Total Population	CRS Community	Flood Claims	Repetitive Loss Properties	Total Policies	Total Insurance Coverage	Date Entered	Current Map Date
Bainbridge	23,025	Ν	6	1	234	\$64 million	7/11/7 5	2/3/17
Bremerton	37,729	Ν	5	0	52	\$15 million	5/27/1 975	
Port Gamble S'Klallam Tribe	851	N	0	0	0	\$0		
Suquamish Tribe	7,434	N	0	0	0	\$0		
Port Orchard	11,144	Ν	0	0	25	\$6.8 million	6/21/7 4	2/3/17
Poulsbo	9,200	Ν	0	0	49	\$8.7 million	12/6/7 4	2/3/17
Unincorpora ted County	170,035	Ν	58	1	566	\$155 million		
Total	259,418	0	69	2	926	\$318 million		

Table 34: NFIP Information

Kitsap County

In 1978 unincorporated Kitsap County entered the National Flood Insurance Program (NFIP). The most recent review of Kitsap County's participation in the NFIP was conducted in February 2010. The review called a Community Assistance Visit (CAV) found that the discrepancies identified in the previous CAV (2002) had resulted in amendments to Kitsap County Code Title 15 (Flood Ordinance). These amendments resulted in improved processes for development in flood-prone zones, enhanced GIS map layering to identify flood hazard areas and permit tracking processes for flood hazard area development. The Kitsap County Board of Commissioners approved these amendments in KCC Title 15; the most recent amendment approval process was February 2010. The following map and table show the NFIP FIRM Panels and jurisdiction information from the FEMA Flood Insurance Study on Kitsap County from 2017. As of October 2019, there are no repetitive or severe repetitive loss properties identified in the planning area.

⁹³ FEMA Risk Report for Kitsap County (2015)



Figure 34: NFIP FIRMS Panel Map

Community	CID	HUC-8 Sub- Basin(s)	Located on FIRM Panel
City of	530307	17110019	53035C0230F, 53035C0235F, 53035C0240F,
Bainbridge			53035C0243F, 53035C0244F, 53035C0245F,
Island			53035C0263F, 53035C0265F, 53035C0379F,
			53035C0380F, 53035C0381F, 53035C0382F,
			53035C0383F, 53035C0384F, 53035C0405F
City of	530093	17110018,	53035C0335E, 53035C0343E, 53035C0344E,
Bremerton		17110019	53035C0345E*, 53035C0352F, 53035C0353E,
			53035C0354F, 53035C0360F, 53035C0364F,
			53035C0365F, 53035C0366F, 53035C0367F,
			53035C0368F, 53035C0380F, 53035C0390F,
			53035C0450E, 53035C0455E
City of Port	530094	17110019	53035C0364F, 53035C0365F, 53035C0366F,
Orchard			53035C0367F, 53035C0368F, 53035C0369E,
			53035C0390F, 53035C0455E, 53035C0457E,
			53035C0460E
City of Poulsbo	530241	17110019	53035C0094F, 53035C0095F, 53035C0115F,
			53035C0206F, 53035C0207F, 53035C0209F,
			53035C0230F

Community	CID	HUC-8 Basin(s)	Sub-	Located on FIF	RM Panel	
Kitsap County	530092	17110019		53035C0025F,	53035C0050F,	53035C0075F,
Unincorporated				53035C0085F,	53035C0094F,	53035C0095F,
Areas				53035C0100F,	53035C0105F,	53035C0110F,
				53035C0115F,	53035C0120F,	53035C0140F,
				53035C0150F,	53035C0170F,	53035C0185F,
				53035C0190F,	53035C0195F,	53035C0205F,
				53035C0206F,	53035C0207F,	53035C0208F,
				53035C0209F,	53035C0212E,	53035C0214F,
				53035C0215F,	53035C0216E,	53035C0218F,
				53035C0220F,	53035C0230F,	53035C0235F,
				53035C0240F,	53035C0244F,	53035C0245F,
				53035C0255F,	53035C0263F,	53035C0265F,
				53035C0275E*,	53035C0300F,	53035C0310F,
				53035C0320E*,	53035C0325F,	53035C0330F,
				53035C0335E,	53035C0340E,	53035C0343E,
				53035C0344E,	53035C0345E*,	53035C0351E,
				53035C0352F,	53035C0353E,	53035C0354F,
				53035C0360F,	53035C0364F,	53035C0365F,
				53035C0366F,	53035C0367F,	53035C0368F,
				53035C0369E,	53035C0379F,	53035C0380F,
				53035C0381F,	53035C0382F,	53035C0383F,
				53035C0384F,	53035C0389E,	53035C0390F,
				53035C0393F,	53035C0395F,	53035C0405F,
				53035C0415F,	53035C0450E,	53035C0455E,
				53035C0457E,	53035C0460E,	53035C0465E*,
				53035C0470E,	53035C0477E,	53035C0480E,
				53035C0485F,	53035C0490E,	53035C0495F,
				53035C0505F		

Table 35: Community FIRM Information

City of Bainbridge Island

The City of Winslow entered the Emergency Program on August 14, 1975, then converted to the National Flood Insurance Program (NFIP) effective February 5, 1986. The Island was incorporated in 1991 and became the City of Bainbridge Island with an NFIP Effective Date of March 1, 1991. The most recent review of the city's participation in the NFIP was conducted in 2004. During this Community Assistance Visit (CAV) the summarized findings from the CAV included the need for an amendment to the City's flood chapter 15.16, preparation of procedures to implement Chapter 15.16, and additional information on eleven specific cases that were cited in their fieldwork. As of February 2005, all these items were cleared, and our CAV was closed.

In 2019, the City updated the Flood Damage Protection Ordinance (FDPO) to update the requirements for FEMA compliance related to the NFIP. The City has also been involved with a Community Assistance Visit (CAV) process as FEMA has audited for compliance measures of the City's Flood Ordinance as adopted. The City continues to enforce regulations related to our FDPO and compliance with the National Flood Insurance Program (NFIP) related to the potential for flooding events.

City of Bremerton

The City of Bremerton entered the National Flood Insurance Program on May 27, 1975. The most recent review of the city's participation in the NFIP was conducted on July 23, 2008. During the visit, the City issued 2 permits that were properly conditioned for the flood elevation

certificates; however, the final Elevation Certificate was inadvertently missed. The corrective action taken by the city was to modify the permitting system computer software to more definitively request flood zone information at the time of initial application for a building permit and at construction inspection stages including prior to framing and prior to the release of final inspection certification.

Like most communities in Kitsap County, after the last major flood, 2007, the city reviewed our flooding issues and once again determined we have no repetitive loss areas in the City of Bremerton. The City of Bremerton has amended its processes as recently as August 2007 resulting in a successful CAV in July 2008.

Bremerton Municipal Code Chapter 17.60 Floodplain Management was updated under Ordinance #5231 to maintain compliance with the NFPIP on December 7, 2013.

City of Port Orchard

The City of Port Orchard entered the National Flood Insurance Program in 1978. The most recent review of the city's participation in the NFIP was conducted in 2005. During this Community Assistance Visit (CVA) the summarized findings from the CAV included the need for an amendment to the City's flood chapter 15.38, preparation of procedures to implement Chapter 15.38, and additional information on three specific cases that were cited in their fieldwork.

On September 16, 2005, the Floodplain Management Specialist responded to the City's transmittal of information by approving Ordinance No. 016-05 bringing the city into full compliance with Federal and State floodplain management requirements.

The City provided the Floodplain Management Specialist with additional information on the three specific cases sited during their visit which cleared all of the findings and closed the CAV for Port Orchard. Their conclusion was that the City is effectively regulating development in the City's flood hazard areas and they would notify FEMA of this certification.

The most recent review of the city's participation in the NFIP was completed in 2013. The City adopted amendments to its Flood Damage Prevention Standards Chapter of the Port Orchard Municipal Code at that time. This code has since been moved into the new title 20 of the Port Orchard municipal code. On September 16, 2013, the city received written confirmation that its code was compliant with 44 CRF 60.3 and 86.16 RCW.

City of Poulsbo

The City of Poulsbo entered into the National Flood Insurance Program in 1979. The most recent review of the city's participation in the NFIP was conducted in 2017. During this update, Community Assistance Visit (CAV) found no deficiencies related to city code.

NFIP Updates

In recent years, NFIP Flood Insurance Rates Maps (FIRM) have been revised. Some zones changed to reflect better data and evaluation regarding coastlines and their related issues, such as the effects of wakes and tides. Changes are not significant. However, the changes have increased the need for some homeowners to file for flood insurance in the NFIP.

Community Rating System

The Community Rating System (CRS) is a voluntary program for National Flood Insurance Program communities with the intent to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management. It provides an incentive for premium discounts for communities that go beyond the minimum and impose extra measures to provide protection from flooding.

Community Rating System Participation ⁹⁴			
Community	CRS Community		
Bainbridge Island	No		
Bremerton*	No		
Port Gamble S'Klallam Tribe**	No		
Suquamish Tribe	No		
Port Orchard	No		
Poulsbo	No		
Unincorporated County	No		

Table 36: Community Rating System Participation

Kitsap County is currently not eligible and has not met the full compliance with the CRS. In 2007, Kitsap County compared the cost to implement CRS versus the savings to citizens which proved insignificant. The County does not have significant flood-prone areas that would benefit from this program.

Climate Change Impacts

Climate change is increasing the extent, and the frequency of flooding, and this trend will continue. Regional warming has been linked to changes in the amount of water available in basins from seasonal snowmelt and streams. The response to change will depend on precipitation in the watersheds and other geographical changes to the landscape. In the future and as early as 2050, snowmelts are expected to be as much as four weeks earlier in the season resulting in lower summer flows. River-related issues, including flood risk, may increase in certain areas but decrease in others.

Consequently, these changes will affect reservoir systems, flood control, and the preservation of habitats. It will also affect irrigation, industrial use, and hydropower production. There will be an effect on freshwater species, like salmon, steelhead, and trout. Adaptive measures will depend on strengthening water resource infrastructure, technology, and water consumption efforts.⁹⁵

In the coastal zone, the effects of sea-level rise, erosion, inundation, threats to infrastructure and habitat, and increasing ocean acidity collectively pose a significant threat to the region. With diverse landforms (e.g., beaches, rocky shorelines, estuaries), the Northwest coast may experience a wide range of climate impacts. Global sea levels have risen about 8 inches since 1880 and are projected to rise another 1-4 feet by 2100. Much of the Pacific Northwest coastline is rising due to tectonic uplift, which raises the land surface. A major earthquake along the Cascadia subduction zone would immediately reverse centuries of uplift and potentially increase

⁹⁴ FEMA Risk Report Kitsap County 2015

⁹⁵ A Summary of the Climate Change Impacts in the United States (2014)

Kitsap County Multi-Hazard Mitigation Plan (MHMP) 2019

relative sea level 40 inches or more. Increased ocean acidity can affect marine species and consequently affect commercial harvests. Increasing coastal water temperatures and changing ecological conditions may alter the ranges, types, and abundances of marine species. Many people use the coasts for a variety of reasons as well as live there where future erosion, inundation, and flooding could adversely affect human habitats.

Kitsap County has approximately 170 miles of coastline that could potentially be affected by ocean temperature changes and changing sea levels. Kitsap County is surrounded by sensitive sea conditions that can affect water species, water quality, and the fishing industry. Any increase in sea levels will also affect coastal towns and beaches.

Vulnerability Summary

- Flood vulnerability and effect on Kitsap is considered "**moderate**" meaning there is moderate potential for a disaster of less than major proportions during the next 25 years. The risk rating is driven by infrastructure and individual residence damage. Life safety and the economy would also be impacted, and effects will be dependent on associated hazards like landslides, hazardous materials events, and dam issues.
- More than any other natural hazard, flooding represents the single biggest repetitive event that has a damaging impact on Kitsap County property and resources. Looking back over twenty years, Kitsap County has flooded (Presidentially declared disaster) at least five times with no major river causing the flooding. Kitsap County is vulnerable to urban stream flooding and localized flooding due to drainage system overload during, especially large or intense storm events. This will continue to occur until more effective flood mitigation strategies can be developed and implemented for urbanized areas that are subject to inundation by floodwater. Engineering and mitigation will have a measure of success, but it is expected that flooding will always occur during extreme storm events.
- In urban areas, flooding is primarily a product of development and its impact on watersheds and rural areas. Kitsap County has numerous large creeks and lakes and can experience significant daily rainfall during the winter, which is influenced by Puget Sound convergence zones. The Kingston area may be most susceptible to convergence zone weather.
- The Growth Management Act (RCW 36.07A) requires that all cities, towns, and counties in the state identify critical areas and establish regulations to protect and limit development in the areas designated as critical areas. Critical areas, as defined by state law, are areas that frequently flood, such as floodplains, as well as areas subject to high tides driven by strong winds. The Growth Management Act is a fundamental tool in mitigation planning. Floodplain mitigation planning and management are coordinated by local, State, and Federal agencies. RCW 86.12, Flood Control by Counties, provides counties with the power to take flood control action by levying taxes, condemning property, and undertaking flood control activities directed toward a public purpose located within their jurisdiction.
- RCW 82.26, State Participation in Flood Control Maintenance, which establishes the Flood Control Assistance Account Program, provides state funding for local flood hazard management planning and implementation efforts. RCW 86.16, Floodplain Management, states that the prevention of flood damage is a matter of statewide public

concern. Statewide building codes and regulations applied to structures during construction also aid in mitigation. FEMA Flood Maps provide additional avenues for information to residents, while the NFIP provides homeowners and renters the ability to purchase insurance coverage for flood damage. In 2011, FEMA initiated a coastal flood study to determine the effects on Kitsap's coastline from earthquake activity, tides, flooding, and potential sudden tsunamis and seiches. The study was completed in 2015 information is included and cited throughout this document.

Conclusions

Mitigation involves flood plain planning and management coordinated by local, state, and federal agencies. Building codes and regulations applied to structures aid in mitigation. Residents should have access to information on flood insurance. Where building has already occurred on flood plains, emergency preparedness in the form of sandbags, building materials, three-day evacuation kits, and alternate shelter should be part of each resident's preparation for possible flooding.

Mitigation Strategies

This section is not applicable for Unincorporated Kitsap since it does not have significant floodprone areas. Most flooding is coastal and is associated with tides during extreme events.

Flood Mitigation Strategy 1

Convene an annual meeting of interested parties to discuss Local, State, and Federal regulatory requirements related to maintenance activities in flood-prone areas.

- The purpose of this meeting would be to exchange information, coordinate future projects, and examine community-wide effects on flood-prone areas.
- This project could be used to assist in the identification of areas of critical risk.
- This project could be used to assist in the identification of areas of influence that affect critical risk areas.

Lead	Community Development with KCDEM as supporting agency		
Priority	High		
Implementation Time	Annual		
Implementation Cost	There should be no cost to hold such a meeting.		
Potential Funding Source	Local, State		
Status	To be completed.		

Flood Mitigation Strategy 2

Identify high-risk areas on Geographic Information System (GIS). Update Local stormwater system plans and improve stormwater facilities in high-risk areas.

- Identify flood and drainage problems on public roads.
- The lead agency would be the appropriate Public Works Departments.
- Local funds and potential private sector funding with possible State or Federal grant funding would be needed to implement the program.
- There are long term plans for Storm Water Management in the Kingston area of the County.
- KCPW is updating the Comprehensive Stormwater Plan as mentioned previously. While they may not be purely focused on the element envisioned, they are updating information and it is funded.

Lead	Public Works					
Priority	High					
Implementation Time	1 to 3 years and incorporate as ongoing					
Implementation Cost	\$65,000 annually - Note: It is recommended this \$65,000 annual budget be contributed towards an enhanced GIS system. Costs associated with updating individual projects, community plans, and facilities are dependent on the identification of criteria and number of projects.					
Potential Funding Source	Local, State					
Status	In progress - Public Works in process to complete this page and reference the maps of the stormwater projects planned and underway.					

Flood Mitigation Strategy 3

Kitsap County Public Works has culverts in areas that are failing, undersized for fish passage and have flooding concerns for downstream areas. Replacement funding for these locations is non-existent. These culverts are not listed in the current 6-year Transportation Improvement Program and are not funded. Kitsap County Public Works is the lead agency for implementation of this strategy and will be coordinated with Kitsap County Department of Community Development, the Department of Emergency Management and Washington State Department of Fish & Wildlife.

Prioritized Locations for Implementation

- 1. On Stottlemeyer Road NE in Poulsbo, there is a failing 24" culvert that needs immediate replacement. **COMPLETED**
- 2. North Mission Road NW in Seabeck Holly has a failing 24" culvert that has a rusted invert and a significant belly.- **COMPLETED**
- 3. Seabeck Holly Rd. NW there is two failing culverts. One of the culverts is an 18" the other is a 36" and both pipes have rust holes and need replacement.
- 4. There are two culverts on NW Newberry Hill Rd. These culverts are 36" and have significant bellies and rust.- **ON SCHEDULE FOR REPLACEMENT**
- 5. There is a concrete culvert in the holly area that is undersized for fish passage. This culvert carries high sediment loads and needs to be improved.
- 6. Banner TO BE COMPLETED
- 7. Crescent Valley TO BE COMPLETED
- 8. Washington Boulevard TO BE COMPLETED
- 9. Brownsville Highway TO BE COMPLETED

Projected Benefits

There would be less of a risk of road failure and environmental degradation to the downstream environments of these watercourses. Fish passage would be achieved, and less flooding would occur to Kitsap County infrastructure.

Lead	Public Works				
Priority	High				
Implementation Time	1 to 6 years				
Implementation Cost	The costs will be determined at the design phase of the culvert upgrade. A special resource to be considered for implementation of this strategy would be to request grant funding for design and culvert upgrade projects. Estimates for culvert replacement is \$750.000.00. This would replace up to five of the failing culverts.				
Potential Funding Source	Local, State, Federal				
Status	In progress. Partially completed.				

Flood Mitigation Strategy 4

Review and create a floodplain planning, management, and over-site program to assure compliance with the National Flood Insurance Program (NFIP) community wide.

- Distribute National Flood Insurance Program (NFIP) information in utility bills on an annual basis prior to flood season. The program lead for this strategy would require the National Flood Insurance Program to coordinate with the local utility companies to provide and distribute the information.
- Develop a plan to maintain an available supply of safety and emergency preparedness supplies. Lead agencies responsible for coordinating supplies and resource information on the availability of supplies would be the Public Works Department, American Red Cross, and KCDEM. The lead agency for sandbags would be the Public Works Department.

2019 Update: This strategy is ongoing.

• Streamline environmental compliance requirements for pre-flood prevention activities. The lead agency would be the Community Development Departments.

	The lead exercise for an Community Development and the Dublic					
Lead	I the lead agencies for are community Development and the Public					
	Works Departments.					
Priority	High					
Implementation Time	Ongoing					
Implementation Cost	No immediate cost					
Potential Funding Source	Local, State					
Status	In progress. Partially complete.					

2019 Update: This strategy is complete.

Flood Mitigation Strategy 5

Familiarize the community with the risks of "convergence zone" type of flooding. A convergence zone is caused when low atmospheric pressure combines with severe weather causing tidal overflow and watershed backup.

Lead	The lead agencies would be the Public Works Departments in coordination with KCDEM.
Priority	High
Implementation Time	Ongoing
Implementation Cost	No immediate cost
Potential Funding Source	Local
Status	In progress. Just in time messaging prior to King Tide storms and
	general flooding preparedness messaging

Severe Storms/Tornado Mitigation Strategies



Lead Agencies					Support Agencies		
Kitsap Manage	County ement	Department	of	Emergency	City/County/Regional Organizations		
Water Purveyor Association of Kitsap (Water PAK)			itsap	(Water PAK)	Tribal Nations		

Hazard Overview

Although Kitsap County has a moderate marine climate, storm activity involving rain, wind, snow, and ice does affect the County. Severe weather can happen any time, with or without notice. Severe weather can include hazardous conditions produced by thunderstorms, including damaging winds, tornadoes, large hail, flooding and flash flooding, and winter storms associated with freezing rain, sleet, snow, and strong winds.

Location

Severe weather can occur at any time or place in the county. Storms have caused significant damage to portions of Kitsap County. An EF-2 tornado occurred in December 2018, causing substantial damage in Port Orchard, including 250 homes. Lightning storms and hailstorms are less frequent but do occur.

Effects

The general effects of most severe storms are immobility and loss of utilities. Transportation routes can become blocked, travelers and commuters can become stranded, and families can be separated. Additionally, when electrical lines are damaged, other utilities such as telephones (cell and landlines), natural gas, and water and sewer systems can



Figure 35: Port Orchard 2018 Tornado Path

•

become inoperable. Physical damage to homes and facilities can occur from winds or the accumulation of snow, ice, or hail. Even a small accumulation of snow can adversely affect transportation systems.

High winds have caused extensive damage throughout the county in past years. The main effects of local storms include disruption of electrical power, accidents and transportation problems, flooding and landslides, and damage to residences and other buildings. Schools may close for several days. Businesses may function at reduced capacity for a time as employees may have difficulty getting to work or are dealing with storm-related problems at home.

There are many private roads in the county, which individuals must maintain themselves or as a cooperative group. Some communities may have one road for ingress and egress. Citizens can become frustrated if private snow removal equipment is inoperable or if extensive damage occurs to private roads and bridges. These concerns were discussed in one of the public town halls.

Information on floods can be found in the Floods Mitigation Strategies section.

Extent

Severe weather may strike during any time of the year and any time of the day. The extent depends on the type of event, duration, and severity. The 2018 Port Orchard EF-2 tornado was the strongest tornado to hit Washington State since 1986. The tornado had estimated wind speeds of 120-130 mph and was on the ground for approximately 1.4 miles. The path of the twister started at Geiger Road and ended at SE Kerri Court. It was approximately 250 to 300 yards wide.⁹⁶ Severe weather may strike during any time of the year and any time of the day. The extent depends on the type of event, duration, and severity. The table below describes theEnhanced Fujita Scale for tornados.

Enhanced Fujita Tornado Intensity Scale						
F-Scale Number	Intensity Phrase	3 Second Gust Speed	Type of Damage Done			
F0	Gale tornado	65-85 mph	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages signboards.			
F1	Moderate tornado	86-110 mph	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.			
F2	Significant tornado	111-135 mph	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.			
F3	Severe tornado	136-165 mph	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted			
F4	Devastating tornado	166-200 mph	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown, and large missiles generated.			
F5	Incredible tornado	Over 200 mph	Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel-reinforced concrete structures badly damaged.			

Table 37: Fujita Tornado Intensity Scale

⁹⁶ National Oceanic and Atmospheric administration National Weather Service Seattle (2018) <u>https://nwschat.weather.gov/p.php?pid=201812192212-KSEW-NOUS46-PNSSEW</u>

Building Stock and Critical Facilities by Jurisdiction Affected by Severe Storms ⁹⁷							
Jurisdiction Total Building Stock		Building Stock in Hazard Area	% Building Stock in Hazard Area Jurisdiction	Total Critical Facilities	Total Critical Facilities in Hazard Area	% Critical Facilities in Hazard Area Jurisdiction	
Unincorporated Kitsap County	87,985	87,985	100	249	249	100	
Bainbridge Island	12,639	12,639	100	83	83	100	
Bremerton	13,683	13,683	100	64	64	100	
Port Orchard	6,708	6,708	100	39	39	100	
Poulsbo	3,516	3,516	100	66	66	100	
Port Madison Suquamish Reservation	4,579	4,579	100	7	7	100	
Port Gamble S'Klallam Reservation	270	270	100	5	5	100	
Totals (Kitsap)	129,380	129,380	100%	513	513	100%	

Table 38: Building Stock and Critical Facilities by Jurisdiction Affected by Severe Storms

History

As stated above, the 2018 Port Orchard EF-2 tornado was the strongest tornado to hit Washington State since 1986. High winds and tornadoes have caused extensive damage through the county in past years. Another notable storm includes the "Columbus Day" storm of 1962, with hurricaneforce winds.⁹⁸ Severe winds also occurred during the Inauguration Day storm of 1993.⁹⁹ Other storms that have severely impacted Kitsap County have occurred in 1986, 1985, 1980, 1979, 1973, and 1971. The most severe snowstorms that have occurred in Kitsap County were in 1996. 1990, 1985, 1971, 1969, 1961, 1951, 1950, and 1949. Historically, the most severe storms occur during the autumn and winter months from October through February. On average, KCDEM will make preparations for three potentially dangerous storms each winter season.¹⁰⁰

Probability of Future Events

There is a high likelihood of numerous severe weather events annually in 100% of the county. However, many of these storms are likely to be small weather anomalies that may not develop into a large event. The frequency, duration, and intensity of extreme heat are expected to increase in Washington State. This will, in turn, increase other weather extremes including, severe/high winds, hail, lightning, tornadoes, and winter storms.

99 https://products.kitsapsun.com/archive/1993/01-

⁹⁷ Kitsap County GIS figures 2012

⁹⁸ https://products.kitsapsun.com/archive/2002/10-12/357425_the_big_blow_that_blew.html

^{21/279795}_high_winds_claim_5_lives_in_was.html ¹⁰⁰ Kitsap County Hazard Identification Risk Assessment (2015)

Climate Change Impacts

Severe weather events are a part of the natural climatic cycle. As such, these events play an important role in the maintenance and sustenance of local biodiversity. However, climate change, by its very nature, and following the fundamental laws of thermodynamics and the conservation of energy, is adding energy to many systems.

One can think of this process as weather having a grand volume dial, a climate-directed rheostat in which climate change is turning up the energy volume, and all atmospheric systems are impacted. This added energy in the atmosphere can result in a cascading effect of stronger winds, increased severe weather, hailstorms, greater rain intensity, and accelerated flooding.

Vulnerability Summary

- Severe storm vulnerability and effect on Kitsap is considered "**moderate**," meaning there is moderate potential for a disaster of less than major proportions during the next 25 years.
- Kitsap County remains highly vulnerable to the effects of rain, snow, and windstorms. In Kitsap County, March 2014 saw the highest amount of rain in one month—with over 12 inches recorded—and December 2018 with the most powerful tornado to ever occur in Kitsap County.
- Severe storms are a fact of life in Kitsap County. Severe wind and rainstorms do not generally impact the region for long periods, but winter snow/ice storms have shut down schools and businesses for several days. Therefore, the most severe storm Kitsap County is likely to face will be a snow/ice storm. It is not unprecedented for a winter storm to leave a long-lasting mark on the community by inflicting substantial financial damage on the area. In 2019, severe winter weather lasted from February 3-12, with temperatures dipping to 25 degrees or below for six nights with copious snowfall. By the time the storm ended, Bremerton had received 20.7 inches of snow, with other areas reporting higher numbers.¹⁰¹
- Based on historical data, the probable future severity for severe storms in the region is moderate. The probability is high, but the risk factor is reduced because of the moderate-to-low overall effect on the county.

Conclusions

Mitigation efforts include effective warning through the media. Three-five-day preparedness kits help people weather the storm if they are without normal utilities and comforts. Well-packed kits could be easily transported if an evacuation was necessary/possible. For those residents living in elevations prone to snowstorms, a 14-day preparedness kit is highly recommended. Any kit should include prescription medications.

Annually, Kitsap County conducts pre-storm season preparations to include briefings with County Officials to include schools, first responders and utilities; conduct winter season public education programs; and prepare equipment and resources for these types of events. In the past few years, Kitsap County DEM has developed and implemented new programs for winter

¹⁰¹ National Oceanic and Atmospheric Administration National Weather Service Seattle (2018)
storm mitigation, including the County's Alert and Warning Program and Damage Assessment Program.

The Alert and Warning System provides hazard information, preparedness tips, and the ability to alert the public on impending hazardous events. The Damage Assessment Program, although used primarily for assessing private and public damage during an event, provides post-event analysis to use in future predictions of storm damage and potential mitigation efforts. The program contains over 700 identified critical facilities by type and response prioritization to better assess the damage in the county and coordinated response.

Mitigation Strategy

Severe Storm/Tornado Mitigation Strategy 1			
Encourage the public secto preparedness supplies.	r to prepare and maintain 14 days of emergency		
Grant funding has been initiative.	identified and other grant opportunities will be pursued for this		
Lead	KCDEM		
Priority	High		
Implementation Time	1 to 5 years. Portions of this strategy are currently being implemented, and they are included in these recommendations to emphasize the importance of the ongoing efforts and to support a future grant application to increase the efforts.		
Implementation Cost	It is recommended that this strategy be included as part of the annual Department of Emergency Management's Public Education Program budget.		
Potential Funding Source	Local		
Status	In progress and receiving ongoing support.		

Severe Storm/Tornado Mitigation Strategy 2

Reduce the risk of casualties due to lost/reduced 911 and EOC Capabilities.

• Procure an emergency generator with backup failover UPS for the joint Emergency Operations Center/Emergency Management & Kitsap911 Facility.

Lead	KCDEM
Priority	High
Implementation Time	2020-2021
Implementation Cost	\$250,000
Potential Funding Source	Local, State, Federal
Status	Pre-Application Submitted for HMGP and PDA Grants

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Drought Mitigation Strategies



Lead Agencies	Support Agencies
Public Utility Districts (all)	Kitsap County Fire Agencies
Water Purveyors (all)	Kitsap County Health District
	Tribal Nations

Hazard Overview

According to the National Drought Mitigation Center (NDMC), "drought is defined as a deficiency of precipitation over an extended period of time (usually a season or more), resulting in a water shortage." The condition perceived as "drought" in a given location is the result of a significant decrease in water supply relative to what is "normal" in that area, particularly relative to the demands placed by humans on the water in that place. Washington State is one of the few states to have a statutory definition of drought (Revised Code of Washington Chapter 43.83B.400): "Drought condition' means that the water supply for a geographical area or for a significant portion of a geographical area is below 75% of normal and the water shortage is likely to create undue hardships."¹⁰²

Location

While Kitsap County may not experience severe drought (as defined above) frequently, the county does face abnormally dry conditions, which may impact community activities and capabilities. Drought may affect the entire county, or it can affect certain areas depending on conditions such as recent rainfall activity. The possibility of a prolonged drought does exist. Typically, average annual rainfall is about 41 inches;¹⁰³ however, there is a considerable difference in precipitation levels within the county. Several consecutive, hot, dry summer months can create parched and tinder-dry conditions. Extremely dry conditions could force the closure of forests to recreation, hunting, camping, and hiking. Campfires and outdoor burning are often limited for a couple of months each summer and longer during arid conditions.

Effects

The effects of drought can include loss of agricultural products, forest fires, loss of jobs in farming and forestry-related industries, loss of fish, and possible saltwater intrusion into the water table along Puget Sound, affecting local wells. Droughts are not expected to have a significant impact on the built environment. Drought conditions will increase the need for wildland fire suppression responses and limit the availability of supporting water sources. The primary impact of drought is expected to be on the agricultural sector.

Drought leads to an increased susceptibility to wildfires. In Washington State, 31% of critical environment areas are ranked moderate or higher for droughts.¹⁰⁴ Many of these regions include forested lands that are prone to wildfires during prolonged periods of dry weather. Drought

¹⁰² <u>https://app.leg.wa.gov/RCW/default.aspx?cite=43.83B.400</u>

¹⁰³ http://kitsapeda.org/life-work/enviable-quality-of-life/location-and-climate/

¹⁰⁴ Washington State Enhanced Hazard Mitigation Plan (2018)

conditions can impact short-term water availability and soil productivity. Persistent drought conditions for more extended periods can result in a significant threat to local ecological diversity.

Large areas supplied by one water system might have to resort to rationing. Residents on private wells may need to use water barrels if their wells become temporarily dry.

Extent

The extent of drought is presented in the table below.

	Drought Severity Classification ¹⁰⁵					
Category	Description	% of Normal Participation	Possible Impacts			
D0	Abnormally Dry	<75% for 3 months	Short-term dryness slowing planting, growth of crops or pastures; fire risk above average.			
D1	Moderate Drought	<70% for 3 months	Damage to crops, pastures; fire risk high; streams, reservoirs, or wells low; some water shortages are developing or imminent.			
D2	Severe Drought	<65% for 6 months	Crop or pasture losses likely; fire risk very high; water shortages common.			
D3	Extreme Drought	<60% for 6 months	Major crop/pasture losses; extreme fire danger; widespread water shortages.			
D4	Exceptional Drought	<65% for 12 months	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies.			

Table 39: Drought Severity Classification

Building Stock and Critical Facilities by Jurisdiction Affected by Drought ¹⁰⁶						
Jurisdiction	Total Building Stock	Building Stock in Hazard Area	% Building Stock in Hazard Area Jurisdiction	Total Critical Facilities	Total Critical Facilities in Hazard Area	% Critical Facilities in Hazard Area Jurisdiction
Unincorporated Kitsap County	87,985	87,985	100	249	249	100
Bainbridge Island	12,639	12,639	100	83	83	100
Bremerton	13,683	13,683	100	64	64	100
Port Orchard	6,708	6,708	100	39	39	100
Poulsbo	3,516	3,516	100	66	66	100
Port Madison Suquamish Reservation	4,579	4,579	100	7	7	100
Port Gamble S'Klallam Reservation	270	270	100	5	5	100%

 ¹⁰⁵ Table adapted from the US Drought Monitor Drought Severity Classification System: <u>https://droughtmonitor.unl.edu/AboutUSDM/AbouttheData/DroughtClassification.aspx</u>
 ¹⁰⁶ Kitsap County GIS figures 2012

Buildin	Building Stock and Critical Facilities by Jurisdiction Affected by Drought ¹⁰⁶					
Jurisdiction	Total Building Stock	Building Stock in Hazard Area	% Building Stock in Hazard Area Jurisdiction	Total Critical Facilities	Total Critical Facilities in Hazard Area	% Critical Facilities in Hazard Area Jurisdiction
Totals (Kitsap)	129,380	129,380	100%	513	513	100%

Table 40: Building Stock and Critical Facilities by Jurisdiction Affected by Drought

History

Historically, drought has not been considered a problem in areas west of the Cascade Mountain Range, although Kitsap County has felt its effects in the past. Multiple measurable and documented droughts have hit the region in the past 100 years, but the following three are the most notable:

- April 1934 March 1937: The longest drought in the region's history.
- October 1976 September 1977: The worst drought on record. Stream flows averaged between 30% and 70% of normal. Temperatures were higher than normal, which resulted in algae growth and fish kills.
- January March 2001: the second driest winter on record in 106 years. Stream flows approached the low levels of the 1976-77 droughts.

Since 2000, the longest duration of drought in Washington State lasted 116 weeks beginning on January 7, 2014 and ending on March 22, 2016. The most intense period of drought occurred the week of August 25, 2015, when drought affected 84.64% of Washington land.¹⁰⁷

Probability of Future Events

Droughts will continue to occur in Kitsap County and are more likely during the warmer summer months. Predicting the future probability of drought is difficult because of the number of variables involved in modeling the underlying climatic conditions. Factors that impact whether drought will occur and how long it will last include atmospheric and ocean circulation, soil moisture, topography, land surface processes, and interactions between the air, land, and ocean, which ultimately influence temperature and precipitation. From the historical record, we know that climate is inherently variable and that anomalies of precipitation and temperature may last from several months to several decades. However, given the number of variables involved, it is difficult to predict future drought events. Climate change is making summers warmer with a correspondingly drier watercourse, leading to prairie expansion in the Puget Sound Region and increasing the likelihood of periods of drought.

Climate Change Impacts

Kitsap County has many creeks formed from rainfall-runoff. Kitsap thrives on rainfall filling the aquifers that provide fresh water to households and filling streams and lakes. Although the county has not experienced a serious drought in several years, dwindling aquifer and water sources could be an issue in the long term. Changes in the timing of streamflow related to shifting snowmelt

¹⁰⁷ National Integrated Drought Information System (2019),

https://www.drought.gov/drought/states/washington

patterns are already being observed, reducing the supply of water and causing far-reaching ecological and socioeconomic consequences.

Drier soils increase the risk of wildfire. Climate change is likely to more than double the area in the Pacific Northwest that is burned by forest fires during an average year by the end of the 21st century. Higher temperatures and a lack of water can make trees more susceptible to pests and disease, and trees damaged or killed burn more readily than living trees. With that said, other factors also contribute to fires, and forests in the Western Cascades may be less vulnerable to climate change than those in the Eastern Cascades.¹⁰⁸

The primary economic force in Kitsap County is the Federal Government and its military bases and the supporting commercial industry. However, Kitsap County does have an agricultural and commercial fishing community, and it may need to adapt to a changing climatic environment.

The success of the agricultural system in the Pacific Northwest is rooted in its specific range of temperatures, precipitation, and growing seasons, as well as its irrigation systems. Changes to climatic cycles, snowmelt, and temperatures may put a significant burden on irrigation rivers. In some cases, however, climate change can provide positive results, providing longer growing seasons, more precipitation, and warmer winters. The region may need to adapt to changing conditions through technology and shifting its key agricultural products to offset some adverse impacts.

Vulnerability Summary

- Based on a 1-5 assessment scale and the evaluation of our four primary assessment categories, drought vulnerability and effect on Kitsap is considered **"low**," or there is little potential for a disaster during the next 25 years.
- Droughts will continue to occur in Kitsap County. History suggests a moderate probability
 of occurrence. Although the entire population of the county is vulnerable to the effects of
 drought, severity has historically been low, being more inconvenient than threatening.
 Locally, actual drought conditions have been limited to a few days, even during extended
 dry periods. Transportation and communications infrastructure would be minimally
 impacted, if at all. However, as growth places more pressure on limited local resources,
 future impacts may be more significant, suggesting moderate vulnerability.
- Kitsap County's population and industries continue to grow, and so does the demand for water. As usage approaches the limit of available water, any decrease in the normal flow will tend to exacerbate past problems. The county does not need severe drought conditions to experience a water shortage.
- Kitsap County is vulnerable to drought in the logging and wood products industries, as well as the recreational areas. Loss of income from hunters, campers, and tourists would not have a devastating effect on Kitsap County economics.
- Aside from the forests, local agriculture can be devastated by a prolonged drought. A shortage of water will also impact industries that depend on inexpensive water supplies, such as laundries and restaurants.

¹⁰⁸ What Climate Change Means for Washington, US Environmental Protection Agency (August 2016)

Conclusions

Droughts will continue to occur in Kitsap County. Drought-related forest and other wildfires will continue to occur in the County. During periods of drought, County and City governments must perform public education concerning water conservation and, when needed, institute water conservation activities such as the prohibition of lawn watering and car washing.

Mitigation Strategies

Droug	aht Mi	tigation	Strategy 1
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Identify cost-effective water conservation measures to be developed and implemented.

• Note: Portions of this program are currently ongoing, and it is recommended that the strategy continue to receive agency and community support.

Lead	Public Utility Districts and Water Purveyors are identified as the lead agencies for mitigation strategy implementation. Fire Agencies, Tribal Nations and the Health District are recommended as support agencies to work with the lead agencies.
Priority	High
Implementation Time	1 to 3 years
Implementation Cost	Estimated \$10,000-\$50,000.
Potential Funding Source	Current Local agency budgets.
Status	In progress. Continue to support all three agencies in their endeavors
	to do this mitigation strategy.

Drought Mitigation Strategy 2

Formulate policies for the conservation of water during times of water shortage and drought, policies to be implemented by governments, citizens, and businesses. This type of policy implementation is an ongoing program.

• Funding sources identified for policy formulation as an ongoing project with Local budgeted funds is recommended. Future consideration for implementation of policies to potentially require utility rate increases.

Lead	The Public Utility Districts, Water Purveyors and Tribal Nations are identified as the lead agencies for mitigation strategy implementation with the support of the Fire Agencies and Health Districts.			
Priority	Moderate			
Implementation Time	1 to 3 years			
Implementation Cost	To be projected and identified within current operational project			
	budgets.			
Potential Funding Source	Local, State			
Status	In progress. Both Emergency Management and the Utility, Water Purveyors and Tribal Nations have brochures, etc., to assist in this			
	project.			

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Multi-Hazard Mitigation Strategies



Lead Agencies					Support Agencies
Kitsap	County	Department	of	Emergency	Kitsap Transit
Manage	ment				
City/Cou	unty Public	Works Depart	men	ts	Washington State Ferry System
					Washington State Department of Transportation
					(WSDOT)
					Tribal Nations

Kitsap County, like most communities in the United States, began using an "all-hazards" planning approach versus planning for one specific hazard during the late '80s. The rationale for this was very simple; most natural hazards have common denominators; road, closures, transportation issues, chain of command, and other issues that, once resolved, can then transcend to all hazards. This "all-hazards" planning approach has been used throughout the mitigation planning process.

Based on historical data, the probable future severity for all hazards is high. Both natural and technological hazards will impact Kitsap County and will continue to transcend all hazards, thus the need to plan for a multi-hazard approach.

Mitigation Strategies

Multi-Hazard Mitigation Strategy 1

Examine potential road closures related to all risks. Compile a plan that identifies alternate access areas in cooperation with State and community officials. Several Local, State, and possibly Federal resources are currently conducting or have already completed this type of study. It is recommended that a Local task force be formed to bring all of the information developed under one comprehensive all-risk road plan.

- The Task Force needs to include the transit system, fire, Tribal Nations, Washington State Ferry System, state, county, and city law enforcement and members of the regional task force as needed.
- This ongoing project needs to be elevated to State and Local task force level.
- It is recommended that an intern position be developed to follow-up on and consolidate alternate route plans for road closures that currently exist.
- Both Kitsap Transit and Emergency Management have worked closely on this project/strategy. In the interim, Kitsap County has been significantly involved in the last 3 years with the Puget Sound Regional Catastrophic Planning. As part of this plan, Kitsap and the planning committee have evaluated critical and vulnerable roads in Kitsap County and identified solutions or alternate routes in the case of a catastrophic event.

Lead	Public Works

Priority	Moderate
Implementation Time	1 to 9 years
Implementation Cost	Intern fees, office, and support costs estimated at \$56,000.
Potential Funding Source	Local, State, Federal
Status	In progress.

Multi-Hazard Mitigation Strategy 2		
Expand real estate disclosure to include all hazards.		
Lead	Research into this issue to be conducted by the Department of	
	Emergency Management.	
Priority	Moderate	
Implementation Time	1 to 5 years	
Implementation Cost	Initial costs unavailable regarding research actions.	
Potential Funding Source	Local	
Status	To be completed.	

Multi-Hazard Public Education Programs Mitigation Strategies



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Kitsap County Department of Emergency Management

Kitsap County Fire/Law Agencies

City/County Public Works Departments

Kitsap County Citizen Corps Council

Winter storms, earthquakes, technological incidents, and other emergencies have and will continue to impact Kitsap County in a number of ways. Historically, the first response for emergencies has been through the citizens in the affected community. It has been proven that if the citizens are prepared to care for themselves during the recommended three-day period, the less likely response will be required by the American Red Cross and other response agencies. Giving citizens the knowledge and understanding of how they can prepare for a disaster will enable them to provide for themselves, which allows the first responders to manage the more devastating effects of an emergency and to respond to and recover from the event more quickly.

