Public Safety Committee
Virtual Meeting Agenda

Thursday, July 10, 2025

MEMBERS: Michael Goodnow (Chair), Anna Mockler (Vice Chair), and Denise Frey

ALSO ATTENDING: City Attorney Kylie Finnell, Fire Chief Pat McGanney, Police Chief Tom Wolfe, Police Captain Aaron Elton, and Contracts Administrator Melinda Monroe.

1. **CALL TO ORDER**

2. **GENERAL BUSINESS**

   2A. Meeting minutes for June 2025 presented for approval

3. **NEW BUSINESS/ DEPARTMENT BRIEFINGS**

   3A. **COURT** – No specific agenda item

   3B. **LEGAL** – No specific agenda item

   3C. **FIRE** –
   1. Kitsap County Hazard Mitigation Plan (Attachment A)

   3D. **POLICE** – No specific agenda item

   3E. **COUNCIL** –
   1. Request for report from Commonstreet.
   2. Request for data on the number and nature of citations issued by BPD in 2024.

4. **NEXT MEETING**

   Thursday, August 7, 2025 at 1:00 p.m.

5. **ADJOURNMENT**

Public Safety Committee Meeting Summary – June 5, 2025

Time: 1:00–2:12 p.m.

1. Interlocal Agreement (ILA) with Central Kitsap Fire & Rescue (CKFR)

- Central Kitsap Fire needs temporary access to Bremerton's fueling station at Station 3, as their existing site (Station 41) is being demolished.
- The ILA allows them to use the station, with billing for fuel usage based on market rate.

2. Police Discussion on Corporal/Sergeant Position Restructuring

- Proposal to replace an open Corporal position with a Sergeant position, aligning with Kitsap County's approach to professional standards.
- No additional staff added—just restructuring for efficiency.
- Financial impact is minimal (~5% salary difference between corporal and sergeant).
- Committee members asked about the justification and future expansion needs.

3. Fireworks Policy and Public Communication

- Second year of city restrictions on fireworks sales and usage.
- Only two firework stand applications received (down from 8-15 historically).
- Concern remains about residents purchasing fireworks outside city limits and bringing them in.
- Fire will collaborate with Council to draft a standardized response for public inquiries.
- Flyers will be updated and distributed in English and Spanish, including in libraries and schools.

4. Law Enforcement Data and Public Safety Webinar

- Committee member Mockler requested detailed data on speeding, noise complaints, and customized mufflers, but current tools lack location-based citation tracking.
- Public Safety and Public Works webinar on June 25th suggested to committee members. Will address risk assessment and street design; both police and fire personnel encouraged to attend.

5. July Meeting Date Change

- Next meeting moved from July 3rd to July 10th to allow discussion of the fireworks aftermath and public safety incidents over the holiday.
- Chief McGanney will be absent due to his 25th wedding anniversary, with Deputy Chief Payne handling fire department matters.

6. Adjournment

- Meeting adjourned at 2:12 p.m.

Attachment A

Meeting Date: January 27, 2025
Agenda Item No:

Kitsap County Board of Commissioners	
Office/Department:	Emergency Management
Staff Contact:	Jan Glarum (360) 900-8556
Agenda Item Title:	Resolution approving the Multi Hazard Mitigation Plan
Recommended Action:	Move to adopt the Resolution approving the Multi Hazard Mitigation Plan
Summary:	It is vital for Kitsap County to have a proactive, coordinated approach to mitigation for it is these mitigation measures that save lives, reduce injuries, and prevent or decrease financial losses from the many hazards our region faces. Kitsap County's Department of Emergency Management (KCDEM) remains 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, its cities, Tribal partners, and the unincorporated regions within Kitsap County. The 2024 MHMP review and update, past mitigation programs and strategies were reviewed, new mitigation measures were examined that could reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs. The Kitsap County Multi-Hazard Mitigation Plan (MHMP) in 2024 underwent its second major update since 2013, to include lessons learned and updates from the response and challenges related to the global pandemic. The 2024 edition of the MHMP is a product of the review and updates from participation from Kitsap County internal government departments/agencies, local government city jurisdictions, fire and utility districts, special purpose districts, school districts, KCDEM, State of Washington Emergency Management Division (State EMD), with final approval from U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA), and adoption by the Kitsap Board of Commissioners.
Attachments:	1. Resolution 2. Multi Hazard Mitigation Plan

Fiscal Impact for this Specific Action	
Expenditure required for this specific action:	NA
Related Revenue for this specific action:	NA
Cost Savings for this specific action:	NA
Net Fiscal Impact:	NA
Source of Funds:	NA

Departmental Coordination		
Office/Department	**Department Director**	**Recommendation**
Emergency Management	Jan Glarum	Approve

This page intentionally left blank.