In the past five years, Kitsap County and its jurisdictions have made great strides in increasing public awareness of hazards and how they can mitigate and prepare for these events. Such programs are commonplace and provided to citizens through various public campaigns or on agency websites. Here are some examples:

- Kitsap Public Health initiative to minimize the effects of pandemics.
- Kitsap County and City Public Works programs to promote programs to reduce hazardous materials spills and reporting to local officials.
- Kitsap County and City Public Works programs to provide public information regarding stormwater systems and how the public can help mitigate rainfall runoff during winter storms.
- Kitsap County and City Community Development programs to provide information to the public on flood-prone areas, land use, and a variety of other information through GIS programs and databases.
- Kitsap County Department of Emergency Management educational programs for earthquake mitigation for schools, businesses, and citizens of Kitsap County. A list of these programs is outlined in the next
- All these programs and others by a variety of different jurisdictions and agencies constitute an ongoing commitment to public education and awareness a foundation for mitigation of hazards in the County.

Kitsap County Department of Emergency Management (DEM) Public Education and Outreach Programs

"Bolt It, Brace It – Do it" Program. Designed to teach local citizens and contractors on how to assess building structures for earthquake retrofitting and conduct the required modifications. This is a partnership program with the Homebuilders Association, Olympic Peninsula Chapter of International Code Council, and Simpson Strong-Tie.

Map Your Neighborhood Program. Designed to provide mitigation and preparedness information and training to neighborhood groups. The program is used to identify key resources in neighbor and the essential for training and exercising personnel in disaster preparedness. To date, Kitsap DEM has mapped approximately 200 neighborhoods in Kitsap County with several awarded the "Disaster Ready" for meeting all the criteria for preparedness.

Community Emergency Response Team (CERT). This nationally recognized CERT program was added in 2012 to promote community awareness and participation. This program provides a 10-week training program to develop community-specific CERT teams.

KREP School Preparedness Program. An ongoing program to train schoolteachers and staff to respond to a myriad of hazards associated with schools. Response teams are developed for hazard response, but the program also includes emergency preparedness for students. All public school districts and some private schools have been part of this program.

Alert and Warning Program. Using purchased software, Kitsap County DEM allows citizens to sign up for the "Alert and Warning Program to receive alerts, tips, and instructions on hazardous events in Kitsap. The Alert & Warning Program has been enhanced through the county formalizing, and MOU with FEAM and the State of Washington allows the county to send EAS, and WEA alerts directly to the County and adjacent counties during an emergency. Further, the Alert & Warning Program is transitioning into a formalized Community Warning System (CWS) with a Technical Advisory Committee (CTAC) charged with providing stakeholder input to the CWS Program. And Alert & Warning processes. The CWS program not only facilitates public opt-in registration, it allows for trained operators to select geo-targeted areas for notification and provides the call-in capability and group alerting for county personnel assets and specific focus groups. Over time the CTAC will develop alert and warning protocols for each of the actions to take in an emergency: SIP, Ready-Set-Go (Evacuate), Vertical Evacuate, Be On The Lookout, All Clear/Return to Normal initially.

Public Media Programs. Kitsap DEM has a website at <u>www.kitsapdem.org</u> for continued public mitigation, preparedness, response, and recovery information. Additionally, Facebook and Twitter accounts have been established and useful obtaining information on threats and hazards in Kitsap. Kitsap County DEM has been working with the local cable television station in Bremerton (BKAT) on a series of public and programmatic information vignettes to improve the public awareness on the functions or KCDEM and the actions the public can take to improve resilience.

Business Preparedness Programs. A program to support mitigation and preparedness for local governments, districts, and businesses in Kitsap. This program teaches mitigation to include evaluating structures for earthquake mitigation, providing employee training in emergency response, and individual/home preparedness information. The Business and Preparedness Program hosted a Business Continuity and Preparedness Planning workshop in 2019 and will be the beneficiary of a Security Forum for small businesses and nonprofits towards the close of 2019.

Table 41: Kitsap County Department of Emergency Management (DEM) Public Education & Outreach

Mitigation Strategies

Multi-Hazard Public Education Programs Mitigation Strategy 1

Enhance and support Public Education Programs including citizen involvement.

- Expand the Kitsap County Community Emergency Response Team (CERT) program to assist in the promotion of public preparedness and volunteerism.
- Use State Homeland Security Grant Funds to facilitate.
- CERT performs these functions in Kitsap County under KCDEM

Lead	KCDEM.
Priority	High
Implementation Time	1 to 5 years
Implementation Cost	\$5,000 - \$15,000 annually
Potential Funding Source	Local, State, Federal
Status	In progress. The Kitsap County Citizen Corps has been developed.
	Ongoing classes are held across the county.

Multi-Hazard Public Education Programs Mitigation Strategy 2

Examine and support ongoing programs with a multi-jurisdictional approach for public education, public awareness, and the promotion of public participation. Specific Hazard Mitigation Public Education recommendations are detailed in the following strategies:

- Implement programs that use Public Education for Hazard Mitigation and emergency preparedness methods. This recommendation emphasizes the continuing support for the programs that exist and the development of further opportunities. It is recommended that these programs provide content guidance for 14-day preparedness kits and individual and community preparedness training.
- It is recommended that business and family emergency communication and preparedness plans be included in flyers available to the public.
- Work to develop additional preparedness education programs targeted towards Local business preparedness, including how to stay in business without power for 14 days.
- Funding would come from existing public education funds and unidentified funds, including State and Federal grant dollars.
- Note: KCDEM has initiated the means by which Kitsap County residents can share their perspectives on their level of concern for specific hazards as well as specific measures that have already been taken to mitigate against emergencies and disasters. The data collected from these surveys will continue to be used as a resource in all future hazard mitigation planning efforts. This will also enable KCDEM to target outreach and education efforts on given hazards to specific communities based on perceived risks versus actual risks.

Lead	The lead agency would be the Department of Emergency Management.
Priority	High
Implementation Time	1 to 3 years
Implementation Cost	Share the above \$78,000 identified staff time with an additional \$50,000
	in support and printed materials annually.
Potential Funding Source	Local, State
Status	In progress.

Mitigation Strategies Updates from the 2013 Plan

The following are updates to the mitigation strategies from the last iteration of the MHMP that were completed or removed.

Flood Mitigation Strategy

Provide a community-wide service to anchor mobile homes for qualifying citizens and encourage private individuals to anchor their own mobile homes.

Lead	Volunteer agencies coordinated by local service organizations and
	KCDEM would take the lead for this strategy.
Status	Complete. Most mobiles in the county have been tied down per code.

Landslide/Erosion Mitigation Strategy

Identify and recommend landslide mitigation measures for implementation throughout the community.

- Task 1: Identify potential Landslide areas based upon historical data and existing geologic studies of the area (to include the addition of the Illahee Coastal Bluffs).
- Task 2: Identify the resources to do the study for areas of influence located near critical areas and the contribution of those areas of influence on the Landslide problems in the identified critical areas.

Recommendation: This would entail setting up a process by which each jurisdiction would submit the geotechnical and geologic reports received as part of the land use and permitting process to the Kitsap County Dept. of Emergency Management (DEM) for review and indexing. Staff at DEM would need to be knowledgeable in this field, and the information on file would need to be readily accessible.

- Take Landslide Hazard Mitigation issues and recommendations to the Emergency Management Council for increased community-wide support.
- Identify and recommend slide mitigation strategies for existing structures and future remodeling of structures.
- Conduct a study to identify potential mitigation steps for the reduction of risk to life and property from landslides.
- Study and improve runoff control systems for slide prone areas.
- The lead agency would be the appropriate City or County, Tribal Nations Community Development Departments.
- Establish a regionally funded program to review geotechnical and geologic reports submitted as part of the planning and permitting process.
- Develop a Task List to include preferred providers and peer review methodology. Include minimum requirements for preferred providers to include 5 years in soilrelated work.
- Identify slide-prone areas and study specific mitigation steps to reduce existing risk and prevent increased risk. Examples of areas of this type are listed below:
 - 1. Rolling Bay Walk
 - 2. Crystal Springs Drive
 - 3. Rockaway Beach
 - 4. Fort Ward Hill
 - 5. Prospect Point
 - 6. Kingston Bluff
 - 7. Suquamish Bluff

- 8. Hood Canal Bluff
- 9. Lower Wheaton Way Canyon
- Pursue pre-disaster and post-disaster Small Business Administration (SBA) loans for the implementation of landslide, slippage, erosion, and subsidence abatement strategies.
- Tribal Nations have sovereignty from County land-use requirements. Tribal Nations will need to work on identification and mitigation measures on Tribal lands when grant funding/personnel are available.

Note: Funding for the above mitigation strategy recommendations would be Local unbudgeted funds combined with State and Federal Grants and administrative program funding. Although, recently conducted LIDAR Studies have been beneficial to the increased understanding and location of landslides in Kitsap. Since the studies, more refined mitigation strategies can be developed.

Lead	Various
Implementation Time	1 to 3 years with an ongoing project projection of 1 to 9 years.
Implementation Cost	It is recommended that \$150,000 be identified to start the engineering and cost studies needed to support this strategy.
Status	Complete.

Tsunami Mitigation Strategy		
Response & Evacuation: Work with the Washington State Emergency Management Division Earthquake-Tsunami-Volcano Program to develop a "Tsunami Interpretive Information" sign. The sign should be based upon the existing "Washington State Geology" signs that are posted on the outer coast, but with a focus on Puget Sound geology and tsunami. The sign should also illustrate the appropriate responses during and after earthquake and tsunami events		
 Primary venues for signage should include high-use visitor/tourist areas such as the Bremerton and Port Orchard waterfronts, downtown Port Orchard, Gorst, the Washington State Ferry terminals and Puget Sound Naval Shipyard. Washington State Emergency Management Division has, in the past, provided signs (free of cost) to local jurisdictions. Recommend matching funds with State EMD to secure two additional signs. 		
Lead	The lead agency for this strategy should be the Washington State Emergency Management Division in coordination with the Kitsap County Department of Emergency Management, Local Chambers of Commerce, and Emergency Management Council.	
Implementation Time	1 to 2 years	
Implementation Cost	The estimated cost per sign is \$1200. A total of 4 signs will be needed to provide adequate coverage of populated vulnerable areas. Total cost: \$4800.	
Status	Complete.	

Tsunami Mitigation Strategy

Planning & Infrastructure: Initiate a collaborative planning effort between County/ City planners, State Government, and local citizens to review and revise existing zoning and land use designations to ensure future construction is sustainable.

- If no established building codes are currently adopted, consider expanding project to redefine the standards for new waterfront construction.
- The Kitsap County GIS Department should be contracted to provide the Best Available Science in compliance with the Washington State Growth Management Act.
- Tribal Nations have sovereignty from County land-use requirements. Tribal Nations will need to work on identification and mitigation measures on Tribal lands when grant funding/personnel are available.

Lead	Lead agencies and private groups for this strategy would include the Board of County Commissioners and Mayors through the Emergency Management Council, Housing Authority, Local Chambers of Commerce, Department of Emergency Management, City/County Public Works Departments, at-risk population service agencies and volunteer organizations.
Implementation Time	1 to 4 years
Implementation Cost	Not available at time of publication.
Status	Complete. Ordinances are in place to protect the public from building "too close to the water" with 100 feet setbacks.

Fire Mitigation Strategy		
Increase and implement fire public education measures.		
Lead	The County Fire Marshall's Office, in coordination with Local Fire	
	Agencies, would take the lead in this program.	
Implementation Time	1 to 3 years	
Implementation Cost	Budget recommendations are for the use of existing funds should the	
	fire agencies determine if current personnel are sufficient. The	
	Steering Committee recommended a study be considered to	
	determine if a Fire Public Educator is needed on a regional basis.	
Status	Complete. This is now an ongoing program.	

Flood Mitigation Strategy

Develop a strategy to implement a flood control and riparian zone management process that ensures coordination of the municipalities with regard to stormwater management standards, zoning requirements, and building codes. The necessary steps to implement this strategy are:

- Review and compare existing flood control standards, zoning, and building requirements and determine minimum acceptable standards for all municipalities.
- Develop inter-jurisdictional mechanisms to ensure that the municipalities are aware of each other's flood-prone areas and properly assign conditions of approval to projects that may affect them.
- Tie this strategy into the implementation of a community-wide Geographic Information System (GIS).

Removed. Funding not available.

• Local funding resources are recommended for potential budget availability.

Status

Kitsap County Multi-Hazard Mitigation Plan (MHMP) 2019

Flood Mitigation Strategy

Develop and implement project proposals to reduce flooding and improve control of runoff within and upstream of flood-prone areas. This may include High Flow Bypass construction in intensely developed areas and buy out programs in frequently flooded areas.

- It is recommended that City/County Public Works Departments pursue Federal and State grant funds to implement this strategy. Additionally, local matching and operational funds would need to be budgeted to implement the program.
- KCPW is updating the Comprehensive Stormwater Plan as mentioned previously. While they may not be purely focused on the element envisioned, they are updating information and it is funded.

Status

Status

Removed. Funding not available.

Flood Mitigation Strategy

Identify, update, and maintain an inventory of privately owned and operated stormwater facilities that contribute runoff to flood-prone areas. Develop and implement guidelines to assess the flood risk and system effectiveness for the individual systems.

- Identify significant un-mitigated man-made runoff generating activities or land uses that may be a contributing cause to public flooding. This project would be undertaken in order to expedite flood risk identification and propose specific area problem resolution.
- Local funding would need to be identified to implement this strategy, and consideration is recommended for potential Federal Grant Application funds. This could encompass retrofitting or construction of flood control facilities.
- **Note:** It is recommended that the project include a study of drainage areas, including the study of selected drainage areas for potential mitigation opportunities.

Status Removed. Funding not available.

Flood Mitigation Strategy

Identify locations where flooding has occurred on a repeated basis and conduct a costbenefit analysis to determine if a flood buyout option would be cost-effective.

- Local funding for the cost-benefit analysis would be needed for this process.
- If deemed cost-effective, Federal Grant Application funds would be sought.
 - Removed. Funding not available.

Flood Mitigation Strategy

Evaluate City/County eligibility for the NFIP Community Rating System for improved flood plain management and NFIP eligible insurance premium discounts. Develop and implement a plan to meet the compliance with the NFIP.

- Develop a plan to meet eligibility requirements over a five-year period.
- Institute the program through City and County zoning ordinances.
- **Note:** It is recommended that the project include a study of drainage areas, including the study of selected drainage areas for potential mitigation opportunities.

Status Removed. Funding not available.

Severe Storm/Tornado Mitigation Strategy

Encourage Water Utility Districts to coordinate the hazard planning, mitigation, and recovery activities through joint efforts of the Water PAK. These strategies would include but are not limited to:

- Coordination of restoration priorities with Puget Sound Energy
- Coordination of phone restoration with community-wide phone companies
- Participation of Mutual Aid Programs with other utilities
- Survey and retrofit facilities for high wind loads damage
- The development of a Water PAK Emergency Response Plan

Status

Removed. Funding not available.

Flood Mitigation Strategy

Pursue Federal EmergencyManagement Agency Disaster Housing/Home RepairProgram to include mitigation measures for the private sector for multi-hazard risks.StatusRemoved. Funding not available.

Flood Mitigation Strategy		
Encourage businesses and harm's way.	l citizens in historic flood areas to raise valuables out of	
Status	Removed. Funding not available.	

Flood Mitigation Strategy

 Conduct cost-benefit analysis for flood buyout plan in areas where properties have had multiple flood losses.

 Status
 Removed. Funding not available.

Landslide & Erosion Mitigation Strategy

Identify and implement agricultural area erosion control measures to aid in the mitigation of identified Landslide related problems.

Funding recommendations are to seek State and Federal support funds.
 Status
 Removed. Funding not available.

Landslide & Erosion Strategy

Landslide General Mitigation Strategy: Identify and implement community-wide erosion
control measures.StatusRemoved. Funding not available.

Removed. Funding not available.

Earthquake Mitigation Strategy

Design and implement an ongoing community-wide public seismic risk assessment program.

This project will require specific task development and may need to be based on the implementation of a community-wide GIS System and/or the implementation of Geologic Mapping Strategy number three.

 Status
 Removed due to lack of structures and staffing to implement this level

of a program.

Earthquake Mitigation Strategy

Identify and study ground motion, landslide, and primary liquefaction community wide. Include new data from the most recent earthquake studies affecting Kitsap County.

- A special resource to be considered for the implementation of this strategy would be to request grant funding to use college and university graduate students for the planning and implementation of the study.
- A recommended result of the study would be the ability to create liquefaction hazard mapping.

Status	Removed due to no longer viewed as a realistic strategy. Kitsap County
	currently does not have the LIDAR program. Information Systems (IS)
	GIS unit has generated liquefaction maps for the county and LIDAR
	data does exist for the community. This strategy will be reviewed in
	coordination with Community Development when a new KCDEM GIS
	employee is hired.

Earthquake Mitigation Strategy

Develop and implement a program for seismic retrofit.

- Funding has not been identified.
- Constraints for this program are based upon the State of Washington's authority to approve tax incentives for mitigation programs.
- Local incentives would require cooperation with insurance brokerage firms to lower rates on seismically retrofitted homes.
- Incentive funding programs can be explored and modeled after Project Impact Communities for community revolving low-interest loans and loan of tools to accomplish the retrofit program.

Status

Removed. Funding not available.

Earthquake Mitigation Strategy

Implement a community-wide water main and water delivery system risk assessment. Formulate alternatives to mitigate risk.

- In addition to Local operational budgets, this project would require matching grant funds.
- Coordinate the risk assessment with the identification of fire hydrants and perform risk analysis for fire protection.

Status

Removed. Funding not available.

Earthquake Mitigation Strategy

Assess community-wide utility infrastructure with regard to earthquake risk, including public and private utilities (power and telephone systems).

- In some cases, private and public rate increases may be considered for implementation of a proactive seismic safety program.
- This program will need to be tied to, and be an active participant in, a regional GIS Mapping Project.
- Note: The Kitsap Regional Coordinating Council (KRCC), in its current state, could not support such a program. It is recommended an assessment be made to identify specific recommendations that would accomplish the KRCC's participation. An estimate of what it would take to accomplish the KRCC participation is required

Status	Removed. Structures are not in place for success.

Earthquake Mitigation Strategy
Incorporate information and recommendations on water system issues identified in seismic studies into the Hazard Mitigation Plan.
Those studies are:
 Report Water System Earthquake Vulnerability Assessment for the City of Bremerton: Dames and Moore Group Company Job No. 05793-007-004, March 1997. These reports are inclusive of Dam Break Inundation Analysis and Down Stream Hazard Classification, May 1996. (Prepared under contract to Dames & Moore by WEScorp) and Washington State Department of Ecology Dam Safety Section, Emergency Action Plan for the City of Bremerton Reservoir No. 4, May 1996.
• Funding for this project would need to include both State and Federal funding resources and
potential private funding where appropriate.
Status Removed. Funding not available.
Drought Mitigation Stratagy

Drought Mitigation Strategy Provide for additional research and compilation of water resource data regarding aquifer recharge areas. Identify long-term priorities vs. short-term priorities. The recommendation for implementation would be to partner with water purveyors, well owners, Tribal Nations, nursery owners, homebuilders, architectural and professionally

certified programs including community vocational education classes.

Status Removed. Funding not available.

Tsunami Mitigation Strategy

Hazard Mapping & Modeling: Contract with the Kitsap County GIS Department to create a "Kitsap County Shore zone Inventory," including a building footprint, for all lands within 1km of the shoreline. GIS staff should incorporate data gathered from ATC-21 Visual Assessments to enhance detail for critical infrastructure elements. The "Kitsap County Shore zone Inventory" should consist of a wide range of data to support future analyses of earthquakes and tsunami hazards.

- The NOAA Pacific Marine Environmental Laboratory (PMEL) located at Sand Point, Seattle, is actively developing tsunami models for Puget Sound. As model results and data improve, Kitsap County should be prepared to compare these data and results to existing local conditions. The "Kitsap County Shore zone Inventory" is a logical step toward this goal.
- Data access constraints at the Puget Sound Naval Shipyard may result in significant data gaps. Recommend initiating talks between Kitsap County GIS staff and PSNS Security/IT staff to discuss data-sharing possibilities.
- GIS has mapped shorelines for a worst-case 25-foot tsunami along any coastline of Kitsap.

Status

Removed. Funding not available.

Tsunami Mitigation Strategy

Transportation: Incorporate best available tsunami hazard mapping and modeling data into future planning efforts for protecting and planning for critical transportation (lifelines and infrastructure). Existing areas of concern include but are not limited to: (1) the Highway 3 / Highway 16 interchange at Gorst, (2) the Manette Bridge, and (3) Marine Drive.

• The Kitsap County GIS Department should work with GIS staff at WSDOT to identify key transportation lines that could be vulnerable to earthquakes and/or tsunami (e.g., those in low-lying areas, or those that are not compliant with current seismic codes).

Status

Removed. Funding not available.

Tsunami Mitigation Strategy

Utilities: Design and implement a project to conduct geotechnical analyses of all utilities within 50 feet in elevation from mean higher high water (MHHW). Project results should include potential impacts from loss of service and plans to retrofit or replace vulnerable system components.

- Until more accurate inundation data is available from NOAA, or other sources, 50 feet in elevation from mean higher high water (MHHW) is a reasonable threshold for considering tsunami risk.
- Project costs will be incurred by appropriate Kitsap County Departments. Retrofit and/or replacement costs will be incurred by the appropriate service provider.

Status

Removed. Funding not available.

Terrorism & Civil Disturbance Mitigation Strategy

Design and implement a community-wide first responder and citizens program including prevention, property protection, public education and awareness, emergency services, and structural project activities.

- Kitsap County Terrorism Planning Committee identifies all priorities for response for both training and equipment needs.
- Kitsap County Department of Emergency Management is the lead coordinating agency for Region 2 Homeland Security District. Through the U.S. Department of Homeland Security, funds have become available to train and equip first responders to respond to acts of terrorism.
- The Terrorism Plan is reviewed and updated annually as well as numerous committees meet to discuss interoperability initiatives, HLS equipment initiatives, training, and exercise, and National Incident Management (NIMS) Compliance. One example is Interoperable Communications, essential to response coordination. Exhibit VII-1 shows the framework for HLS Region 2's interoperable communications plan used to identify systems and processes to improve coordination among various agencies. Over the last five years, Kitsap County has been involved in numerous federal, state, and local programs to train and exercise responders and provide information to the public on being vigilant about terrorism. Because of the numerous military installations, Kitsap participates in multi-million-dollar exercises regarding radiological and terrorist events. As such, the military installations collaborate and exercise with the local on numerous disaster exercises, including all of the hazards mentioned in this section. This cooperation provides an ongoing successful program of working together and minimizing the effects of these hazards on Kitsap County.

Status	Removed. Terrorism is not a hazard being discussed in the 2019 MHMP
	due to focusing on natural hazards.

Multi-Hazard Mitigation Strategy

Study and identify areas of geographical/geological influence affecting identified critical area hazards. Add identified areas of influence to critical areas geographic identification as part of the problems to be addressed. (Determine what the science is to identify areas of influence.) This strategy is to be done in coordination with the Landslide areas of influence Hazard Mitigation Strategy.

• **Note:** It is recommended that consideration be given to make this a MULTI HAZARD demonstration grant project through FEMA.

Status

Removed. Funding not available.

Multi-Hazard Mitigation Strategy

Areas of Impact Mitigation Strategy: Study non-traditional areas of impact such as:

- Pre-identified critical areas that require monitoring and potential areas of influence near and adjoining these risk areas.
- Identify single lot property owners who are in an area of influence to an adjoining critical risk area and determine what effects, if any, usage of the adjoining areas of influence have on the critical risk area.
- Local funds recommended from future budget appropriations with potential grant applications from mitigation sources.
- Identify infrastructure improvements for specific critical risk areas and identify the level of risk for which these improvements will be effective.
- Funding sources would be a combination of Local funds and State and Federal matching grants.

Status	Removed. Funding not available. This is another mitigation strategy that
	would require strong participation from a regional GIS.

Multi-Hazard Mitigation Strategy

Examine the feasibility of implementing building codes requiring underground utilities for new development where possible.

Status Removed. Funding not available.

Multi-Hazard Public Education Programs Mitigation Strategy

Develop a Critical Risk Areas Educational Program, including expanding current programs where appropriate to include:

- Assure the availability of accurate maps and information defining critical areas to the public and private sector.
- Use advertisements to identify critical areas for the public to include mitigation strategies that individuals and businesses can implement.
- Include lenders and insurance agents' cooperation and participation in the educational process.

Status	Removed. Funding not available. Will not be completed within five years
	with current staffing.

Multi-Hazard Public Education Programs Mitigation Strategy

Use public education programs and meetings, including Public Access Television, to provide methods to identify and mitigate erosion area problems. Use Public Access Television to educate property owners and renters, both commercial and residential, on the definition and identification of erosion and land-shift problems and identify mitigation measures for the protection of private property.

• Funding recommendations are for State and Federal support funds.

Status Removed. Funding not available.

Multi-Hazard Public Education Programs Mitigation Strategy

Implement a public education program to alert the public on the dangers of and steps to reduce the risk of landslides on private property. Identify and implement public education programs on seismic safety and strengthening for homes, public spaces, schools, and businesses.

• This strategy is an ongoing project, and it is recommended that both Local government budget funding and Federal funds be used to more fully implement the program.

Status

Removed. Funding not available.

Fire Mitigation Strategy

Identify the Urban Wild Land Fire interface problem areas, including the development of an urban fire risk map. This project would be dependent upon a Regional GIS program for mapping components.

• Study urban fire issues, including the development of recommendations for requiring fire retardant building materials and sprinklers where possible.

<u> </u>	
Status	Removed. Funding and staffing not available. The economic downturn
	had reduced staff and the ability to take on this strategy.

Fire Mitigation Strategy

Offer community-based loan programs or other identified incentives to replace
combustible roofing and to retrofit buildings with fire sprinkler systems.StatusRemoved. Funding not available.

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City-Specific Mitigation Strategies

The following goals have been defined by the City of Bainbridge Island, Bremerton, Port Orchard, and Poulsbo and are consistent with those in the basic MHMP update. These goals are applied to each of the hazard categories noted below, with associated strategies for 2019.

Goal 1:	Eliminate or reduce the long-term risk to human life and property from identified hazards.
Goal 2:	Aid both the private and public sectors in understanding the risks they may be exposed to and finding mitigation strategies to reduce those risks.

Each city's mitigation strategies and updates are outlined in their respective sections.

City of Bainbridge Island

Updates from the 2013 Plan

Strategy	Implementation Time	Remarks/Status
Develop and implement projects to improve control of runoff and flooding.	Based on the size of the project and availability of funds	 Completed. Flood Prevention: The City updated the Flood Damage Protection Ordinance (FDPO) updating the requirements for FEMA compliance related to the National Flood Insurance Program (NFIP). The City has also been involved with a Community Assistance Visit (CAV) process as FEMA has audited for compliance measures of the City's Flood Ordinance as adopted. The City's National Pollutant Discharge Elimination System <u>new NPDES Permit</u> includes planning and inspection of projects related to control of soils, stability of soils and run-off at properties. In the COBI, Capital Improvement Plan (CIP); Engineering has an Annual Drainage Program that addresses control of runoff. Many studies and projects related to runoff and flooding have been completed. A project is currently in design to replace the deep culvert under Eagle Harbor Dr. at McDonald Creek.
Inspect and identify trees and other objects that can pose a hazard during a storm	Ongoing/1-5 years	Completed. Ongoing strategy. Significant improvements have been made with city funds
Identify slide-prone areas and study- specific mitigation steps to reduce existing risk and	When funds were available	Completed. Various studies and projects related to slide and erosion issues have been completed:

Strategy	Implementation Time	Remarks/Status
prevent increase risks.		 A study was performed by Myers Biodynamics in 2006 to access shoreline road locations at Gertie Johnson, Manitou Beach Drive, and Country Club Road. There are several shoreline road locations that are being monitored. The City currently has a project underway to repair the bulkhead at Country Club Road. The City has a contingency project identified in the CIP repairing the bulkhead at the medium bank section of Manitou Road. The City has completed shoreline road stabilization projects in recent years at Rockaway Beach, Crystal Springs (south of Baker Hill near the public dock), and most recently Manitou Park. Slides have occurred in the last 10 to 15 years at the following locations: South Beach Drive south of Toe Jam (private), Crystal Springs Drive north of Baker Hill (public and private), Rockaway Beach Road, Rolling Bay Walk/ Gerte Johnson Rd, Sunrise Drive north of Gerte Johnson Road, and Seabold near Adas Will Ln (private). Debris removal and repairs have occurred repeatedly at Rockaway, Crystal Springs, and Gerte Johnson. For non-shoreline roads the City monitors several locations for movement and embankments and to make sure drainage is maintained. This includes Fort Ward Hill Road near South Beach, Toe Jam Hill road near south-beach, Blakley Hill Road, Halls Hill Road, and Gerte Johnson Road. Information on slide hazard areas has been placed into the City GIS system.
Pursue seismic upgrades to equipment, infrastructure, and critical facilities	Ongoing/1-5 years	Some improvements completed. HMP funds may be sought for high-end projects
Aid both the private and public sectors in understanding the risks they may be exposed to and fund programs to mitigate.	Ongoing/1-5 years	Completed. Bainbridge has extensively provided disaster preparedness to citizens and businesses throughout the island, although ongoing commitment may require funds to amplify the program.

Strategy	Implementation Time	Remarks/Status
Study Tsunamis and improve mapping of tsunami risk areas on Bainbridge Island	1-2 years	Tsunami mapping has been completed: link to tsunami affecting mapping video simulation. <u>https://www.bainbridgewa.gov/</u> <u>DocumentCenter/View/8145</u>

2019 Mitigation Strategies

City of Bainbridge Island Mitigation Strategy 1		
Implement 2018 updates to the City Fire and Building Code. To be adopted in January 2020 and effective in July 2020. Updates include codes related to mitigating seismic, wildfire, flooding, and landslide risk.		
Lead	City of Bainbridge Island Planning & Community Development	
Support		
Priority	High	
Probability of Occurrence	High	
Implementation Timeline	January – December 2020	
Implementation Cost	\$25,000	
Potential Funding Source	Local	
Status	To be completed.	

City of Bainbridge Island Mitigation Strategy 2		
Update to Bainbridge Island Wildfire Protection Plan		
(Originally developed in 2010,		
https://www.bifd.org/pdfs/CWPP%20Bainbridge%20Island.pdf) and develop		
community outreach and education campaign once the plan is published		
Lead	Bainbridge Island Fire Department	
Support	City of Bainbridge Island Emergency Management	
Priority	Moderate	
Probability of Occurrence	Moderate	
Implementation Timeline	2020	
Implementation Cost	\$15,000	
Potential Funding Source	Local	
Status	To be completed.	

City of Bainbridge Island Mitigation Strategy 3

Develop method to track active landslide activity of Bainbridge Island. Create map with current and historical data on landslide activity for use with community outreach efforts.

Lead	City of Bainbridge Island Planning & Community Development	
Support	City of Bainbridge Island Emergency Management, City of Bainbridge	
	Island Information Technology (GIS)	
Priority	High	
Probability of Occurrence	High	
Implementation Timeline	2020-2022	
Implementation Cost	\$10,000 per year	
Benefit to Cost	Low, most vulnerable areas involve residential homes.	
Potential Funding Source	Local	
Status	To be completed. Bainbridge Island has many potential slide areas	
	along coastal ways including Rockaway Beach area, Rolling Bay Walk	
	and Fort Ward Hill. These areas are mostly residential and roads	
	vulnerable to landslides.	

City of Bainbridge Island Mitigation Strategy 4

Conduct community outreach programs related to personal preparedness with a focus on earthquake and wildfire risk. Includes: Community Emergency Response Team (CERT) training, Wilderness First Responder (WFR) training, and Map Your Neighborhood program implementation.

Lead	City of Bainbridge Island Emergency Management
Support	Bainbridge Island Fire Department, Bainbridge Prepares
Priority	High
Probability of Occurrence	High
Implementation Timeline	2020 - 2022
Implementation Cost	\$30,000 per year
Potential Funding Source	Local, State
Status	To be completed.

City of Bainbridge Island Mitigation Strategy 5

Update to Shoreline Master Plan to include data on sea-level rise and impacts to Bainbridge Island. Develop community outreach and education campaign once the plan is published.

Lead	City of Bainbridge Island Planning and Community Development
Support	
Priority	Moderate
Probability of Occurrence	Moderate
Implementation Timeline	2020
Implementation Cost	\$10,000
Potential Funding Source	Local
Status	To be completed.

City of Bremerton

Updates from the 2013 Plan

Strategy	Implementation Time	Remarks/Status
Pursue seismic upgrades to the Bremerton water system and its components as identified in the report by Dames & Moore, March 1997 and in the City of Bremerton's	6 years	Completed in 2017.
6-year Capital		
Improvement Plan. Includes seismic protection of Jackson Park/NAD water main, seismic restraint/isolation valves on the Warren Avenue Bridge main		
Pursue seismic upgrades to the dam and provide improved monitoring and an early warning system in the event of an uncontrolled release of the reservoir caused by a dam failure as identified in the report by WoodardClyde Consultants, July 1997 and in the City of Bremerton's 6-year Capital Improvement Plan.	1 year	Progress: Completed seismic bracing for the Casad Dam intake tower. Provide Mason County with a telephone warning system. Still looking for funding for an early warning system in the event of an uncontrolled release.
Pursue seismic upgrades to equipment, infrastructure and critical facilities	Ongoing	Ongoing program. Need additional funding.
Aid both the private and public sectors in understanding the risks they may be exposed to and fund programs to mitigate.	Ongoing	Support the County's Bolt and Brace Program for retrofitting older homes in Bremerton

2019 Mitigation Strategies

Bremerton Mitigation Strategy 1

Improve citizen preparedness programs to include mitigating residential structures.

Lead	KCDEM
Support	City of Bremerton
Priority	Low
Probability of Occurrence	High
Implementation Timeline	Ongoing
Implementation Cost	\$10,000 per year
Benefit to Cost	Increase disaster preparedness and improve ability for structures to weather a disaster
Potential Funding Source	Local
Options & Discussion	This project is ongoing and involves a continued effort to get neighborhoods involved in preparedness.
Status	To be completed. This project is ongoing and involves a continued
	effort to get neighborhoods involved in preparedness

Bremerton Mitigation Strategy 2

Provide pipeline redundancy and seismic protection for the cross-town main and transmission main under SR 3.

Lead	City of Bremerton Public Works & Utilities
Support	Washington State Department of Health and Department of Ecology
Priority	Low
Probability of Occurrence	Low
Implementation Timeline	Undetermined
Implementation Cost	\$3,100,000
Potential Funding Source	Local, State, Federal
Options & Discussion	Improve water supply service after an earthquake.
Status	In progress.

Bremerton Mitigation Strategy 3

Improve the retrofitting of older residences in the City of Bremerton.

Lead	City of Bremerton Public Works & Utilities
Support	Kitsap County Department of Emergency Management
Priority	High
Probability of Occurrence	Moderate
Implementation Timeline	1-4 years
Implementation Cost	\$50,000
Benefit to Cost	High due to reducing uninsured damages after an earthquake.
Potential Funding Source	Local, State
Options & Discussion	Provide training and loans/funds to residence for retrofitting their
	homes to reduce the effects of a potential earthquake.
Status	Ongoing.

Bremerton Mitigation Strategy 4		
Develop and implement projects to improve control of runoff and flooding.		
Lead	City Engineering	
Support	Community Development	
Priority	Moderate	
Probability of Occurrence	High	
Implementation Timeline	Based on the size of project and availability of funds	
Implementation Cost	\$250,000 per year	
Benefit to Cost	Reduces erosion and road/infrastructure maintenance	
Potential Funding Source	Local, State	
Options & Discussion	When funds are available.	
Status	In progress.	

City of Port Orchard

Updates from the 2013 Plan

Strategy	Implementation Time	Remarks/Status
Seismic upgrades to equipment, infrastructure, critical facilities	Ongoing	Partially completed. Small projects accomplished in house. Ongoing and remains part of the plan.
Inspect and Identify trees and objects that pose a hazard during a storm	Ongoing	In progress. Ongoing projects are funded as funds become available. Remains part of the city's strategy.

2019 Mitigation Strategies

Port Orchard Mitigation Strategy 1		
Develop and implement projects to improve control of runoff and flooding.		
Lead	Public Works	
Support	None	
Priority	High	
Probability of Occurrence	High	
Implementation Timeline	Based on the size of the project and availability of funds	
Implementation Cost	\$250,000 per year	
Benefit to Cost	Reduces erosion and road/infrastructure maintenance	
Potential Funding Source	Local, State	
Options & Discussion	The City is contracting with a local engineering firm to develop a downtown Stormwater Retrofit Plan. One of the major topics of this study is improving runoff and flood control.	
Status	In progress. Data is being collected for modeling and implementation of this plan. Deliverable to be received 2020. Cost estimates to be updated when data is available.	

Port Orchard Mitigation Strategy 2

Improve citizen preparedness programs to include mitigating residential structures.

Lead	KCDEM
Support	City of Port Orchard
Priority	High
Probability of Occurrence	High
Implementation Timeline	Ongoing
Implementation Cost	\$10,000 per year
Benefit to Cost	Increase disaster preparedness and improve the ability for structures
	to weather a disaster
Potential Funding Source	Local
Options & Discussion	This project is ongoing and involves a continued effort to get neighborhoods involved in preparedness. The County DEM KPREP program for neighborhood and school preparedness has been widely used, but funds are needed to provide ongoing training and equipment for preparedness.
Status	In progress.

Port Orchard Mitigation Strategy 3

Pursue seismic upgrades to equipment, infrastructure, and critical facilities.

City of Port Orchard Engineering
Kitsap County Department of Emergency Management
High
High
Ongoing
To be determined as projects are authorized. Agency may pursue
HMG funding and low-interest loans to complete projects.
Beneficial to earthquake survivability
Local, State
None
To be completed. Ongoing retrofit as part of capital improvement plan

Port Orchard Mitigation Strategy 4		
Evaluate water and sewer utilities within 50 feet of shoreline. In addition, The City is		
redesigning and retrofitting the City's Marina Sanitary Sewer Lift Station.		
Lead	City of Port Orchard Engineering	
Support	West Sound Utilities District	
Priority	High	
Probability of Occurrence	High	
Implementation Timeline	Ongoing	
Implementation Cost	Based on an initial assessment of mitigating high tide and winter storm	
	flood events. The study would cost approximately \$150,000.	
Benefit to Cost	Undetermined.	
Potential Funding Source	Local, State	
Options & Discussion	The City continues to evaluate water and sanitary sewer facilities	
	within 50 feet of the shoreline as it implements its capital facilities plan.	
Status	In progress.	

Additionally, the City of Port Orchard has reviewed the mitigation strategies in the base plan and will participate in those applicable to the hazards associated with Port Orchard. Please note that only the City Council can commit funds and significant resources to any strategy.

Flooding

- The City will participate in the review of flood control and riparian zone management process with regard to stormwater management standards, zoning requirements, and building codes.
- The City will participate in the annual countywide meeting to review regulatory permitting and maintenance activities in flood-prone areas.
- When flooding problems are identified, the City will develop project proposals to reduce the flooding. Implementation would be dependent upon adequate financing and other factors.
- The City will maintain an inventory of privately-owned stormwater systems and use this data when assessing potential flooding problems.

Severe Storms

- As part of its public education program, the City will continue to stress the importance of being self-sufficient for at least three days with food, water, and other essentials.
- The City will continue to maintain its emergency response plan for the water utility.

Landslides/Erosion

• The City will provide available information to the County GIS system to identify potential landslide areas for GIS mapping.

Earthquake

- The City will participate in the countywide seismic risk assessment program with the Department of Emergency Management as the lead agency.
- The City would provide relevant available data to help identify areas prone to ground motion, landslide, and liquefaction.
- To the extent feasible, the City would participate in Kitsap County's USGS-UW Geological mapping effort.
- The City's water and sanitary sewer systems will be included in the countywide assessment in regard to earthquake mitigation.
- If appropriate funding programs are available, the City will participate in a program to encourage seismic retrofitting of public and private properties.
- The City will continue to assess the water main and water delivery system and cooperate with the lead agency, as possible.
- The City would incorporate hazard mitigation improvements in the Water System Plan and Hazard Mitigation Plan, as appropriate.

• The City will continue to include seismic retrofit concepts in its public education efforts.

Drought

- The City will continue to partner with the water purveyors within the corporate limits to research and compile water resource data, particularly in the aquifer recharge areas, as they are identified.
- The City will continue to emphasize water conservation, particularly for times of drought.
- The City will formulate a policy for water distribution for times of drought

Tsunami

- The City will participate in countywide workshops to educate the public about tsunamis and responses to those events.
- The City will participate in countywide tsunami mitigation strategies, as funding is available.
- The City will post appropriate tsunami informational signs if they are provided and comply with municipal codes.
- The City will participate in a countywide public educational effort by distributing informational brochures.
- The City will provide relevant and available information to Kitsap County GIS for its Kitsap County Shorezone Inventory.
- The City will participate in the countywide transportation mapping effort by providing relevant and available information to Kitsap County.
- If appropriate funding is available, the City would have a qualified person perform a geotechnical analysis of the water and sewer utilities within 50 feet of the shoreline.
- The City will participate in tabletop training exercises involving large-size debris removal associated with a tsunami.
- The City would participate in a countywide review of zoning and land-use rules as they relate to tsunamis.

Multi-Hazards

- The City will participate in a comprehensive all-risk road plan.
- The City will provide relevant and available information for a countywide critical area hazard review.
- If appropriate funding is available, the City will participate in countywide studies of nontraditional areas of impacts.

Multi-Hazard Public Education Programs

- The City will enhance and support countywide public education programs for multi-hazard responses.
- The City will support. on-going programs for countywide programs to include public participation in the planning effort.
- The City will participate in a countywide critical risk area educational program.
- If appropriate funding is available, the City will participate in a countywide public educational program.
- The City will participate in public education programs.

Fire Mitigation Studies

• The fire authority for the City is Kitsap County Fire District #7, and the City has a close working relationship with the firefighting professionals and will continue to cooperate on joint ventures.

City of Poulsbo

Updates to the 2013 Plan

Strategy	Implementation Time	Remarks/Status
Pursue seismic upgrades to equipment, infrastructure, and critical facilities	Ongoing	This strategy has been implemented to all City of Poulsbo infrastructure improvements. Costs TBD.
Inspect and identify trees and other objects within falling distance of critical facilities to determine if they pose a hazard during a storm.	Ongoing.	Areas of improvement were identified and evaluated for future funding with the budget or as HMG funds were available. This strategy has been implemented. No changes.

2019 Mitigation Strategies

Poulsbo Mitigation Strategy 1			
Pursue seismic upgrades to equipment, infrastructure, and critical facilities.			
Lead	City of Poulsbo Engineering		
Support	Kitsap County Department of Emergency Management		
Priority	High		
Probability of Occurrence	High		
Implementation Timeline	Ongoing		
Implementation Cost	To be determined as projects are authorized. Agency may pursue HMG		
	funding and low-interest loans to complete projects.		
Benefit to Cost	Beneficial to earthquake survivability		
Potential Funding Source	Local		
Options & Discussion	None		
Status	In progress. This strategy has and will to continue to be implemented to all City of Poulsbo infrastructure improvements. Costs TBD.		

Poulsbo Mitigation Strategy 2

Inspect and identify trees and other objects within falling distance of critical facilities to determine if they pose a hazard during a storm.

Lead	City of Poulsbo
Support	Kitsap PUD #1
Category & Priority	Cat II/High
Probability of Occurrence	High
Implementation Timeline	Ongoing
Implementation Cost	\$25,000 per year
Benefit to Cost	Reduces problem areas associated with significant wind and rain events.
Potential Funding Source	Local
Options & Discussion	Areas of improvement are identified and evaluated for future funding with
	the budget or as HMG funds are available.
Status	In progress. This strategy has been implemented and will continue to be
	implemented.

Poulsbo Mitigation Strategy 3

Develop and implement projects to improve control of runoff and flooding.

Lead	City of Poulsbo Engineering			
Support	City of Poulsbo Public Works			
Category & Priority	Cat I/Medium			
Probability of Occurrence	High			
Implementation Timeline	Based on the size of the project and availability of funds			
Implementation Cost	\$250,000 per year			
Benefit to Cost	Reduces erosion and road/infrastructure maintenance			
Potential Funding Source	Local, State			
Options & Discussion	When funds are available.			
Status	In progress. This strategy continues to be implemented. This is an			
	ongoing project that is dependent on the size of projects and available funds.			
Poulsbo Mitigation Strategy 4				
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Improve citizen preparedne	ss programs to include mitigating residential structures.			
Lead	Kitsap County Emergency Management			
Support	City of Poulsbo			
Category & Priority	All Categories/High			
Probability of Occurrence	High			
Implementation Timeline	Ongoing			
Implementation Cost	\$10,000 per year			
Benefit to Cost	Increase disaster preparedness and improve the ability for structures to			
	weather a disaster			
Potential Funding Source	Local			
Options & Discussion	This project is ongoing and involves a continued effort to get neighborhoods involved in preparedness. The County DEM KPREP program for neighborhood and school preparedness has been widely used, but funds are needed to provide ongoing training and equipment for preparedness. In addition, a Community Emergency Response Team (CERT) will be formed for the City of Poulsbo in 2014.			
Status	In progress. This strategy has been implemented and will continue to be.			

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Future Actions & Goals

Summary

The Kitsap County Multi-Hazard Mitigation Plan and Identified Hazard Mitigation Program Strategies establish the framework within which the post-disaster and day-to-day mitigation activities of the community may be carried out on a prioritized and regional basis.

The Plan is based upon the experience of the region through the input of the Hazard Mitigation and Recovery Team Steering Committee, the 2019 City and Special Purpose District Planning Partners, the Department of Emergency Management and the input of the community.

The plan recognizes the varied conditions that exist and can be found throughout Kitsap County. No single mitigation strategy will effectively meet the needs of all of the communities. However, by embracing the regional coordinated approach and objectives found in this plan, Kitsap County can take significant strides toward the efficient and effective use of its resources to resolve and mitigate the community's identified hazards.

One of the most important accomplishments of the Hazard Mitigation planning project was the process itself, where the participants shared information, resources, and methodologies – community-wide, for the benefit of reducing or eliminating risk to Critical Areas.

Future Actions

Kitsap County Emergency Management Council

The Kitsap County Emergency Management Council should review and adopt portions of or all of the Hazard Mitigation Plan and Strategy Recommendations.

- Each member of the Emergency Management Council will support and bring back to their individual political subdivisions, the recommendations adopted by the Council for implementation and coordination on a regional basis.
- The Council will review and adopt, as necessary, the work of the Multi-Hazard Mitigation Planning Committee on an annual basis.

Kitsap County Hazard Mitigation Planning Committee

The Kitsap County Hazard Mitigation Planning Committee (HMPC) should meet annually early in the 4th quarter, to review the progress made in the current year, on the identification of resources and implementation of the Hazard Mitigation strategies. It should also seek input on future unidentified Hazard Mitigation programs and strategies.

 The KCDEM Mitigation, Operations and GIS Officer should perform an annual review of the Multi-Hazard Mitigation Plan as needed by contacting and working with each Hazard Mitigation Strategy's Lead Agency to develop a progress report per funding and implementation of the strategies recommended in the current MHMP; and

- 2. Review and document revisions and/or additions to the County Multi-Hazard Mitigation Plan and work to identify new, or revise existing, Hazard Mitigation strategies to be pursued within the county.
- The Mitigation, Operations and GIS Officer should meet annually with the Kitsap County Hazard Mitigation Planning Committee to provide a status update to the MHMP program; and
- 4. Submit an annual mitigation program status report to the Director in the fourth quarter, to present to the Emergency Management Council (1st quarter on the next calendar year).

Long-Term Goals & Strategies

Goal 1:	Work towards the reduction of long-term risk to human life and property from identified hazards.
Goal 2:	Capacity build the private and public sectors on the risks they may be exposed to and mitigation strategies they may use to reduce those risks
Goal 3:	Work towards reducing the risk of exposure to identified hazards.
Goal 4:	Work towards minimizing impacts of risks when they cannot be avoided.
Goal 5:	Work towards reducing the impacts of damage as a result of identified hazards.
Goal 6:	Work towards reducing negative impacts on the environment of mitigation strategies.
Goal 7:	Mitigation is most successful when it grows from Local and regional planning activities. Capture and document local planning efforts and existing interagency group efforts to inform the mitigation planning process.
Goal 8:	Develop a funding matrix based on priorities for mitigation strategies and funding partners/donors' priorities, agendas, themes, and conditions.
Goal 9:	Establish and document a process to accomplish annual Hazard Mitigation Plan updates based on quarterly requirements.

Table 42: Long-Term Goals & Strategies

Appendix A: Participating City Profiles

In this section, each jurisdiction is described, including its community assets at risk to hazards. Information is taken from the 2019 Hazard Identification & Vulnerability Assessment (HIVA). Assets are defined broadly to include anything that is important to the character and function of a community and can be described very generally in the following four categories:

- People
- Economy
- Built environment
- Natural environment

Although all assets may be affected by hazards, some assets are more vulnerable because of their physical characteristics or socioeconomic uses.

The profiles are presented in the following order:

- Bainbridge Island
- Bremerton
- Poulsbo
- Port Orchard

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Bainbridge Island



Bainbridge Island is located east of the main Kitsap peninsula, separated by Agate Passage to the north, the main body of Puget Sound to the east, Rich Passage Inlet to the south, and Port Orchard Bay to the west. The island is approximately five miles wide and ten miles long, encompassing nearly 17,778 acres, and is one of the larger islands in Puget Sound. Through island annexes in 1991, the City of Winslow, 2 miles square and with a little over 3,000 residents, grew to over 27 square miles and a population today of 24,522, making it the second-largest city in the County.¹⁰⁹

As a noncharter code city, Bainbridge Island originally operated under a mayor / council form of government. The form of government has

been changed following a May 19, 2009 vote in which a majority of islanders expressed a preference for the council / manager form of government. This form of government is regulated under the Revised Code of Washington (RCW) 35A.13.

The city manager reports to and is appointed by the City Council. The City Council's seven members are elected in non-partisan elections for four-year staggered terms. The Bainbridge Island City government provides services in the areas of Public Works, Planning and Community Development, Finance, Municipal Court, and Police.

Bainbridge Island has State, County, and municipal parks, in addition to shoreline access from many City-owned roads. There are golf courses, tennis courts, and youth playfields on the island. The City is also home to the Kids Discovery Museum and the Bainbridge Historical Museum.

People

Population Overview

The island is characterized by professional, scientific employment, construction, and education. Many professionals transit daily to downtown Seattle. The City is mostly rural with an urban center (formerly the City of Winslow) located at the ferry landing.

Bainbridge Island Population Information ¹¹⁰					
Population	Population	Number of	Median Household	Under 65 with a	
	Density	Households	Income	Disability	
24,870	901 per sq. mi	10,246	\$118,382	4.8%	
(2019)	(2019)	(2019)	(2019)	(2017)	

Table 43: Bainbridge Island Population Information

Age Distribution

The following figure shows the distribution of age on Bainbridge Island. Overall, the city's population has a typical distribution with a slightly higher "baby boomer" group. There are several

¹⁰⁹ United States Census Bureau (2017)

¹¹⁰ Esri Demographics (2019)

senior/assist facilities on the island, mostly located in the city's urban center. The senior population has grown consistent with national trends.







Table 44: Bainbridge Island Vulnerable Population

Bainbridge Island Population Density



Figure 37: Bainbridge Island Population Density, © OpenStreetMap Contributors

Economy

The city is primarily residential, with some commercial light manufacturing, recreation, agriculture, and open space. The principal economic base consists of retail outlets/offices, Bainbridge Island School District, and light industry.

Bainbridge Island has four centers of commerce and has become noted for its active online business community. Winslow is the downtown core and has most of the shopping and dining. Lynwood Center on the south end of the island has several restaurants and a small hotel. Centrally located, Fletcher Bay has a small grocery store and one restaurant. Rolling Bay, on the east side of the island, is a small commercial center with Bay Hay and Feed, the Bud Hawk Post Office, and several shops. There are 1,767 businesses licensed

on the island; 923 are commercial-based licenses, and 844 are home-based licenses.¹¹¹

Built Environment

Land Use

Land use on Bainbridge Island is primarily residential with some commercial, light manufacturing, recreation, agriculture, and open space. Table 18 provides information on housing units on Bainbridge Island. As also noted in the table, most of the Island's structures are recently built structures. Total building stock is 12,639 with 82 critical facilities. Critical facilities are those identified by the City as vital to emergency response and citizen safety and are part of Kitsap County's Damage Assessment Program. Table 16 includes a list of facilities and their locations.

Based on the 2015 Hazus risk assessment, the table below highlights some of the buildings in the City of Bainbridge that are affected by flooding, tsunami, earthquake, and landslide.

City of Bainbridge Areas of Mitigation Interest ¹¹²					
Community Building Name	Address	Building Value	Loss Value	Loss Ratio	Hazard Type
Single Family Home	10680 NE Gertie Johnson Road	\$501,000	\$247,000	49%	Flood
Hyla Middle School	7861 NE Bucklin Hill Road	\$290,000	\$266,000	91%	Earthquake
Bainbridge Island Fire Department Station #22	Fire Department Station #22 7934 NE Bucklin Hill Road	\$377,000	\$202,000	53%	Earthquake

¹¹¹ COBI Finance Department, Bainbridge Island (2019)

¹¹² FEMA Risk Report for Kitsap County (2015)

City of Bainbridge Areas of Mitigation Interest ¹¹²					
Community Building Name	Address	Building Value	Loss Value	Loss Ratio	Hazard Type
Single Family Home	5151 Crystal Springs Dr. NE	\$501,000	\$366,000	73%	Earthquake, Landslide
Shopping Center/Mixed Retail	4569 Lynwood Center Rd. NE	\$2.39 million	\$2.29 million	96%	Earthquake

Table 45: City of Bainbridge Areas of Mitigation Interest

Housing

Eleven percent of the City of Bainbridge's buildings are located in the moderate-high liquefaction zone, with 3,082 of them built before modern building codes, increasing the risk of significant damage to an earthquake. It also has 177 buildings within the landslide zone, representing \$55M in value.¹¹³

Residential Structures				
Туре	Estimate	Percent		
Housing Occupancy				
Total housing units	10,340	10,340		
Occupied housing units	9,679	93.6%		
Vacant housing units	661	6.4%		
Homeowner vacancy rate	0.9	(X)		
Rental vacancy rate	0.0	(X)		
Units in Structure				
Total housing units	10,340	10,340		
1-unit, detached	7,907	76.5%		
1-unit, attached	448	4.3%		
2 units	187	1.8%		
3 or 4 units	179	1.7%		
5 to 9 units	375	3.6%		
10 to 19 units	369	3.6%		
20 or more units	609	5.9%		
Mobile home	257	2.5%		
Boat, RV, van, etc.	9	0.1%		
Year Structure Built				
Total housing units	10,340	10,340		
Built 2014 or later	142	1.4%		
Built 2010 to 2013	326	3.2%		
Built 2000 to 2009	2,188	21.2%		
Built 1990 to 1999	2,085	20.2%		
Built 1980 to 1989	1,398	13.5%		

¹¹³ FEMA Risk Report for Kitsap County (2015)

Residential Structures				
Type Estimate Percent				
Built 1970 to 1979	1,660	16.1%		
Built 1960 to 1969	662	6.4%		
Built 1950 to 1959	361	3.5%		
Built 1940 to 1949	495	4.8%		
Built 1939 or earlier	1,023	9.9%		

Table 46: Bainbridge Island Housing Characteristics 2013-2017 American Community Survey 5-Year Estimates (US Census)

Infrastructure

Transportation, Communications, and Utilities

Bainbridge Island is served by the Washington State Ferries system, which docks in the downtown Winslow area. State Route (SR) 305 connects the ferry terminal with SR 3 in Poulsbo. The island also has an extensive system of arterials, suburban, and local public streets. Kitsap Transit operates a commuter system in the City, which is coordinated with the ferry schedule; Kitsap Transit also offers a dial-a-ride service. There are several designated transit stops in Winslow, but, for the rest of the island, transit "stops" are generally wherever riders flag down buses on their routes.

Bainbridge Island is connected to the Kitsap Peninsula by the Agate Pass Bridge, carrying SR 305 over Agate Passage. The Agate Pass Bridge, built in the 1950s, is the only fixed transportation route to the island. The island is not serviced by any other bridge and therefore must rely on maritime service should the bridge be damaged. The only other public way off of the island is by the Seattle–Bainbridge ferry, the Washington State Ferries service from the dock at Winslow in Eagle Harbor to Colman Dock (Pier 52) in Seattle.

The City is provided electrical service by the City. The City provides sewer service to approximately 6,000 residents within two separate areas known as the Winslow Sewer Service Area and the South Island Sewer Service Area. Sewer District 7 operates the South Island wastewater treatment plant. The rest of the City is provided sewer service by on-site septic systems. The City provides water service to approximately 6,000 residents within four separate water service areas known as the Winslow, Rockaway Beach, Public Works, and Casey Street Water Systems.

Residents are also provided water service by several other water systems operated by providers known as Kitsap Public Utilities District, Washington Water, and Northwest Water. There is also a multitude of smaller water systems and individual wells operated by homeowners' associations and individuals who serve the remaining residents in the city.

Critical Facilities

A list of critical City-owned and non-City-owned facilities can be found at the end of this section in Table 16.

Critical City-owned facilities include:

City Hall

- Public Works facilities
- Police station
- Fire Stations
- Main wastewater treatment facility
- Reservoir facilities at High School Road, Old Creosote Road, and Knechtel and Grand
- Well fields at the Head of the Bay, Fletcher Bay, and Rockaway Beach
- 17 sewage pumps stations

Critical non-City-owned facilities include:

- Agate Pass bridge and Winslow Ferry Terminal
- Five elementary schools
- Three middle/intermediate schools
- Two high schools
- Three alternate schools
- Four medical centers
- Senior assistance centers
- Various parks and a nature preserve

Cultural Resources

The City of Bainbridge Island has seven historic properties registered with the federal register and 35 historic properties registered with the local historic register. There are 19 heritage trees on the island.¹¹⁴

The island has two museums: Kids Discovery Museum (KiDiMu) and the Bainbridge Island Historical Museum.¹¹⁵ The island is also home to the Japanese American Exclusion Memorial, an outdoor exhibit commemorating the internment of Japanese Americans from Bainbridge Island in the state of Washington. Bainbridge Island also has several parks, learning centers, religious centers, and a nature preserve. Table 16 below includes some of the most critical cultural facilities.

	Bainbridge Island Critical Facilities						
#	Name	Address	Description				
City	City-Owned						
1	City Hall	280 Madison Ave	City Hall				
2	Police Department	625 Winslow Way East	Police Department				
3	Fire Department	8895 Madison Ave NE	Fire Department Station 21 - Headquarters				
4	Fire Department	7934 NE Bucklin Hill Road	Fire Department Station 22 (as of June 2019, closed for construction)				
5	Fire Department	12985 Phelps Road	Fire Department Station 23				
6	Senior Center/Commons	Water Front Park	Senior Center/Commons				
7	Public Works Facility	7305 Hidden Cove Road	Public Works Facility				
8	Municipal Court	10255 NE Valley RD	Municipal Court				

¹¹⁴ City of Bainbridge Island - Planning Department (2019)

¹¹⁵ City of Bainbridge Island - Planning Department (2019)

	Bainbridge Island Critical Facilities				
#	Name	Address	Description		
9	Head of Bay Well Site	7290 Wyatt Way	Wells, treatment, booster pumps		
10	Sands Avenue Well Site	8499 Sands Avenue NE	Wells, treatment, booster pumps		
11	Fletcher Bay Well Site	5579 N.E. Foster Road	Well, treatment, booster pump		
12	Commodore Well Site		Well, treatment, booster pumps		
13	1.0 Million Gallon Reservoir	1755 Lewis Place NW	1,000,000 gal above ground tank		
14	1.5 Million Gallon Reservoir	1755 Lewis Place NW	1,500,000 gal above ground tank		
15	Grand Avenue Reservoir	Cherry Avenue	300,000 gal above ground tank		
16	Rockaway Reservoir	1100 Old Creosote Road	132,000 gal above ground tank		
17	Rockaway Treatment Facility	1100 Old Creosote Road	Treatment		
18	Rockaway Taylor Avenue Well	Taylor Avenue	Well		
19	Erickson Avenue PRV	Ericsen and Wyatt	Underground PRV station		
20	Cherry Avenue PRV	851 Cherry Avenue	Underground PRV station		
21	Grow Avenue PRV	Grow and Wyatt	Underground PRV station		
22	Madison/Knechtel PRV	Madison and Knechtel	Underground PRV station		
23	Weaver PRV	Weaver between HS & Wyatt	Underground PRV station		
24	Madison Avenue PRV	Madison and Madrona	Underground PRV station		
25	Ferncliff Avenue PRV	Ferncliff and Wing Point	Underground PRV station		
26	Cave Avenue PRV	Cave Avenue	Underground PRV station		
27	Highway 305 South	400 Harborview Drive SE	Dry pit pump station		
28	Island Terrace	1174 Ferncliff Avenue NE	Dry pit pump station		
29	Klickitat	692 Klickitat Place NE	Dry pit pump station		
30	Lower Hawley	1195 Irene Place NE	Dry pit pump station		
31	Lower Lovell	426 Lovell Avenue SW	Dry pit pump station		
32	Lynwood Center	4573 Point White Drive NE	Wet pit pump station		
33	North Town Woods	9665 NE North Town Loop	Dry pit pump station		
34	Old Treatment Plant	310 Madison Avenue S	Dry pit pump station		
35	Sunday Cove	020 Hildebrand Lance NE	Dry pit pump station		
30	Wing Doint	920 Fildebland Lance NE	Dry pit pump station		
20	Sakai Villago	1870 Sakai Loop	Wet pit pump station		
30	Eerny Terminal		Wet pit pump station		
40	Rockaway	3900 Rockaway Beach Road	Wet pit pump station		
40	Vinevard Lane	682 State Highway 305	Wet pit pump station		
42	Woodward School	9125 N.F. Sportsman Club	Wet pit pump station		
43	Madrona	Madison and New Brooklyn	Wet pit pump station		
44	Wastewater Treatment Plant	1220 Donald Place	Wastewater treatment facilities		
45	Vincent Road Landfill	6400 Don Palmer Avenue	Closed landfill		
46	Stormwater Decant Facility	6401 Don Palmer Avenue	Stormwater spoils handling facility		
47	Fort Ward Wastewater Treatment Plant	1220 Donald PI NE	Wastewater Treatment Plant		
Non	-City Owned				
48	Agate Pass Bridge	Bainbridge Island, WA 98110	Agate Pass Bridge		
49	Winslow Ferry Terminal	Bainbridge Island, WA 98110	Winslow Ferry Terminal		

	Bainbridge Island Critical Facilities				
#	Name	Address	Description		
50	Washington State Ferry Maintenance Yard	Bainbridge Island, WA 98110	Washington State Ferry Maintenance Yard		
51	Blakey Elementary School	4704 Blakely Ave NE	Elementary School		
52	The Island School	8553 NE Day Rd	Elementary School		
53	Montessori Country School	10994 Arrow Point Dr. NE,	Elementary School		
54	Ordway Elementary School	8555 Madison Ave NE	Elementary School		
55	Wilkes Elementary School	12781 N Madison Ave NE	Elementary School		
56	Sakai Intermediate School	9343 Sportsman Club Rd NE	Intermediate School		
57	HYLA Middle School	7861 Bucklin Hill Rd NE	Middle School		
58	Woodward Middle School	9125 Sportsman Club Rd	Middle School		
59	Bainbridge High School	9330 High School Rd	High School		
60	Eagle Harbor High School	9530 NE High School Rd	High School		
61	Commodore Options School	9530 High School Rd	Options School		
62	Madrona School	219 Madison Ave S	School		
63	St. Cecilia Catholic School	1310 Madison Ave N	Catholic School		
64	Swedish Primary Care - Bainbridge Island	945 Hildebrand Ln NE Suite 100	Medical Center		
65	Virginia Mason Medical	1344 Wintergreen Lane Northeast	Medical Center		
66	CHI Franciscan/City MD	1344 Wintergreen Lane Northeast Suite 100	Medical – Urgent Care		
67	Bainbridge Island Health and Rehabilitation	835 Madison Ave N	Island Health and Rehabilitation		
68	Bainbridge Island Historical Museum	215 Ericksen Ave NE	Historical Museum		
69	Kitsap Regional Library – Bainbridge Branch	1270 Madison Ave N	Regional Library		
70	Madrona House	8800 Madison Ave N	Senior Living		
71	Winslow Manor	234 Wood Ave SW	Senior Living		
72	Wyatt House	186 Wyatt Way NW	Senior Living		
73	IslandWood	4450 Blakely Ave NE	Learning Center		
74	Bloedel Reserve	7571 NE Dolphin Dr	Nature Reserve		
75	Island Church	9624 Sportsman Club Rd	Church		
76	BattlePoint Park	11299 Arrow Point Dr. NE	Park		
77	Ft. Ward Park	2241 Pleasant Beach Dr. NE	Park		
78	Hubs (shelter) Locations	Various	Hubs (shelter) Locations		
79	Two high power transmission lines across Agate Pass	Agate Pass Bridge	Two high power transmission lines across Agate Pass		
80	Port Madison PSE Sub- stations	N/A	PSE Substation		
81	Winslow PSE Sub-stations	N/A	PSE Substation		
82	Murden Cove PSE Sub- stations	N/A	PSE Substation		

Table 47: Bainbridge Island Critical Facilities

Future Development

The City of Bainbridge Island has been undertaking its Comprehensive Plan Update in accordance with the Washington State Growth Management Act (GMA) governed by RCW 36.70A. Comprehensive Plans establish the vision for how a community wishes to grow and the features it wishes to preserve for the next 20 years. The plan can be found here: <u>https://www.bainbridgewa.gov/615/Navigate-Bainbridge-Comprehensive-Plan-U</u>.

From 2009 through 2018, a new supply of residential units, of all types, has been limited. In April of 2009, there were 10,469 units on Bainbridge Island. In April of 2018, there were 11,061 units. This translates into an average growth of 66 residential units per year. This represents a cumulative annual growth rate of .63 percent per year (less than 1 percent per year). This limited supply on Bainbridge Island is well below demand in a way that increases housing costs.

A handful of projects are planned along the Madison Avenue corridor over the next few years. Housing projects abound along the roadway, and the city is planning to make some improvements to the road's intersection with Wyatt Way in the coming years. The city's plans include sidewalk and bicycle lanes along a portion of Wyatt Way.

Natural Environment

Bainbridge Island shorelines border the main body of Puget Sound, a large, protected embayment, Port Orchard Bay, and two high-current tidal passages, Rich Passage and Agate Pass.

The Island is characterized by an irregular coastline of approximately 53 miles, with numerous bays and inlets and a significant diversity of other coastal landforms, including spits, bluffs, dunes, lagoons, cuspate forelands, tide flats, streams, tidal deltas, islands, and rocky outcrops. The highest point is 425-foot Toe Jam Hill. The topography is generally of low rolling hills with several ridges oriented mostly north to south at 250 to 300 feet elevation.

The waters of Puget Sound surround Bainbridge Island. There are numerous streams and creeks, in addition to Gazzam Lake, a year-round freshwater lake. Environmentally sensitive areas on Bainbridge Island include wetlands, aquifer recharge areas, geologically hazardous areas, continuous and seasonal streams and waters including the waters of Puget Sound, and fish and wildlife habitat. There are over 170 documented wetlands, although more exist that are unmapped. The following figure illustrates the topography of the Island, noting the rolling hills and valleys of Bainbridge Island.



Figure 38: Topography of Bainbridge Island

History of Disasters

Bainbridge Island, through recent studies, shows historical signs of past earthquakes. The island is obviously vulnerable to earthquakes, but also tsunamis and landslides. The table below shows the history of events on Bainbridge Island. As noted in the last 10 years, Bainbridge Island has been mostly affected by severe winter storms, but most were not serious enough to require any federal assistance.

Event Date	Type of Event	Declaration	Comments	
February 2019	Severe winter storm	Local, State, Federal	Local Public Assistance threshold not met. Local SBA declaration.	
December 2018	Severe Winter Storms - Tornado	Local, State, Federal	Local Public Assistance threshold not met.	
December 2018	Wind and rain	No	Did not meet PA threshold	
January- February 2017	Snow, heavy rain, wind	State	No assistance	
December 2015	Wind and rain	No		
November 2015	Wind and rain	State	No assistance	
August 2015	Wind and rain	No		
November 2012	Heavy rain	No		
December 2010	Heavy rain	No		
Dec 2008	Severe wind and rain	Local	No assistance	
Dec 2007	Severe wind and rain	Local, State, and Federal	Yes	
Jan 2006	Severe wind and rain	Local	Did not meet PA threshold	
Dec 2006	Severe wind and rain	Local	Did not meet PA Threshold	
Oct 2003	Severe wind and rain	Local, state, and Federal	Local PA Threshold not met. IA paid out	
Jan 2002	Severe wind and rain	Local and State	State Only; presidential denied	
Feb 2001	Nisqually Earthquake	Local, state, and Federal	YES	
June 1997	Rolling Bay mudslide	Local	No assistance	
Dec 1996	Severe rain and snow runoff storm	Local, State, and Federal	Yes	
Nov 1995	Severe wind and rain	Local, State, and Federal	Local PA threshold not met	
Jan 1993	Severe wind and rain	Local, State and Federal	No record on file	
Jan 1992	Severe wind and rain	Local	No assistance	
Dec 1990	Severe wind and rain	Local, State and Federal	Yes	
Dec 1982	Severe wind and rain	Local	No assistance	
May 1965	Earthquake	Local, state, and Federal	No record on file	
Oct 1962	Severe wind and rain	Local, state and Federal	No record on file	

Table 48: Emergency/Disaster History for Bainbridge Island

Mitigation Planning

Risk Assessment

The Kitsap County Profile Section of this plan provides a thorough assessment of hazards associated with Kitsap County and its incorporated cities. Although each city is affected differently, risks significant to the City of Bainbridge Island are floods, earthquakes, landslides, tsunamis, and winter storms. The Kitsap County Profile Section provides a synopsis of the County and cities, while this profile provides additional information specific to Bainbridge Island.

Rating System

The rating system for the City of Bainbridge Island is consistent with the general plan. A rating for each hazard is defined as high, moderate, and low based on the information provided in The Planning Process Section to this plan. Additional ratings are applied for priority mitigation strategies and Cost analysis.

Overview

As noted earlier, the City of Bainbridge Island has a history of severe storms, landslides, and earthquakes. These vulnerabilities can cause serious damage and isolate the island should the Agate Pass Bridge become impassable. Although other alternatives are possible, mitigation strategies can provide improvement to the city infrastructure and minimize the loss of life from such events. Major east/west fault lines in the Puget Sound Region intercept the southern end of the Island. Bainbridge Island is also vulnerable to potential inland and ocean tsunamis depending on the earthquake magnitude and location. The City of Bainbridge Island contributes and uses the County Hazard Identification and Vulnerability Assessment (HIVA) to set priorities on natural hazardous events. Although annually the City is hit by severe winter storms, the greatest threat to Bainbridge Island is an earthquake and potentially associated tsunami. This catastrophic event, possibly along the Seattle fault, would cause significant damage to the island and possibly isolate the City from the mainland.

Planning Process

As noted in the basic MHMP Plan Update, the City of Bainbridge Island assigned personnel to the mitigation plan update and through the planning update process were assigned to the Multi-Hazard Mitigation Planning Committee. Personnel also attended monthly Planning Committee webinar conference calls as well as completed the HIVA and MHMP RFI Trackers, reviewed drafts of the document, and communicated via emails and one-on-one discussions. Records can be found in Appendix C: Stakeholder and Public Engagement. Additionally, the City solicited for inputs from City Departments, City Council, and the citizens of Bainbridge Island.

Every effort should be afforded to incorporate mitigation strategies into city ordinances and plans where appropriate. The mitigation plan and its strategies should be reviewed when other plans are up for revision. As noted below, each plan provides mitigation strategies for capital improvement and land use.

Plans and Ordinances

In an effort to maximize hazard mitigation planning, the following city plans are used to support and mandate mitigation efforts throughout the city:

1. Comprehensive Land Use Plan

The plan guides the growth and long-range vision of the community towards it's five overriding principals listed below.

- Preserve the special character of the Island;
- Protect fragile water resources;
- Foster diversity;
- Consider costs and benefits to property owners when making land-use decisions;
- Promote sustainable development.

The Comprehensive Plan also includes a Land Use Map linked to the land use and environmental policies that establish areas of the City for residential, commercial, industrial, and other land uses.

2. Zoning Ordinances

Changes and updates to Zoning Ordinances are the responsibility of Planning and Community Development. Its mission to coordinate and manage land use activity. Mitigates again building in hazardous locations

3. Critical Areas Ordinances (includes flood damage prevention and geologically hazardous areas provisions).

This ordinance defines critical areas (wetlands, areas of critical recharging effect on aquifers used for water, fish, and wildlife habit.) as required by the Growth Management Act. This ordinance regulates, protects and defines these Areas under Bainbridge Island Municipal Code Section 16.20. it prohibits developments in ecologically sensitive areas or adjacent to sensitive areas that may be affected by hazards from those sites.

4. Capital Facilities Plan

This 6-year plan identifies and prioritizes Parks, Opens Spaces and Shoreline Improvements and mitigation between 2009 and 2014. It is part of the Comprehensive Land Use Plan required by the Growth Management Act. Effective use of lands to mitigate developments in flood zones and areas associated with natural or manmade hazards.

5. Surface and Storm Water Management Plan and Ordinance

The SSWMP divides the duties and responsibilities into four areas Regulatory Program Activities, Local Storm Water Activities, Program Overhead & CID and Equipment and Technical Memos. This 5-year Plan defines staffing, funding, and mitigation goals. Mitigates runoff from roads and potential damage from winter-storm or flooding. Mitigates run off of hazardous materials into ecological sensitive systems.

6. International Building and Fire Codes

Establish codes and regulations for building structures for safe occupancy. Mitigates against accidents and natural or human-made causes.

7. Bainbridge Island Municipal Code

These plans and policies regulate the infrastructure, environment, and building codes for the City of Bainbridge Islands. The city follows these codes to mitigate potential damage

during catastrophic events. Mitigate seismic events and other hazards through building structures to withstand or minimize the effects of these hazards.

Hazard Assessments

Flooding

Probability of Occurrence: High

Bainbridge Island is prone to some flooding, mostly due to significant rainfall. The Island does not have any significant rivers or streams but does have rolling hills and lowlands susceptible to urban flooding. Comprehensive land management has helped in years to reduce urban flooding. Changes to the National Flood Insurance Program and coastal studies have defined changes to shoreline management aiding building codes and regulations. Some areas are coastal, but all inland areas are remote with no critical facilities affected and minimal residential housing.

The City of Bainbridge has the largest number of buildings in the SFHA (1-percent-annual-chance flood zone) and has the highest loss ratio which compares the losses due to flooding to the overall building value within the community. Not all of the buildings within the floodplain experience damage due to the level of flooding as well as current floodplain regulations. In addition, the number of buildings is highlighted, which are located in the 1-percent-annual-chance flood zone.¹¹⁶

In conclusion, it is anticipated that every 10 years, Bainbridge Island may experience severe storms enough to cause flooding and possibly Landslide resulting in private and public losses. Bainbridge Island has been modernizing its stormwater systems to mitigate urban flooding throughout the Island.

National Flood Insurance Program (NFIP)

The City of Winslow entered the Emergency Program on August 14, 1975, then converted to the National Flood Insurance Program (NFIP) effective February 5, 1986. The Island was incorporated in 1991 and became the City of Bainbridge Island with an NFIP Effective Date of March 1, 1991. The most recent review of the city's participation in the NFIP was conducted in 2004. During this Community Assistance Visit (CAV) the summarized findings from the CAV included the need for an amendment to the City's flood chapter 15.16, preparation of procedures to implement Chapter 15.16, and additional information on eleven specific cases that were cited in their fieldwork. As of February 2005, all these items were cleared, and our CAV was closed.

In 2019, the City updated the Flood Damage Protection Ordinance (FDPO) to update the requirements for FEMA compliance related to the NFIP. The City has also been involved with a Community Assistance Visit (CAV) process as FEMA has audited for compliance measures of the City's Flood Ordinance as adopted. The City continues to enforce regulations related to our FDPO and compliance with the National Flood Insurance Program (NFIP) related to the potential for flooding events.

More NFIP information can be found in the Kitsap County Profile section.

¹¹⁶ FEMA Risk Report Kitsap County 2015

Special Flood Hazard Area Assessment for Bainbridge Island ¹¹⁷						
Total Estimated Building Value	Percentage of Buildings in the Special Flood	Building Dollar Loss for a 1% Annual Chance Flood	Loss Ratio (Dollar Losses/Total Building Value)	Number of Buildings in Zones AE, A	Number of Buildings in Zone VE	
	Hazard Area	Event				
\$2.6 Billion	1.5%	\$3.6 Million	1.4%	136	8	
\$2.6 Billion1.5%\$3.6 Million1.4%1368Note: Loss information is included for communities in the coastal floodplain. The table includes both dollar losses and a loss ratio, which is calculated as total losses/total building value. Also included is a count of the buildings in Zone VE, which is the 1-percent-annual-chance coastal flood zone with wave action, and in Zones A and AE, which are riverine or coastal 1-percent-annual-chance floodplains. The loss information for the county is only for coastal SFHAs; the rest of the county's SFHAs are identified as Zones AE or A						

Table 49: Special Flood Hazard Area Assessment for Bainbridge Island

Figure 39 on the following page shows building damage percentage (Loss Ratio) and Figure 40 show Flood Zones for the City of Bainbridge Island.

¹¹⁷ FEMA Risk Report for Kitsap County 2015



Note: The loss ratio is calculated by the total building loss divided by the total building value. This percentage easily highlights those buildings which will have the most building damage in the community.

Figure 39: Building Damage Percentage (Loss Ratio) for Bainbridge Island



Figure 40: Flood Zones: Bainbridge Island



Figure 41: Streams and Surface Water, City of Bainbridge Island, Kitsap County GIS

Severe Storms/Tornados Probability of Occurrence: High

The City of Bainbridge Island is vulnerable to severe weather, typically in the winter months. High winds, significant rainfall, and snow can cause some urban flooding as well as damage from falling trees and the potential for landslides due to saturated soils. This can result in loss of life, damage to homes, and significant power outages. Although earthquakes have the potential for significant damage and loss of life, severe storms are annual occurrences, and any mitigation can also minimize the loss of life and damage from other hazards.

Severe storms affect the entire City of Bainbridge Island. Although the island does not have any major rivers or contributories, urban flooding form over-taxed stormwater systems can cause damage to residential and retail outlets. The Island is heavily wooded with significant old-growth timber. The location of the island is ideal for being in the Puget Sound convergent zones during significant weather events and vulnerable to strong winds as weather fronts move over the Olympic Mountains. This results in falling trees and significant power outages. Over the past couple of years, the City of Bainbridge Island and Puget Sound Energy have been working to reduce the number and length of power outages on the Island. Additionally, community programs have been established to reduce power consumption. 100% of the island has the potential for damage and loss of life from severe storms. More information on severe storms/tornados can be found in the Severe Storms/Tornados Mitigation Strategies section.

Landslides & Erosion

Probability of Occurrence: High

The City of Bainbridge Island is vulnerable to landslides and erosion, as noted in Figure 42, with mostly coastal cliffs potentially vulnerable during an earthquake or significant rainfall when the ground is saturated. Previous LIDAR studies noted numerous areas on the Island that are vulnerable to landslides. The City of Bainbridge Island has 27 known areas that have the potential to slide based on USGS LIDAR studies. These areas are known to City Planners. Additional studies of building stock located in these areas will be conducted in the future. Initial estimates define residential stock in these locations and critical facilities. Long term mitigation efforts include restrictions on developing these areas for use, while in the short term, areas are monitored by Public Works during significant weather events.

Bainbridge Island also contains a significant number of buildings that are exposed to the effects of landslides. Several landslides have affected Kitsap County over the last 20 years, causing deaths, injury, damage to properties, and loss of land use. The following accounts were documented by McKenna and others (2008). Several landslides were triggered by storms throughout the winter of 1996-1997. One of these storm events caused a landslide in the Rolling Bay area of Bainbridge Island, which forced a house off its foundation and down a hill into Puget Sound. Several other landslides severely damage homes, roads, 17 and utilities along the bluffs of Bainbridge Island. One of these events resulted in the death of a family of four and destroyed millions of dollars of both public and private property. This deadly landslide demonstrates the unpredictability and destructiveness of landslides in Kitsap County. The scar of the slide was nearly 15 meters wide and 15 to 20 meters high. While assessing the damage from this incident, the USGS also observed numerous other scars from many previous landslides that occurred on the steep bluffs of Bainbridge Island.

Building Exposure to Landslides ¹¹⁸						
Community	Buildings within Landslide Zone	Building Value with Landslide Zone				
Bainbridge Island	177	\$55 Million				
Table EQ. Building Expedure to Landelidee						

Table 50: Building Exposure to Landslides



Figure 42: LIDAR Data on Landslide: Bainbridge Island (USGS)

¹¹⁸ FEMA Risk Report Kitsap County 2015

Earthquakes Probability of Occurrence: High

All communities in Kitsap County would be affected if a Seattle Fault event were to occur. The Cities of Bainbridge Island and Port Orchard have the largest percentage of buildings located in the moderate-high liquefaction zone, while unincorporated areas of the county have the highest total number of buildings located in these zones¹¹⁹.

Bainbridge Island is affected by known faults including the east/west Seattle Fault. Earthquake modeling shows Bainbridge vulnerable to numerous Puget Sound faults should there be an earthquake. A significant Puget Sound earthquake could potentially cause significant damage to the Island, including isolation to the mainland should the Agate Pass Bridge be lost. This includes the possibility of Landslides, infrastructure damage, and transportation disruptions. Although the Island has very few older structures and the majority of the island is wood structures. Some areas are vulnerable to liquefaction, including the urban downtown formerly the city of Winslow. The entire population and building stock are potentially at risk of damage from an earthquake depending on the size and location of the event.

Bainbridge Island contains a substantial number of buildings that would experience building loss ratios of greater than 25 percent during an earthquake event of 7.2 magnitude. Bainbridge Island has the third-highest average building loss ratio of 21 percent after the City of Bremerton at 45 percent and Port Orchard at 39 percent¹²⁰.

Pre-Code versus Moderate Code Building in Kitsap County ¹²¹							
Community	Number of Pre- Code Buildings (before 1975)	Percent Pre-Code Buildings	Number of Moderate Code Buildings (after 1975)	Percent of Moderate Code Buildings			
Bainbridge Island	3,082	34%	6,012	66%			
Total	31,978	36%	56,145	64%			
Note: Pre-code buildings are those that are built prior to 1975. Moderate code are those built after 1975.							

These dates were chosen based on when the seismic provisions were incorporated into the building code statewide which was 1975. Please note that the analysis in Hazus used the following dates: Precode are any buildings prior to 1941. Moderate Code were any buildings after 1941, which is the default Hazus methodology. Please refer to the appendix for additional information.

 Table 51: Pre-Code versus Moderate Code Building in Kitsap County

¹¹⁹ FEMA Risk Report Kitsap County 2015

¹²⁰ FEMA Risk Report Kitsap County 2015

¹²¹ FEMA Risk Report Kitsap County 2015

Earthquakes continue to be the number one priority for mitigation strategies due to the significant losses that may occur during an event. Ongoing land use and building regulation help manage vulnerability to earthquakes.



Figure 43: Liquefaction on Bainbridge Island

Hazus Earthquake Results for a Seattle M 7.2 Earthquake Bainbridge Island ¹²²							
Community	Total Estimated Building Value	Total Number of Buildings	Number of Buildings in the Moderate- High Liquefaction Zone	Percentage of Buildings in the Moderate- High Liquefaction Zone	Building Dollar Loss for a Seattle 7.2 Event	Loss Ratio (Dollar Losses/Total Building Value)	
Bainbridge Island	\$2.6 Billion	9,094	384	4%	\$538 Million	21%	

¹²² FEMA Risk Report Kitsap County 2015

Note: The above table shows the total estimated building value by community, total number of buildings by community, total number of buildings within the moderated to high liquefaction zone, and percentage of buildings within the moderate to high liquefaction zone. In addition, building losses are reported for a Seattle Fault 7.2 magnitude event as well as a loss ratio. A loss ratio is calculated by dividing the dollar loss by the total building value. The loss values are for building losses only; additional damages to infrastructure and building contents are not captured in this table. *Information from the military base was not included in the assessment for the City of Bremerton. **No building data was available for the Port Gamble S'Klallam Indian Reservation from Kitsap County, so the results are shown as unknown.