RESOLUTION No. 018 -2025

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 27 day of January, 2025.

BOARD OF COUNTY COMMISSIONERS
KITSAP COUNTY, WASHINGTON

CHRISTINE ROLFES, Chair

ORAN ROOT, Commissioner

KATHERINE T. WALTERS, Commissioner

ATTEST:

Dana Daniels, Clerk of the Board

This page intentionally left blank.

Kitsap County Multi-Jurisdictional Multi-Hazard Mitigation Plan

December 2024

Kitsap County
City of Bainbridge Island,
City of Bremerton,
City of Port Orchard,
City of Poulsbo

Prepared by:

KCDEM
Kitsap County Department of Emergency Management

This page intentionally left blank.

Table of Contents

Kitsap County Board of Commissioners Adoption i
Tables & Figures x
Record of Changes 1
Executive Summary 3
Introduction 5
The Planning Process 8
Mitigation Planning Defined 8
Lead Agency and Stakeholder Steering Committee Participation 10
Threat and Hazard Identification and Risk Assessment 20
(THIRA) Process 20
Hazard Mitigation Process for Kitsap County 23
Public Outreach & Engagement 29
Stakeholder Review & Adoption Process 32
Plan Review & Adoption Process 33
Plan Evaluation & Maintenance 35
Integration with other Local Plans 37
Kitsap County Profile 39
Kitsap County 40
People 41
Built Environment 46
Asset Inventory 50
Physical and Improved Assets 54
Natural Environment 57
Mitigation Strategies & Recommendations 65
Mitigation Strategy Updates from 2019 MHMP 65
Funding/Financial Resources 66
Earthquake Mitigation Strategies 66
Hazard Overview 67
Location 67
Effects / Extent 69
Expected Extent 76
History 79
Probability of Future Events 81
Climate Change Impacts 82
Vulnerability Summary 82
Conclusions 83
Mitigation Strategies 84
Landslide & Erosion Mitigation Strategies 86
Hazard Overview 86
Location/Extent 86
Effects 87
History 88
Probability of Future Events 88

Climate Change Impacts 92
Vulnerability Summary 93
Conclusions 93
Mitigation Strategies 95
Tsunami Mitigation Strategies 96
Hazard Overview 96
Location 97
Effects 98
Extent 99
History 101
Probability of Future Events 102
Climate Change Impacts 104
Vulnerability Summary 104
Conclusions 105
Mitigation Strategies 106
Wildfire & Urban Fire Mitigation Strategies 109
Hazard Overview 109
Location 109
Effects 109
Extent 110
History 110
Probability of Future Events 111
Climate Change Impacts 113
Vulnerability Summary 113
Conclusions 114
Mitigation Strategies 114
Flood Mitigation Strategies 119
Hazard Overview 119
Location/Extent 119
Effects 121
History 121
Probability of Future Events 123
National Flood Insurance Program (NFIP) 124
Climate Change Impacts 132
Vulnerability Summary 133
Conclusions 134
Mitigation Strategies 135
Severe Storms/Tornado Mitigation Strategies 139
Hazard Overview 139
Location 139
Effects 139
Extent 140
History 141
Probability of Future Events 142
Climate Change Impacts 142
Vulnerability Summary 142

Conclusions 143
Mitigation Strategy 144
Drought Mitigation Strategies 146
Hazard Overview 146
Location 146
Effects 146
Extent 147
History 148
Probability of Future Events 148
Climate Change Impacts 149
Vulnerability Summary 149
Conclusions 150
Mitigation Strategies 151
Multi-Hazard Mitigation Strategies 153
Multi-Hazard Public Education Programs Mitigation Strategies 155
Mitigation Strategies Updates from the 2019 Plan 158
Mitigation Strategies Updates from the 2013 Plan 158
City-Specific Mitigation Strategies 170
City of Bainbridge Island 170
City of Bremerton 175
City of Port Orchard 178
City of Poulsbo 183
Kitsap County 186
Future Actions & Goals 186
Future Actions 186
Long-Term Goals & Strategies 187
Appendix A: Participating City Profiles 188
Bainbridge Island 190
Bremerton 215
Port Orchard 241
Poulsbo 264
Appendix B: Capability Assessment 284
Government 285
County and City Maps 287
Infrastructure 288
Critical & Essential Facilities 288
Transportation 288
Vulnerable Populations 289
Cultural and Historical Assets 290
Hazard Mitigation Funding Resources 298
Appendix C: MHMP Update History 304
Appendix D: Stakeholders and Engagement Records 308
Appendix E: Special Districts 317
Appendix F: References & Authorities 321
Appendix G: Glossary 327