Table 52: Hazard Data for Earthquakes: Bainbridge Island

Tsunamis & High Waves

Probability of Occurrence: Moderate

The City of Bainbridge Island is susceptible to tsunamis depending on the magnitude and location of any given earthquake. In recent years, USGS and other organizations have studied locations throughout the Puget Sound Region to better define the impact of tsunamis in the region. The USGS and the National Weather Service have installed a warning system to warn the public of a potential tsunami and reduce the risk of loss of life. Warning systems are our best bet to save lives, but due to the short time to respond, may not be able to mitigate the loss of life.

An ocean generated tsunami significant enough to travel the length of the Strait of Juan De Fuca's inland may generate a wave that will cause damage to coastlines. On the other hand, an inland tsunami from a large magnitude earthquake in the Puget Sound would have devastating effects on the City's urban center.

Drought Probability of Occurrence: Low

Drought is most likely to affect the entire county. Hazard assessment information on drought can be found in the Drought Mitigation Strategies section.

City of Bainbridge Island (COBI) Asset Profile

Location COBI Facilities (Critical Facilities: High, Medium and Low)	Zip Code	Prop. Value	Contents	Year Built	Type of Construction	Stories	Square Footage	Type of Protection	Critical Facility (Yes/No)
280 Madison Ave, Bainbridge Island, WA City Hall (High)	98110	\$ 2,461,605	\$10,906,441	1999	Wood	2	19,051 ft2	Alarm System	Yes
625 Winslow Way East, Bainbridge Island, WA Police Department (High)	98110	\$ 548,550	\$ 380,160	1967	Wood	2	3,953 ft2	Alarm System	Yes
1220 Donald Place, Bainbridge Island, WA Wastewater Treatment Plant	98110	\$ 425,640	\$13,000,000	2009	Cinderblock	1	12,000 ft2	Intrusion Alarm, Fenced	Yes
Bainbridge Island, WA Fletcher Bay Pump Station	98110	\$ 90,000	\$ 300,000	1977	Wood	1	475 ft2	Intrusion Alarm, Fenced	Yes
Bainbridge Island, WA Sands Ave Pump Station	98110	\$ 82,860	\$ 1,361,014	1988	Wood	1	390 ft2	Intrusion Alarm, Fenced	Yes
Bainbridge Island, WA Head of the Bay Pump Station	98110	\$ 118,480	\$ 270,983	1970	Wood	1	651 ft2	Intrusion Alarm, Fenced	Yes

Location COBI Facilities (Critical Facilities: High, Medium and Low)	Zip Code	Prop. Value	Contents	Year Built	Type of Construction	Stories	Square Footage	Type of Protection	Critical Facility (Yes/No)
Bainbridge Island, WA Taylor Ave Pump Station	98110		\$ 872,930	1994	Cinderblock	1	247 ft2	Intrusion Alarm, Fenced	Yes
Bainbridge Island, WA Grand Ave Tank	98110	\$ 43,045	\$ 126,817	1979	Steel			Fenced	Yes
Bainbridge Island, WA High School Tank	98110	Leased	\$ 529,216	1990	Steel			Fenced	Yes
Bainbridge Island, WA High School Tank	98110	Leased	\$ 303,528	1977	Steel			Fenced	Yes
Bainbridge Island, WA Commodore Pump Station	98110	Leased	\$ 731,000	1995	Cinderblock	1	260 ft2	Intrusion Alarm	Yes
Bainbridge Island, WA Creosote Rd Tank	98110		\$ 500,000	1995	Concrete, Cinderblock			BLD has intrusion Alarm	Yes
Bainbridge Island, WA Public Works Yard	98110	\$ 1,471,516	\$ 2,928,540	1998	Steel, T1-11	2	3,426 ft2	Gate	Yes

Location COBI Facilities (Critical Facilities: High, Medium and Low)	Zip Code	Prop. Value	Contents	Year Built	Type of Construction	Stories	Square Footage	Type of Protection	Critical Facility (Yes/No)
Water Front Park, Bainbridge Island, WA Senior Center/Commons/ Health District (Medium)	98110	\$ 110,240	\$ 482,274	1996	Wood	1	5,640 ft2	Alarm System	Yes
Bainbridge Island, WA Telemetry Building	98110	\$ 119,700	\$ 183,000		Steel, T1-11	1	190 ft2	Gate	Yes
Bainbridge Island, WA Weaver RD Pump Station	98110	\$ 105,520	\$ 50,000	1950' s	Wood	1	153 ft2	None	No
10255 NE Valley RD, Bainbridge Island, WA Municipal Court	98110	Leased	Leased		Wood	1	2,362 ft2	None	Yes
TOTAL		\$ 8,002,336	\$33,490,423						

Table 53: City of Bainbridge Island (COBI) Asset Profile

Bremerton



The City of Bremerton lies east of the Olympic Mountains directly across Puget Sound from Seattle. For over a century, Bremerton has been the home to Puget Sound Naval Shipyard that continues to service U.S. Navy ships and its 9,000 civilians and many active-duty personnel.

The City was incorporated on October 14, 1901 and operates as a charter city with a Mayor/Council form of government. The current form of government was established by a 1983 charter that eliminated a decadesold city commission composed of a mayor, public works commissioner and finance commissioner. Each member of the Kitsap County Board of Commissioners represents a portion of the city of Bremerton. The City's

downtown core underwent a comprehensive revitalization with the building of a new conference center, parking garage, hotel on the waterfront, and a public safety and headquarters fire station.

People

Population Overview

The population of the City of Bremerton is 41,041,¹²³ making it the largest city in Kitsap County. During the day, the population swells another 9,000 with employees coming in to work at the Puget Sound Naval Shipyard and support organizations. An increase in population of 13,000 is forecast through 2025.¹²⁴

Bremerton Population Information ¹²⁵							
Population	Population	Number of	Median Household	Under 65 with a			
	Density	Households	Income	Disability			
43,268	1,520 per sq. mi	16,813	\$54,232	15.6%			
(2019)	(2019)	(2019)	(2019)	(2017)			

Table 54: Bremerton Population Information

Age Distribution

The figure below shows the distribution of age and vulnerable population in the City of Bremerton. The senior population has grown consistent with statistics nationwide.



Figure 44: Population Distribution

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¹²³ United States Census Bureau (2017)

¹²⁴ 2025 Population Forecast for City Limits and Urban Growth Area

¹²⁵ Esri Demographics (2019)



Bremerton (Updated Jan 2019) Kitsap Sub-County Populations with Functional and Access Needs Estimates

Table 56: Bremerton Vulnerable Population



Bremerton Population Density

Figure 45: Bremerton Population Density, © OpenStreetMap Contributors

Economy

Business and industry are mostly composed of retail and service-oriented organizations like the Bremerton Conference Center. The city also includes contractors that support the Shipyard and is the primary county hub for medical and health services, including Harrison Medical Center.

Built Environment

Existing Structures

80% of Bremerton's structures were built before modern building codes, increasing the risk of significant damage during an earthquake. Bremerton has 312 buildings in the Special Flood Hazard Area, representing \$8.2M in loss after a 1percent annual chance flood.¹²⁶

Based on the 2015 Hazus risk assessment, the table below highlights some of the buildings in Bremerton that are affected by flooding, tsunami, earthquake, and landslide.

City of Bremerton Areas of Mitigation Interest ¹²⁷							
Community Building Name	Address	Building Value	Loss Value	Loss Ratio	Hazard Type		
Bremerton Post Office	602 Pacific Ave. Bremerton	\$316,000	\$302,000	96%	Earthquake		
Kitsap Regional Library	612 5th St. Bremerton	\$756,000	\$724,000	96%	Earthquake		
Bremerton High School (Multiple buildings)	1313 Ohio Ave. Bremerton	\$9.1 million	\$5.6 million	61%	Earthquake		
Fire Station #2 Bremerton	5005 Kitsap Way	\$438,000	\$269,000	61%	Earthquake		

Table 20: City of Bremerton Areas of Mitigation Interest

Land Use

Land use in Bremerton includes residential, commercial, industrial, and open space. The city includes the Bremerton School District and Olympic College.

¹²⁶ FEMA Risk Report for Kitsap County (2015)

¹²⁷ FEMA Risk Report for Kitsap County (2015)

Housing

The following table shows housing units in the city of Bremerton, which represent a high density of older homes that were built pre-earthquake code requirements. A relatively large number of units were built earlier than 1949.

Residential Structures						
Туре	Estimate	Percent				
Ηοι	ising Occupancy					
Total housing units	18,541	100%				
Occupied housing units	16,516	89.1%				
Vacant housing units	2,025	10.9%				
Homeowner vacancy rate	1.9	(X)				
Rental vacancy rate	8.6	(X)				
Ur	nits in Structure					
Total housing units	18,541	100%				
1-unit, detached	9,096	49.1%				
1-unit, attached	1,537	8.3%				
2 units	1,232	6.6%				
3 or 4 units	1,217	6.6%				
5 to 9 units	1,527	8.2%				
10 to 19 units	1,029	5.5%				
20 or more units	2,468	13.3%				
Mobile home	349	1.9%				
Boat, RV, van, etc.	86	0.5%				
Yea	ar Structure Built					
Total housing units	18,541	100%				
Built 2014 or later	219	1.2%				
Built 2010 to 2013	406	2.2%				
Built 2000 to 2009	1,145	6.2%				
Built 1990 to 1999	1,452	7.8%				
Built 1980 to 1989	1,654	8.9%				
Built 1970 to 1979	2,900	15.6%				
Built 1960 to 1969	1,862	10.0%				
Built 1950 to 1959	1,854	10.0%				
Built 1940 to 1949	3,008	16.2%				
Built 1939 or earlier	4,041	21.8%				

Table 57: Bremerton Housing Characteristics 2013-2017 American Community Survey 5-Year Estimates (US Census, 2017)

Infrastructure

Transportation, Communications, and Utilities

The City of Bremerton is serviced by numerous State Routes including SR 3, Kitsap Way, and Hwy 303 to the east. The city has two bridges (Manette and Warren Ave) that connect East and
West Bremerton. The city also has ferry service via Washington State Ferries to downtown Seattle and local service to Port Orchard. Bremerton is connected to downtown Seattle by two ferries: a 60-minute ferry that carries both vehicles and walk-on passengers, and a 28-minute fast ferry that takes passengers and a limited number of bicycles.

City Infrastructure

The city has many government and non-government structures, including libraries, dams, medical and health facilities, and City and County government buildings.

Critical Facilities

Critical structures include:

- The Norm Dicks Building, housing City government and Kitsap Public Health
- Public Works campus
- Olympic College
- Bremerton School District: As of 2019, the Old East High/Junior High School was demolished, and 10,000 square feet was added to the STEM West Hills Elementary School.
- Casad Dam
- Bremerton Fire Department and facilities
- Bremerton Police Department and Courthouse
- Kitsap Mental Health Services
- American Red Cross

Both fire stations in Bremerton are brick, are not retrofitted, and show significant damage in earthquake Hazus models.

Cultural Resources

The Bremerton Arts Commission represents the community during the creative phase of new city development or improvement projects. Bremerton has one of the largest and most diverse official fine arts districts in the northwest. There are several city parks including Blueberry Park, Evergreen Rotary Park, and other parks throughout the Bremerton. Golf resources include Gold Mountain Golf Club, disc golf courses, and other golf courses in the Bremerton area. Bremerton includes various aquatic, athletic, and recreational opportunities.

Future Development

Bremerton has a Comprehensive Plan that is a 20-year vision and roadmap for its future. The plan guides City decisions on where to build new jobs and houses, how to improve the transportation system, and where to make capital investments such as utilities, sidewalks, and parks. The Comprehensive Plan is the framework for most of Bremerton's big-picture decisions on how to grow while preserving and improving its neighborhoods and can be found at https://www.bremertonwa.gov/185/Comprehensive-Plan.

Natural Environment

The City of Bremerton is 28.44 square miles. The topography in the area is low rolling hills, generally trending north to south. There are few streams and wetlands, some high liquefaction areas to the East, and many shoreline areas. The Casad Dam provides water for the city of Bremerton. The map on the following page shows the elevation and typography of the city.



Figure 46: Topographical Feature, City of Bremerton

History of Disasters

Bremerton's history of emergency/disasters is much like the remainder of the county. Kitsap is a micro-climatic region in which winds, rain, and temperatures can differ throughout the County. Although, like other cities, Bremerton is susceptible to earthquakes, tsunamis, urban flooding, and Landslides. As noted below, typical issues are winter storm events, although, Bremerton experienced the Nisqually earthquake and suffered damages greater than other cities in the County.

Event Date	Type of Event	Declaration	Declared Disaster
February 2019	Severe Winter Storm	Local (was undeclared locally), State	Local Public Assistance threshold not met. Local SBA declaration.
December 2018	Severe Winter Storms - Tornado	Local, State, Federal	Local Public Assistance threshold not met.
Dec 2008	Severe wind and rain	Local	No assistance
Dec 2007	Severe wind and rain	Local, State, and Federal	Yes
Jan 2006	Severe wind and rain	Local	Did not meet PA threshold
Dec 2006	Severe wind and rain	Local	Did not meet PA Threshold
Oct 2003	Severe wind and rain	Local, state, and Federal	Local PA Threshold not met. IA paid out
Jan 2002	Severe wind and rain	Local and State	State Only; presidential denied
Feb 2001	Nisqually Earthquake	Local, state, and Federal	YES
June 1997	Rolling Bay mudslide	Local	No assistance
Dec 1996	Severe rain and snow runoff storm	Local, State, and Federal	Yes
Nov 1995	Severe wind and rain	Local, State, and Federal	Local PA threshold not met
Jan 1993	Severe wind and rain	Local, State and Federal	No record on file
Jan 1992	Severe wind and rain	Local	No assistance
Dec 1990	Severe wind and rain	Local, State and Federal	Yes
Dec 1982	Severe wind and rain	Local	No assistance
May 1965	Earthquake	Local, state, and Federal	No record on file
Oct 1962	Severe wind and rain	Local, state and Federal	No record on file

Table 58: Emergency/Disaster History for Bremerton

Mitigation Planning

Risk Assessment

The Kitsap County Profile Section of this plan provides a thorough assessment of hazards associated with Kitsap County and its incorporated cities. Although each city is affected

differently, risks significant to the City of Bremerton are floods, earthquakes, landslides, tsunamis, and severe storms. The Kitsap County Profile Section provides a synopsis of the County and cities, while this profile provides additional information specific to Bremerton.

Rating System

The rating system for Bremerton is consistent with the general plan. A rating for each hazard is defined as high, moderate, and low based on the information provided in The Planning Process Section to this plan. Additional ratings are applied for priority mitigation strategies and Cost analysis.

Overview

The purpose of this profile is to assess the vulnerability of the City of Bremerton in regard to the various natural hazards previously identified in 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 mitigation profile.

As part of the vulnerability assessment process, the City of Bremerton government completed an inventory of all critical facilities and has considered these critical facilities in our planning and mitigation strategy development process. The City of Bremerton has no repetitive loss properties.

Planning Process

As noted in the basic MHMP Plan Update, the City of Bremerton assigned personnel to the mitigation plan update and through the planning update process were assigned to the Multi-Hazard Mitigation Planning Committee. Personnel also attended monthly Planning Committee webinar conference calls as well as completed the HIVA and MHMP RFI Trackers, reviewed drafts of the document, and communicated via emails and one-on-one discussions. Records can be found in Appendix C: Stakeholder and Public Engagement. Additionally, the City solicited for inputs from City Departments, City Council, and the citizens of Bremerton.

The analyses conducted by City of Bremerton 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.

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 the City of Bremerton government were used in the planning, including assumptions and approximations that were believed to be reasonable. 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. In any event, mitigation strategies identified in this plan will be incorporated when appropriate into other land use or capital improvement plans. Mitigation will be addressed with each plan revision.

The City of Bremerton 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.

City of Bremerton 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 City of Bremerton more resistant to the damages and hardships that could otherwise be the result of future natural disasters.

Plans and Ordinances

In an effort to maximize hazard mitigation planning, the following city plans are used to support and mandate mitigation efforts throughout the city:

1. Comprehensive Land Use Plan 2016

Bremerton's Comprehensive Land Use Plan is a policy and legal document that reflects the community's desires, goals, and the needs of the future within the context of the Growth Management Act. The plan was adopted in June of 2016 and is updated yearly as part of the annual amendment process.

2. Comprehensive Transportation Plan

This transportation plan provides the framework to guide short- and long-term development and maintenance of the multi-model transportation system within the city of Bremerton. It addresses the mandates of the Growth Management Act under the Revises Code of Washington, Title 36.70A.070.

3. Comprehensive Water System Plan 2012

This plan includes goals and policies to protect the natural environment and mitigate the impacts of future growth. It is in compliance with the Growth Management Act and the Critical Areas Ordinance.

4. Comprehensive Sewer System Plan

Responsible for collection, treatment, and disposal of all sanitary sewer waste from commercial and residential customers. Operates the City's Wastewater Treatment Plant and maintains 33 pump stations in the City. The plan is designed to identify, design and implement mitigation and upgrades for the wastewater system for the City of Bremerton.

5. Comprehensive Stormwater System Plan 2009

This responsibility includes the protection and preservation of the natural resources of the area that play such a large role in sustaining the City's quality of life. Within the City, the responsibility for storm and surface water management and the protection of groundwater have been entrusted to the Department of Public Works and Utilities. It is the mission of the Stormwater Program within the Department to control flooding, enhance water quality, protect sensitive habitat areas, and optimize the recharge of local aquifers.

6. Capital Improvement Plan 2019

The purpose of the Capital Facilities Plan is to demonstrate that all capital facilities serving Bremerton have been addressed. The plan covers roads, parks, water and sewer lines, police facilities, and administrative buildings. It is compliant with the Growth Management Act.

7. International Building and Fire Code

The City of Bremerton adopted the 2015 International Fire Codes with state amendments under Chapter 15.04 of the Building Code. These codes define building, fire, and mitigation practices.

8. Municipal Code

The Bremerton Municipal Code are plans and policies regulate the infrastructure, environment, and building codes for the city. The city follows these codes to mitigate potential damage during catastrophic events.

9. Zoning Ordinance

The zoning code contains regulations to manage the community's growth in a manner that ensures efficient use of land, preserves regulated critical areas and encourages good urban design. Specifically, the code supports the vision of the city and is designed to implement the comprehensive plan and by reference the requirements of the Washington State Growth Management Act.

10. Subdivision Ordinance

The purpose of this title is to implement the comprehensive plan in accordance with the Growth Management Act; to regulate the subdivision of land and to promote the public health, safety, and general welfare.

11. Critical Areas Ordinance

This ordinance defines critical areas (wetlands, areas of critical recharging effect on aquifers used for water, fish and wildlife habit, frequently flood areas and geologically hazardous areas) as required by the Growth Management Act. This ordinance regulates, protects and defines these Areas under Bremerton Municipal Code Chapter 16.20.

12. Participation in National Flood Insurance Program

Bremerton's participation in the NFIP allows them to use the resources of FEMA to use mitigation planning is to identify policies and actions that can be implemented over the long term to reduce risk and future losses.

13. Participation in the Community Rating System Program

Bremerton's involvement in The Community Rating System (CRS) through FEMA NFIP allows them to benefit in reduced insurance rates and by using the CRS floodplain management system enhances public safety, reduce damages to property and public infrastructure, avoid economic disruption and losses, reduce human suffering, and protect the environment.

Hazard Assessments

Flooding

Probability of Occurrence: Moderate

The City of Bremerton does not have any rivers are large tributaries that cause significant flooding in the City limits. There are creeks and streams that can be overwhelmed during periods of heavy

rain and will overflow their banks. Additionally, significant rain will cause urban flooding in areas noted for poor drainage. Except for earthquakes, flooding is the next costly event, and mitigation efforts can help reduce the effect of life and property. Efforts to reduce stormwater overflows have been successful, and there are areas that need attention. Flooding may also occur along the shoreline of the City of Bremerton due to high tides. Recent changes to the National Flood Program have incorporated these areas to include the requirement for flood insurance. All residents and housing units are susceptible to urban flooding. Figure 47 shows the flood zones for Bremerton.

National Flood Insurance Program (NFIP)

The City of Bremerton entered the National Flood Insurance Program on May 27, 1975. The most recent review of the city's participation in the NFIP was conducted on July 23, 2008. During the visit, the City issued two permits that were properly conditioned for the flood elevation certificates; however, the final Elevation Certificate was inadvertently missed. The corrective action taken by the city was to modify the permitting system computer software to more definitively request flood zone information at the time of initial application for a building permit and at construction inspection stages including prior to framing and prior to the release of final inspection certification.

Like most communities in Kitsap County, after the last major flood, 2007, we reviewed our flooding issues and once again determined we have no repetitive loss areas in the City of Bremerton. The City of Bremerton has amended its processes as recently as August 2007 resulting in a successful CAV in July 2008.

Bremerton Municipal Code Chapter 17.60 Floodplain Management was updated under Ordinance #5231 to maintain compliance with the NFPIP on December 7, 2013.

Special Flood Hazard Area Assessment ¹²⁸											
Community	Total Estimated Building Value	Percentage of Buildings in the Special Flood Hazard Area	Building Dollar Loss for a 1% Annual Chance Flood Event	Loss Ratio (Dollar Losses/Total Building Value)	Number of Buildings in Zones AE, A	Number of Buildings in Zone VE					
Bremerton*	\$1.7 Billion	<1%	\$404,000	<1%	21	0					
Note: Loss inform dollar losses and count of the build	Note: Loss information is included for communities in the coastal floodplain. The table includes both dollar losses and a loss ratio, which is calculated as total losses/total building value. Also included is a count of the buildings in Zone VE, which is the 1-percent-annual-chance coastal flood zone with wave										
action, and in Zones A and AE, which are riverine or coastal 1-percent-annual-chance floodplains. The loss information for the county is only for coastal SFHAs; the rest of the county's SFHAs are identified as Zones AE or A. *Information from the military base was not included in the assessment for the City of Bremerton. **No building data was available from Kitsap County for the Port Gamble S'Klallam Indian											

More information regarding the NFIP can be found in the Kitsap County Profile section.

Table 59: Special Flood Hazard Area Assessment

Reservation, so the results are listed as unknown.

¹²⁸ FEMA Risk Report Kitsap County 2015

Flood Risk Community Characteristics ¹²⁹												
Community	mmunityTotalCRSFloodRepetitiveTotalTotalPopulationCommunityClaimsLossPoliciesInsurancePropertiesCoverage											
Bremerton*	37,729	No	5	0	52	\$15 Million						
Note: The community overview summarizes characteristics at the community level. Data were obtained from FEMA and the U.S. Census and were current as of November 23, 2015												

Table 60: Flood Risk Community Characteristics



Figure 47: Bremerton Flood Zones

¹²⁹ FEMA Risk Report Kitsap County 2015



Watercourse & Surface Water Map of Bremerton



Figure 48: Watercourse & Surface Water Map of Bremerton

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Severe Storms/Tornados Probability of Occurrence: High

Flooding and severe storms work hand-in-hand. Severe winter storms are the typical event that has the highest probability of cause damage to property. These events which occur annually results in a variety of mixed events of snow, rain, low temperatures, and severe winds. The combination of these events generally results in significant power outages, urban flooding, and loss of work and revenue to the economy. Should the event become significant with long-term heavy rainfall, major creeks like Gorst Creek, would overflow and flood areas downstream along the shoreline.

100% of the City has the potential for damage and loss of life from severe storms.

Landslides & Erosion

Probability of Occurrence: High

The city of Bremerton has some areas vulnerable to landslides and erosion. These areas are mostly in East Bremerton along Puget Sound. Landslides may be caused by earthquakes, or significant prolong rainfall and ground saturation. These areas are known to the City Planner. There are no critical facilities in these areas. Building stock is mostly residential based on initial estimates. The graphic below shows LIDAR data on landslides in Bremerton.



Figure 49: LIDAR Data on Landslide, Bremerton (USGS)

Earthquakes Probability of Occurrence: High

The city of Bremerton's greatest danger is an earthquake. Like other cities in Kitsap, it is vulnerable to the known faults that run east/west through the Puget Sound Region. Bremerton has many older buildings, storefronts, and residents as well as historical buildings. Some homes and businesses have gone through retrofitting or brought up to earthquake codes established in the 1980s. Over 80% of the homes were built before 1989. A significant Puget Sound earthquake could potentially cause significant damage to the city and affect their primary economic base, merchants and the Naval Shipyard, as well as city infrastructure. A significant earthquake could also damage the only airport in the area, Bremerton Airport, as well as the Casad Dam, a facility built in the 1930s as the city water supply. Damage to the dam could result in flooding to the west into a residence near the dam but also down the Union River and into Mason County. As noted in the figure below, few areas have a high degree of liquefaction susceptibility. These areas are mostly areas that have few residences and no critical facilities.

Earthquakes continue to be the number one priority for mitigation strategies due to the significant losses that may occur during an event. Ongoing land use and building regulation help to manage vulnerability to earthquakes.



Figure 50: Liquefaction Areas, City of Bremerton Source: Kitsap County Department of Information Services

Hazus Earthquake Results for a Seattle M 7.2 Earthquake ¹³⁰											
Community	Total Estimated Building Value	Total Number of Buildings	Number of Buildings in the Moderate- High Liquefaction Zone	Percentage of Buildings in the Moderate- High Liquefaction Zone	Building Dollar Loss for a Seattle 7.2 Event	Loss Ratio (Dollar Losses/Total Building Value)					
Bremerton	\$1.7 Billion	10,899	116	1%	\$760 Million	45%					

Note: The above table shows the total estimated building value by community, total number of buildings by community, total number of buildings within the moderated to high liquefaction zone, and percentage of buildings within the moderate to high liquefaction zone. In addition, buildings losses are reported for a Seattle Fault 7.2 magnitude event as well as a loss ratio. A loss ratio is calculated by dividing the dollar loss by the total building value. The loss values are for building losses only; additional damages to infrastructure and building contents are not captured in this table. *Information from the military base was not included in the assessment for the City of Bremerton. **No building data was available for the Port Gamble S'Klallam Indian Reservation from Kitsap County, so the results are shown as unknown.

Table 61: Hazus Earthquake Results for a Seattle M 7.2 Earthquake

Pre-Code versus Moderate Code Building in Kitsap County¹³¹

Community	Number of Pre- Code Buildings (before 1975)	Percent Pre-Code Buildings	Number of Moderate Code Buildings (after 1975)	Percent of Moderate Code Buildings
Bremerton	8,698	80%	2,201	20%
	11 P 4	41 4 1 14	· · · · · · · · · · · · · · ·	1 1 1 10 10

Note: Pre-code buildings are those that are built prior to 1975. Moderate code are those built after 1975. These dates were chosen based on when the seismic provisions were incorporated into the building code statewide which was 1975. Please note that the analysis in Hazus used the following dates: Pre-code are any buildings prior to 1941. Moderate Code were any buildings after 1941, which is the default Hazus methodology. Please refer to the appendix for additional information.

Table 62: Pre-Code versus Moderate Code Building in Kitsap County4

Tsunamis & High Waves

Probability of Occurrence: Moderate

Bremerton can be affected by tsunamis, mostly in the area along the shipyard. The greatest threat is inland tsunamis caused by an earthquake and subsequent tsunami in the Puget Sound waters. Such a tsunami would have little warning and may cause loss of life and significant damage to areas noted in Figure 51. Although there may be a surge of water, a Pacific Ocean subduction zone earthquake may force a higher than normal surge in the area causing unexpected flooding in the City of Bremerton. Such a surge would disrupt transportation lines and ferries and other potential hazards.

¹³⁰ FEMA Risk Report Kitsap County 2015

¹³¹ FEMA Risk Report Kitsap County 2015



Figure 51: Tsunami Inundation, City of Bremerton

Drought Probability of Occurrence: Low

Drought is most likely to affect the entire county. Hazard assessment information on drought can be found in the Drought Mitigation Strategies section.

City of Bremerton Asset Profile

Description	Building Value	Content Value	Content w/ Bldg	Const Type	# of Stories	SQ. FT.	Year Built	Flood Plain	Zip Code	Responsible Dept.
Ted Tillet Fire Station 3031 Olympus	1,610,793	325,124	No	Masonry Joisted	1	7,782	1979	No	98310	Fire
M. Meigs Fire Station 5005 Kitsap Way	1,577,765	325, 124	No	Masonry Joisted	1	7,621	1981	No	98312	Fire
Golf Course Maintenance Sheds 7263 W Belfair Valley Rd	989,255	625,238	No	Masonry Joisted	1	9,600	1990s	No	98312	Parks
Sheridan Park Headquarters 680 Lebo Boulevard	3,668,135	271,843	No	Masonry Joisted	2	30,000	1940s	No	98310	Parks
Storage Shed and Contents 680 Lebo Blvd	117,456	-	Yes	Frame	1	2,100	1940s	No	98310	Parks
Police Special Operations Bldg 3029 Olympus Drive	802,578	108,737	No	Steel Frame	1	7,200	1980s	No	98310	Police
Reservoir #4 4801 Roosevelt Blvd	9,835,321	-	Yes	Fire Resistive	1		1921	No	98312	Water
Reservoir #5	3,217,662	-	Yes	Fire Resistive	1		1954	No	98311	Water
Reservoir #6	446,898	-	Yes	all steel	1		1950	No		Water

Description	Building Value	Content Value	Content w/ Bldg	Const Type	# of Stories	SQ. FT.	Year Built	Flood Plain	Zip Code	Responsible Dept.
Reservoir #21	2,681,385	-	Yes	all steel	1		1983	No		Water
Reservoir #8	2,502,626	-	Yes	all steel	1		1970	No		Water
Reservoir #11	1,644,583	-	Yes	Fire Resistive	1		1930s	No		Water
Reservoir #12	2,046,282	-	Yes	Fire Resistive	1		1930s	No		Water
Reservoir #13	893,795	-	Yes	Fire Resistive	1		1930s	No		Water
Reservoir #15	1,275,814	-	Yes	all steel	1		1960s	No		Water
Reservoir #16	1,161,934	-	Yes	all steel	1		1970s	No		Water
Reservoir #17	1,258,854	-	Yes	all steel	1		1970s	No		Water
Reservoir #18	1,235,325	-	Yes	all steel	1		1970s	No		Water
Reservoir #19	1,889,595	-	Yes	all steel	1		1970s	No		Water
Reservoir #20	1,220,334	-	Yes	all steel	1		1980s	No		Water
Glen Jarstad Aquatic Center 500 Magnuson Way	4,946,275	84,660	No	Fire Resistive	2	21,000	1970s	No	98310	Parks

Description	Building Value	Content Value	Content w/ Bldg	Const Type	# of Stories	SQ. FT.	Year Built	Flood Plain	Zip Code	Responsible Dept.
Senior Citizens Center 1140 Nipsic	1,200,552	210,120	No	Frame	1	5,000	1940s	No	98310	Parks
Reservoir #10	1,488,904	-	No	all steel	1		1970s	No		Water
Anderson Creek Well #8	156,632	-	No	Masonry Joisted	1	104	1970s	No		Water
Bridle Ridge Well #9	317,524	-	No	Masonry Joisted	1	140	1970s	No		Water
Pump Station #2	1,125,612	405,821	No	Masonry Joisted	1	1,128	1980s	No		Water
Residence: Pump Station #2	52,397	-	No	frame	1	936	1930s	No		Water
Gorst Creek Pump Station #1	334,279	131,572	No	Fire Resistive	1	2,700	1940s	No		Water
Forestry Division Office	277,076	26,393	No	Mobile	1	1,375	1970s	No		Water
Forestry Garage Building 4398A W Old Belfair Highway	112,618	30,900	No	frame	1	2,000	1960s	No		Water
5572 Imperial Way	99,246	-	No	Metal	1	3,200	2002	No		Water
Pump Station #3	112,618	-	Yes	Masonry Joisted	1	180	1990s	No		Water
Pump Station #8	880,405	-	Yes	Masonry	1	950	2003	No		Water

Description	Building Value	Content Value	Content w/ Bldg	Const Type	# of Stories	SQ. FT.	Year Built	Flood Plain	Zip Code	Responsible Dept.
Pump Station #11	112,618	-	Yes	Masonry Joisted	1	225	1991	No		Water
Pump Station #12	112,618	-	Yes	Masonry Joisted	1	323	1966	No		Water
Pump Station #14	71,761 112,618	-	Yes	Masonry Joisted	1	160	1995	No		Water
Pump Station #4	71,761	-	Yes	Frame	1	187	1950s	No		Water
10151 W McKenna Falls Rd	178,759	127,805	No	Masonry Joisted	1	323	1983	No		Water
Chlorine Facility McKenna Falls Intake	256,290	73,899	No	Masonry Joisted	1	768	1996	No		Water
50 NE Vena Ave	505,888		Yes	Masonry	1	520	1975	No		Water
Residence/Laboratory McKenna Falls	176,555	21,114	No	Masonry Joisted	2	2,200	1940S	No		Water
408 Lebo Blvd	76,791	-		Frame	1		1950s	No	98310	Parks
Eastside Treatment Plant 2475 Stephenson Avenue	7,419,412	-	Yes	Fire Resistive	1	3,981	2002	No	98310	ww
3027 Olympus Drive	1,688,007	343,000	No	Fire Resistive	2	15,200	1980s	No	98310	Utilities
Well #14 5853 S Central Valley Rd NE	115,413	71,920	No	Masonry Joisted	1	104	1982	No		Water

Description	Building Value	Content Value	Content w/ Bldg	Const Type	# of Stories	SQ. FT.	Year Built	Flood Plain	Zip Code	Responsible Dept.
Sewage Treatment Plant 1600 Oyster Bay Avenue	54,582,393	10,112,285	No	Fire Resistive	3	100,08 2	1984	No	98312	ww
Well #17 7001 W Belfair Valley Rd	115,413	30,446	No	Masonry Joisted	1		1986	No		Water
Louis Mentor Boardwalk Park - no longer Overwater Park 2nd & Washington Ave	4,356,357	46,757	No	Fire Resistive	-		1980s	No		Parks
Casad Dam 2920 Upper Union River Rd	36,824,358	-	No	Fire Resistive			1940S	No		Water
Pump Station CE1	9,892,550	-	Yes	Fire Resistive	2	4,182	1984	No		WW
Pump Station WB3	8,795,029	-	Yes	Fire Resistive	2	2,050	1984	No		WW
2304 19th Street	4,121,896	-	Yes	Fire Resistive	2	1,302	1984	No		WW
Watershed Bridges	627,740	-		Fire Resistive		1,200	2000	No		Water
Public Works Complex 100 Oyster Bay	4,286,772	984,629	No	Masonry Joisted	2	32,300	1990s	No	98312	Street/Storm
589 Lebo Blvd	92,955	-	Yes	Masonry Joisted	1	256	1992	No		Water
Pump Station #13	109,043	-	Yes	Fire Resistive	1		1942	No		Water

Description	Building Value	Content Value	Content w/ Bldg	Const Type	# of Stories	SQ. FT.	Year Built	Flood Plain	Zip Code	Responsible Dept.
Pump Station #17 4398D W Belfair Valley Rd	303,890	-	Yes	Masonry Joisted	1	480	1991	No		Water
Well #2R	115,413	-	No	Fire Resistive	1	30	1980	No		Water
Well #3	115,413	-	No	Fire Resistive	1	30	1950	No		Water
Well #7	148,388	-	No	Fire Resistive	1		1992	No		Water
Well #13	117,100	15,056 -	No	Frame	1	80	1990	No		Water
Well #15	115,413	-	No	All Steel	1	80	1992	No		Water
Well #18 8301B W. Old Belfair Highway	115,413	-	No	Fire Resistive	1	336	1988	No		Water
Equipment Storage Building (Biosolids App. Area - Gorst) McKenna Falls Head Tank	23,239	2,060	No	Steel	1	800	1994	No		Water
Well #16	123,657	-	Yes	Fire Resistive	1		1981	No		Water
Gorst Production Well	63,036	-	Yes	Fire Resistive	1		1993	No		Water

Description	Building Value	Content Value	Content w/ Bldg	Const Type	# of Stories	SQ. FT.	Year Built	Flood Plain	Zip Code	Responsible Dept.
Booster Station #6	35,752	-	Yes	Fire Resistive	1		1992	No		Water
Booster Station #7 1527 Cook Rd SW	35,752	-	Yes	Fire Resistive	1		1992	No		Water
Pump Station CE-2	839,657	-	Yes	All Steel	1	36	1970s	No		WW
Pump Station CE-3	1,648,758	-	Yes	Fire Resistive	2	450	1970s	No		WW
Pump Station CE-4	7,419,412	-	Yes	Fire Resistive	2	3,906	1980s	No		WW
Pump Station CE-6	3,832,723	-	Yes	Fire Resistive	2	966	1980s	No		WW
Pump Station CW-2	1,321,891	-	Yes	Fire Resistive	0	264	1940s	No		WW
Pump Station CW-3	700,602	-	Yes	All Steel	1	36	1970s	No		WW
Pump Station CW-4	824,379	-	Yes	Fire Resistive	0	100	1960s	No		WW
Pump Station EB-2	5,602,577	-	Yes	Fire Resistive	2	400	1970s	No		WW
Pump Station EB-3	2,473,137	-	Yes	Fire Resistive	2	480	1970s	No		WW
Pump Station EB-4	350,301	-	Yes	All Steel	0	48	1960s	No		WW

Description	Building Value	Content Value	Content w/ Bldg	Const Type	# of Stories	SQ. FT.	Year Built	Flood Plain	Zip Code	Responsible Dept.
Pump Station EB-5	700,602	-	Yes	All Steel	1	36	1970s	No		WW
Pump Station EB-6	1,541,325	-	Yes	Fire Resistive	1	144	1940s	No		WW
Pump Station EB-8	736,053	-	Yes	All Steel	1	36	1970s	No		WW
Pump Station EB-9	726,071	-	Yes	All Steel	0	12	1970s	No		WW
Pump Station KL-1	1,541,325	-	Yes	Fire Resistive	2	675	1970s	No		WW
Pump Station KL-2	1,541,325	-	Yes	Fire Resistive	2	630	1970s	No		WW
Pump Station KL-3	1,071,693	-	Yes	Fire Resistive	2	450	1970s	No		WW
Pump Station KL-4	1,071,693	-	Yes	Fire Resistive	2	450	1970s	No		WW
Pump Station PB-1	1,236,569	-	Yes	All Steel	1	64	1970s	No		WW
Pump Station PB-2	1,648,758	-	Yes	All Steel	1	64	1970s	No		WW
Pump Station OB-1	7,561,264	-	Yes	Fire Resistive	2	1,260	1970s	No		WW
Pump Station OB-2	2,473,137	-	Yes	Fire Resistive	2	480	1970s	No		WW

Description	Building Value	Content Value	Content w/ Bldg	Const Type	# of Stories	SQ. FT.	Year Built	Flood Plain	Zip Code	Responsible Dept.
Pump Station OB-3	2,473,137	-	Yes	Fire Resistive	2	450	1970s	No		WW
Pump Station OB-4	2,473,137	-	Yes	Fire Resistive	2	450	1970s	No		WW
Pump Station OB-5	824,379	-	Yes	Fire Resistive	2	480	1970s	No		WW
Pump Station OB-7	824,379	-	Yes	Masonry Joisted	1	240	1990s	No		WW
Pump Station MD-1	824,379	-	Yes	Fire Resistive	1	56	1990s	No		WW
Pump Station WB-4 432 Constitution Ave	736,053	-	Yes	All Steel	1	36	1970s	No		WW
Odor Control Station #3	494,627	-	Yes	Fire Resistive	1	120	1990s	No		WW
Odor Control Station #1	494,627	-	Yes	Fire Resistive	1	240	1990s	No		WW
Odor Control Station #2 200 High Ave	494,627	-	Yes	Fire Resistive	1	336	1990s	No		WW
Composite Sampling Station SS-1	123,657	-	Yes	Fire Resistive	1	100	1980s	No		WW
Composite Sampling Station SS-2	123,657	-	Yes	Fire Resistive	1		1980s	No		WW
Corrosion Control Facility 1650 3rd Ave	1,716,150		Yes	Masonry	2	1,290	1998	No		WW

Description	Building Value	Content Value	Content w/ Bldg	Const Type	# of Stories	SQ. FT.	Year Built	Flood Plain	Zip Code	Responsible Dept.
Generator Storage Facility at Well 14 5853 S Central Valley Rd NE	19,278	-	Yes	Frame	1	240	1997	No		Water
W Branch Water Intake Facility 5200 Rd Bremerton Watershed	1,045,834	-	Yes	Fire Resistive	1		1990s	No		Water
McKenna Falls Water Intake Facility 5000 Rd Bremerton Watershed	1,016,473	-	Yes	Masonry Joisted	1		1990s	No		Water
Booster Station #10 5785 Imperial Way SW	175,313	-	Yes	Masonry Joisted	1	504	1970s	No		Water
Fire Department Warehouse 3031 Olympus	290,540	105,060		Steel Frame	1	5,000	2003	No		Fire
Pump Station WB-6 299 Callow Avenue S	5,602,577	-	Yes	Fire Resistive	1	900	2003	No		WW
Conference Center 100 Washington Avenue	10,985,445	420,240	No	Masonry	1		2004	No		Econ Devel
Government Center 345 6th Street	10,000,000	2,000,000		Steel Frame	5		2004	No	98337	Finance
Fire Station # 1 911 Park Avenue	3,000,000 4,508,867	650,000		Wood Frame/Steel	1		2004	No	98337	Fire
BPD Building B 1025 Burwell Street	377,477	110,000		wood /Brick	1		1980			
Pistol Range Building	95,329	5,000		Masonry	1		1970s			

Description	Building Value	Content Value	Content w/ Bldg	Const Type	# of Stories	SQ. FT.	Year Built	Flood Plain	Zip Code	Responsible Dept.
6851 W Belfair Valley Road										
TOTAL	\$139,536,051	4,526,872								

Port Orchard



The City of Port Orchard was first established along the south shore of Sinclair Inlet and has grown southward for more than 100 years. As the county seat, the City has been an important urban area for Kitsap County, and particularly South Kitsap. The City is served by a Mayor and seven Council members and is classified as a second-class City. Its proximity along Sinclair Inlet provides an easily accessible saltwater shoreline and stunning views of the Olympic Mountains. Natural ravines protect blackjack Creek and Ross Creek and maintain a rural belt in an urban area. There is convenient access to Port Orchard with regularly scheduled passenger ferry service, with connections to Seattle via the Washington State Ferry system. The marine Park and downtown waterfront host numerous community activities, concerts, and the weekly farmers market. Boating is supported by the Port Orchard Marina and numerous other marinas and boating services.