Tables & Figures

Tables

Table 1: Record of Changes. 2
Table 2: List of Jurisdictions participating in the review, edit, and update process. 14
Table 3: Record of Review, Edit, and Update process. 18
Table 4: Risk Rating Adjective Descriptions. 22
Table 5: 2022 Kitsap THIRA Risk Ratings. 23
Table 6: Community Survey Results. 30
Table 7: Overview of Community Feedback and actions taken. 32
Table 8: Kitsap County MHMP Agency Review and Adoption. 34
Table 9: Historic MHMP Review, Evaluation, and Update (2005 - 2024). 37
Table 10: Kitsap County Most Recent Population Estimates. 41
Table 11: Kitsap County Areas of Mitigation Interest. 46
Table 12: Kitsap County Critical Facilities & Cultural Resources. 54
Table 13: Listing of Culturally Sensitive Sites Port Madison Indian Reservation. 56
Table 14: Kitsap County Emergency/Disaster History 1962-2024. 63
Table 15: Kitsap County Hazard Loss 1960 - 2024. 63
Table 16: Hazus Earthquake Results for a Seattle M 7.2 Earthquake. 78
Table 17: Pre-Code versus Moderate Code Building in Kitsap County. 78
Table 18: Washington State Earthquakes 80
Table 19: Building Exposure to Landslides. 88
Table 20: Kitsap County LIDAR Defined Landslides (2018). 89
Table 21: Building Exposure to Landslides. 89
Table 22: Building Stock and Critical Facilities by Jurisdiction Affected by Tsunami. 99
Table 23: Types of Tsunami Risk (WADNR). 100
Table 24: Population by Jurisdiction Affected by Fire in Kitsap County (2024). 112
Table 25: Building Stock and Critical Facilities by Jurisdiction Affected by Fire. 113
Table 26: Special Flood Hazard Area Assessments. 123
Table 27: National Flood Insurance Information. 124
Table 28: Community FIRM Information. 127
Table 29: Community Rating System Participation. 132
Table 30: Fujita Tornado Intensity Scale. 140
Table 31: Building Stock and Critical Facilities by Jurisdiction Affected by Severe Storms. 141
Table 32: Drought Severity Classification. 147
Table 33: Building Stock and Critical Facilities by Jurisdiction Affected by Drought. 148
Table 34: Long-Term Goals & Strategies. 187
Table 35: Bainbridge Island Population Information. 190
Table 36: City of Bainbridge Areas of Mitigation Interest. 193
Table 37: Bainbridge Island Housing / residential structures. 193
Table 38: Bainbridge Island Critical Facilities. 197
Table 39: Emergency/Disaster History for Bainbridge Island. 200
Table 40: Special Flood Hazard Area Assessment for Bainbridge Island. 204
Table 41: Pre-Code versus Moderate Code Building in Bainbridge Island. 209
Table 42: Estimated dollar value for damages from a M7.2 Seattle Fault Earthquake, Bainbridge

Island. 210
Table 43: City of Bainbridge Island (COBI) Asset Profile. 214
Table 44: Bremerton Population Information. 215
Table 45: City of Bremerton Areas of Mitigation Interest. 217
Table 46: Bremerton Housing Characteristics 2020-2024 (US Census, 2022). 218
Table 47: Emergency/Disaster History for Bremerton. 221
Table 48: Special Flood Hazard Area Assessment. 226
Table 49: Flood Risk Community Characteristics. 226
Table 50: Hazus Earthquake Results for a Seattle M 7.2 Earthquake. 230
Table 51: Pre-Code versus Moderate Code Building in Kitsap County. 230
Table 52: Asset Profile City of Bremerton. 240
Table 53: Port Orchard Population Information. 241
Table 54: City of Port Orchard Areas of Mitigation Interest. 243
Table 55: Port Orchard Housing Characteristics 2017-2022 (US Census, 2022). 244
Table 56: Emergency/Disaster History for Port Orchard. 247
Table 57: Special Flood Hazard Area Assessment. 251
Table 58: Flood Risk Community characteristics. 251
Table 59: Port Orchard Building Exposure to Landslides. 256
Table 60: Hazus Earthquake Results for a Seattle M 7.2 Earthquake. 256
Table 61: Pre-Code versus Moderate Code Building in Port Orchard. 256
Table 62: Asset Profile City of Port Orchard. 263
Table 63: Poulsbo Population Information. 264
Table 64: City of Poulsbo Areas of Mitigation Interest. 267
Table 65: Poulsbo Housing Characteristics 2017-2022 (US Census, 2022). 268
Table 66: Emergency/Disaster History for Poulsbo. 267
Table 67: Poulsbo Special Flood Hazard Area Assessment. 270
Table 68: Poulsbo Flood Risk Community Characteristics. 270
Table 69: Poulsbo Building Exposure to Landslides. 274
Table 70: Hazus Earthquake Results for a Seattle M 7.2 Earthquake. 275
Table 71: Pre-Code versus Moderate Code Building in Kitsap County. 276
Table 72: Asset Profile City of Poulsbo. 283

Figures

Figure 1: Five mission areas organize the 32 core capabilities needed to address threat and hazards. 20
Figure 2: Map of Kitsap County. 39
Figure 3: Map of Census Urbanized Areas & Urban Growth. 42
Figure 4: Kitsap Zoning Map amended Nov 13, 2023. 43
Figure 5: Kitsap County Population with a Disability by subgroups. 44
Figure 6: Kitsap County Population Distribution 44
Figure 7: Kitsap County Populations with Functional and Access Needs. 45
Figure 8: Kitsap County Comprehensive Land Use (2023). 47
Figure 9: Kitsap County Housing Characteristics - American Community Survey (2023). 48
Figure 10: Critical facilities; Medical / Dental Faculties. 50
Figure 11: Critical facilities; Water service areas. 50
Figure 12: Map of Culturally Sensitive Sites Port Madison Indian Reservation. 56
Figure 13: Critical Areas of Kitsap County. 60
Figure 14: Puget Sound Faults. 67
Figure 15: USGS Cascadia earthquake graphic. 68
Figure 16: Building Damage Percent during a 7.2M Earthquake on the Seattle Fault. 70
Figure 17: 7.2 Seattle Fault Zone ground motion scenario. 71
Figure 18: Estimated intensity of an 7.2 magnitude Seattle Fault earthquake. 72
Figure 19: Shaking Intensity for a 7.2 Seattle Fault Earthquake. 77
Figure 20: Historical Earthquake Damage. 81
Figure 21: Frequency of Damaging Earthquake Shaking Around the US. 81
Figure 22: Shallow Landslide Susceptibility Zones and Building Impacts. 87
Figure 23: Kitsap County Erosion Hazard Map 90
Figure 24: Kitsap County Landslide Hazard Map 91
Figure 25: Maximum Inundation Depths for the Tsunami Generated by the Seattle Fault Scenario. 97
Figure 26: Potential Tsunami Inundation Zone for Bremerton and Port Orchard (Kitsap County GIS (2022) 98
Figure 27: Cascadia Subduction Zone. 101
Figure 28: earthquake modeling 102
Figure 29: Tsunamis in Washington. 103
Figure 30: Historical Wildfire locations and Wildland Urban Interface. 110
Figure 31: Kitsap County Fire Risk. 112
Figure 32: FEMA Flood Mapping, Kitsap County. 120
Figure 33: 1% Annual Chance Depth Grid (in feet) for the city of Bremerton area. 122
Figure 34: BFE Plus 1-, 2-, and 3- foot grids for the City of Bremerton area. 122
Figure 35: Watercourse and Surface Water. 125
Figure 36: NFIP FIRMS Panel Map (2022). 126
Figure 37: Potential flooding areas for East Central Kitsap County and Bainbridge Island. 128
Figure 38: Potential flooding losses West Central Kitsap County. 129
Figure 39: Potential flooding South Kitsap and Port Orchard Areas. 130
Figure 40: Potential flooding for North Kitsap and Poulsbo areas. 131
Figure 41: Port Orchard 2018 Tornado Path 139
Figure 42: Age Distribution Bainbridge Island. 191
Figure 43: Bainbridge Island Vulnerable Population. 191
Figure 44: Bainbridge Island Population Density, © OpenStreetMap Contributors. 192
Figure 45: Business Licenses on Bainbridge Island 192