People

Population Overview

Port Orchard has a diverse population of 14,390.¹³² Many professionals transit daily to downtown Seattle. The city is characterized by professional, scientific employment, construction, and education. Table 64 shows the City's population density and urbanization.

Port Orchard Population Information										
Population	Population Density	Number of Households	Median Income	Household	Under 65 Disability	with	а			
15,163 (2019)	1,571 per sq. mi (2019)	5,775 (2019)	\$68,287 (2019)		12.9% (2017)					

Table 63: Port Orchard Population Information

Age Distribution

Figure 52 shows the distribution of age in Port Orchard.



Figure 52: Population Distribution

¹³² April 1, 2019 OFM Population Estimate for Port Orchard



South Kitsap (Updated Jan 2019) Kitsap Sub-County Populations with Functional and Access Needs Estimates

Figure 53: South Kitsap Vulnerable Population



Figure 55: Port Orchard Population Density

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Economy

The most current economic census data from 2012 show the economy based (by annual revenue, highest first) in retail trade, health care, and social assistance, wholesale trade, and real estate. Based on the number of establishments (highest first), the economy is based on retail trade, professional, scientific and technical services, health care and social assistance, accommodation and food service, and other services except for public administration.¹³³

The City's economy also supported by the Puget Sound Naval Shipyard, local commerce as seen on the Port Orchard Industrial Park, and employment in the Seattle-Tacoma area. The City's downtown corridor is characterized by working private shipyards, marinas, and merchants providing a variety of retail services to the citizens. The economic base also includes multiple federal defense agencies: Naval Station Port Orchard, Puget Sound Naval Shipyard, Naval Submarine Base Banger, Naval Keyport Center, and support facilities. The dominance of Federal employment (the Navy) drives all other economies in the county. The dominance of service industries in Port Orchard indirectly supports the Federal economic base.

Built Environment

Existing Structures

Land use in Port Orchard is primarily residential housing, government, retail, and waterfront marinas. As part of the Management Growth Act, Port Orchard has annexed land in recent years to accommodate city growth. Because it is the County seat, Port Orchard includes the Kitsap County Administration Building, courthouse, and adjoining Corrections Center. These facilities are part of the County's Damage Assessment Program. Land use also includes include numerous residential areas and commercial zones.

Port Orchard has 6% of its buildings located in the moderate-high liquefaction zone, with 725 of them built before modern building codes, increasing the risk of significant damage to an earthquake.¹³⁴ Based on the 2015 Hazus risk assessment, the table below highlights some of the buildings in Port Orchard that are affected by flooding, tsunami, earthquake, and landslide.

City of Port Orchard Areas of Mitigation Interest ¹³⁵									
Community Building Name	Address	Building Value	Loss Value	Loss Ratio	Hazard Type				
General Retail	205 Bethel Ave.	\$76,000	\$50,000	66%	Earthquake, Landslide				
Cedar Heights Junior High School	336 Lippert Dr. W.	\$2.9 million	\$1.6 million	56%	Earthquake				
Kitsap County Government Building	507 Austin Ave.	\$5.0 million	\$2.9 million	57%	Earthquake				
Single Family Home	1699 Bay St.	\$61,000	\$26,000	42%	Flood				
Multiple Single- Family Homes	SW Bay St.	\$676,000	N/A	N/A	Landslide				

Table 64: City of Port Orchard Areas of Mitigation Interest

 ¹³³ Washington Department of Finance Management (2012)
¹³⁴ FEMA Risk Report for Kitsap County (2015)

¹³⁵ FEMA Risk Report for Kitsap County (2015)

Housing

Out of just under 5,500 units in the City, over half were built before 1989. There are a significant number of structures that were constructed pre-earthquake code requirements.

Resid	Residential Structures							
Туре	Estimate	Percent						
Housing Occupancy								
Total housing units	5,460	100%						
Occupied housing units	4,776	87.5%						
Vacant housing units	684	12.5%						
Homeowner vacancy rate	6.0	(X)						
Rental vacancy rate	5.3	(X)						
Units in Structure								
Total housing units	5,460	100%						
1-unit, detached	3,379	61.9%						
1-unit, attached	364	6.7%						
2 units	139	2.5%						
3 or 4 units	396	7.3%						
5 to 9 units	395	7.2%						
10 to 19 units	357	6.5%						
20 or more units	263	4.8%						
Mobile home	167	3.1%						
Boat, RV, van, etc.	0	0.0%						
Year Structure Built								
Total housing units	5,460	100%						
Built 2014 or later	189	3.5%						
Built 2010 to 2013	491	9.0%						
Built 2000 to 2009	1,073	19.7%						
Built 1990 to 1999	1,306	23.9%						
Built 1980 to 1989	460	8.4%						
Built 1970 to 1979	569	10.4%						
Built 1960 to 1969	210	3.8%						
Built 1950 to 1959	302	5.5%						
Built 1940 to 1949	351	6.4%						
Built 1939 or earlier	509	9.3%						

Table 65: Port Orchard Housing Characteristics 2013-2017 American Community Survey 5-Year Estimates (US Census, 2017)

Infrastructure

Transportation, Communications, and Utilities

Major thoroughfares include State Highway 16, Bay Street, Tremont Street, Sidney Avenue, Sedgwick, Port Orchard Blvd, and Bethel. The City has an extensive system of local public streets with commuter service provided by Kitsap Transit. The City of Port Orchard is serviced by Puget

Sound Energy, West Sound Utilities Districts, and Wave Cable for internet and television service. Xfinity also serves Port Orchard for cable television.

The City Hall was built in 1999 and serves as City administration, courts, and was the former Emergency Operations Center (EOC). Port Orchard's EOC has been relocated to South Kitsap Fire and Rescue, Station 31, which resolves the critical vulnerabilities that were inherent with the previous EOC location.

Critical Facilities

Critical structures include:

- City of Port Orchard City Hall and Public Works shop;
- South Kitsap School District: South Kitsap High School, Cedar Heights Jr. High;
- Givens Community Center;
- Kitsap County Courthouse Complex and county jail;
- Fire District #7 Fire Station #31;
- Health Facilities: Group Health Coop of Puget Sound, Harrison Memorial; and
- Joint wastewater treatment facility wells: 5 wells and one transmission main from the City of Port Orchard.

Cultural Resources

Port Orchard has various cultural resources that involve the community in many ways. Some of them include The Masonic Hall on the National Register of Historic Places¹³⁶, The Sidney Museum and Arts Association¹³⁷ with cultural assets such as a gallery, art museum, and log cabin museum, The Western Washington Center for the Arts¹³⁸ which acts as a community theater, The Veteran's Living History Museum¹³⁹, and The Fathoms 'O' Fun Festival¹⁴⁰, which is considered a valued community tradition.

Future Development

The City's Comprehensive Plan and the Kitsap County Countywide Planning Policies include growth targets for 2036 that indicate a future Port Orchard population of 20,558 people. As of 2015, the City had sufficient land capacity to accommodate a population of 22,681 people. Port Orchard grows annually adding about 300 new residents to the city every year.

Natural Environment

The city is characterized by a typical port bordered by hills and cliffs above the downtown corridor. The city is currently 5,500 acres. Marinas, merchants, and parking areas border the waterfront. The city includes some waterways.

¹³⁶ <u>https://catalog.archives.gov/id/75612725</u>

¹³⁷ http://www.sidneymuseumandarts.com

¹³⁸ https://www.wwca.us

¹³⁹ https://www.facebook.com/pages/Veterans-Living-History-Museum/439610442816832

¹⁴⁰ https://www.fathomsofun.org



Figure 56: Elevation (LiDAR): Port Orchard

History of Disasters

The below shows the history of natural hazards in Port Orchard. Most damage that has occurred has been associated with heavy rains, high tides, or landslides. The downtown area is prone to flooding during significant rainfall and tides. Some mitigation has been performed, but more is needed to improve the situation.

Event Date	Type of Event	Declaration
February 2019	Severe Winter Storm	Local (was undeclared locally), State
December 2018	Severe Winter Storms - Tornado	Local, State, Federal
12/11/2008	Severe Winter Shelter	Local
12/03/2007	Severe Winter Storm	Local, State
12/16/2006	Severe Storm	Local
01/30/2006	Severe Storm	Local
12/05/2005	Severe Winter Storm	Local, State, Federal
08/29/2005	Hurricane	Federal
10/20/03	Flooding	Local, State, Federal
07/02	Flooding	Local, State
09/11/2001	Terrorist Attack	Federal
02/01 02/28/01	Earthquake – Nisqually	Local, State, Federal
03/97	Flooding	Local, State, Federal
12/96	Severe Storm	Local, State, Federal
04/96	Mudslide	Local
02/96	Flooding	Local, State, Federal
11/95	Severe Storm – Wind/flooding	Local, State, Federal
12/94	Flooding	Local
01/93	Windstorm	Local, State, Federal
01/92	Severe Storm	No declaration
12/90	Severe Storm	Local, State, Federal
12/82	Severe Storm	Local, State, Federal
05/80	Mt. St. Helens, volcano	State, Federal
01/74	Severe Storm	Local, State, Federal

Event Date	Type of Event	Declaration
05/65	Earthquake	Local, State, Federal
10/62	Severe Storm – Wind	Local, State, Federal

Table 66: Emergency/Disaster History for Port Orchard

Mitigation Planning

Risk Assessment

The Kitsap County Profile Section of this plan provides a thorough assessment of hazards associated with Kitsap County and its incorporated cities. Although each city is affected differently, risks significant to the City of Port Orchard are floods, earthquakes, landslides, tsunamis, and severe storms. The Kitsap County Profile Section provides a synopsis of the County and cities, while this profile provides additional information specific to Port Orchard.

Rating System

The rating system for Port Orchard is consistent with the general plan. A rating for each hazard is defined as high, moderate, and low based on the information provided in The Planning Process Section to this plan. Additional ratings are applied for priority mitigation strategies and cost analysis.

Overview

As noted earlier, the City of Port Orchard has a history of severe storms, landslides, and earthquakes. These vulnerabilities can cause serious damage and, in some cases, limit the mobility of the city around these hazards. Major east/west faults line in the Puget Sound Region intercept the southern end of the Island as well as being vulnerable to potential inland and ocean tsunamis.

As part of the vulnerability assessment process, the City of Port Orchard government completed an inventory of all critical facilities and has considered these critical facilities in our planning and mitigation strategy development process. The City of Port Orchard has no repetitive loss properties.

Planning Process

As noted in the basic MHMP Plan Update, Port Orchard assigned personnel to the mitigation plan update and through the planning update process were assigned to the Multi-Hazard Mitigation Planning Committee. Personnel also attended monthly Planning Committee webinar conference calls as well as completed the HIVA and MHMP RFI Trackers, reviewed drafts of the document, and communicated via emails and one-on-one discussions. Records can be found in Appendix C: Stakeholder and Public Engagement. Additionally, the City solicited for inputs from City Departments, City Council, and the citizens of Bainbridge Island. Additionally, the City solicited for inputs from City Departments, City Council, and the citizens of Port Orchard The city conducted a notice of public hearing and review of the MHMP for the City at a public town hall on September 4, 2019, at City Chambers.

Plans and Ordinances

In an effort to maximize hazard mitigation planning, the following city plans are used to support and mandate mitigation efforts throughout the city:

1. Comprehensive Land Use Plan adopted June 14, 2019 (Ordinance 014-16), most recently amended on July 10, 2018, by Ordinance 021-18.

This 20-year plan is a vision for the City of Port Orchard, which guides the development of the City into the future. The Plan's goals and policies give direction for managing future growth consistent with citizens' desired future and quality of life.

The Comprehensive Plan also includes a Land Use Map linked to the land use and environmental policies that establishes areas of the City for residential, commercial, industrial and other land uses

These actions will work to strengthen the natural environmental and the quality of the built environment and provided a plan for mitigation during natural or other disasters.

2. Transportation Improvement Plan approved each July (projected 6-year plan)

The Transportation element identifies future system improvements. The Transportation Improvement Plan (6-year TIP) is adopted by reference into the City's Comprehensive Plan. It is amended annually as part of the annual Comprehensive Plan amendment process.

3. Capital Facilities Plan

The purpose of the Capital Facilities Plan is to provide policy direction to decision-makers regarding development regulations and expenditures for capital facilities associated with fire protection and emergency medical services, law enforcement, parks, schools, water, sewer, stormwater, and solid waste collection and disposal.

The plan also identifies and prioritizes Parks, Open Spaces and Shorelines and mitigation needs to the year 2036. It is an element of the Growth Management Act, which plans for effective use and development in flood zones and areas associated with natural or manmade disasters.

4. Surface Water Management Plan and/or Stormwater Management Code

This Stormwater Management Program (SWMP) is intended, along with the City's Comprehensive Stormwater Management Plan, to assist the City in planning, funding, and implementing a comprehensive program for addressing current and future regulatory and policy requirements for managing and mitigating stormwater runoff, water quality, flooding problems, and the City's natural resources. The Stormwater Plan is being updated and new standards were adopted in 2016.

5. Uniform Building and Fire Code

The Uniform Building and Fire Code establishes codes and regulations for building structures for safe occupancy and mitigates against accidents and natural or man-made causes.

The City has adopted the International Building Code, International Fire Code, and International Residential Code consistent with state law. The currently adopted codes are the 2015 series. The "Uniform" series of codes (except for plumbing), hasn't been used since the early 2000s.

6. The Port Orchard Municipal Code

These plans and policies regulate the infrastructure, environment, and building codes for the City of Port Orchard. The city follows these codes to mitigate potential damage during catastrophic events. Mitigate seismic events and other hazards through building structures to withstand or minimize the effects of these hazards.

7. Unified Development Code

Title 20 of the Port Orchard municipal code contains the City's development regulations including zoning, design standards, subdivision standards, critical areas code, building codes, stormwater regulations, flood damage prevention standards (National Flood Insurance Program), and other environmental regulations.

Zoning Ordinance Updated 2012 contains changes and updates to Zoning Ordinances are the responsibility of Planning and Community Development. Its mission is to coordinate and manage land use activity. Mitigates buildings and the environment in hazardous locations.

Subdivision Ordinance Incorporated in Title 16, 2013 POMC: The purpose of this chapter is to regulate the subdivision of land within the city limits of Port Orchard and to require accurate legal descriptions. The controls, standards, and procedures set forth in this chapter shall serve to minimize any expected negative impact of the proposed property use and mitigates potential damage during catastrophic events

The Critical Areas Ordinance 18 (includes Flood Damage Prevention), and Codified as Title 18, POMC defines wetlands, areas of critical recharging area effect on aquifers used for water, fish and wildlife habitat as required by the Growth Management Act. This ordinance identifies and plans for future mitigation of these critical areas.

National Flood Insurance Program Ordinance: The most recent review of the city's participation in the NFIP was completed in 2013. The City adopted amendments to its Flood Damage Prevention Standards Chapter of the Port Orchard Municipal Code at that time. This code has since been moved into the new title 20 of the Port Orchard municipal code. On September 16, 2013, the city received written confirmation that its code was compliant with 44 CRF 60.3 and 86.16 RCW.

Port Orchard's participation in the NFIP allows them to use the resources of FEMA to use mitigation planning is to identify policies and actions that can be implemented over the long term to reduce risk and future losses.

These plans inherently include strategies, policies, and ordinances that approve mitigation strategies or deter improvements affected by hazards. In each case, mitigation planning is essential to the safety and security of the citizens of Port Orchard. As such, The City Engineers, the HMP representative for Port Orchard, will review mitigation strategies to ensure other plans are consistent with the plan.

Hazard Assessments

Flooding

Probability of Occurrence: Moderate

The city center of Port Orchard sits along Sinclair Inlet of Puget Sound and is susceptible to high tides and urban flooding during the winter months. Extreme high tides coupled with significant rainfall, can cause flooding in downtown Port Orchard as well as affect residential waterfront properties. The significant water puts significant pressure on stormwater systems forcing water on the streets and into nearby retail outlets downtown. In other areas of town, land management and improvements in stormwater systems have reduced flooding during the winter storm season, although significant events will cause urban flooding. The City of Port Orchard is affected by creeks and streams, but there are no significant tributaries in the city. There are no critical facilities inside the flood-prone areas.

National Flood Insurance Program (NFIP)

The City of Port Orchard entered the National Flood Insurance Program in 1978. The most recent review of the city's participation in the NFIP was conducted in 2005. During this Community Assistance Visit (CVA) the summarized findings from the CAV included the need for an amendment to the City's flood chapter 15.38, preparation of procedures to implement Chapter 15.38, and additional information on three specific cases that were cited in their fieldwork.

On September 16, 2005, the Floodplain Management Specialist responded to the City's transmittal of information by approving Ordinance No. 016-05 bringing the city into full compliance with Federal and State floodplain management requirements.

The City provided the Floodplain Management Specialist with additional information on the three specific cases sited during their visit which cleared all of the findings and closed the CAV for Port Orchard. Their conclusion was that the City is effectively regulating development in the City's flood hazard areas and they would notify FEMA of this certification.

The most recent review of the city's participation in the NFIP was completed in 2013. The City adopted amendments to its Flood Damage Prevention Standards Chapter of the Port Orchard Municipal Code at that time. This code has since been moved into the new title 20 of the Port Orchard municipal code. On September 16, 2013, the city received written confirmation that its code was compliant with 44 CRF 60.3 and 86.16 RCW.

Special Flood Hazard Area Assessment ¹⁴¹								
Community	Total Estimated Building Value	Percentage of Buildings in the Special Flood Hazard Area	Building Dollar Loss for a 1% Annual Chance Flood Event	Loss Ratio (Dollar Losses/Total Building Value)	Number of Buildings in Zones AE, A	Number of Buildings in Zone VE		
Port Orchard	\$966 Million	<1%	\$579,000	<1%	24	0		

Note: Loss information is included for communities in the coastal floodplain. The table includes both dollar losses and a loss ratio, which is calculated as total losses/total building value. Also included is a count of the buildings in Zone VE, which is the 1-percent-annual-chance coastal flood zone with wave action, and in Zones A and AE, which are riverine or coastal 1-percent-annual-chance floodplains. The loss information for the county is only for coastal SFHAs; the rest of the county's SFHAs are identified as Zones AE or A. *Information from the military base was not included in the assessment for the City of Bremerton. **No building data was available from Kitsap County for the Port Gamble S'Klallam Indian Reservation, so the results are listed as unknown.

Table 67: Special Flood Hazard Area Assessment

Flood Risk Community Characteristics ¹⁴²							
Community	Total Population	CRS Community	Flood Claims	Repetitive Loss Properties	Total Policies	Total Insurance Coverage	
Port Orchard	11,144	No	0	0	25	\$6.8 Million	
Note: The community overview summarizes characteristics at the community level. Data were obtained							
from FEMA and th	ne U.S. Census a	and were currer	nt as of Nov	ember 23, 201	5		

Table 68: Flood Risk Community Characteristics

¹⁴¹ FEMA Risk Report Kitsap County 2015

¹⁴² FEMA Risk Report Kitsap County 2015


Figure 57: Figure 4: Flood Zones City of Port Orchard Kitsap County Department of Information Services 2013



Figure 58: Streams and Surface Waters, City of Port Orchard (Kitsap County GIS)

Severe Storms/Tornados Probability of Occurrence: High

The City of Port Orchard is vulnerable to severe weather, typically in the winter months. High winds, significant rainfall, and snow can cause some urban flooding, damage from falling trees, and the potential for landslides due to saturated soils. This can result in loss of life, damage to homes, and significant power outages. Although earthquakes have the potential for significant damage and loss of life, severe storms are annual occurrences, and any mitigation can also minimize the loss of life and damage from other hazards.

Severe storms affect the entire City. Although Port Orchard does not have any major rivers or contributories, urban flooding from over-taxed stormwater system can cause damage to residential and retail outlets. The location of the city is ideal for being in the Puget Sound convergent zones during significant weather events and vulnerable to strong winds as weather fronts move over the Olympic Mountains. This results in falling trees or branches and significant power outages. Downtown Port Orchard is vulnerable to flooding when heavy rains are combined with high seasonal tides, routinely in the winter months. The downtown area will experience temporary flooding of roads and some buildings while tides remain high. Some mitigation has been conducted, but significant changes to infrastructure would be necessary to reduce these symptoms.

100% of the City has the potential for damage and loss of life from severe storms

Landslides & Erosion

Probability of Occurrence: Moderate

The City of Port Orchard is vulnerable to minor landslides and erosion mostly on coastal cliffs vulnerable to an earthquake or when significant rainfall saturates vulnerable landslide areas. Former LIDAR studies showed some minor vulnerable areas, noting many are within the city limits but do pose a threat to highways that lead to the downtown area. Additional studies of building stock located in these areas will be conducted in the future. Initial estimates define residential stock in these locations, but no critical facilities. Long-term mitigation efforts include restrictions on developing these areas for use. In the short term, areas are monitored by Public Works during significant weather events.



Figure 59: LIDAR Data on Landslide Port Orchard (USGS)

Building Exposure to Landslides ¹⁴³						
Community	Buildings within Landslide Zone	Building Value with Landslide Zone				
Port Orchard	66	\$8.1 Million				

Table 69: Building Exposure to Landslides

Earthquakes

Probability of Occurrence: High

The City of Port Orchard is vulnerable to earthquakes and associated inland tsunamis. The downtown corridor is also susceptible to liquefaction impacting merchants, waterfront marinas, and the infrastructure. Figure 60 shows liquefaction susceptibility. Red areas in downtown note the high-risk areas in Port Orchard. Liquefaction in the downtown area could damage major roads into downtown from the west, and damage residential and commercial buildings. Along this

¹⁴³ FEMA Risk Report Kitsap County 2015

corridor are apartment complexes and senior assist facilities. Roads damage would disrupt lifesafety response and alternative routes into downtown.

Hazus Earthquake Results for a Seattle M 7.2 Earthquake ¹⁴⁴								
Community	Total Estimated Building Value	Total Number of Buildings	Number of Buildings in the Moderate- High Liquefaction Zone	Percentage of Buildings in the Moderate- High Liquefaction Zone	Building Dollar Loss for a Seattle 7.2 Event	Loss Ratio (Dollar Losses/Total Building Value)		
Port Orchard	\$966 Million	4,076	258	6%	\$377 Million	39%		

Note: The above table shows the total estimated building value by community, total number of buildings by community, total number of buildings within the moderated to high liquefaction zone, and percentage of buildings within the moderate to high liquefaction zone. In addition, buildings losses are reported for a Seattle Fault 7.2 magnitude event as well as a loss ratio. A loss ratio is calculated by dividing the dollar loss by the total building value. The loss values are for building losses only; additional damages to infrastructure and building contents are not captured in this table. *Information from the military base was not included in the assessment for the City of Bremerton. **No building data was available for the Port Gamble S'Klallam Indian Reservation from Kitsap County, so the results are shown as unknown.

Table 70: Hazus Earthquake Results for a Seattle M 7.2 Earthquake

Pre-Code versus Moderate Code Building in Kitsap County ¹⁴⁵							
Community	Number of Pre- Code Buildings (before 1975)	Percent Pre-Code Buildings	Number of Moderate Code Buildings (after 1975)	Percent of Moderate Code Buildings			
Port Orchard	1,415	35%	2,661	65%			
Note: Pre-code but	uildings are those	that are built	prior to 1975. Moderate	code are those built after			
1975. These date	s were chosen ba	sed on when	the seismic provisions v	were incorporated into the			
building code stat dates: Pre-code a	ewide which was ' re any buildings pr	1975. Please ior to 1941. N	note that the analysis in loderate Code were any	Hazus used the following buildings after 1941, which			

is the default Hazus methodology. Please refer to the appendix for additional information.

Table 71: Pre-Code versus Moderate Code Building in Kitsap County

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¹⁴⁴ FEMA Risk Report Kitsap County 2015

¹⁴⁵ FEMA Risk Report Kitsap County 2015



Figure 60: Liquefaction on Port Orchard (Kitsap County Department of Information Services)

Tsunamis & High Waves

Probability of Occurrence: Moderate

There is some potential for a tsunami affecting the City of Port Orchard. Recent studies have shown that a tsunami affected the area thousands of years ago. Here is the excerpt from the Kitsap Plan regarding the event:

A recent study produced by Maria E. Martin Arcos entitle *"The A.D. 900–930 Seattle-Fault-Zone Earthquake with a Wider Coseismic Rupture Patch and Postseismic Submergence:*

Inferences from New Sedimentary Evidence" suggest evidence of 4-5 m tsunami hitting the Gorst Area of Sinclair Inlet. The tsunami may have been an outcome of a Seattle fault earthquake or possibly other events cataclysmic enough to cause an 18-foot tidal wave in the Puget Sound. Maria Arcos conclusion is

"This study reiterates the threat of multiple hazards associated with earthquakes in the Puget Lowland, of which tsunamis are prominent in the case of Sinclair Inlet. Tsunami deposits at Gorst and tsunami modeling reiterate the tsunami threat in this inlet. Evidence for a tsunami in Sinclair Inlet is not unexpected based on the proximity to the Seattle fault zone and on previous tsunami models (Koshimuraet al., 2002). Simulated wave heights of 4–5 m indicate tsunamis are not only a threat to the infrastructure in Gorst but also to the naval base at Port Orchard. Tsunami

simulations demonstrate that the higher uplift documented in this study results in almost a meter higher tsunami wave along Sinclair Inlet. Even an order-of-magnitude smaller Tacoma faultgenerated tsunami would generate strong currents in the narrow straits and harbors near Gorst. Further tsunami simulations in the Puget Lowland, including different fault scenarios would help determine the degree of hazard posed by locally generated tsunamis."

A four to five-meter tsunami can significantly affect the Cities of Port Orchard and Port Orchard as well as the Puget Sound Naval Shipyard. This and other studies conclude that inland tsunamis can be potentially catastrophic and need more attention by those Counties in the Puget Sound Region.

Earthquakes along the Washington coast would cause a surge of seawater along the coastal areas of the Straits of Juan De Fuca's. Such a tsunami may cause a surge of water in Puget Sound affecting the coastal water of the entire area. Considering the number of people living along the coastal water of Puget Sound, such a wave could have devasting effects on lives as well as property and infrastructure. Similar damage to life and the economy could occur in Port Orchard depending on the size of the surge. Approximately 5.2% of the population resides in potentially dangerous areas. Damage from such an event may force boats and docks up along the shoreline damaging facilities and boats.

Drought

Probability of Occurrence: Low

Drought is most likely to affect the entire county. Hazard assessment information on drought can be found in the Drought Mitigation Strategies section.

City of Port Orchard Asset Profile

Location Port Orchard, WA	Zip Code	Prop. Value	Contents	Year Built	Type of Construction	Number Stories	Square Footage	Type of Protection	Critical Facility (Yes/No)
Givens Active Club 1025 Tacoma	98366	\$750,000	\$50,000	1962	Wood	2	7,500	Locked	No
City Hall 216 Prospect Street	98366	\$10,000,000	\$500,000	1999	Steel	4	28,000	Sprinkled	Yes
Public Works Facility 1535 Vivian Court	98366	\$2,000,000	\$500,000	2001	Steel	1	10,000	Alarmed	Yes
Port Orchard Library 87 Sidney Avenue	98366	\$3,000,000	\$1,000,000	1975	Masonry	1	10,000	Alarmed	No
South Shed Sidney Avenue	98366	\$1,000,000	\$100,000	1960	Steel	2	2,000	Locked	No
DeKalb Pier DeKalb Waterway	98366	\$1,000,000	0	1985	Wood	1	6,000		No
Van Zee Water Tank 2 MG	98366	2,000,000	0	1976	Concrete			Locked	Yes
Sedgwick Water Tank 1 MG	98366	\$1,000,000	0	2000	Steel			Fenced	Yes
Lloyd Parkway Water Tank, 1 MG	98366	\$1,500,000	0		Concrete				Yes

Location Port Orchard, WA	Zip Code	Prop. Value	Contents	Year Built	Type of Construction	Number Stories	Square Footage	Type of Protection	Critical Facility (Yes/No)
McCormick Water Tank 450,000 Gal	98367	\$750,000	0	1994	Steel			Fenced	Yes
Mc Cormick Water Tank #1 59,500 Gal	98367	500,000	0		Concrete			Fenced	Yes
Mc Cormick Water Tank #2 59,500 Gal	98367	500,000	0		Concrete			Fenced	Yes
Morton Street Water Tank, 90,000 Gal	98366	\$400,000	0	1990	Steel			Fenced	Yes
Sidney Avenue Water Tank, 125,000 Gal	98366	\$500,000		1985	Steel			Fenced	Yes
Melcher Street Water Pump Station	98366	\$1,500,000	\$100,000	1976	Masonry	1	1,000	Fenced	Yes
City Hall Pump Station Kitsap/Cline	98366	\$1,000,000	\$200,000	1930	Masonry	2	2,000	Locked	Yes
Port Orchard Water Pump Station, SR 16	98366	\$300,000	\$25,000	1983	Wood	1	200	Locked	Yes
Well 6 Maple Street	98366	\$1,000,000	\$50,000	1940	Wood/Concrete e	1	600	Locked	Yes

Location Port Orchard, WA	Zip Code	Prop. Value	Contents	Year Built	Type of Construction	Number Stories	Square Footage	Type of Protection	Critical Facility (Yes/No)
Well 8 Sidney Avenue	98366	\$500,000	\$50,000	1986	Wood	1	400	Fenced	Yes
Well 9 Van Zee Park	98366	\$500,000	\$50,000	2004	Wood	1	400	Locked	Yes
McCormick Well Field	98366	\$1,000,000	\$100,000	1992	Wood	1	800	Fenced	Yes
Marina Sewer Pump Station	98366	\$3,000,000	\$500,000	1984	Concrete	1	1,000	Locked	Yes
Cedar Heights Sewer Pump Station, Pottery Avenue	98366	\$400,000	\$35,000	1969	Concrete			Locked	Yes
Harrison Sewer Pump Station, SK Blvd	98366	\$500,000	\$50,000	1995	Concrete			Fenced	Yes
Eagle Crest Sewer Pump Station,	98366	\$300,000	\$50,000	1997	Concrete			Fenced	Yes
Golden Pond Sewer Pump Station	98366	\$300,000	\$50,000	1999	Concrete			Fenced	Yes
Flower Meadows Sewer Pump Station	98366	\$400,000	\$50,000	2002	Concrete			Fenced	Yes
Bravo Terrace Sewer Pump	98366	\$500,000	\$50,000	1998	Concrete			Fenced	Yes

Location Port Orchard, WA	Zip Code	Prop. Value	Contents	Year Built	Type of Construction	Number Stories	Square Footage	Type of Protection	Critical Facility (Yes/No)
Station									
McCormick Woods Sewer Pump Station #1	98367	\$1,000,000	\$100,000	1996	Concrete			Fenced	Yes
McCormick Woods Sewer Pump Station #2	98367	\$1,000,000	\$100,000	1996	Concrete			Fenced	Yes
Givens Field Restrooms	98366	100,000		2001	Masonry	1	507	Locked	No
Sander Rack Shed @ Well #6	98366	20,000		1998	Pole Bldg	1	720		No
213/215 Prospect	98366	400,000		1918	Wood	2	4888		No
Central Playfield Restroom	98366	50,000		1995	Masonry	1	1590	Locked	No
Van Zee Tennis Court	98366	100,000		1974	Asphalt	0	18000		No
Givens Tennis Court	98366	100,000		1974	Asphalt	0	18000		No
Boat Launch, 535 Bay	98366	250,000		1985	Concrete	0	555		No
Observation Deck @ Marina Pump Station	98366	20,000		1989	Concrete	2	530		No

Location Port Orchard, WA	Zip Code	Prop. Value	Contents	Year Built	Type of Construction	Number Stories	Square Footage	Type of Protection	Critical Facility (Yes/No)
Etta Turner/Blackjack Creek Park	98366	100,000		2005	Varies	0	18000		No
Central Park Retaining Wall	98366	50,000		2007	Concrete	0	800		No
Bay St Lift Station (Coast to Coast)	98366	1,500,000		1962	Concrete	2	100	Fenced	Yes
Tremont Place Lift Station	98366	150,000		1975	Concrete	1	100	Fenced	Yes
Annapolis Intertie Building (Wa Main)	98366	100,000		2007	Masonry	1	200	Locked	Yes
Wilkins Well	98366	100,000		1989					No
Well #7	98366	100,000		1961					Yes
Sedgwick Lift Station	98366	100,000		1995	Concrete	1	100	Fenced	Yes
MW Well #3 170ft	98367	150,000	25,300	Pchsd 1998				Fenced	Yes
MW Well #2 215ft	98367	150,000	20,200	Pchsd 1998				Fenced	Yes
MW Well #1 283ft	98367	200,000	18,200	Pchsd 1998				Fenced	Yes

Location Port Orchard, WA	Zip Code	Prop. Value	Contents	Year Built	Type of Construction	Number Stories	Square Footage	Type of Protection	Critical Facility (Yes/No)
Storage Bldg @ 1 MG Reservoir	98366	50,000		2004	Metal	1	200	Locked	No
WS Storage Shed	98366	25,000		2006	Wood	1	200	Locked	No
Well #10	98366	750,000		2007					Yes
The Ridge II Lift Station	98367	300,000	123,200	2007	Concrete	1	100	Fenced	Yes
Lowes Lift Station	98367	600,000	165,500	2007	Concrete	1	100	Fenced	Yes
The Ridge III Lift Station	98367	400,000	177,600	2007	Concrete	1	100	Fenced	Yes
Chemical Storage Shed	98367	30,000		2008	Wood	1	200	Locked	No
Shop Storage Canopy	98366	150,000		2002	Wood		3200	Fenced	No
Picnic Shelter @ Active Club	98366	50,000		1960	Masonry	1	720		No
Asset Profile Tot Values:	al	\$44,195,000	\$4,250,000						

Poulsbo



Poulsbo is located in north-central Kitsap County. Scandinavian settlers arrived on the shores of Liberty Bay more than 100 years ago. Poulsbo became a city in the early 1900s with fishing and farming as primary industries. Downtown Poulsbo is adjacent to Liberty Bay, an extension of Puget Sound. Many community and regional events, some of which celebrate the Scandinavian heritage, are hosted in Poulsbo parks and historic downtown area. Being situated among the saltwater shoreline and low hills provides exceptional views of the Cascade and Olympic mountain ranges as well as Liberty Bay. The total land area is 2,905 acres. Poulsbo maintains a mayor-council structure but also staffs a city administrator.

People Population Overview

The population of Poulsbo is 11,121. Many professionals transit daily to downtown Seattle. The city is characterized by professional, scientific employment, construction, and education. Citizens of Poulsbo, like other nearby cities, are employed at the military installations in Kitsap County. The table below shows the city's population density.

Poulsbo Population Information								
Population	Population	Number of	Median Household	Under 65 with a				
	Density	Households	Income	Disability				
11,121	2,346 sq. mi	4,688	\$69,072	6.9%				
(2019)	(2019)	(2019)	(2019)	(2017)				

Table 72: Poulsbo Population Information

Age Distribution

The city's population is consistent with other cities in the county with a number of senior/assist facilities in the city mostly located in the city's urban center. The senior population has grown consistent with statistics nationwide.



Figure 61: Poulsbo Population Distribution



North Kitsap (Updated Jan 2019) Kitsap Sub-County Populations with Functional and Access Needs Estimates

Figure 62: North Kitsap Vulnerable Population



Figure 63: Population Density: City of Poulsbo

Economy

Community leaders, residents, and business interests strive to maintain a small-town character while continuing to thrive and grow. Both residential and commercial development continues. College Marketplace, which includes the Poulsbo Branch of Olympic College, continues to develop business and residential uses. Poulsbo Place, a winner of numerous local and national awards, is one of several residential areas that continue to develop. A new city hall is one of the current public projects.

North Kitsap School District is also centered in Poulsbo.

The city is primarily residential with commercial businesses in the city core and College Marketplace, which is home to several big-box stores. The principal economic base is retail outlets/offices, North Kitsap School District, and light industry. Some citizens, like those on Poulsbo, commute to Seattle daily for work others are part of the military or work at military installations noted below.

Federal defense agencies include Naval Base Kitsap (NBK) Bangor, (NBK) Keyport, (NBK) Poulsbo, Puget Sound Naval Shipyard, and support facilities. Commercial entities include Home Depot, Wal-Mart, and Central Market.

Built Environment

Existing Structures

Land use in Poulsbo includes residential, commercial, light industrial, and open space. North Kitsap School District is also centered in Poulsbo. Commercial enterprises have increased significantly to the west with the development of the Olhava property, which includes Wal-Mart and Home Depot. This property and adjoining areas were annexed by the City as part of the County's comprehensive land growth and management program.

Poulsbo has 35 buildings in the Special Flood Hazard Area, representing \$740,000 in loss after a 1-percent annual chance flood. It also has 40 buildings within the landslide zone representing \$9.8M in value.

Based on the 2015 Hazus risk assessment, the table below highlights some of the buildings in Poulsbo that are affected by flooding, tsunami, earthquake, and landslide.

City of Poulsbo Areas of Mitigation Interest ¹⁴⁶								
Community Building Name	Address	Building Value	Loss Value	Loss Ratio	Hazard Type			
Commercial Office Buildings	17791 Fjord Dr. NE	\$1.2 million	\$473,000	38%	Flood			
Commercial – General Retail	18969 Front St. NE	\$126,000	\$63,000	50%	Earthquake			
Multiple Single- Family Homes	West side of 11th Ave. NE	\$2.6 million (12 Homes)	N/A	N/A	Landslide			
Multiple Single- Family Homes	Rosebud PI. NE	\$2.1 million (9 Homes)	N/A	N/A	Landslide			

Table 73: City of Poulsbo Areas of Mitigation Interest

Housing

Most building stock is residential homes of wood frame construction. Poulsbo is part of the County's Damage Assessment Program for disasters and has identified critical facilities as part of the program.

¹⁴⁶ FEMA Risk Report for Kitsap County (2015)

	Residential Structure	S
Туре	Estimate	Percent
	Housing Occupancy	•
Total housing units	4,312	100%
Occupied housing units	4,126	95.7%
Vacant housing units	186	4.3%
Homeowner vacancy rate	1.2	(X)
Rental vacancy rate	6.3	(X)
	Units in Structure	•
Total housing units	4,312	100%
1-unit, detached	2,743	63.6%
1-unit, attached	210	4.9%
2 units	38	0.9%
3 or 4 units	213	4.9%
5 to 9 units	225	5.2%
10 to 19 units	265	6.1%
20 or more units	411	9.5%
Mobile home	207	4.8%
Boat, RV, van, etc.	0	0.0%
	Year Structure Built	•
Total housing units	4,312	100%
Built 2014 or later	69	1.6%
Built 2010 to 2013	195	4.5%
Built 2000 to 2009	1,049	24.3%
Built 1990 to 1999	1,000	23.2%
Built 1980 to 1989	749	17.4%
Built 1970 to 1979	723	16.8%
Built 1960 to 1969	98	2.3%
Built 1950 to 1959	166	3.8%
Built 1940 to 1949	102	2.4%
Built 1939 or earlier	161	3.7%

Table 74: Poulsbo Housing Characteristics 2013-2017 American Community Survey 5-Year Estimates (US Census, 2017)

Infrastructure

Transportation, Communications, and Utilities

Poulsbo is served by SR 305, the main corridor to Poulsbo and the Washington State Ferry System. This route provides cross-country traffic to and from Seattle to the east and SR 3 to the west providing service to the Olympic Peninsula and south to Poulsbo. The City has an extensive system of local public streets with commuter service by Kitsap Transit.

The City is serviced by Puget Sound Energy and maintains its own sewer and water system with nine sewer lift stations and five water pump stations. Kitsap Public Utilities District One provides

water service. Communications are provided through a variety of cell phone providers, Comcast, and CenturyLink.

Critical Facilities

The City of Poulsbo has identified 62 critical facilities, including:

- City of Poulsbo City Hall
- City of Poulsbo Public Works office and shop
- North Kitsap School District:
 - Administration Building
 - North Kitsap Senior High School
 - Poulsbo Junior High School
 - Poulsbo and Vinland Elementary Schools
 - The building formerly known as Spectrum Alternative School has been repurposed after being closed in 2010. As of 2019, it is a new alternative learning program.
- Olympic College Poulsbo Branch Campus
- Fire District #18 Headquarters/Fire Station #71
- Health facilities:
 - Poulsbo Village Medical Center with Regional Hospitals as backup
 - North Kitsap Medical Center
- Wastewater treatment plant: Brownsville via pressurized pipe under Liberty Bay
- There are six operational wells and one is not online at this time.
- There are nine sewer lift stations and five water pump stations.

Cultural Resources

Parks, recreational facilities, and open space serve as vital parts of the community's character. Poulsbo has 16 city parks totaling 137 acres – about one-half of the acreage is developed while the rest is undeveloped or in open space designation. The city also has 5+ linear miles of trails. The city has been active in park development in recent years, making sure that partnerships are used to enhance park projects and activities. Volunteerism and stewardship of the natural and cultural resources within the city has helped shape many city parks projects

Future Development

Future development includes the Poulsbo Event and Recreation Center. The PERC will serve as a significant attraction for visitors in search of recreational activities; additionally the center would create an opportunity for job growth and would further cement Poulsbo's College Marketplace as an economic hub within the community.

Poulsbo's Comprehensive Plan is a policy and legal document that reflects the community's desires, goals, and needs for the future, within the context of the requirements of the Growth Management Act. On December 21, 2016, the Poulsbo City Council adopted the 2016 Comprehensive Plan by approving an adopting ordinance and exhibits. The plan can be found here: https://cityofpoulsbo.com/comprehensive-plan-2/.

Natural Environment

The topography in the area is low rolling hills, generally trending north to south. Poulsbo has areas of wetlands, aquifer recharge, and geological concern, streams, and shoreline. The highest point in Poulsbo is under 500 feet. Liberty Bay along the shoreline of Poulsbo responds to high and low tides but is 80% enclosed and isolated from Puget Sound.

Natural creeks like Dogfish Creek are spawning streams for salmon and drain into Liberty Bay. Figure 64 shows topographic information on the Poulsbo area.



Figure 64: Poulsbo Elevation using LiDAR

History of Disasters

The table below shows the history of natural hazards in Poulsbo. Any damage that has occurred has associated with heavy rains and high tides or landslides. The downtown area is prone to flooding during significant rainfall and tides. Some mitigation has been performed, but more is needed to improve the situation.

Event Date	Type of Event	Declaration	Declared Disaster
February 2019	Severe Winter Storm	Local (was undeclared locally), State	Local Public Assistance threshold not met. Local SBA declaration.
December 2018	Severe Winter Storms - Tornado	Local, State, Federal	Local Public Assistance threshold not met.
Dec 2008	Severe wind and rain	Local	No assistance
Dec 2007	Severe wind and rain	Local, State, and Federal	Yes
Jan 2006	Severe wind and rain	Local	Did not meet PA threshold
Dec 2006	Severe wind and rain	Local	Did not meet PA Threshold
Oct 2003	Severe wind and rain	Local, state, and Federal	Local PA Threshold not met. IA paid out
Jan 2002	Severe wind and rain	Local and State	State Only; presidential denied
Feb 2001	Nisqually Earthquake	Local, state, and Federal	Yes
Dec 1996	Severe rain and snow runoff storm	Local, State, and Federal	Yes
Nov 1995	Severe wind and rain	Local, State, and Federal	Local PA threshold not met
Jan 1993	Severe wind and rain	Local, State and Federal	No record on file
Jan 1992	Severe wind and rain	Local	No assistance
Dec 1990	Severe wind and rain	Local, State and Federal	Yes
Dec 1982	Severe wind and rain	Local	No assistance
May 1965	Earthquake	Local, state, and Federal	No record on file
Oct 1962	Severe wind and rain	Local, state and Federal	No record on file

Table 75: Emergency/Disaster History for Poulsbo

Mitigation Planning

Risk Assessment

The Kitsap County Profile Section of this plan provides a thorough assessment of hazards associated with Kitsap County and its incorporated cities. Although each city is affected differently, risks significant to the City of Poulsbo are floods, earthquakes, landslides, tsunamis, and severe storms. The Kitsap County Profile Section provides a synopsis of the County and cities, while this profile provides additional information specific to Poulsbo.

Rating System

The rating system for Poulsbo is consistent with the general plan. A rating for each hazard is defined as high, moderate, and low based on the information provided in The Planning Process Section to this plan. Additional ratings are applied for priority mitigation strategies and Cost analysis.

Overview

As noted earlier, the City of Poulsbo has a history of severe storms, landslides, and earthquakes. Although other alternatives are possible, mitigation strategies can provide improvement to the city infrastructure and minimize the loss of life and damage to properties from such events. Major east/west fault lines in the Puget Sound Region make Poulsbo vulnerable to earthquakes. The City of Poulsbo contributes and uses the County Hazard Identification and Vulnerability Assessment (HIVA) to set priorities on natural hazardous events. Although annually the City is hit by severe winter storms, the greatest threat to Poulsbo is an earthquake and associated liquefaction in downtown Poulsbo. This type of event could be catastrophic to not only life-safety but the economic recovery of its downtown area.

Planning Process

As noted in the basic MHMP Plan Update, the City of Poulsbo assigned personnel to the mitigation plan update and through the planning update process were assigned to the Multi-Hazard Mitigation Planning Committee. Personnel also attended monthly Planning Committee webinar conference calls as well as completed the HIVA and MHMP RFI Trackers, reviewed drafts of the document, and communicated via emails and one-on-one discussions. Records can be found in Appendix C: Stakeholder and Public Engagement. Additionally, the City solicited for inputs from City Departments, City Council, and the citizens of Poulsbo. The city conducted a notice of public hearing and review of the MHMP for the City via public town hall on September 3, 2019, at City Chambers.

Plans and Ordinances

The plans noted below represent documents that help to manage mitigation efforts in the City of Poulsbo. Each plan or ordinances dictate measures to ensure the safe well-being of its citizens. Departments responsible for the plan will ensure the mitigation plan is incorporated into each of the plans listed on the following page.

1. Comprehensive Land Use Plan

This 6-year plan identifies and prioritizes Parks, Opens Spaces and Shoreline Improvements and mitigation between 2015 and 2020. It is part of the Comprehensive Land Use Plan required by the Growth Management Act. Effective use of lands to

mitigate developments in flood zones and areas associated with natural or man-made hazards.

2. Surface Water Management Plan and Code

This Stormwater Management Program (SWMP) is intended, along with the City's Comprehensive Stormwater Management Plan, to assist the City in planning, funding, and implementing a comprehensive program for addressing current and future regulatory and policy requirements for managing and mitigating stormwater runoff, water quality, flooding problems, and the City's natural resources.

3. International Building and Fire Code

The City of Poulsbo adopted the 2015 International Fire Codes with state amendments under Chapter 15.04 of the Building Code. These codes define building, fire, and mitigation practices.

4. Municipal Code

These plans and policies regulate the infrastructure, environment, and building codes for the City Poulsbo. The city follows these codes to mitigate potential damage during catastrophic events. Mitigate seismic events and other hazards through building structures to withstand or minimize the effects of these hazards.

5. Zoning Ordinance

Changes and updates to Zoning Ordinances are the responsibility of Planning and Economic Development. Its mission is to coordinate and manage land use activity. Changes and updates to Zoning Ordinances are the responsibility of Planning and Community Development. Its mission to coordinate and manage land use activity. The plan mitigates buildings and the environment in hazardous locations.

6. Comprehensive Transportation Plan

This transportation plan provides the framework to guide short- and long-term development and maintenance of the multi-model transportation system within the city of Poulsbo. It addresses the mandates of the Growth Management Act under the Revises Code of Washington, Title 36.70A.070.

7. Subdivision Ordinance

The purpose of this chapter is to regulate the subdivision of land within the city limits of Poulsbo and to require accurate legal descriptions. The controls, standards, and procedures set forth in this chapter shall serve to minimize any expected negative impact of the proposed property use and mitigates potential damage during catastrophic events.

8. Critical Areas Ordinance

This ordinance defines critical areas (wetlands, areas of critical recharging effect on aquifers used for water, fish and wildlife habit, frequently flood areas and geologically hazardous areas) as required by the Growth Management Act. This ordinance regulates, protects and defines these Areas under Poulsbo Municipal Code Chapter 16.20.

Hazard Assessments

Flooding

Probability of Occurrence: Moderate

The city of Poulsbo is prone to some flooding, mostly due to significant rainfall. Built above the shores of Liberty Bay, runoff from above fills natural streams that may overflow during significant rainfall. Significant rainfall events will also cause city sewer systems to be overwhelmed and cause local urban flooding. Comprehensive land management has helped in years to reduce urban flooding. Changes to the National Flood Insurance Program and coastal studies noted in Section III are defining changes to shoreline management aiding building codes and regulations. Some areas are coastal, but all inland areas are remote with no critical facilities affected and minimal residential housing affected by potential high-water areas.

National Flood Insurance Program (NFIP)

The City of Poulsbo entered into the National Flood Insurance Program in 1979. The most recent review of the city's participation in the NFIP was conducted in 2017. During this update, Community Assistance Visit (CAV) found no deficiencies related to city code.

In recent years, NFIP Flood Insurance Rates Maps (FIRM) has been revised. Some zones changed mostly reflecting coastlines changes based on better data and evaluation of such issues as wake and tidal issues. Changes are not significant, although, have increased the need for some homeowners to file for flood insurance under NFIP.

Special Flood Hazard Area Assessment ¹⁴⁷										
Community	Total Estimated Building Value	Percentage of Buildings in the Special Flood Hazard Area	Building Dollar Loss for a 1% Annual Chance Flood Event	Loss Ratio (Dollar Losses/Total Building Value)	Number of Buildings in Zones AE, A	Number of Buildings in Zone VE				
Poulsbo	\$865 Million	<1%	\$3.4 Million	<1%	7	0				
Note: Loss information is included for communities in the coastal floodplain. The table includes both dollar losses and a loss ratio, which is calculated as total losses/total building value. Also included is a count of the buildings in Zone VE, which is the 1-percent-annual-chance coastal flood zone with wave action, and in Zones A and AE, which are riverine or coastal 1-percent-annual-chance floodplains. The loss information for the county is only for coastal SFHAs; the rest of the county's SFHAs are identified										
as Zones AE or A of Bremerton. **No	. *Information building data	from the militation was available	ry base was from Kitsap	not included in County for the P	the assessmo ort Gamble S	ent for the City 'Klallam Indian				

More information about the NFIP can be found in the Kitsap County Profile section.

Table 76: Special Flood Hazard Area Assessment

Reservation, so the results are listed as unknown.

¹⁴⁷ FEMA Risk Report Kitsap County 2015

Flood Risk Community Characteristics ¹⁴⁸										
Community	ry Total CRS Flood Repetitive Total Total Population Community Claims Properties Properties Coverage									
Poulsbo	9,200	No	0	0	49	\$8.7 Million				
Note: The community overview summarizes characteristics at the community level. Data were obtained from FEMA and the U.S. Census and were current as of November 23, 2015										

Table 77: Flood Risk Community Characteristics



Figure 65: City of Poulsbo Flood Zones (Kitsap County Department of Information Services 2013)

¹⁴⁸ FEMA Risk Report Kitsap County 2015



Figure 66: Streams and Surface Water, City of Poulsbo (Kitsap County GIS Department)

Severe Storms/Tornados Probability of Occurrence: High

The City of Poulsbo is vulnerable to severe weather, typically in the winter months. Severe weather, high winds, significant rainfall, and snow can cause some urban flooding, damage from falling trees, and the potential for landslides due to saturated soils. This can result in loss of life, damage to homes, and significant power outages. Although earthquakes have the potential for significant damage and loss of life, severe storms are annual occurrences, and any mitigation can also minimize the loss of life and damage from other hazards.

Severe storms affect the entire City of Poulsbo. The location of the City is ideal for being in the Puget Sound convergent zones during significant weather events and vulnerable to strong winds

as weather fronts move over the Olympic Mountains. This results in falling trees or branches and significant power outages. Figure 66 shows the streams and surface water in the City of Poulsbo. Figure 67 provides hydrology information for the City of Poulsbo. 100% of the city has the potential for damage and loss of life from severe storms.



Figure 67: City of Poulsbo Water Hydrology

Landslides & Erosion Probability of Occurrence: Low

The City of Poulsbo is not vulnerable to Landslides based on previous LIDAR studies. Some areas outside the city are vulnerable, as noted in Figure 76.



Figure 68: LIDAR Data on Landslide, City of Poulsbo (USGS)

Building Exposure to Landslides ¹⁴⁹								
Community	Buildings within Landslide Zone	Building Value with Landslide Zone						
Poulsbo	40	\$9.8 Million						

Table 78: Building Exposure to Landslides

Earthquakes

Probability of Occurrence: High

Like all of Kitsap County, the City of Poulsbo is vulnerable to earthquakes. Some models show damage from the Seattle Fault associated earthquake as well as faults in South Puget Sound. Poulsbo experienced little damage during the Nisqually earthquake of 2001, mostly due to a significant number of older homes in the City limits. Although a significant earthquake with extensive shaking could cause serious damage, liquefaction in the downtown area could damage major roads into downtown from the west, and damage residential and commercial buildings. Along this corridor are apartment complexes and senior assist facilities. Roads damage would disrupt life-safety response and alternative routes into downtown. Figure 69 shows liquefaction susceptible areas in Poulsbo. The Moderate to High areas are those noted in the previous discussion. High areas are along the waterfront in the downtown area.

¹⁴⁹ FEMA Risk Report Kitsap County 2015



Figure 69: Liquefaction in Poulsbo

Hazus Earthquake Results for a Seattle M 7.2 Earthquake ¹⁵⁰												
Community	Total Estimated Building Value	Total Number of Buildings	Number of Buildings in the Moderate- High Liquefaction Zone	Percentage of Buildings in the Moderate- High Liquefaction Zone	Building Dollar Loss for a Seattle 7.2 Event	Loss Ratio (Dollar Losses/Total Building Value)						
Poulsbo	\$865 Million	3,160	50	2%	\$67.5 Million	7.8%						

¹⁵⁰ FEMA Risk Report Kitsap County 2015

Note: The above table shows the total estimated building value by community, total number of buildings by community, total number of buildings within the moderated to high liquefaction zone, and percentage of buildings within the moderate to high liquefaction zone. In addition, buildings losses are reported for a Seattle Fault 7.2 magnitude event as well as a loss ratio. A loss ratio is calculated by dividing the dollar loss by the total building value. The loss values are for building losses only; additional damages to infrastructure and building contents are not captured in this table. *Information from the military base was not included in the assessment for the City of Bremerton. **No building data was available for the Port Gamble S'Klallam Indian Reservation from Kitsap County, so the results are shown as unknown. *Table 79: Hazus Earthquake Results for a Seattle M 7.2 Earthquake*

Pre-Code versus Moderate Code Building in Kitsap County ¹⁵¹									
Community	Number of Pre- Code Buildings (before 1975)	Percent Pre-Code Buildings	Number of Moderate Code Buildings (after 1975)	Percent of Moderate Code Buildings					
Poulsbo	725	23%	2,435	77%					
NULL DUI LL	91.P	L = (= L = 1)(.		a la sua di su i la la la desa					

Note: Pre-code buildings are those that are built prior to 1975. Moderate code are those built after 1975. These dates were chosen based on when the seismic provisions were incorporated into the building code statewide, which was 1975. Please note that the analysis in Hazus used the following dates: Pre-code are any buildings prior to 1941. Moderate Code were any buildings after 1941, which is the default Hazus methodology. Please refer to the appendix for additional information.

 Table 80: Pre-Code versus Moderate Code Building in Kitsap County

Tsunamis & High Waves

Probability of Occurrence: Moderate

There is some potential for a tsunami affecting the City of Poulsbo. Subduction Earthquakes along the Washington coast would cause a surge of seawater along the coastal areas of the Straits of Juan De Fuca's. Such a tsunami may cause a surge of water along the shores of

Liberty Bay and the city of Poulsbo. As noted below in the map, some areas along the shore of Liberty Bay may see damage from the surge, but the downtown area would experience little effect except for the marinas. Damage from such an event may force boats and docks up along the shoreline damaging facilities and boats. Very little of the population would be affected except for live-a-boards and those living in residence along the banks of Liberty Bay. There is no history of tsunamis along the Banks of Liberty Bay. Liberty Bay is closed to the Puget Sound waters and masked by Poulsbo from surges. Some damage may be to businesses at the end of Liberty Bay to the North.



Figure 70: Tsunami Models, City of Poulsbo (Kitsap County GIS)

¹⁵¹ FEMA Risk Report Kitsap County 2015

Drought Probability of Occurrence: Low

Drought is most likely to affect the entire county. Hazard assessment information on drought can be found in the Drought Mitigation Strategies section.

City of Poulsbo Asset Profile

Location Poulsbo, WA	Year Built	Type of Construction	Bldg. Sq.	Building Value	Contents Value	Number of Stories	Type of Protection	Critical Facility (Yes/No)
American Legion Park	2004	Playground, Tables, Restrooms	200	\$1,200,000		1	Locked	No
Austurbruin Park	1999	Playground, Tables		\$200,000			Fenced	No
Betty Iverson Kiwanis Park	1986	Playground, Tables, Picnic Shelter, BBQs		\$500,000				No
Centennial Park	1968	Tables, Pergolas, Bridge, Observation Deck	1,800	\$75,000				No
City Hall	2010	All Combustible	30,000	\$12,000,000	\$1,293,900	3	Locked	Yes
Decant Facility/SW Transfer Station	2016		3,956	\$1,940,000			Fenced	No
Decant Facility/SW Transfer Station Restroom Building	2016		300	\$60,000			Fenced Locked	No
Forest Rock Hills Park	1999	Playground, Tables, Benches		\$255,000			Locked	No

Location Poulsbo, WA	Year Built	Type of Construction	Bldg. Sq.	Building Value	Contents Value	Number of Stories	Type of Protection	Critical Facility (Yes/No)
Lincoln Water Treatment Plant	2018		589	\$800,000	\$400,000		Locked	No
Lions Park	2000	Restrooms, Tables, Tennis Court, Playground		\$2,750,000		1	Fenced	No
MIW Waterfront Park	1976	Boardwalk, Gazebo, Restrooms, Pavilion, Benches, Tables	576	\$6,500,000		1		No
Nelson Park - Log Cabin/Museum	1996	All Combustible	480	\$75,000	\$25,000	1	Locked	No
Nelson Park	2004	Picnic Shelter, Tables, Windmill, Playground		\$600,000		1		No
Nelson Park Caretakers Residence	1996	All Combustible	1,200	\$250,000	\$200,000	2	Locked	No
Nelson Park Restroom/Storage Building (one unit)	1996	All Combustible	864	\$350,000	\$100,000	1	Locked	No
Net Shed Vista Park	2000	Tables		\$75,000	\$500		Fenced	No
Oyster Park	2000	Pier, Ramp, Float	3,000	\$1,000,000				No

Location Poulsbo, WA	Year Built	Type of Construction	Bldg. Sq.	Building Value	Contents Value	Number of Stories	Type of Protection	Critical Facility (Yes/No)
Parks & Rec Bldg	1987	All Combustible	15,000	\$3,000,000	\$300,000	2	Locked	No
Poulsbo's Fish Park	2002	Boardwalk, Platforms, Bridges, Pergola		\$1,400,000				No
Public Works Facility	1960	All Combustible	12,994	\$500,000	\$350,000	1	Locked	Yes
PW Admin Bldg	1970	Metal	2,623	\$350,180	\$128,434	1	Locked	Yes
Raab Park	2007	Picnic Shelter, Tables, Playground, Skate Park, Basketball Court	1,860	\$370,000				No
Raab Park Caretaker's Mobile Home	1972	All Combustible	1,440	\$200,000	\$22,400	1	Locked	No
Raab Park Restrooms	2008	All Combustible	800	\$300,000		1	Locked	No
Raab Park Storage Garage	2009	All Combustible	640	\$150,000	\$150,000	1	Locked	No
Sewer Lift Station - 6th Ave	2015	Non- Combustible		\$750,000			Fenced Locked	Yes
Sewer Lift Station - 9th Ave	2015	Non- Combustible		\$600,000			Fenced Locked	Yes
Sewer Lift Station - Alasund Meadows	2003	Non- Combustible	45	\$200,000			Fenced Locked	Yes

Location Poulsbo, WA	Year Built	Type of Construction	Bldg. Sq.	Building Value	Contents Value	Number of Stories	Type of Protection	Critical Facility (Yes/No)
Sewer Lift Station - Applewood	1992	Non- Combustible		\$200,000			Fenced Locked	Yes
Sewer Lift Station - Bond	2007	Non- Combustible		\$1,500,000			Fenced Locked	Yes
Sewer Lift Station - Liberty	2017	Non- Combustible		\$400,000			Fenced Locked	Yes
Sewer Lift Station - Lindvig	2000	Non- Combustible		\$1,000,000			Fenced Locked	Yes
Sewer Lift Station - Marine Science Center	1991	Non- Combustible		\$600,000			Fenced Locked	Yes
Sewer Lift Station - Village/7th Ave	2017	Non- Combustible		\$750,000			Fenced Locked	Yes
Water Station - 10th Ave PRV	1991	Non- Combustible		\$50,000			Fenced Locked	Yes
Water Station - Caldart PRV	2006	Non- Combustible		\$50,000			Fenced Locked	Yes
Water Station - Commerce PRV	2017	Non- Combustible		\$50,000			Fenced Locked	Yes
Water Station - Finn Hill/Staffordshire PRV	0	Non- Combustible		\$50,000			Fenced Locked	Yes
Water Station - Forest Rock PRV	1996	Non- Combustible		\$50,000			Fenced Locked	Yes

Location Poulsbo, WA	Year Built	Type of Construction	Bldg. Sq.	Building Value	Contents Value	Number of Stories	Type of Protection	Critical Facility (Yes/No)
Water Station - Mesford PRV	0	Non- Combustible		\$50,000			Fenced Locked	Yes
Water Station - Olhava PRV	2000	Non- Combustible		\$50,000			Fenced Locked	Yes
Water Pump Station - Poulsbo Place Booster	2003	Non- Combustible		\$25,000			Locked	Yes
Water Pump Station - Pugh	1989	Non- Combustible	598	\$2,000,000	\$300,000		Fenced Locked	Yes
Water Station - Stendahl Ridge PRV	2007	Non- Combustible		\$50,000			Fenced Locked	Yes
Water Station - Swanson PRV	0	Non- Combustible		\$50,000			Fenced Locked	Yes
Water Station - Viking Ave PRV	2017	Non- Combustible		\$50,000			Locked	Yes
Water Station - Vikings Landing PRV	2014	Non- Combustible		\$50,000			Fenced Locked	Yes
Water Pump Station - Wilderness Booster	0	Non- Combustible		\$20,000			Fenced Locked	Yes
Water Station - Wilderness PRV	0	Non- Combustible		\$50,000			Fenced Locked	Yes
Water Tank - 4th Ave	1975	Non- Combustible		\$500,000			Fenced Locked	Yes

Location Poulsbo, WA	Year Built	Type of Construction	Bldg. Sq.	Building Value	Contents Value	Number of Stories	Type of Protection	Critical Facility (Yes/No)
Water Tank - Raab Park	1967	Reinforced Concrete		\$350,000			Fenced Locked	Yes
Water Tank - Wilderness Park Tank	1980	Non- Combustible	200	\$2,000,000			Fenced Locked	Yes
Water Tank - Caldart (2)	1990	Non- Combustible		\$385,600			Fenced Locked	Yes
Water Tank - Finn Hill	1981	Non- Combustible		\$1,000,000			Fenced Locked	Yes
Water Tank - Olhava	2004	Non- Combustible	200	\$2,000,000			Fenced Locked	Yes
Well - Bus Barn Well	1940	Non- Combustible	288	\$225,000	\$150,000		Locked	No
Well - Lincoln Rd Well #2	1968	Non- Combustible	200	\$300,000	\$250,000		Fenced Locked	Yes
Well - Lincoln Rd Well #1	1968	Non- Combustible	276	\$400,000	\$100,000		Fenced Locked	Yes
Well - Pugh	1988	Non- Combustible		\$750,000			Fenced Locked	Yes
Well - Westside	2003	Non- Combustible	200	\$450,000	\$300,000		Fenced Locked	Yes
Well - Big Valley	1975	Masonry Combustible	286	\$100,000	\$500,000		Fenced Locked	Yes
Asset Profile Total Va	lues:			\$52,005,780	\$4,570,234			

Table 81: City of Poulsbo Asset Profile
Appendix B: Capability Assessment

In support of the overall effort, Kitsap County Government and its independent jurisdictions inventoried and analyzed existing capabilities, plans, programs, and policies that enhance our ability to implement mitigation strategies. This section summarizes the findings of the Capability Assessment in the following order:

- Overview of County Information
 - County and City-Specific Government Information
 - County and City Map Locations
 - Infrastructure Information
 - Critical and Essential Facilities Information
 - Transportation Information
 - Vulnerable Populations Information
 - Cultural and Historical Asset Information
- An assessment of legal and regulatory capabilities
- Development and permitting capabilities
- An assessment of fiscal capabilities
- An assessment of administrative and technical capabilities
- An assessment of education and outreach capabilities
- Information on National Flood Insurance Program (NFIP) compliance
- Classifications under various community mitigation programs
- Hazard Mitigation Resources
- The community's adaptive capacity for the impacts of climate change

Government

Agency/ Department	Role	Contact	More Information
Department of Administrative Services	The Department of Administrative Services (DAS) operates under the Board of County Commissioners. DAS helps county departments optimize their performance by providing centralized services and support in a cost effective manner.	Director: Amber D'Amato Located in the Administration Building Kitsap County Department of Administrative Services 619 Division St., Fourth Floor Port Orchard, WA 98366 (360) 337-5777 Ireyes@co.kitsap.wa.us	https://www.kitsapgov.co m/das/Pages/default.asp X

Agency/ Department	Role	Contact	More Information
	Port Orchard and the unincorporated areas of Silverdale.		
Kitsap County Human Resources	The HR department is chiefly responsible for establishing and implementing employment policies and procedures.	Director: Nancy Buonanno Grennan 507 Austin Avenue Port Orchard, WA 98366 (360) 337-7185 humanresources@co.kitsap. wa.us	https://www.kitsapgov.co m/hr/Pages/default.aspx
Kitsap County Human Services	To provide essential services that address individual and community needs, preserve the rights and dignity of those they serve, and promote the health and well-being of all Kitsap residents	Supervisor: Hannah Shockley 507 Austin Avenue Port Orchard, WA 98366 (360) 337-4604 <u>hshockle@co.kitsap.wa.us</u>	https://www.kitsapgov.co m/hs/Pages/Default%20 Home%20Page%20HS. aspx
Kitsap County Information Services	Information Services is the central information technology hub for Kitsap County, located in the County Courthouse. The group provides technology infrastructure, development, support and network solutions to all County departments and some other local government entities.	Director: Craig Adams First Floor, Room 108 County Courthouse Port Orchard, WA 98366 (360) 337-5777 helpdesk@co.kitsap.wa.us	https://www.kitsapgov.co m/dis/Pages/default.asp X
Kitsap County Parks	Parks is committed to providing quality-of-life enhancing opportunities through the management of natural areas and stewardship and offering an outstanding service-oriented environment.	Director: Jim Dunwiddie 1195 NW Fairgrounds Rd, Bremerton, WA 98311 (360) 337-5350 parks@co.kitsap.wa.us	https://www.kitsapgov.co m/parks
Kitsap County Public Works	Provide the citizens of Kitsap County with quality service in the planning, maintenance, and operations of public works facilities.	Director: Andrew Nelson 614 Division Street. MS - 26 Port Orchard, WA 98366 (360) 337-5777 help@kitsap1.com	https://www.kitsapgov.co m/pw/Pages/default.asp X

More information regarding Government in Kitsap County can be found in the Kitsap County Profile section starting on page 40.

Various county and city-specific agencies, departments, and officials are listed in the Participating Jurisdictions, Agencies, & Organizations table starting on page 13.

City-specific Government information can be found on the following pages:

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- Bainbridge Island: 173
- Bremerton: 199
- Port Orchard: 227
- Poulsbo: 251

City-Specific City Manager information can be found on page 286 for Bainbridge Island, Bremerton, Port Orchard, and Poulsbo.

County and City Maps

Maps from various county, state, and federal agencies and departments are included in this document. Some of those agencies include Kitsap County Department of Emergency Management, Kitsap County Information Services, Kitsap County Community Development, FEMA, NOAA, WADNR, as well as city-specific departments.

- Maps of Kitsap County as a whole can be found on pages 39, 42, 47, 58, 72, 84, 87, 88, 105, 115, 116, 119
- Maps of different hazards and their effects on the county can be found on the following pages:
 - o Earthquake: 65, 68, 72, 18, 78
 - o Landslide & Erosion: 84, 87, 88
 - o Tsunami: 94
 - Wildfire & Urban Fire: 105
 - Flood Mitigation: 113, 115, 116, 119
 - Severe Storm/Tornado: 127
 - Drought:
- Locations of city-specific location and hazard maps:
 - o Bainbridge Island: 68, 94, 182, 188, 189, 190, 192, 194
 - o Bremerton: 68, 113, 204, 220, 211, 212, 213, 215
 - o Port Orchard: 68, 94, 127, 228, 232, 239, 241, 243
 - o Poulsbo: 253, 257, 262, 263, 264, 265, 266, 267

Infrastructure

Every jurisdiction is unique. The list of assets that are most important to protect, as well as the criticality of any given facility, can vary widely from community to community. For planning purposes, a jurisdiction should determine criticality based on the relative importance of its various assets for the delivery of vital services, the protection of special populations, and other important functions. Infrastructure may be considered critical for a variety of reasons.

Infrastructure information can be found on the following pages:

- Kitsap County: 48-49, 69-71
- Bainbridge Island: 177, 178-180,
- Bremerton: 202-203,

- Port Orchard: 230-231
- Poulsbo: 255-256

Critical & Essential Facilities

Critical facilities are those facilities and infrastructure necessary for emergency response efforts and whose loss of function would present an immediate threat to life, public health, and safety. Essential facilities, which are necessary for the health and welfare of an area and are essential during the response and recovery phase of a disaster such as: public safety facilities, hospital, schools. Lifeline utility systems include potable and wastewater treatment plants, electrical generation facilities, and power grid and communications systems.

A list of information regarding critical and essential facilities can be found on the following pages:

- Kitsap County: 49-54
- Bainbridge Island: 177-178, 196-198
- Bremerton: 203, 216-226
- Port Orchard: 231, 245-250
- Poulsbo: 256, 269-274

Transportation

Transportation systems include airports, ports, harbor, highway, and roads.

Information regarding transportation systems can be found on the following pages:

- Kitsap County: 48-49, 69-71
- Bainbridge Island: 177
- Bremerton: 202-203
- Port Orchard: 230-231
- Poulsbo: 255-256

Vulnerable Populations

Information on vulnerable populations can be found on the following pages:

- Kitsap County: 43
- Bainbridge Island: 174
- Bremerton: 199-200
- Port Orchard: 227-228
- Poulsbo: 252-252

Cultural and Historical Assets

Cultural and historical assets are those facilities that augment or help define community character that, if lost, would represent a significant loss to the community.

Information on cultural and historical assets can be found on the following pages:

- Kitsap County: 49-54
- Bainbridge Island: 177-178, 178-180
- Bremerton: 203,
- Port Orchard: 231
- Poulsbo: 256

Legal and Regulatory Capability				
	Local Authority	Other Jurisdiction Authority	State Mandated	Integration Opportunity?
Codes, Ordi	nances, & Re	equirements		
Building Code Comment: Kitsap County Code Title 14	Yes	Yes	Yes	Yes
Zoning Code Comment: Kitsan County Code Title 17	Yes	Yes	Yes	Yes
Subdivisions Comment: Comprehensive Plan (2016-2036)	Yes	Yes	Yes	Yes
Stormwater Management Comment: Kitsap County Code Title 12, WA Department of Ecology Storm Water Permit Regulations	Yes	Yes	Yes	Yes
Post-Disaster Recovery Comment: Kitsap County Comprehensive Emergency Management Plan (2015)	Yes	Yes	Yes	Yes
Real Estate Disclosure	No	No	No	No
Growth Management Comment: Kitsap County Comprehensive Plan (2016-2036)	Yes	No	Yes	Yes
Site Plan Review Comment: City/County Codes	Yes	Yes	Yes	Yes
Environmental Protection Comment: WA State Dept of Ecology and Federal EPA	No	Yes	Yes	Yes
Flood Damage Prevention Comment: Kitsap County, 1980. Ordinance No. 80 - Flood Damage Prevention Regulations, Kitsap County Critical Areas Ordinance, December 2017	Yes	Yes	No	Yes
Emergency Management Comment: Kitsap County Code Title 2, Kitsap County CEMP	Yes	Yes	Yes	Yes
Climate Change	No	Yes	No	Yes

Legal and Regulatory Capability				
	Local Authority	Other Jurisdiction Authority	State Mandated	Integration Opportunity?
Comment: WA State Dept of Ecology				
Other: Comprehensive Plan Comment: Kitsap County Comprehensive Plan (2016-2036)	Yes	Yes	Yes	Yes
Plar	nning Docum	ents	•	
Comprehensive Plan <i>Comment: Kitsap County Comprehensive</i> <i>Plan (2016-2036)</i>	Yes	Yes	Yes	Yes
Capital Facilities Plan (2016-2036) How often is the plan updated? Annually	Yes	Yes	Yes	Yes
Floodplain or Watershed Plan Comment: Gorst Creek Watershed Plan	Yes	Yes	Yes	Yes
Stormwater Plan Comment: Stormwater Pollution Prevention Plan, Kitsap County Stormwater Design Manual 2016, 2019 Stormwater Management Program (SWMP)	Yes	Yes	No	Yes
Urban Water Management Plan Comment: Kitsap County Ground Water Management Plan, Kitsap County Coordinated Water System Plan	Yes	Yes	No	Yes
Habitat Conservation Plan Comment: Washington State Department of Natural Resources Habitat Conservation Plan. Kitsap County Code Title 19	No	Yes	No	Yes
Economic Development Plan Comment: Kitsap County Comprehensive Plan (2016-2036)	Yes	Yes	Yes	Yes
Shoreline Management Plan Comment: Kitsap County Shoreline Master Program, Kitsap County Regional Shoreline Restoration Project, Kitsap County Code Title 22	Yes	Yes	Yes	Yes
Community Wildfire Protection Plan Comment: Bainbridge Island Community Wildfire Protection Plan, WADNR Wildland Fire Protection 10-Year Strategic Plan	Yes	Yes	Yes	Yes
Forest Management Plan	No	No	No	No
Climate Action Plan	No	No	No	No
Comprehensive Emergency Management Plan Comment: Kitsap County Comprehensive Emergency Management Plan 2015	Yes	No	Yes	Yes
Threat & Hazard Identification & Risk Assessment Comment: Kitsap County HIVA 2019	Yes	Yes	No	Yes
Post-Disaster Recovery Plan	Yes	Yes	No	Yes

Legal and Regulatory Capability					
		Local Authority	Other Jurisdiction Authority	State Mandated	Integration Opportunity?
Comment: Kitsap County Compreh	ensive				
Emergency Management Plan 201	5	Vee	Vee	Vee	Vaa
Continuity of Operations Plan		res	res	res	res
Plan (under development)	s (COOP)				
Plan (under development)		Voc	Voc	Voc	Voc
Comment: Kitsan County Health		165	165	165	163
District Emergency Response Plan	1				
Planning/ Regulatory Tool	Kitsap	Bainbridge	Bremerton	Port	Poulsbo
	County	Island		Orchard	
Emergency					
Operations/Emergency	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Management Plan					
Hazard Mitigation Plan		,	,		
Comprehensive Land Use Plan				\checkmark	\checkmark
Open Space Management Plan		\checkmark	\checkmark	\checkmark	\checkmark
(Parks & Rec/Greenway Plan	•	•	,	•	,
Stormwater Management Plan/Ordinance	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Natural Resource Protection Plan					
Flood Response Plan					
Continuity of Operations Plan					
Disaster Recovery Plan		,	,		
Economic Development Plan					\checkmark
Flood Damage Prevention		\checkmark		\checkmark	
Ordinance	,				
Zoning Ordinance			N	N	N
Subdivision Ordinance	V		N	N	N
Unified Development Ordinance	٧	N	N	N	N
Post-Disaster Redevelopment					
Ordinance Duilding Orde					
Building Code	N	N	N	N	N
Fire Code	N	N	ν	N	N
Program (NEID)	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
NEID Community Pating System					
INFIF Community Rating System					

Development and Permitting Capability		
Criterion	Response	
Does your jurisdiction issue development permits? If no, who does? If yes, which department?	Yes, Kitsap County, Bainbridge Island, Bremerton, Port Orchard, and Poulsbo Community Development and Public Works departments.	
Does your jurisdiction have the ability to track permits by hazard area?	Yes	
Does your jurisdiction have a buildable lands inventory?	Yes	

Fiscal Capability			
Financial Resource	Accessible or Eligible to Use?		
Community Development Block Grants	Yes		
Capital Improvements Project Funding	Yes		
Authority to Levy Taxes for Specific Purposes	Yes		
User Fees for Water, Sewer, Gas or Electric Service	No		
Incur Debt through General Obligation Bonds	Yes		
Incur Debt through Special Tax Bonds	Yes		
Incur Debt through Private Activity Bonds	No		
Withhold Public Expenditures in Hazard-Prone Areas	No		
State-Sponsored Grant Programs	Yes		
Development Impact Fees for Homebuyers or Developers	Yes		
Other	N/A		

Administrative and Technical Capability			
Staff/Personnel Resource	Available?	Department/Agency	
Planners or engineers with knowledge of land development and land management practices	Yes	Kitsap County, Bainbridge Island, Bremerton, Port Orchard, and Poulsbo Community Development and Public Works departments. Positions include Director, Administrators, Supervisors, Planners, and Engineers. The Kitsap County Planning Commission is an advisory body that assists the Planning Department in carrying out its duties, including assistance in the preparation and execution of the comprehensive plan and recommendations to the planning department for the adoption of official controls and/or amendments (RCW 36.070.040; Kitsap County Resolution 60-1961, Sec 2), and acts as the research and fact finding agency of the County.	
Engineers or professionals trained in building or infrastructure construction practices	Yes	Kitsap County, Bainbridge Island, Bremerton, Port Orchard, and Poulsbo Community Development and Public Works departments. Positions include Director, Administrators, Supervisors, Planners, and Engineers. Kitsap County Transit Engineers.	
Planners or engineers with an understanding of natural hazards	Yes	Kitsap County, Bainbridge Island, Bremerton, Port Orchard, and Poulsbo Community Development and Public Works departments. Positions include Director, Administrators, Supervisors, Planners, and Engineers. Kitsap County Transit Engineers.	
Staff with training in benefit/cost analysis	No	KCDEM Director and EMAT staff	

Administrative and Technical Capability				
Staff/Personnel Resource	Available?	Department/Agency		
Surveyors	Yes	Kitsap County, Bainbridge Island, Bremerton, Port Orchard, and Poulsbo Public Works departments.		
Personnel skilled or trained in GIS applications	Yes	Numerous county and city departments		
Scientist familiar with natural hazards in local area	Yes	Kitsap County, Bainbridge Island, Bremerton, Port Orchard, and Poulsbo Community Development and Public Works departments, Kitsap Transit.		
Emergency Manager	Yes	Kitsap County Department of Emergency Management		
Grant writers	Yes	Numerous county and city departments		
Other	N/A			

Education and Outreach Capability			
Criterion	Response		
Do you have a Public Information Officer or Communications Office?	Yes, within the Kitsap County Department of Emergency Management.		
Do you have personnel skilled or trained in website development?	Yes, within the Kitsap County Department of Emergency Management and Information Services, as well as various county and city departments. Most agencies/departments keep up-to-date websites and social media accounts.		
Do you have hazard mitigation information available on your website? If yes, please briefly describe.	Yes, the hazard mitigation plan and hazard vulnerability assessment are routinely uploaded to the kitsapdem.org website where the public can view and download a PDF version of the document. The website also includes standalone information on the natural hazards that affect Kitsap County, as well as terrorism, hazardous materials, and public health information.		
Do you utilize social media for hazard mitigation education and outreach? If yes, please briefly describe.	Yes, KCDEM utilizes the kitsapdem.org website, KCDEM Facebook, and KCDEM Nextdoor accounts to share information, documents, and links to hazard mitigation education and outreach. Various county departments utilize social media for public engagement, warning, and outreach.		
Do you have any citizen boards or commissions that address issues related to hazard mitigation? If yes, please briefly describe.	Kitsap County has various organizations, advisory groups, and steering committees for citizens, which the public is asked to join such as the Central Kitsap Community Council, Manchester Citizens Advisory Committee, Kingston Citizens Advisory Committee, and the Suquamish Citizens Advisory Committee. Nextdoor is also a forum used to engagement with the public regarding providing and requesting hazard mitigation information.		
Do you have any other programs already in place that could be used to communicate hazard-related information? If yes, please briefly describe.	Kitsap County ALERT is the county's emergency notification system which can be used to communicate hazard-related information, as well as the		

Education and Outreach Capability		
Criterion	Response	
	kitsapdem.org website, KCDEM Facebook, and KCDEM Nextdoor accounts.	
Do you have any established warning systems for hazard events? If yes, please briefly describe.	Kitsap County ALERT is the county's emergency notification system which can be used to communicate hazard-related information. These emergency alerts could be related to specific hazards that require action be taken such as evacuation, shelter in place, boil water, etc. In addition to the public receiving information on their wireless devices, they may also sign up to receive notification on a traditional landline phone. Adding a location address will provide geographically targeted alerts when an emergency impacts a specific location.	

National Flood Insurance Program Compliance			
Criterion	Response		
What local department is responsible for floodplain management?	Kitsap County Community Development		
Who is your floodplain administrator? (department/position)	Kitsap County Community Development Flood Plain Coordinator		
Are any certified floodplain managers on staff in your jurisdiction?	Bainbridge Island has 2, Port Orchard has 1. Bremerton and Poulsbo do not have any.		
What is the date that your flood damage prevention ordinance was last amended?	1980		
Does your floodplain management program meet or exceed minimum requirements?	Meet		
When was the most recent Community Assistance Visit or Community Assistance Contact?	2002		
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed?	No		
Do your flood hazard maps adequately address the flood risk within your jurisdiction?	Yes		
Does your floodplain management staff need any assistance or training to support its floodplain management program?	Yes		
If so, what type of assistance/training is needed?	Floodplain development permitting		
Does your jurisdiction participate in the Community Rating System (CRS)?	No for all.		
If yes, is your jurisdiction interested in improving CRS Classification?	N/A		
Is your jurisdiction interested in joining the CRS program?	No. In 2007, Kitsap County compared the cost to implement CRS versus the savings to citizens which proved insignificant. The County does not have significant flood-prone areas that would benefit from this program.		
How many flood insurance policies are in force in your jurisdiction?*	926		
What is the insurance in force?	\$318 million		

National Flood Insurance Program Compliance				
Criterion	Response			
What is the premium in force?	Unknown			
How many total loss claims have been filed in your jurisdiction? *	Unknown			
How many claims are still open/were closed without payment?	Unknown			
What were the total payments for losses?	Unknown			
*According to FEMA as of 2015 City-Specific NEIP Information can be found on 120-124				

Community Classifications				
	Participating?	Classification	Date Classified	
Community Rating System	No to all	N/A	N/A	
Building Code Effectiveness	Yes	N/A	N/A	
Grading Schedule				
Public Protection	Yes	N/A	N/A	
Storm Ready	No	N/A	N/A	
Firewise	Yes	N/A	N/A	
Bainbridge Island	Yes	Participating	N/A	
Bremerton	Yes	Participating	N/A	
Port Orchard	Yes	Participating	N/A	
Poulsbo	Yes	Participating	N/A	

Hazard Mitigation Funding Resources

State Mitigation Funding

Direct State Disaster Mitigation Funding

The state of Washington has PA and IA programs under State-declared disasters

State Provision of Non-Federal Match to Federal Mitigation Programs

Many federal mitigation programs require a local match of non-federal funds. The match required varies with the program regulations and community being granted funds. These programs, described in detail below, include the Public Assistance (also called 406 mitigation) and Hazard Mitigation Grant Program (HMGP) which are funded under federally-declared disasters. The matching funds are paid through the State DRF

Hazard Mitigation Grant Program (HMGP)

This state-managed program is available only after a Presidential Declaration of Major Disaster. The program funds mitigation planning initiatives and cost-effective mitigation projects designed to reduce or eliminate the effects and costs of future disaster damage. Upon approval of the governor and state legislature, the state may pay a portion of the applicant's cost share.

DR-4418 Grant

On March 4, 2019, Federal Disaster Declaration DR-4418 was granted to the state of Washington triggering a new HMGP round. While HMGP is competitive and open to all eligible entities in the state, grant applications from eligible entities within the declared and affected counties will be given priority status. For DR-4418, the declared and affected counties are as follows:

- Declared counties: Clallam, Grays Harbor, Island, Jefferson, Mason, Pacific, Snohomish and Whatcom.
- Affected (but not declared) counties: King, Kitsap, Lewis, Pierce, Skagit and Thurston.

HMGP Post Fire Mitigation

Hazard Mitigation Grant Program funding is now available for every Fire Mitigation Assistance Grant (FMAG) declared during calendar years 2017 and 2018 within the state of Washington. This new grant funding is prioritized for pre- and post-wildfire risk reduction projects in the declared counties but is competitively available statewide. Standard HMGP eligibility criteria apply. Each new FMAG in 2018 will trigger a new HMGP grant opportunity.

Pre-Disaster Mitigation

This annually available, nationally competitive program provides funds for hazard mitigation measures designed to reduce injuries, loss of life, and damage and destruction of property. Grants are available for mitigation planning initiatives and cost-effective mitigation projects. Small, impoverished communities and Tribes may be eligible for a 90 percent federal cost share.

Flood Mitigation Assistance

This annually available program provides funds for cost-effective measures that reduce the risk of flood damage to structures that have flood insurance coverage. Grants are available for planning initiatives to update the flood hazard portion of an applicant's hazard mitigation plan and for cost-effective flood mitigation projects. Funding for properties that meet the repetitive loss or severe repetitive loss thresholds is available at a 90 percent and 100 percent federal cost share, respectively. Funding for all other Flood Mitigation Assistance grants are available at a 75 percent federal cost share. There are no longer separate Repetitive Flood Claim and Severe Repetitive Loss grant programs.

Supporting Mitigation Programs

Division of Homeland Security and Emergency Management Disaster Relief Fund The State of Washington provides State funding for PA and IA in State-declared disasters and cost share funds for federally-declared disasters through the DRF.

Block Grant Program

The Block Grant Program is funded through the Federal Department of Housing & Urban Development (HUD). Kitsap County receives an annual allocation of Community Development Block Grant (CDBG) and HOME Investment Partnership (HOME) funds. The amounts are determined by a formula and the federal budget.

The purpose of the program is to provide the community with a source of funds to address a wide range of housing and community needs. The funds are used to support agencies, non-profits, and governments in addressing the needs of low-income and special needs households in the community. CDGB funds are primarily used to fund capital and economic development projects, with a smaller portion used to fund public services. HOME funds are used to fund housing projects. The goal is to assist in the development of decent housing, create suitable living environments and expand economic opportunities for low income individuals and families.

Washington Department of Commerce

The Department of Commerce is the one agency in state government that touches every aspect of community and economic development: planning, infrastructure, energy, public facilities, housing, public safety and crime victims, international trade, business services and more. We work with local governments, tribes, businesses and civic leaders throughout the state to strengthen communities so all residents may thrive and prosper.

Rural Development Assistance Mini-Grants

These grants partially fund plan development, feasibility engineering studies, and capital projects. Mini-grants are awarded by the State Legislature.

Unincorporated Community Grants

These grants are awarded by the State Legislature to unincorporated communities and nonprofits for a wide range of projects and programs.

Federal Mitigation Funding

There are several Federal agencies and programs funding mitigation projects in the State of Washington. Mitigation grants are administered through the Department of Homeland Security as the grantee to local communities functioning as sub-grantees with the State providing the required matching funds for the Hazard Mitigation Grant Program (HMGP). The following table is an overview of grant projects and their eligible programs (Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Grants (PDM), Flood Mitigation Assistance Grant (FMA)).

Activities	HMGP	PDM	FMA
Mitigation Projects	\checkmark	\checkmark	\checkmark
Property Acquisition and Structure Demolition	\checkmark	\checkmark	\checkmark
Property Acquisition and Structure Relocation	\checkmark	\checkmark	\checkmark
Structure Elevation	\checkmark	\checkmark	\checkmark
Mitigation Reconstruction			
Dry Floodproofing of Historic Residential Structures	\checkmark	\checkmark	\checkmark

Activities	HMGP	PDM	FMA
Dry Floodproofing of Non-residential Structures	\checkmark	\checkmark	\checkmark
Minor Localized Flood Reduction Projects	\checkmark	\checkmark	\checkmark
Structural Retrofitting of Existing Buildings	\checkmark	\checkmark	
Non-Structural Retrofitting of Existing Buildings and Facilities	\checkmark	\checkmark	
Safe Room Construction	\checkmark	\checkmark	
Infrastructure Retrofit	\checkmark	\checkmark	
Soil Stabilization	\checkmark	\checkmark	
Wildfire Mitigation	\checkmark	\checkmark	
Post-disaster Code Enforcement	\checkmark		
5% Initiative Projects	\checkmark		
Hazard Mitigation Planning	\checkmark	\checkmark	\checkmark
Management Costs	\checkmark	\checkmark	\checkmark

FEMA administers HMA grants through Congressional authorization of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 2000 as amended. While many features of the HMA grants overlap, such as the benefit cost analysis (BCA) requirement, each grant program has specific features. Detailed guidance for these grants is provided by FEMA at http://www.fema.gov/library/viewRecord.do?id=3649.

Federal Disaster Mitigation Grants

406 Public Assistance Mitigation

FEMA PA repair projects are eligible for additional mitigation funds through 406 PA mitigation. Section 406 of the Stafford Act stipulates the mitigation project must relate directly to the disaster damages.

Hazard Mitigation Grant Program

In contrast, whenever there is a presidentially-declared disaster in the State of Washington, FEMA offers mitigation grant funds based on a percentage of the overall Federal share of disaster costs (15% in 2013). This program, called the HMGP, was created in 1988 by the Stafford Act, Section 404 (404 mitigation) and allows HMGP funds to be used anywhere in the State if it is stipulated in the State disaster declaration to the President. While HMGP is funded through a presidentially-declared disaster, HMGP funds are not used to repair disaster damage but to reduce future disaster losses through mitigation projects and planning.

Federal Unmet Needs Program

Unmet Needs is a program activated in specific disasters based upon a Congressional determination there are unmet needs following a disaster. Mitigation funds may be available for jurisdictions receiving an unmet needs allocation. Mitigation projects are specified in the Unmet Needs allocation. The Unmet Needs program funds up to 75% of an approved project.

Additional Primary Federal Mitigation Programs

FEMA

Pre-Disaster Mitigation Grant Program

The FEMA Pre-Disaster Mitigation (PDM) grant program funds mitigation projects and planning for State, local, and eligible tribal organizations. The PDM program is annual, subject to Congressional appropriation, and nationally competitive. PDM sets aside a minimum monetary amount for each State and offers any remaining funds for national competition. Congress controls the PDM program and may award PDM funds in lieu of any competitive application process.

The State is the grantee of PDM funds and communities are the sub-grantees. Grant awards are a 75% Federal/25% applicant cost share match. In Fiscal Year (FY) 2016, PDM program funding totaled approximately \$90 million. Communities identified as "small and impoverished" are eligible for 90% Federal and 10% applicant match.

Hazard Mitigation Technical Assistance Program

Through the Hazard Mitigation Technical Assistance Program (HMTAP), FEMA creates technical products for Federal, State, and local community use. FEMA administers HMTAP contracts with State advisement. HMTAPs continue to be a potential tool to accomplish specific, clearly-defined mitigation planning work as identified by the SHMO.

Department of Commerce National Oceanic and Atmospheric Administration (NOAA)

National Tsunami Hazard Mitigation Grant Program

The National Tsunami Hazard Mitigation Grant Program (NTHMP) combines Federal and State partners involved in mitigating tsunami risk. This NOAA-directed program includes Federal partners from the United States Geological Survey (USGS), FEMA, and States with tsunami risk. The State of Alaska serves as a member of the Coordination Committee for the NTHMP and is the grantee for NTHMP funds allocated to Alaska. In Alaska, NTHMP funds are combined with State-managed projects, local community sub-grants, and intra-state reimbursable services agreements (RSAs) for tsunami hazard mapping, outreach and warning systems. In Alaska, the NTHMP is managed though the SHMO.

Small Business Administration

Business Physical Disaster Loans are available for businesses and non-profit organizations in the area of a declared Federal disaster or Small Business Administration (SBA) declared disaster. SBA often sends representatives on federally-declared disasters to present their disaster loan program.

Natural Resource Conservation Service

Emergency Watershed Protection Program

The NRCS is responsible for the Emergency Watershed Protection (EWP) program. EWP provides financial and technical assistance to remove debris from streams, protect destabilized stream banks, establish cover on critically eroding lands, establish conservation practices, and purchase flood plain easements.

Department of Defense

U.S. Army Corps of Engineers

Funding for USACE projects and studies is dependent on Congressional appropriation and program requirements.

Additional Federal Agencies

- Department of Agriculture
 - o U.S. Forest Service
- Department of Commerce
 - National Oceanic & Atmospheric Administration See above under NTHMP and RCASP.
 - National Weather Service Office of Coastal Resource Management
- Department of Defense
 - o USACE Army Corps of Engineers National Flood Proofing Committee
- Department of Health, Education & Welfare
 - Center for Disease Control (CDC)
- Department of Housing & Urban Development Community Development Block Grant
 - HOME Investment Partnerships Program
- Department of the Interior
 - U.S. Geological Survey U.S. Fish & Wildlife Service Bureau of Land Management Bureau of Indian Affairs
- Environmental Protection Agency
- Department of Transportation
 - Federal Highway Administration Federal Aviation Administration
- National Trust for Historic Preservation

Additional Mitigation Grant Resources

Information about other grant programs may be found in these sources:

- Washington Emergency Management Division: <u>https://mil.wa.gov/disaster-assistance-overview</u>
- FEMA Hazard Mitigation Assistance: https://www.fema.gov/hazard-mitigation-assistance
- FEMA Hazard Mitigation Grant Program: <u>https://www.fema.gov/hazard-mitigation-grant-program</u>
- FEMA Disaster Assistance: A Guide to Recovery Programs:: https://www.fema.gov/media-library/assets/documents/31850

Adaptive Capacity for Climate Change for Kitsap County			
Criterion	Jurisdiction Rating*		
Technical Capacity			
Jurisdiction-level understanding of potential climate change impacts	Moderate		
Jurisdiction-level monitoring of climate change impacts	Low		
Technical resources to assess proposed strategies for feasibility and externalities	Low		

Clear authority/mandate to consider climate change impacts	Moderate		
during public decision-making processes			
Identified strategies for greenhouse gas mitigation efforts	Low		
Identified strategies for adaptation to impacts	Low		
Champions for climate action in local government departments	High		
Political support for implementing climate change adaptation	Moderate		
strategies			
Financial resources devoted to climate change adaptation	Unsure		
Local authority over sectors likely to be negative impacted	Unsure		
Public Capacity			
Local residents' knowledge of and understanding of climate risk	Moderate		
Local residents' support of adaptation efforts	Moderate		
Local residents' capacity to adapt to climate impacts	Moderate		
Local economy current capacity to adapt to climate impacts	Unsure		
Local ecosystems capacity to adapt to climate impacts	Unsure		
*High = Capacity exists and is in use; Moderate = Capacity may exist but is not used or could use some improvement; Low = Capacity does not exist or could use substantial improvement; Unsure= Not enough information is known to assign a rating.			

Appendix C: MHMP Update History

Steering Committee Hazard Mitigation Strategy Identification Activities 1998 to 2019

1998 to 1999 Planning Process – Overview

- Members of the Steering Committee met with representatives from each City and County in the Community to identify Local Hazard Mitigation Strategy recommendations.
- The Steering Committee, starting in August of 1998 through April of 1999, met on a monthly basis to identify additional Hazard Mitigation Strategy recommendations and to develop those recommendations received from the political subdivisions.
- In January of 1999, the Steering Committee assisted in the facilitation of a Community-Wide Planning
- Team full-day meeting to introduce the community to the Hazard Mitigation Strategies identified and received input and prioritization from the Community-Wide Planning Team. Over 80 community participants attended the day-long working session and examined, prioritized, and recommended acceptance or rejection of the Hazard Mitigation Strategies presented.
- Following the January meeting, the Steering Committee again examined and prioritized the Hazard Mitigation Strategies incorporating the result from the Community-Wide Planning Team meeting. The Steering Committee further estimated implementation costs for those strategies where possible.
- The Kitsap County MHMP and Recovery Plan were formally adopted in October 1999 by the Kitsap County Emergency Management Council (includes the three county commissioners and the mayors of each city).

2003 to 2004 Plan Development – Overview

- Members of the Planning Committee met on a bi-monthly/monthly basis from February of 2003 through July of 2004 to review and update the 1999 plan.
- The Planning Committee broke into sub-groups by expertise to review, assess, and evaluate current recommendations, strategies, and priorities and to develop new recommendations, strategies, and priorities as needed. The sub-groups broke down as follows:
 - Community Groups (Not-for-Profits)
 - City Community Development
 - Fire Agencies

- School Districts
- o Ports
- Water Purveyors

The outcomes of these sub-groups were as followed:

- 1. Schools Natural Hazards Earthquake mitigation and preparedness is still a number one issue for schools. School violence is the terrorist threat that now requires more attention and mitigation activities.
- **2.** Ports reviewed all strategies, but the newest threat is terrorism, and port security will need to be included in the planning process.
- **3.** Fire Agencies confirmed all mitigation strategies for drought were still effective.
- **4.** All other agencies reviewed all strategies and assessed most were current for their organizations.
- 5. The Planning Committee designed the public outreach process for May of 2004.
- 6. The Planning Committee further developed an ongoing Planning Committee comprised of one representative from each discipline to meet annually (in April) to evaluate ongoing strategies, update the plan as needed, determine ways to add additional strategies as identified by either the community at large and/or an event that took place in the community that identified areas for mitigation (i.e., earthquake).

2012 Plan Review & Update

- All City and Special Purpose District planning partners were contacted in October 2009 to advise them of the periodic update to this plan. All were asked to review their current profile, update profile information and supplemental documents, and place the planning meetings on their calendars for December 2009 through March 2010.
- The kickoff meeting was held on December 17th, 2009, and the attending partners agreed on the deadlines for agency-specific documentation delivery. Planning partners unable to attend the meeting on December 17th, 2009 attended a second kick-off meeting on December 28th, 2009. All partners agreed to the delivery deadlines.
- The progress of the MHMP Update was verified at a meeting held on January 21st, 2010. In addition to verifying progress, a subcommittee was formed to review the basic plan from 2004 to determine if the basic plan, process, strategies, and recommendations all remain valid for Kitsap County and associated Cities and Special Purpose Districts based on the HIVA (October 2008). The volunteers for this subcommittee represented a crosssection of all of the planning partners including representatives from Public Works, Schools, Water/Utility, Tribal, City and County Government. These volunteers would review the basic plan in its entirety and provide feedback before the next planning partner meeting.

 The planning partners met again on February 18th, 2010, for final verification of progress. By this time each partner had made public notice (if applicable), held a hearing on their profile input for the MHMP update, and provided minutes of those board meetings / hearings for inclusion into the plan. All documents were to be electronically submitted for the plan one week from this meeting so that the update of the MHMP could be completed.

Each Planning Partner was tasked to:

- Review the 2004 MHMP
- Update their jurisdiction/agency profile
- Evaluate and update their profiles to reflect changes in hazard risk assessments
- Evaluate strategies and update profiles for potential terrorist threats and mitigation strategies
- Report on completed mitigation strategies to the Committee
- Report any concerns that may warrant further action by the Multi-Hazard Mitigation Planning Committee.

Kitsap County MHMP Development - 2010			
Date	Activity	Subject	Action Items
October 29, 2009	Notification of MHMP Update, kick-off meeting date and the timeline for update	Review Current HIVA (October 2008), MHMP (December 2004) and schedule meeting dates	Team to review HIVA, MHMP and begin on updates to profiles
December 17, 2009	Meeting	 Action Items – Review Plan Profile Public Notice Meeting Notice Meeting Minutes Follow up MHMP meeting dates 	Continue development of required elements and updated profile
December 28, 2009	Meeting	 Action Items – Review Plan Profile Public Notice Meeting Notice Meeting Minutes Follow up MHMP meeting dates 	Continue development of required elements and updated profile

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Kitsap County MHMP Development - 2010			
Date	Activity	Subject	Action Items
January 21, 2010	Meeting	 Review of Project Timeline Provide Planning Assistance Establish Sub-committee 	Continue development of required elements and updated profile. Sub-committee to review basic plan for necessary updates.
February 18, 2010	Meeting	Finalize documents and timeline for submission. Sub- committee reports no significant changes to plan, only minor updates to text, data, and fiscal info.	The final deadline for submission of all notices, agenda, minutes, and profiles is one week. All planning partners on schedule.
February 25, 2010	Partner Documents	Deliver all electronic documents for the plan update	Await draft plan finalization and approval
March 11, 2010	Draft Plan Review	Draft Plan to Director	Corrections as needed
March 12, 2010	Draft Plan Delivery	Delivery of Draft Plan to WA EMD	Await approval and forwarding to FEMA for final approval.

Table 82: Kitsap County MHMP Development - 2010

Such detailed records were not found for the 2015 update cycle.

Appendix D: Stakeholder and Engagement Records

Stakeholder Point-of-Contact Information:

Bainbridge Island

Morgan Smith City Manager – City of Bainbridge Island 280 Madison Ave North Bainbridge Island, WA 206-780-8620

Bremerton

Pat McGanney Fire Chief 911 Park Ave Bremerton, WA 360-478-5380

Port Orchard

Mark Dorsey Director of Public Works 216 Prospect Street Port Orchard, WA 360-876-4991

Poulsbo

Karla Boughton Planning & Economic Development Director 200 NE Moe Street Poulsbo, WA 360-39-9748

Stakeholder Engagement Records January 19, 2019

	Aleksandra Baran <aleks@tamarackmgmt.com></aleks@tamarackmgmt.com>
Fw: Tentative Mitigation Project Kickoff Meeting Agenda	
Randy Unger <randyunge 2012@hotmail.com=""> To: Aleksandra Baran <aleks@tamarackmgmt.com></aleks@tamarackmgmt.com></randyunge>	Thu, Sep 19, 2019 at 8:06 PM
Randy L. Unger, PMP	
Kitsap County Department of Emergency Management	
randyunger2012@hotmail.com	
235375018	
From: Randy Unger	
Sent: Saturday, January 19, 2019 4:17 PM Tor: Elizabeth Nuter eskulle@co.ktsap.wa.us>	
Ce: herb JEWELL https://weil@comcast.neb; force Totar	com>; Tom Malley <tmalley@co.kitsap.wa.us>; Dave</tmalley@co.kitsap.wa.us>
Subject: Tentative Mitigation Project Kickoff Meeting Agenda	
KICKOFF MEETING DELIVERABLES	
Emphasis throughout the workshop sessions is on the deliverables to be produced by the team. These are:	
Agreement on project goals.	
List of key concerns and major open issues. Identify associated risks.	
A well-defined project/work breakdown structure (PBS).	
A task/responsibility matrix, based on the PBS.	
A list of key project coordination and public comment events, linked to the PBS and identifying responsibility and audience(s).	
A project master schedule, based on the PBS, reflecting the key project coordination events, and based on the consensus of the project team on the ov	verall allocation of time.
Agreed procedures for project monitoring and control, including dates for periodic project review meetings.	
Action items resulting from the kick-off workshop discussions, with assigned responsibility and agreed due date for each.	
All: the above intended to get us thinking in the general direction of setting project expectations. Added plus is that it gives me something to do wh Will be great to get the band together again.	ile sitting around with my busted leg.
best always,	
Randy	

February 3, 2019

	Aleksandra Baran ≺aleks@tamaraokm	gmt.com>
Fw: February 3 Version, MHMP Memo		
Randy Unger <archive.2012@hotmail.com> To:Aleksandra Baran <aleks@stamaraokmgmt.com></aleks@stamaraokmgmt.com></archive.2012@hotmail.com>	Thu. Sep 19, 2019	at 8:04 PM
Randy L. Unger, PMP Kitsap County Department of Emergency Management		
randyunger2012@hotmail.com 258-851-901 c. 253-988-8737		
From: Randy Unger Sent: Sunday, February 3, 2019 3:16 PM To: Force Tolar < GF Tolar@gmail.com>; Elizabeth Klute <eklute@co.kitsap.wa.us>; Linda Tsubaki <lisubaki@icloud.com>; chiefjim@wavecable.com < Subject: February 3 Version, MHMP Memo</lisubaki@icloud.com></eklute@co.kitsap.wa.us>	schiefjim@wavecable.com>	1
Thanks for Force for edits.	KCDEM	
Randy	KITSAP COUNTY DEPARTMENT OF EMERGENCY MANAGEMENT	
UMMM RFI Memo 02-03-2019.docx 20K	Daar TRD-	
	Mitigating natural hazards saves lives, reduces injuries, and prevents or limits financial losses from disasters in Kinsap County. Additionally, the federal government requires states, local jurisdictions, and tribal governments to have a Federal Emergency Management Agency-approved mitigation plan in place in order to apply for emergency funds and mitigation grants. Kitsap County's Multi-Hazard Mitigation Plan, first approved in 2005 and revised in 2012, is due for updating. This ensures the Plan reflects today's challenges to Kitsap's people and infrastructure.	
	Kitsap County is committed to incorporating input from all stakeholders—public, private, and non-profils—during the next several months as we together develop a meaning/thy lanh that supports the unique recells of our communities. Stakeholder activities will occur over the next several months, beginning with a new Hazard Identification Vulnerability Assessment. We seperch the poject to be completed by the end of October. Your jurisdiction's participation in this effort is critical. My initial request is for hy a primary point of contact for coordination with my staff. T Intend to schedule the first of a series of briefings on Mitigation Plan process and progress abortly. I am always available to provide clarification and to answer your questions.	
	Best regards.	
	Elizabeth Klute	

March 4, 2019

Aleksandra Bara	n <aleks@tamarackmgmt.com></aleks@tamarackmgmt.com>
Fw: Wednesday Agenda items	
Randy Unger <randyunger2012@hotmail.com> To: Aleksandra Baran <aleks@itamarackmgmt.com></aleks@itamarackmgmt.com></randyunger2012@hotmail.com>	Thu, Sep 19, 2019 at 8:15 PM
Randy L. Unger, PMP Kitsap County Department of Emergency Management	
randyunger2012@hotmail.com 259-581-301 c: 253-988-6737	
From: Randy Unger <tandyunger2012@hotmail.com> Sem: Nonday, March 4, 2019 917 AM Tis froor-biotar-1930 TRBULI-Weigrepiles 3. basecamp.com <force-tolar-ng3trbuil-wid@repiles 3.="" basecamp.com="">; Elizabeth Kiute <eklute@co.kitsap.wa.us>; Linda Tsubaki Linda Tsubaki Linda Tsubaki Linda Tsubaki </eklute@co.kitsap.wa.us></force-tolar-ng3trbuil-wid@repiles></tandyunger2012@hotmail.com>	1
All:	
Here are the issues from my viewpoint	
 Finalize stakeholders Stakeholder engagement - POC request letters, RPI requests, who is going to shepherd entities that are not cities The above drive adjusting the project timeline, meeting schedule, and other project materials 	
I'm going to refresh myself on the stakeholder powerpoint and RFI form prior to Wednesday. Remember the conference call is 1100 - 1200 Pacific time.	
I'm including comments from Force (my response) in restril green) which are some of the points we need to clarify.	
Best regards,	
Randy	
From: Force Tolar (Basecamp) <notifications@3 basecamp.com=""> Sent Sunday, March 3, 2019 12:30 PM To: randy.upe27012@olomalii.com Subject: Re: (Kitsap County HIVA Update and Mitigation Plan Review) Proposed Stakeholder List</notifications@3>	
On first blush:	
Naval Base Kitse is appropriate. Navy Region Northwest can be dropped. Good, just wanted to keep the orthol of command heapy. Is City of Bainbridge intentionally excluded (as well as the BI school district and BI free)? Haven'theart that COB wants to play. Was bound try to include the school district, so that we capture all of them. Is the BI FD independent of the city government? As for as infrastructure is coverneem, ethigation grianning usually learns a lot from Projet Sourd Energy and their wulnerabilities in supporting critical infrastructure. Agreed. They could replace CNRINW. Does Public Health provide input/capability information from CHI Franciscan hospital? I looked at their weakies, and they have no formal agreements with CHI, Multicare, Kaiser or any other private providers that I could see.	
Lis- interested in your thoughts.	
Randy	
8 You can reply to this email or respond in Basecamp.	
This message was sent to Force Tolar and Randy Unger,	
Unsubscribe - Change your notification settings Get the Basecama and not Plance ac Antroiti	
App Stars D Cooper Fey	

March 27, 2019

Aleksandra Baran <aleks@aleksbaran.com< th=""></aleks@aleksbaran.com<>
2019 Kitsap County Hazard Identification Vulnerability Assessment/Multihazard Mitigation Plan Kickoff
Randy Unger «randjunger»: 01:00 hotmai.com?
KCDEM
KITSAP COUNTY DEPARTMENT OF EMERGENCY MANAGEMENT
Mitigating natural hazards saves lives, reduces injuries, and prevents or limits financial losses from disasters in Kitsap County. Additionally, the federal government requires states, local jurisdictions, and tribal governments to have a Federal Emergency Management Agency-approved mitigation plan in place in order to apply for emergency funds and mitigation grants. Kitsap County's Multi-Hazard Mitigation Plan, first approved in 2005 and revised in 2012, is due for updating. This ensures the Plan reflects today's challenges to Kitsap's people and infrastructure.
Kitsap County is committed to incorporating input from all stakeholders—public, private, and non-profits—during the next several months as we together develop a meaningful plan that supports the unique needs of our communities. Stakeholder activities will occur over the next several months, beginning with a new Hazard Identification Vulnerability Assessment (HIVA). We expect the project to be completed by the end of June. Your jurisdiction's participation in this effort is critical. My initial request is for a primary point of contact for coordination with my staff. To explain the HIVA drafting process, we are conducting a virtual kickoff briefing at 1:00 on April 8 th in conjunction with the Kitsap Emergency Management Training Schedule meeting. A GoToMeeting invitation will arrive shortly. Our Project Manager (<u>randyuuger2012@hotmail.com</u> , 253-851-3018) and I (<u>eklute@co.kitsap.wa.us</u> , 360-307-5871) are available to provide clarification and to answer your questions.
Best regards,
Elizabeth Klute
Kitisap County HIVA One-Pager 2.4.19.pdf 123K

April 10, 2019

	Aleksandra Baran <aleks@aleksbaran.com></aleks@aleksbaran.com>
MHMP Project Team Meeting	
Randy Unger <andyunger2012@hotmail.com> To:Linds Tsubasi <tubaski@loud.com>, ForeIolar</tubaski@loud.com>, TAMARA CHAPMAN <tammy@tamarackmgmt.com>, "ohiefjm@wavecable.com" <chiefjm@wavecable.com>, Aleksandra Baran <aless@aleksbaran.co Ce:Elizabeh Nuck «etkst@gotNitagoswa.u=></aless@aleksbaran.co </chiefjm@wavecable.com></tammy@tamarackmgmt.com></andyunger2012@hotmail.com>	Wed, Apr 10, 2019 at 8:35 PM om>
Alt	
Looks like the most of us are best available this Friday PM (sorry, Alex-hopefully Tamara can back brief you). Purpose of the meeting is to determine a due date for data gathering (and gently enforce it) ar POC engagement.	nd to discuss the most efficient POC to
thanks,	
Randy	
MHMP Team Meeting Fn, Apr 12, 2019 1:30 PM - 2:00 PM PDT	
Please join my meeting from your computer, tablet or smartphone. https://global.gotomeeting.com/join/672310557	
You can also dial in using your phone. (For supported devices, tap a one-touch number below to join instantly.)	
United States: +1 (571) 317-3122 - One-touch: tel:+15713173122,672310557#	
Access Code: 672-310-557	
New to GoToMeeting? Get the app now and be ready when your first meeting starts: https://global.gotomeeting.com/install/672310557	

April 19, 2019

	Aleksandra Baran <aleks@aleksbar< th=""></aleks@aleksbar<>
Kitsap County Hazard Identification and Vulnerability Assessment (HIVA) Request for Information	
Randy Unger < randpunger 2012@httmail.com? The holdby out of https://workino.com? The holdby out of htt	Fri, Apr 19, 2019 a Fri, Apr 19, 2019 a ools.org>, "ebischoff@bisd30.org" om" <kboughton@cityofpoulsbo.com>, gov" <duley(@wsdot.ws.gov>, a <kmedina@bainbridgews.gov>,</kmedina@bainbridgews.gov></duley(@wsdot.ws.gov></kboughton@cityofpoulsbo.com>
Good Day:	
As promised at the April 8th HIVA/Multihazard Mitigation Plan Kickoff Meeting, the link to the updatable Request for Information Spreadsheet is:	
https://docs.google.com/spreadsheets/d1FJSPbSmM61iOk0zG3_POAyOLLHbse_3dI-syH-8GCJc/edit?usp=sharing	
If you weren't able to attend the kickoff, I've attached the briefing that explains our overall plan and the mechanics of the spreadsheet. Project Team members from the Kitsap County Emergency Manager your jurisdiction to assist you:	nent Assistance Team are assigned f
 Force Tolar, CFTolar@gmail.com, 380-509-3182. City of Poulsbo, Naval Base Kitap Jim Wilson, chiefjim@gwavecable.com, (12 305-758-738, (1) 233-509-2581. City of Bremerton, County Fire and Rescue Districts Linds Tubuki, HusbaX@clouds com, (12 364-2648-8), 19 363-534-382. City of Pouls Orthorial, School and Port Districts Randy Unger, randyunger2012@hotmail.com, (2) 253-688-8737, (b) 253-551-3018. City of Bainbridge Island, Water Districts, Nonprofits, WASHDOT, Tribes, Other Jurisdictions 	
You'll notice in the spreadsheet's "Responsible for information Collection" we've made some recommendations for offices that may want the opportunity to comment. These are suggestions only, any and all jurisdictions who want to participate in this	critical effort are welcome.
in order to meet County, State, and FEMA timelines, input is requested by mid-May.	
Best regards,	
Randy Unger, PMP Project Manager	
T Risp County HIVA Update Stakenolder Presentation 040813.pdf 3015.	
Alebsandra Baran Alebsandra Baran ketes @alebsada.com/	
Kitsap County Hazard Identification and Vulnerability Assessment (HIVA) Request for Information	
Randy Upger Knopunge20128/phonesi zoom Erik Age II. 2019 and III. 2019 and IIII. 2019 and IIII. 2019 and IIII. 2019 and IIII. 2019 and IIIIII. 2019 and IIIIIIIII. 2019 and IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	
Good Day:	
As promised at the April 8th HIVA/Multibazard Mitgetion Plan Kickoff Meeting, the link to the updatable Request for information Spreadcheet is:	
https://docs.google.com/spreadsheets/d11FJSPbSmlM61iOkQzG3_POAyOLLHbse_3dI-syH-8GCJc/edit?usp=sharing	

From User, OF Solar Quencils Control Section 2014 (Section 2014) Section 2014 (Sect

You'll notice in the spreadsheet's "Responsible for information Collection" we've made some recommendat In order to meet County, State, and FEMA timelines, input is requested by mid-May.

Best regards,

Randy Unger, PMP Project Manager

Kitsap County HIVA Update Stakeholder Presentation 040819.pdf

May 2, 2019

Aleksandra Baran <aleks@aleksbaran.com></aleks@aleksbaran.com>
/HMP Project Team Meeting, Thursday 02 May
tandy Unger <sandyunger2012@hotmal.com> Euclida Tsubaki (tsubaki)disubaki (tsub</sandyunger2012@hotmal.com>
Randy Unger has shared a OneDrive file with you. To view It, click the link below.
Kitsap HIVA 4.30.19 DRAFT v4 1.docx
MHMP Project Team Meeting Thu, May 2, 2019 12:00 PM - 12:30 PM PDT
Agenda:
1. RFI Progress/Challenges 2. First Look at Draft HIVA (see note from our over the horizon contingent):
Aloha, Randy. In honor of us reaching the end of April, I wanted to share with you our in-progress HIVA draft. Some notes on the draft: We added line numbers to help with the review process; we have a Google sheet that we can use to collect comments on the document. There are also (obviously) still some information gaps that we are working to close. In some cases, these are outstanding RFIs; in others, we are working to track down citations to validate the information that was in earlier versions of the document. There are also (obviously) still some information that was in earlier versions of the document. There are also (obviously) still some information that was in earlier versions of the document. There are being from your computer, tablet or smartphone. https://doi.org/doi.org/a00046000000000000000000000000000000000
You can also dial in using your phone. United States: +1 (312) 757-3121
Access Code: 823-856-221
New to GoToMeeting? Get the app now and be ready when your first meeting starts: https://global.gotomeeting.com/install/023056221

June 3, 2019

	Aleksandra Baran <aleks@tamarackmgmt.com></aleks@tamarackmgmt.com>
Fw: MHMP Review Spreadsheet	
Randy Unger <=nndyunger2012@botmal.com> To: Aleksandra Baran <aleks@tamarackmgmt.com></aleks@tamarackmgmt.com>	Thu, Sep 19, 2019 at 8:10 PM
Randy L. Unger, PMP Kitsap County Department of Emergency Management randyunger2012@hotmail.com 253-651-301 c: 253-988-8737	
From: Tamara Chapman <lammy@tamarackmgmt.com> Sent: Monday. June 3, 2019 9:28 AM To: Randy Unger <crandy unger2012@hohmail.com=""> Subject: MHMP Review Spreadsheet</crandy></lammy@tamarackmgmt.com>	
Aloha, Randy.	
This link will take you to our review of the MHMP. We went ahead and set it up with RFIs. I think that some of the information this time around is best suited to updating through conversations, though, such as the mitigation strate new information to include.	gies, both in terms of updating and identifying
My recommendation is that we present an overview of the data needs when we convene stakeholders in late June/early July, much like we did with the HIVA.	
Let me know if have any issues getting to the Google Sheet.	
Enjoyi	
Tammy	
TAMARA R. CHAPMAN Overere Calocer TamarAck Maint MORLE (51-205-940)	

June 19, 2019

	Aleksandra Baran <aleks@tamarackmgmt.com></aleks@tamarackmgmt.com>
Fw: FW: HMP Update Grant Kickoff - Follow-Up	
Randy Unger <randyunger2012@hotmail.com> To: Aleksandra Baran <aleks@tamaraokmgmt.com></aleks@tamaraokmgmt.com></randyunger2012@hotmail.com>	Wed, Sep 18, 2019 at 6:51 PM
Randy L. Unger, PMP Kitsap County Department of Emergency Management	
randyunger2012@hotmail.com 253-651-301 c: 253-988-8737	
From: Bandy Unger <frandy unger2012_bhohmail.com=""> Sent: Wednesday, June 19, 2019 7:24 PM To: Unda Tsubaski «Isubaski @icloud.com>; Force Tolar Grand International Com> Cc: chilefim@wavecable.com <chilefim@wavecable.com> Subject: Fw: HMP Update Grant Kickoff - Follow-Up</chilefim@wavecable.com></frandy>	
From: Levkowitz, Michael (MIL) < <u>Michael Levkowitz@mil.wa.gov></u> Sent: Wednesday, June 19, 2019 3:23 PM To: Klute Elizabath; Randy Unger, Malley Tom Co: Enders, Sue (MIL), Aleksandra Baran (lidels@aleksbaran.com); HMA (MIL); Tamara Chapman (lammy@tamarackmgmt.com); Cook, Tim (MIL) Subject: HMV [update Grank (Kichof F-Follow-Up	
HAIL	
Thanks again for making space for our Plan Update Grant Kickoff Meeting back at the end of May! My sincere apologies for the delay in our response – you posed a lot of good questions and it took us a responses below.	bit more time than anticipated to pull together the suite of
Following up with more information on a variety of topics we touched on at that May 28 th meeting:	
Here the control of the control o	
 Prevale note: Any funded pre-award costs can be moved to post-award obuget categories – pieses puts as in you alive to move any of mose funds to another category. Per our discussions about examples of successful grant applications, live attached a copy of the HMOP application for replacement generators for critical facilities submitted by Pacific County. We at FEMA on the application, meaning they have not yet reviewed it, but thought it was a well-aveloped concept and application from our perspective here at the State. Regarding the concerns that you expressed about having "too much" in donated contributions and staff hours: You are wellowed to counted to fund a should have a submit you first reimbursement request you've incurred thus far. However, we'll need you to keep track of any match contributions that are "banked." I recommend that you go work with Sue and submit your first reimbursement request 	ire currently waiting on any RFIs (Request For Information) from e been made to this point, regardless of what reimbursable costs it as a "draft" so that she can walk through the process with a
 You'll also find a copy of our Reimbursement Pockage attached. This spreadsheet shows the forms that we reviewed at our meeting in May – and Sue can walk you through the process of po • You'll also find a copy of our Reimbursement backage attached. This spreadsheet shows the forms that we reviewed at our meeting in May – and Sue can walk you through the process of po • The first tab in that spreadsheet is the official A-19. This form serves as the summary form showing the total amount requested. • The Second tab is the Reimbursement Summary. This form occuments the individual items, vendors, budget category, date, and amount of each individual invoiced item. 	spulating and submitting these as you are learning to use them.
 Initially, the time data is the double which room. Initial torms interleade to serve as your documentation for any donated hours – tor example to nep capture the value of the net and any set of the set of th	urs stakeholders dedicated to attending the climate change ary. You might also have line items on that Reimbursement ent Summary sheet (total invoice, federal share, and local share)
Woldu as used to publicate or 4-13 I've conferred with my supervisor and confinmed that we're happy to provide you with a letter of support for the new position you mentioned. Can you provide me with a short blurb about the p hiring in your own words would suffice. I'll use thin to is draft up something appropriate and send that your way ASAR. We also touched on the difference between developing approximate animess as opposed to having participating entities. I believe I characterized things this way at the meeting as well, but in short: W	osition? A very brief description, position title, basic rationale for Ve typically recommend that entities participate as annexes only if
there is an indexis in appying birectly to the state bit moved or lowing and programs, and use explosity and submit an application and manage a grain. Per a request from US, here is a link for FEMNS Benefit Cost 106.5.3. https://www.fEma.gov/media/ubrary/assels/documents/128334. Per the terms of your contract, we need to notify you in writing that Derrick Hiedert is no longer the Mitigation Strategist with Emergency Management Division – I now fill that role, and Sue Ende to information contained within Box 7 of your contract tack sets and attachment I (page 2) of the contract. You do not need to take any action in response to this notification.	rs is your alternate contact with our office. This information refers
I realized there is a loc in this email. It might not look like it, but we really did try to pare this down as much as possiblebut here we are anyway.	
PLEASE feel free to reach out to either Sue or me with <i>ony</i> questions or concerns!	
Best,	
Michael Levkowitz	
Mitigation Strategist Washington Emergency Management Division	
Office: (253) 512-7467 Mobile: (253) 370-5432 Michael Levkowitz@mil. wa.gov <u>www.mil.wa.gov</u>	

July 7, 2019

From: Randy Unger
Sent: Sunday, July 7, 2019 8:17 PM
To: stephen.finlev@redcross.org; Anne LeSage; ebischoff@bisd303.org; karen.bevers@bremertonschools.org; Wisecup, Jamye; achastain@co.clallam.wa.us; sgeorge@kitsao911.org; JoeV@ckschools.org;
jacobhausdorf@catholichealth.net; Anne LeSage; Patrick McGanney; planning@cityofportorchard.us; kboughton@cityofpoulsbo.com; Mark; Mike Pleasants; robert.e.hubbard@navy.mil; Bence, Willie;
help@kitsap1.com; amckinnon@co.kitsap.wa.us; hshockley@co.kitsap.wa.us; Jessica Guidry; bob@kpud.org; pcampbell@co.kitsap.wa.us; mikep@kitsaptransit.com; amy.anderson@kitsappublichealth.org;
jessica.guidry@kistappublichealth.org; michael.e.simpkins2@army.mil; molson@nkschools.com; jikreidlermoss@pchsweb.org; axels@portofbremerton.org; mives@pgst.nsn.us; daniel.shinners@navy.mil;
chad.delaney@navy.mil; russel.j.blackstock@navy.mil; matthew.r.miller@navy.mil; mary.hobday@pse.com; daniel.paquette@teamrubiconusa.org; johnsond@skschools.org; cmay@suquamish.nsn.us;
michael.e.simpkins1@navy.mil; dudleyl@wsdot.wa.gov; swright@skfr.org; Screws, Jeannie; kmedina@kitsapfoundation.org; Kol Medina; Milenka Hawkins-Bates; Thomas Knuckey
Cc: Elizabeth Klute; Linda Tsubaki; Force Tolar; <u>chiefjim@wavecable.com</u>
Subject: July 10 Stakeholder Steering Committee Read-Ahead Documents
All:
As promised, here are the background documents for Wednesday. The HIVA draft reflects inputs received by close of business Friday. Please don't hesitate to contact me with any questions.
**
hest regards
Dandy L Lenger DMD
Kitsap County Department of Emergency Management
randyunger2012@hotmail.com
253-851-3018
c: 253-988-8737

July 9, 2019

Aleksandra Baran <aleks@tamarac< th=""></aleks@tamarac<>		
MHMP Project Team Monthly, Tuesday July 9, 2019 11:00 AM - 11:30 AM PDT		
Randy Unger <randyunger2012@hotmail.com> To:Linds Tsubaki , Fore Tolar , Fore Fore Tolar , Fore</randyunger2012@hotmail.com>	Tue, Jul 2, 2019 at 8:26 PM mt.com>	
Gallant Colleagues:		
Main purpose this time is to make sure our ducks are in a row for the Stakeholder Meeting.		
best regards,		
Randy		
MHMP Project Team Monthly Tue, Jul 9, 2019 11:00 AM - 11:30 AM PDT		
Please join my meeting from your computer, tablet or smartphone. https://global.gotomeeting.com/join/861941149		
You can also dial in using your phone. United States: +1 (672) 240-3311		
Access Code: 861-941-149		
New to GoToMeeling? Get the app now and be ready when your first meeting starts: https://global.gotomeeting.com/install/861941149		
Randy L. Unger, PMP Kitsap County Department of Emergency Management		
randyunger2012@hotmail.com 253-851-3018 c: 253-988-8737		

July 10, 2019

Aleksandra Baran <a leaks@tamarackmgmt.com<="" th="">
Kitsap County Multihazard Mitigation Plan Stakeholder Steering Committee, Wed, Jul 10, 2019 10:00 AM - 11:30 AM PDT
Bank Unger conjunged 2012 global call const. Two is a set of the stage global construction of the s
Alexsanora baran , Uave +asmussen <onasmussigoo us="" wa="" xitsap=""> Good Day:</onasmussigoo>
Thank you again for your continuing participation in the MIMP Project. During July 10th's virtual meeting, the project team will- • repart the new County House (detection on 2 bit Assessment (we'll continue to incorporate new input as received); • Social the wind forward as we dont to Monthly and • Discuss our Community Engagement strategy.
sakogenon maranas un es auto ca borri, Dur input ang durancia sesanta la posiciana se auto activana de Mittaña.
Kitsap County Multihazard Mitigation Plan Stakeholder Steering Committee Wed, Jul 10, 2019 10:00 AM - 11:30 AM PDT
Please join my meeting from your computer, tablet or smartphone. https://global.gotomeeting.com/join/441244413
You can also dial in using your phone. United States: +1 (872) 240-3212
Access Code: 441-244-413 New to GoTolkeeting? Get the app now and be ready when your first meeting starts: https://global.gotomeeting.com/install/441244413
best regards,
Randy L. Unger, PMP Kitsap County Department of Emergency Management
randyunga?012(20)totmail.com 253-951-010 c: 253-988-9737
Randy Unger <radyunger 2012@hotmsi.com=""> Wed, Sep 18, 2019 at 6:46 PM To: Aleksandra Baran <aleks@tamarackmont.com></aleks@tamarackmont.com></radyunger>
Randy L. Unger, PMP Kitsap County Department of Emergency Management randyunger2012@hotmail.com 253-853-3018 c: 253-988-8737
From: Randy Unger <frandyunger2012@hohmail.com> Sem: Wedmesday, Juny 10, 2019 7:56 AM To: Rhoads, Jacon L AlRhoads@mkschools orgp- Subject: Fvx: Kitsap County Multibazard Mitigation Plan Stakeholder Steering Committee, Wed, Jul 10, 2019 10:00 AM - 11:30 AM PDT</frandyunger2012@hohmail.com>
Mr. Rhoads:
I am very, very sorry that you did not receive this in a timely manner. I emailed Mr. Molson in error. Today's meeting will be recorded, and I am also attaching the slide deck we will be using.
pes regeros, Randy L. Unger, PMP Kitano County Denartment of Emergency Management
randyungar2012@hotmail.com 253-853-9018 - : ::::::::::::::::::::::::::::::::::
Fons: Sandy Unger Fons: Sandy Unger Sens: Taxiday, July 2, 2019 459 FM To: stelphan (Integret/cross or g., Ance LeSage; eblschoff@bisd303 org; karen bevers@bremefonschools.org; Wiscup, Jamye; achastain@co.clailam. wa us; sgeorge@kitsap011.org; JoeV@ckschools.org; jacobhausdorf@catholichealth net; Anne LeSage; Parick KGsanoe; Johannog@chytopdortchard us; kboupting@chytopdorbco.com; Mark; Mike Pesanst; robert in Lubbard@navy.mil; Bence; Wille; help@kitsap11.org; JoeV@ckschools.org; jacobhausdorf@catholichealth net; Anne LeSage; parick KGsanoe; Joannob@co.ktsap wa us; mes@cathsapublichealth org; miles@catholichealth org; miles@catho
Randy Unger <randyunger2012@hotmai.com> Wed, Sep 18, 2019 at 6/49 PM</randyunger2012@hotmai.com>
Randy L. Unger, PMP Kitsap County Department of Emergency Management randyunger2012@hotmail.com 235453-0018
Here: Bandy Liver: Seen: Existing, July 2. 2019 45 PM Seen: Existing July 2. 2019 10 PM Seen: Existing July 2. 2019 45 PM Seen: Existing

		Aleksandra Baran <aleks@tamarackmgmt.com></aleks@tamarackmgmt.com>
Wednesday 10 July MHMP Stakeholder/Steering Comm	ittee Key Takeaways	
Randy Unger candiumge2012@pichaia comi 10. "soci@cumor candiumge2012@pichaia comi 10. "soci@cumor candiumge2012@pichaia testschr@pichai2033.03" celesionef@is303.03". Anne LeSage celesage@bai 450oughton@citydboallos.com> "michaia as ampkinat@maxy mill" cimichaia a la 450oughton@citydboallos.com> "michaia as ampkinat@maxy mill" cimichaia a 450oughton@citydboallos.com> "michaia as ampkinat@citydboallos.com> cimichaia a 450oughton@citydboallos.com> "michaia as ampkinat@citydboallos.com> cimichaia a 450oughton@citydboallos.com> "michaia as ampkinat@citydboallos.com> cimichaia as a 450oughton@citydboallos.com> "michaia as ampkinat@citydboallos.com> cimichaia as a 450oughton@citydboallos.com> "michaia as ampkinat@citydboallos.com> cimichaia as a 450oughton@citydboallos.com> cimichaia as ampkinat@citydboallos.com> cimichaia as a 450oughton@cit	, "assica guidry@kitaspublichealth.org" (essica guidry@kitaspublichealth.org>. "hishockwy@co.kitasp.us.us" (hi is org». "JewY@estonosis org" (JewY@ciskohoosis org». "phrasond@atsahools org". "son hisfogewa gav». "Jatrick MoSaney Satrick.moganewegiblemention.wsus", "planning@kityophotrothatu us" (pla mpiona figewy mih." 'swingt@atkf.org" "swingt@atkf.org», "swis@botobemention org" "saxei@pototobemention hosmab.genetics"	Fri, Jul 12, 2019 at 8-47 PM ren basver@premetonshols.org* Kasen basvers@sremetonshols.org>, ning@shopborshorat.us>, "kouption@shopborbac.com" ngo", "jsors@swel3.org* jacres@swel3.org>, "dudey@seatot.wa.gov" njtodsig@se.com".Kansyhobs@jse.com", Kol Medina HAPMAN <tammy@tamarackmgmt.com>. Elizabeth Klute</tammy@tamarackmgmt.com>
Randy Unger has shared a OneDrive file with you. To view it, click the link	below.	
🚢 2019-07-10 10.04 Kitsap County Multihazard Mitigation Plan Stakeho	Ider Steering Committee.mp4	
Thank you for your continued support. I've attached a link to the reco	ding of the meeting. The key takeaways as I see them (feel free to correct/comment):	
The HIVA is considered "done," and while you can access the RFI spreadsheet, Our focus now is on updating the existing MHMV, Via an RFI spreadsheet that is jurisdictions, as best as vac en figure that our. Won't be perfect. A spart of our effort to quantify the relative hazards to Kitap as you see them, We will be meeting monthly for the rest of the year. The next gathering is Augu Subject: Kitap County 2019 HIVA Update Rick Survey	rou won't be able to add to it. We still want all your input, which you can add to the MMMP RM spreadsheet or send it right to n ook and works like the one you die for the HIVA. That will be sent out this weekend, after i complete the modifications you requ we've sent out a questionnaire and have received back only three responses. I'm enclosing the link below, and I swear it is pain at 14th at 10:00.	re, as you feel appropriate. ested-changing the assignments from the generic "stakeholders" to specific ess.
Google Forms		
	Having trouble viewing or submitting this form?	
	FILL OUT IN GOOGLE FORMS	
	Kitsap County 2019 HIVA Update Risk Survey Assessing risk is both a quantitative and qualitative process. This survey was made to gather input from stakeholders regarding heir perception of the various natural and human-made hazards that may affect Kitsan County is nonulation comount built environment and natural environment Plasar tate arch	
	hazard and its effect on the county on a scale of 1-10. with 1-3 meaning "Low Impact," 4-7 meaning "Medium or Moderate Impact," and 8-10 meaning "High Impact."	
	Email address *	
	Please provide your last and first name: *	
	Which agency do you represent? *	
	Continue »	
	Powered by	
	This form was created inside of Tamarack Management. Report Abuse - Terms of Sarvice - Additional Terms	
Thanks again for all your efforts on behalf of all the folks in Kitsap.		
Randy L. Unger, PMP Kitsap County Department of Emergency Management		
randyunger2012@hotmail.com 253-851-3018 c: 253-988-8737		

July 31, 2019 (Email to Washington State Department of Emergency Management for Quick Review)

	Fw: Kitsap County MHMP Progress Inbox x			ē	ß
	Randy Unger	Wed, Sep 18, 6:45 PM (7 days ago)	☆	*	÷
	to me +				
	Randy L. Unger, PMP				
	Kitsap County Department of Emergency Management				
	randyunger2012@hotmail.com				
	253-851-3018				
	c: 253-988-8737				_
Fw: Kitsap County MHMP Progress Import Randy Unger to me + Randy L. Unger, PMP Kitsap County Department of Emergency Management randyunger2012@hotmail.com 253-851-3018 253-958-9737 From: Randy Unger Sent: Wednesday, July 31, 2019 5:49 PM To: Levkowitz, Michael (MHL) <	From: Randy Unger				
	Sent: Wednesday, July 31, 2019 5:49 PM				
	To: Levkowitz, Michael (MIL) < <u>Michael.Levkowitz@mil.wa.gov</u> >; Enders, Sue (MIL) < <u>sue.enders@mil.wa.gov</u> >				
	Gallant Colleagues:				
	I've attached the slide deck for our recent MHMP Stakeholder Steering Committee meeting if you would like to se	e where we are at. Additionally, the	HIVA (draft	
	represents the 95% solution and we will continue to tweak it as needed.				
	best regards,				
	Randy L. Unger, PMP				
	Kitsap County Department of Emergency Management				

Adeksandra Baran <aleks@tamarackmgmt.com> Project Team Meeting Agenda Emady Unger <andyunger/2012@hotmail.com> To: TAMARA CHAPMAN Hasting tamarackmgmt.com>. Aleksandra Baran <aleks@tamarackmgmt.com>. Linda Tsubaki <itsubaki@ioloud.com>. Porce Tolar <QPTolar@gmail.com>, "thiefjm@wavecable.com" <chiefjm@wavecable.com" <chiefjm@wavecable.com</td> • Stakeholder Survey replisa • Outreach • Outreach • Outreach • Outreach • Outreach • Stakeholder Survey replisa • Outreach • Anny Julg sub tar.comesto estabaholder Stering Committee Presentation • Gentral will Genda • Anny Lunger, PMP Kittapa County Department of Emergency Management randyunger/2012@hotmail.com 253-853-9318 c: 253-988-8737

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August 14, 2019



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August 16, 2019

	Aleksandra Baran <aleks@tamarackmgmt.com></aleks@tamarackmgmt.com>
Multi Hazard Mitigation Plan Update - Critical Path	
Elizabeth Klute <eklute@co.kitsap.wa.us> To: "stephen.finley@redcross.org" < stephen.finley@redcross.org>, "ebischoff@bisd303.org" <ebischoff@bisd303.org>, Karen Bevers <karen bevers@bremertonsc<br="">]acobhausdorf@catholichealth.net" <jacobhausdorf@catholichealth.net", <alesage@bainbridgewa.gov="" anne="" lesage="">, Patrick McGanney <patrick meganney@cli<br=""><pre>cplanning@clivofportorchard.us>, "kboughton@clivofpoulsbo.com>, "kboughton@clivofpoulsbo.com>, "ndorsey@clivofportorchard.us", "mdorsey@clivofportorchard.us", "mdorsey@clivofportorchard.us", "mdorsey@clivofportorchard.us", "mdorsey@clivofportorchard.us", "mdorsey@clivofportorchard.us", "kboughton@clivofpoulsbo.com>, "hdorsey@clivofportorchard.us", "mdorsey@clivofportorchard.us", "mdorsey@clivofportorchard.us", "mdorsey@clivofportorchard.us", "mdorsey@clivofportorchard.us", "mdorsey@clivofportorchard.us", "mdorsey@clivofportorchard.us", "mdorsey@clivofportorchard.us", "mdorsey@clivofportorchard.us", "mathe@clivofportorchard.us", "mdorsey@clivofportorchard.us", "mathe@clivofportorchard.us", "mathe@clivofportorchard.us", "mathe@clivofportorchard.us", "mathe@clivofportorchard.us", "mathe@clivofportorchard.us", "mathe@clivofportorchard.us", "mathe@clivofportorchard.us", "mathe@clivofportorchard.us", "mathe@clivofportorchard.us", "daniel.shinnes@pary,", "daniel.as, acute@clivofportorchard.us", "daniel.shinnes@pary,", "daniel.shinnes@par</pre></patrick></jacobhausdorf@catholichealth.net",></karen></ebischoff@bisd303.org></eklute@co.kitsap.wa.us>	Fri, Aug 16, 2019 at 12:41 AM hools org>, "JoeV@ckschools org" – ZoeV@ckschools org>, "remerton wa us>, plannin@clyopfontorchard us", d.us>, Mike Pleasants «mpleasants@clyopfontorchard us>, is may be an expected of the analysis of the
CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.	
On behalf of the Multi Hazard Mitigation Plan update team; Hello Stakeholder Steering Committee,	
Due to security filters it may be many of you have not been receiving emails from the project team who do not have Kitsap County email add	resses which we were notified of today!
As you know, we were already running on a very short timeline to update the Kitsap County Multi-Hazard Mitigation Plan (MHMP).	
Completion of this update and subsequent approval of the document by our State partners is critical so the County can initiate and fund impr hazards and disasters that may affect our community in many ways. Kitsap County and your cities will not be able to apply for Stafford Act, Mitigation Grants if an updated Multi-Hazard Mitigation Plan is not completed by the end of this year.	ortant mitigation strategies to mitigate against Hazard Mitigation Grant Program, or Pre Disaster
To do this, we need to complete the draft for State Emergency Management and FEMA review by the end of Septemberl We are dependent opportunities, it is an all or none proposition.	on each other to qualify for these funding
The focus of yesterday's Stakeholder Steering Committee Meeting was to review and update the County-wide and City-specific mitigation st group. It is important to remember that the MHMP helps your agency, organization, and community receive funding for identified mitigation n	rategies, the most critical part of the MHMP, as a eeds.
Due to the low number of participants who attended the meeting, we were not able to review and capture that needed information. Keeping please review the first draft of the MHMP and focus on updating the status of mitigation strategies or identifying new ones by AUG regarding mitigation strategies from the previous MHMP, they will be <u>automatically removed.</u>	our short timeline in mind, we ask you to UST 20th. If we do not receive feedback
Your input and feedback are extremely important regarding the completion of this document. If you received this email and do not think you a please let us know as soon as possible so we can get the document into the right hands.	are the right individual to complete the review,
Per FEMA mitigation requirements, we have to allow the public the opportunity to provide feedback on the document. This MHMP will be sh 21st via the KCDEM website as well as in person at the Kitsap County Stampede and Fair. We need stakeholder input by AUGUST 20th in before sharing with the public.	ared online with the public on AUGUST order to implement all stakeholder feedback
HOW TO REVIEW AND UPDATE THE MHMP:	
If you are a stakeholder from BAINBRIDGE ISLAND, BREMERTON, PORT ORCHARD, or POULSBO, we ask that you please review and update o Download your City-specific charapter to review in Microsoft Word BAINBRIDGE ISLAND (Updates Completed) BREMERTON PORT ORCHARD POULSBO POULSBO Provide feedback via: Tracked changes in Microsoft Word, OR Download and use the Excel Comment Tracker	your City-specific chapter to the MHMP.
2. The rest of the Stakeholder Steering Committee should review and update the MHMP Base Plan document (focusing on mitigation strategies)	
Download the PDF of the MHMP Base Plan Provide feedback by downloading and using the Excel Comment Tracker.	
ALL of these documents are available for DOWNLOAD at https://drive.google.com/open?id=1C81orCm6Frwz_NeX8L7ep2aeZIEy9M3Z	
We thank you for your participation in this process. We kindly ask that you please complete your review and feedback by AUGUST 20th share a completed document with the public.	າ or as soon as possible so we are able to
Please reach out with any questions or we can walk through the applicable elements with you if that would expedite. We apologise but were not aware of the spam and security filters blocking our documents preciously.	
Thank you!	
Kitsap County Multi Hazard Mitigation Plan Update Team	
Sincerely,	
Elizabeth Klute, CEM® Director	
Kitsap County Department of Emergency Management 0:360.307.5871 0:360.204.6703	

August 26, 2019

	Aleksandra Baran <aleks@tamarackmgmlcom></aleks@tamarackmgmlcom>
MHMP Town Hall Material	
Bandy Unger < transjunger/01/2@hotmail.com? To "tashen finding@motors.com? To "tashen finding@motors.com? To "tashen finding@motors.com? Stopptint@motors.com? St	Mon, Aug 26, 2019 at 12:31 PM gov, Platnic McGanney, capatrick moganen gig ci bremerton schools org>, Stephanie George csgeorge@kitasp011 org>, 'Jolav (2019 at 12:31 PM gov, Platnic McGanney, capatrick moganen gig ci bremerton wa us>, 'planning@cityfoptortorbat us>, 'George@kitasp011 org>, 'Jolav Plasaarst cmjobard@cityfoptorbat us>, 'roisen ta hubbard@avm, mil "cobart a hubbard@nay mil, 'Bene, 'Mille' io wa uu' cpcampbeli@co kitao wa us>, 'mikap@kitastorbant.com 'cmikap@kitastorbant.com>, kaskis Quidy Bignischools org>, 'Jennifer L.Korden-Moss Giventemos@citastorbant.com>, 'askis Quidy afeginachools org>, 'Ional Bioactbock@nay,mil>, 'mathew.nille@nay,mil>, 'mathew.nille@nay,mil>, aneg@nay,mil>, 'musai_blocktook@nay,mil>, 'mathew.nille@nay,mil>, 'mathew.nille@nay,mil>, mile<' Clowed to org>.'math@cusadi.htm.cs', 'Annib@subath.htm.cs', 'mathew.nille@nay,mil>, index to forge. 'mgmt.com>, Aleksandta Baran <a href="mathatastatarat.com", Fore Tolar@gmail.com", Linda Stubaki.ditubaki@icloud.com", Aleksandra Baran <a href="mathatastatarat.com", Aleksandra Baran <a href="mathatastatarat.com", Kaskaddi.com", Tolarbagmail.com", Milae", Stubaki.ditubaki@citag.com", Linda Stubaki.com, Cashad, complexandra, com, Aleksandra Baran <a href="mathatastatarat.com", Aleksandra Baran <a href="mathatastatarat.com", Fore Tolar@gmail.com", Linda Stubaki.com", Linda Stubaki.com", Linda Stubaki.com, Aleksandra Baran <a href="mathatastatarat.com", Aleksandra Baran <a href="mathatastatarat.com", Aleksandra Baran <a href="mathatastatarat.com", Fore Tolar@gmail.com", Linda Stubaki.com", Linda Stubaki.com", Aleksandra Statastatarat.com, Aleksandra Statastatarat.com", Aleksandra Baran <a href="mathatastatarat.com", Stubaki.com", Linda Stubaki.com", Linda Stubaki.com", Linda Stubaki.com, Aleksandra Statastatarat.com, Aleksandra Baran <a href="mathatastatarat.com", Aleksandra Baran <a href="mathatastatarat.com", Aleksandra Baran <a href="mathatastatarat.com", Aleksandra Baran <a href="mathatastatatastataatastataatastataatastataata</th>
All:	
The plan for the town halls are to start with the attached PowerPoint, which walks through the Hazard Mitigation backgro in April, the slides will be familiar. Questions and comments will be encouraged and captured during the presentation and	und, specific KC hazards, and how the planning process works. If you attended the HIVA/MHMP Kickoff Meeting at KCDEM I at the end of the meeting.
best regards,	
Randy L. Unger, PMP Kitsap County Department of Emergency Management	
randyunger2012@hotmail.com 253-851-3018 c: 253-988-8737	
Kitsap County MHMP Update Engagement PPT 8.7.19.pptx 8042/4	-

August 30, 2019

Gmail	Aleksandra Baran <aleks@tamarackmgmt.com></aleks@tamarackmgmt.com>
MHMP Town Halls Update	
Randy Unger <=ndyunger 2012@hotmail.com> To: Elizaber Klude «kullge: xluspa.ws.us», TANARA CHAPMAN <lammy@tamarackingmt.com>, Aleksandra Baran <aleks@tamarackingmt.com>, "chiefjim@wavecable.com" <chiefjim@wavecable.com" Co: Linda Tsubacki@idoud com>, Force Totar CGFT0at@gmail.com>. Dave Rasmussem <drasmuss@co.klisp.ws.us></drasmuss@co.klisp.ws.us></chiefjim@wavecable.com" </aleks@tamarackingmt.com></lammy@tamarackingmt.com>	Fri, Aug 30, 2019 at 3:37 PM
Both Town Halls are Scheduled for 6:30 - 9:00 PM	
Poulsbo, 3 Sent	
 Participating: Lis, Randy, Tamara, Aleksandra, Dave Biedsoe (Poulobo City Staff, required by City after hours) AV walkthru with Dave Stenstrom (only support VGA format), 4:00 PM 	
Port Orchard, 4 Sag	
 Participating: Lis, Randy, Jim, Tamara, Aleksandra AV walkthru with Jason Furs, 3:30 - 4:30 	
Note staff support is welcome. Remember Js is only available unit dusk, when she has to feed critters or turns into a critter, I forget which. Aleksandra, syoch have all the links and stuff you need to plug into the side show?	
pleasant holidey,	
Randy L. Unger, PMP Kitsap County Department of Emergency Management	
randyunger2012@hotmail.com 253-851-3018 c: 253-988-8737	

September 26

	Multihazard Mitigation Plan Stakeholder Steering Committee 💷 🗶 🗧	Ľ
	Randy Unger 💿 Sun, Sep 15, 10:34 PM (10 days ago) 📩 🛧 to stephen.finley@redcross.org, ebischoff@bisd303.org, Karen, Stephanie, JoeV@ckschools.org, jacobhausdorf@catholichealth.net, Anne, Patrick, planning 🗸	:
	Sep Multihazard Mitigation Plan Stakehold 26 From Google Calendar	
	Thu This invitation is out of date. This event has been updated. View updated information on Google Calendar	
	Virtual meeting. Purpose is to introduce the final MHMP and review the approval/adoption process. Full agenda and slides will follow. Many thanks, Randy Unger, Project Manager	
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by Google	Aleksandra Baran <aleks@tamarac< td=""><td>:mgmt.com></td></aleks@tamarac<>	:mgmt.com>
Multihazaro Randy Unger <br To: "stephen.fink <loev@ckschoo "kboughton@cit <wbence@co.je "amy.anderson@ <lessica.guidry "mices@pgst.ns Mary Hobday <n <wichael.e.simp <td>d Mitigation Plan Stakeholder Steering Committee Thu, Sep 26, 2019 10:00 AM - 12:00 PM PDT, Dial-in Info crandyurge2012@hotmail.com iscardyurge2012@hotmail.com</td><td>9 at 1:16 PM 9" rd.us>, merton.org>, gnavy.mil>, mil"</td></wichael.e.simp </n </lessica.guidry </wbence@co.je </loev@ckschoo 	d Mitigation Plan Stakeholder Steering Committee Thu, Sep 26, 2019 10:00 AM - 12:00 PM PDT, Dial-in Info crandyurge2012@hotmail.com iscardyurge2012@hotmail.com	9 at 1:16 PM 9" rd.us>, merton.org>, gnavy.mil>, mil"
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Randy L. Ung Kitsap Count	ger, PMP ty Department of Emergency Management	
randyunger 253-851-301 c: 253-988-8	r2012@hotmail.com 18 3737	
GMa	Aleksandra Baran <aleks@tamarac< td=""><td>(mgmt.com></td></aleks@tamarac<>	(mgmt.com>
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Hazard Identification & Vulnerability Analysis (HIVA) Request for Information (RFI) Spreadsheet

Canbeaccessedelectronicallyat:https://docs.google.com/spreadsheets/d/1FJSPbSmM61iOkQzG3_POAyOLLHbse_3dI-syH-8GCJc/edit#gid=6488818198dCJc/edit#gid=648881819

÷	Å	Røvløwer 🗢	Page Num - ber	Comment ⊽	Туре 🗢	Priority 🗢	Responsible for information Collection	USE THIS LINK TO RESPOND TO THE INFORMATION REQUEST	Please change status to COMPLETE when done
1	HIVA	Aleksandra	1	Revise document cover with updated graphics and branding in accordance with most recent logos.	Visual	Recommended	Tamarack	None	COMPLETE +
2	HIVA	Aleksandra	5	P2: Have there been any major emergencies in Kitsap County and its incorporated Otles since 2015? Please list any events which triggered the Emergency Operations Center as well as the date of those activations and any other notable information.	Content	Required	Kitsap County Emergency Management	https://docs.google.com/document/d /163oetW2cMLm913FEpbpeftcs08_z-y3 ke6vQ2miGbAA/edit?usp=sharing	COMPLETE -
3	HIVA	Aleksandra	ALL	inconsistent Oxford Comma/No Oxford Comma use. Recommend using it and staying consistent within the document.	Formatting	Recommended	Tamarack	None	COMPLETE -
4	HIVA	Aleksandra	ALL	All tables, figures, maps, and other graphics should have a designated tille and number. They should all be listed is order of appearance after the table of contents so readers are able to identify and locate specific information quickly.	Visual	Recommended	Tamarack	None	COMPLETE -
5	HIVA	Aleksandra	5-6	Table: Does the HIVA Risk Ratings 2015 table need to be updated or are the risk levels for each category still accurate? Need to obtain most recent Kitsep County or Washington State THIRAs.	Content	Required	Tamarack	https://docs.google.com/document/d /1fkstjeFcoQ3httFeX-J_80tBhtQVs5NL Wogshl3qk0/edit?usp=sharing	COMPLETE -
8	HIVA	Aleksandra	6	Bullet point 3: " The HIVA helps to assign weight and focus on vulnerabilities and insure the county and four cities prepare" Replace insure with ensure because incorrect word is being used.	Grammar	Recommended	Tamarack	None	COMPLETE -
7	HIVA	Aleksandra	6-7	Section "Updates to the pain incluse" needs to be updated with changes made during the HVA revision. 1 - Bhould be taken out since this was included in last revision. 2 - Bhould be taken out since the was included in last revision. 3 - Bhould be taken out since the was included in last revision. 3 - Bhould be taken out since the was included in last revision. 4 - Bhould be taken out since the was included in last revision. 4 - Bhould be updated to reflect using information from the most recent Kitsap Outhy Washington Bitst FHIRA. 4 - Bhould be updated to reflect that the update included the newest climate change Information.	Content	Required	Tamarack	None	COMPLETE -
8	HIVA	Aleksandra	7	The "December 2016" section should be taken out since information from the FEMA Kitsap County Risk Assessment will be included in the overall document. Content stating that information from that assessment is used for the HUX-update should be added to the "Updates to this plan include" section.	Content	Required	Tamarack	None	COMPLETE -
SECTION I: Infroduction and Hazard Assessment Process									
	HIVA	Aleksandra	10	P3: "The 2014 HIVA of Kitsep County covers both natural and technological hazards" Update year as well as Section names to reflect most recent information.	Content	Required	Tamarack	None	COMPLETE -
10	HIVA	Aleksandra	12	Take out builet point in box on top of page "A limited area or segment of population" None of the other information in the table is buileted.	Formatting	Recommended	Tamarack	None	COMPLETE -
11	HIVA	Aleksandra	11-13	Tables should be reformatted to include colors in order to better show difference in levels visually.	Visual	Recommended	Tamarack	None	COMPLETE -
12	HIVA	Aleksandra	12	The word "Affects" in the Environment section of the Vulnerability table should be changed to "Effects."	Grammar	Recommended	Tamarack	None	COMPLETE -
				SECTION II: Kitsap County and	d Ita Cities Pro	1108			
18	HIVA	Aleksandra	15	P1: Need to update year with most recent Natural Hazards Mitigation Plan (HNP) revision as well as most recent Census Information. What is the most recent US Census Information we can use for this update (what year?)	Content	Required	Tamarack	None	COMPLETE -
				KITSAP COUNT	ΓY				
14	HIVA	Aleksandra	15	Becond builet point in Addendum A: Kitsep County states winter storms represent 77% of the historical declaration at the local level. Is this still	Content	Required	Kitsap County Emergency	https://docs.google.com/document/d /1508u_MuGob_HnVDfCJE6JRi45XHVf	COMPLETE -

Multi-Hazard Mitigation Plan (MHMP) Request for Information (RFI) Spreadsheet

Can be accessed electronically at:

https://docs.google.com/spreadsheets/d/1v2ogo5tQJbemJoXbsidjF3E2OgBhlLi7OH19rmLkjiA/e dit#gid=648881819

Comment , Number	Document 👳	Page Number =	Comment	Type 👳	Priority 👳	Responsible for Information Collection	USE THIS LINK TO RESPOND TO THE INFORMATION REQUEST	Please change status to COMPLETE when done
			PREFACE & ACKN	OWLEDGE	MENTS			
1	Kitsap County Multi-Hazard Mitigation Plan	1	Cover page: Update graphics, logos, and date. Design to fit with the 2019 updated HIVA.	Visual	Recommended	Tamarack Mgmt	N/A	COMPLETE 👻
2	Kitsap County Multi-Hazard Mitigation Plan	2	Update Revision Plan Review Subcommittee members	Content	Required	Tamarack Mgmt	N/A	COMPLETE +
3	Kitsap County Multi-Hazard Mitigation Plan	2	Does the "The Kitsap County Emergency Management Council " still exist or does it go by a different name?	Content	Required	Tamarack Mgmt	N/A	COMPLETE +
4	Kitsap County Multi-Hazard Mitigation Plan	3	Record of Changes: Update Record of Changes	Content	Required	Tamarack Mgmt	N/A	COMPLETE +
5	Kitsap County Multi-Hazard Mitigation Plan	i-vi	Table of Contents: Update Table of Contents/Appendices/Tables/Figures	Content	Required	Tamarack Mgmt	N/A	COMPLETE +
6	Kitsap County Multi-Hazard Mitigation Plan	vii-viii	Executive Summary: Update executive summary with most recent information	Content	Required	Tamarack Mgmt	N/A	COMPLETE +
7	Kitsap County Multi-Hazard Mitigation Plan	ix-xi	Kitsap County Multi-Hazard Mitigation Plan Change Matrix Summary of Changes: update table to reflect pertinent changes from the 2012/2013 update to the 2019 version.	Content	Required	Tamarack Mgmt	N/A	COMPLETE *
8	Kitsap County Multi-Hazard Mitigation Plan	xii-xiii	Multi-Hazard Mitigation Plan Participants: Update Plan Review Sub-Committee and HMP participants with new stakeholder information.	Content	Required	Tamarack Mgmt	N/A	COMPLETE +
9	Kitsap County Multi-Hazard Mitigation Plan	ALL	Edit document for spelling and grammar.	Content	Required	Tamarack Mgmt	N/A	COMPLETE +
10	Kitsap County Multi-Hazard Mitigation Plan	ALL	Create graphics , tables, and visuals in line with new design/branding	Visual	Required	Tamarack Mgmt	N/A	COMPLETE +

Public Engagement Records

MHMP Public Informational Flyer



MHMP Public Printed Community Survey (English & Spanish)



MHMP Electronic Community Survey via Google Forms (English & Spanish)

18 57	18 57
Kitsap County 2019 Multi-Hazard	
Mitigation Plan Community Survey	Encuesta del Plan para mitigar
This survey is designed to help the Kitsap County Department of Emergency Management (KDEM) identify the community's concerns about natural and human-based heards and to	riesgos múltiples en el Condado De
better understand community needs in reducing risk and loss from such hazards. Prease take a few minutes to complete this survey, All individual reaponess are strictly confidential and are for research purposes only.	Kitsap 2019
Have you taken this survey before either in electronic or printed form?	Esta encuesta está diseñada para ayudar al Departamento de manejo de emergencias del Condado de Kitaso (KODEM por sus siglias en Inglés) a Identificar las preocupaciones de la comunidad acersa de los pelipros naturaises y cuesados por el ser humano, y para entender melor las
O Yes	necesidades de la comunidad en la reducción de riesgos y pérdidas de tales peligros. Por favor, tómese unos minutos para completar este encuesta. Todas las respuestas individuales son
O No	estrictamente confidenciales y son sólo para fines de investigación.
O Not sure	¿Ha realizado esta encuesta antes en forma electrónica o impresa?
What is your zip code?	O si
Your answer	○ No
How aware are you of the natural hazards that could affect your home?	O No estoy seguro/segura
O Not at all	Cuál as su cádico postal?
O Somewhat	cuares su courgo postar:
O Moderately	Your answer
O Very much	
NEXT Page 1 of 4 Nexes submit peakends through Google Forms.	NEXT Page 1 of 4 Never submit pasawords through Google Forms.

MHMP Public Engagement Poster & Coloring Poster for Kids (used in town halls and at the Kitsap County Fair and Stampede)



Kitsap County Multi-Hazard Mitigation Plan (MHMP) 2019

MHMP Public Electronic Feedback Survey on Draft of MHMP (English & Spanish)

18	57	
Kitsap	County 2019 Multi-Hazard	
Mitigat	ion Plan Feedback Survey	
This survey is desi Hazard Mitigation process. Feedback the final draft of th 2019.	gned to provide the public the opportunity to review the Kitsap County Multi- Plan (MHMP) in draft form and participate in the document's development collected from this survey will be reviewed and implemented accordingly into e document, which is estimated to be completed toward the end of September	
Please take a few and are for researc	minutes to complete this survey. All individual responses are strictly confidential ch purposes only.	
This survey is divid numbers, table/fig	ded into the same sections as the MHMP document. You may reference line ure numbers, or provide overall comments.	
REMINDER: This d formatting errors a completion. Pleas	ocument is in DRAFT form. Please do not focus on spelling, grammar, or as the document will go through various revisions and reformatting near e focus on the content.	
* Required		
What is you	r zip code? *	
Your answer		
NEXT	Page 1 of 9	
Never submit passv	rords through Google Forms.	



Screenshots of Social Media Posts to the Public on Facebook & Nextdoor









DRIVE.GOOGLE.COM Kitsap County MHMP Draft PDF 8.20.19.pdf

Screenshot of MHMP Draft on the kitsapdem.org Website

Pet Preparedness

- Disaster Preparedness for Horses PDF
- □ Disaster Preparedness for Livestock PDF
- ☑ Disaster Preparedness For Pets PDF
- Pet Preparedness PDF

AmeriCorps Position

➢ KCDEM AmeriCorps position 2019-2020

Damage Assessment Plans

- Damage Assessment Basic Plan
- [™] Field Assessment
- 3 Preliminary Damage Assessment Procedure
- Mapid Assessment Basic Plan
- ≌ Rapid Assessment Procedures

Mult-Hazard Mitigation Planning

Mitsap County MHMP Draft PDF 8.20.19

- Preparing Makes Sense for People with Disabilities and Special Needs- PDF
- Training
 - 3 2015-16 Severe Weather Shelter Volunteer Handbook
 - [™] 2018 Training and Exercise Plan
 - Molunteer Code of Conduct

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Appendix E: Special Districts

Special districts established under State law (per FEMA)

Community Development Districts are special districts that finance, plan, establish, acquire, construct or reconstruct, operate, and maintain systems, facilities, and basic infrastructure within their respective jurisdictions. To be eligible, a Community Development District must be legally responsible for the ownership, maintenance, and operation of an eligible facility that is accessible to the public.

Established Kitsap Special Districts by WA State (2013 data)						
Annapolis Water District No. 1 (1951) - Consolidated		Consolidated with Karcher Creek Sewer District 5 to form West Sound Utility District November 2007 election				
Bainbridge Island Fire Department (FPD #2)	Bainbridge Island					
Bainbridge Island Metropolitan Park and Recreation District (09/2004)	Bainbridge Island					
Bainbridge Island School District No. 303	Bainbridge Island					
Bremerton School District No. 100-C	Part Bremerton					
Bremerton Transportation Benefit District (2009)	Bremerton					
Central Kitsap Fire and Rescue - Kitsap County Fire District No. 1		In 1977, District No. 11 merged into District No. 15, and a new facility was built with Trident impact funds in the Meadowdale area. In 1989, District No. 9 merged with District No. 15. In 1999, Fire District No. 15 merged with District No. 1 and became Central Kitsap Fire and Rescue (CKFR). On January 1, 2003, Kitsap County Fire District No. 12 officially merged with CKFR.				
Central Kitsap School District No. 401	Bremerton					
Crystal Springs Water District No. 3		Boundary includes portions of Bainbridge.				
Karcher Creek Sewer District No. 5 (1947) - Consolidated		Formed as Kitsap County Sewer District No. 5. Consolidated with Annapolis Water District to form West Sound Utility District November 2007.				
Kitsap Conservation District						
Kitsap County Consolidated Housing Authority						

Established Kitsap Special Districts by WA State (2013 data)						
Kitsap County Fire Protection District No. 7	Port Orchard					
Kitsap County Fire Protection District No. 9 - Merged		In 1989, District No. 9 merged with District No. 15.				
Kitsap County Fire Protection District No. 11 - Merged		In 1977, District No. 11 merged into District No. 15.				
Kitsap County Fire Protection District No. 12 - Merged		On January 1, 2003, Kitsap County Fire District No. 12 officially merged with CKFR.				
Kitsap County Fire Protection District No. 15 - Merged		In 1999, Fire District No. 15 merged with District No. 1 and became Central Kitsap Fire and Rescue (CKFR)				
Kitsap County Fire Protection District No. 18	Poulsbo					
Kitsap County Health District						
Kitsap County Public Transportation Benefit Area - Kitsap Transit	Bremerton, Port Orchard, Poulsbo, Bainbridge Island					
Kitsap County Sewer District No. 7		Serves the Fort Ward area of the south end of Bainbridge Island				
Kitsap Public Facilities District						
Kitsap Rural Library District - Kitsap Regional Library	Port Orchard (8/10)					
Manchester Water District No. 11 (1942)						
North Kitsap Fire and Rescue - Kitsap County Fire District No. 10						
North Kitsap Hospital District 2 - Dissolved by court November 2005						
North Kitsap Park and Recreation Service Area - Status Unknown	Poulsbo	Created by Interlocal cooperation agreement dated 03/01/1993 between Kitsap County and Poulsbo pursuant to County Resolution 276-1992 and Poulsbo Resolution No. 92-06.				
North Kitsap School District No. 400	Poulsbo					
North Perry Avenue Water District No. 13 (1942)						
Old Bangor Water District No. 19						
Port of Bremerton	Bremerton, Port Orchard, part Poulsbo					
Port of Brownsville (Bremerton)						
Port of Eglon (Kingston)						
Port of Illahee (Bremerton)						
Port of Indianola						
Port of Keyport						
Port of Kingston						

Established Kitsap Special Di	stricts by WA Sta	ite (2013 data)
Port of Manchester		
Port of Poulsbo	Poulsbo	
Port of Silverdale		
Port of Tracyton	Part Bremerton	
Port of Waterman (Port Orchard)		
Public Utility District No. 1 of Kittitas County	Bainbridge, Bremerton, Port Orchard, Poulsbo	
Rocky Point Water District No. 12		
Silverdale Water District No. 16 (1919)		
South Bainbridge Island Water District #18 - Dissolved		Dissolved by Kitsap County Ordinance No. 207, 1997
South Kitsap Park and Recreation District - Dissolved		South Kitsap Community Park given to county 06/2007
South Kitsap School District No. 402	Part Bremerton, Port Orchard	
Sunnyslope Water District No. 15 (1952)		Service area includes Bremerton
Tracyton Water District No. 17 - Dissolved		Kitsap County Superior Court Order dissolving district dated March 27, 2006, effective June 13, 2006
Housing Authority of the City of Bremerton	Bremerton	
Village Green Metropolitan Park District (8/2010)		
West Hill Water District No. 20 - Disposition Unknown		Service area includes Bainbridge
West Sound Utility District No. 1 (2007)		Formed by the consolidation of Annapolis Water District and Karcher Creek Sewer District in November 2007. Service area includes Port Orchard

Table 83: Established Kitsap Special Districts by WA State (2013 data)

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Appendix F: References & Authorities

- Census Reporter, Kitsap County Demographic Overview, 2010-2017. <u>https://censusreporter.org/profiles/05000US53035-kitsap-county-wa/</u>
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- Threat and Hazard Identification and Risk Assessment (THIRA), Homeland Security Region 2 and FEMA at <u>www.fema.gov/threat-and-hazard-idenfication-and-risk-assessment</u>
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- Washington State Enhanced Mitigation Plan 2018.
- Washington State Preparedness Report (SPR): SPR Capabilities Assessment
- Hard and soft paths for climate change adaptation, Sovacool, Benjamin K., 2011

Appendix G: Glossary

Critical Areas	Environmentally sensitive areas, which include wetlands fish and wildlife habitat conservation areas; geologically hazardous areas; areas with a critical recharging effect on aquifers used for potable water; and frequently flooded areas. Critical areas have measurable characteristics which, when combined, create a value for or potential risk to public health, safety and welfare.
Erosion	The process whereby the land surface is worn away by the action of water, wind, ice or other processes, and by geologic events such as gravitational creep or landslides
Federal Emergency Management Agency Hazard Mitigation Grant Program	Authorized under Section 404 of the Stafford Act. Provides funding for Hazard Mitigation projects that are cost-effective and comply with existing post- disaster mitigation programs and activities. These projects cannot be funded through other programs to be eligible.
Floodplain	Areas inundated with water that are typically adjacent to streams, rivers, lakes, and coastlines and are susceptible to strong winds.
Floodplain (100 Year)	Floodplains that have the potential to flood once every 100 years, or that have a one percent chance of flooding equal to or in excess of that in any given year.
Flood Way	An area of land immediately adjacent to a stream or river channel that, in times of flooding, becomes an enlarged stream or river channel and carries the floodwater with the highest velocity.
Hazard Mitigation	Any action taken to reduce or permanently eliminate the long-term risk to human life and property and the environment posed by a hazard
Hazard Mitigation Plan	The plan resulting from a systematic evaluation of the nature and extent of vulnerabilities posed by a hazard present in society that includes the strategies needed to minimize future vulnerability to hazards.
Landslide Hazard Areas	Areas potentially subject to landslides, based on a combination of geologic, topographic, and hydrologic factors. This includes areas with any combination of bedrock, soil, slope, structure, and hydrology.
LIDAR	Light Detection and Ranging Airborne Laser Mapping. LIDAR compliments other remote sensing such as ortho-photography and traditional topographic mapping. LIDAR is able to sense through vegetation (remove the trees) and produce a map of the actual topography.
Liquefaction	Liquefaction occurs in areas that have certain soils, which lack cohesion and where the water table is close to the surface. Such soils can lose shear strength and flow like a liquid even during earthquakes originating beyond Kitsap County.
Riparian Zones	Areas typically consisting of vegetated corridors or areas adjacent to streams, wetlands, lakes or tidewater and may include some uplands depending on site conditions. Native vegetation in these areas is considered to provide a natural barrier, which can prevent or significantly reduce the amount of pollutants from reaching waterbodies.
Seismic Hazard Areas	Areas subject to severe risk of damage because of earthquake induced ground shaking, slope failure, settlement, soil liquefaction, or surface faulting.

		Settlement can occur in areas with loose, unconsolidated soil, which can either slide or suddenly drop when shaken.
Wildfire Interface	Urban	Wildland vegetation and forest areas adjacent to or intermingled with residential developments.

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