Figure 46: Bainbridge Island Units and Occupancy 2023. 194
Figure 47: Topography of Bainbridge Island. 199
Figure 48: Building Damage Percentage (Loss Ratio) for Bainbridge Island. 204
Figure 49: Flood Zones: Bainbridge Island. 205
Figure 50: Streams and Surface Water, City of Bainbridge Island, (Kitsap County GIS Department). 206
Figure 51: LIDAR Data on Landslide: Bainbridge Island (USGS). 208
Figure 52: Liquefaction on Bainbridge Island. 210
Figure 53: Bremerton Population Distribution. 216
Figure 54: Bremerton's vulnerable populations. 216
Figure 55: Bremerton Population Density. 217
Figure 56: Housing units and Occupancy rates, Bremerton 2023. 218
Figure 57: Topographical Feature, City of Bremerton. 220
Figure 58: Bremerton Flood Zones. 225
Figure 59: Watercourse & Surface Water Map of Bremerton (Kitsap GIS Department). 227
Figure 60: LIDAR Data on Landslide, Bremerton (USGS). 228
Figure 61: Liquefaction Areas, City of Bremerton (Kitsap County GIS Department). 229
Figure 62: Tsunami Inundation, City of Bremerton. 231
Figure 63: Port Orchard population distribution by age. 241
Figure 64: Port Orchard Population Density. 242
Figure 65: South Kitsap Vulnerable Population, includes Port Orchard. 242
Figure 66: Port Orchard Housing, Units and Occupancy. 244
Figure 67: Port Orchard City Limit growth due to annexation since 2008. 245
Figure 68: Elevation (LiDAR): Port Orchard. 246
Figure 69: Flood Zones City of Port Orchard (Kitsap County GIS Department 2022). 252
Figure 70: Streams and Surface Waters, City of Port Orchard (Kitsap County GIS Department 2022). 253
Figure 71: LIDAR Data on Landslide Port Orchard (USGS). 255
Figure 72: Liquefaction on Port Orchard (Kitsap County Department of Information Services). 257
Figure 73: Poulsbo Population Distribution. 265
Figure 74: North Kitsap Vulnerable Population, including Poulsbo. 265
Figure 75: Population Density: City of Poulsbo. 266
Figure 76: Poulsbo Housing Units and Occupancy (US. Census, 2022) 268
Figure 77: Poulsbo Elevation using LiDAR. 266
Figure 78: City of Poulsbo Flood Zones (Kitsap County Department of Information Services 2020). 271
Figure 79: Streams and Surface Water, City of Poulsbo (Kitsap County GIS Department). 272
Figure 80: City of Poulsbo Water Hydrology (Kitsap County GIS Department). 273
Figure 81: LIDAR Data on Landslide, City of Poulsbo (USGS). 274
Figure 82: Liquefaction in Poulsbo. 275
Figure 83: Tsunami Models, City of Poulsbo (Kitsap County GIS Department). 276

This page intentionally left blank.

Record of Changes

Element	Description	Date of Change	Changed By
Approval of 2019 MHMP	• Board of commissioner's approval of 2019 Multi-Hazard Mitigation Plan (MHMP)	Jan 27 2020	Approval
United States Department of Homeland Security's Federal Emergency Management Agency (FEMA) Region 10 Approval	• FEMA Approval of Kitsap County's MHMP.	Jan 28 2020	Approval
Annual Review	• Annual review of MHMP, no edits or revisions at this time, updated to mitigation strategies noted.	Jul 2021	N/A
Governing document update	• FEMA updated the "Local Mitigation Planning Policy Guide • New guidelines to be incorporated as of 19 April 2023	Apr 2022	FEMA
Annual Review	• Annual review of MHMP, no edits or revisions at this time, updates to Mitigation strategies noted. Reviewed At LEPC mtg. • Discussion of FEMA's updates to governing document.	Jul 2022	N/A
Annual review	• Annual review of MHMP, no edits or revisions at this time, updates to Mitigation strategies noted. Reviewed At LEPC mtg.	Nov 2023	N/A
THIRA development	• Development of Kitsap County's THIRA	Oct 2022	KCDEM WAEMD
THIRA development	• Multi Hazard Mitigation Plan reviewed and edited to include THIRA results and remove HIVA references.	Jul 2024	KCDEM

Overall	• Kitsap County DEM review, edit, and update of MHMP. • General grammar and spelling review and proofreading. • Updated graphics, maps, tables, and statistical data. • Updated for changes related to hazard-prone areas which have either increased or decreased in community vulnerability since 2019 approved plan.	Sept 2024	KCDEM / Partner cities
Executive Summary	• Updated Executive Summary text to better reflect the Multi-Hazard Mitigation Plan. • Reviewed and revised grammar and spelling.	Nov 2024	KCDEM
Introduction	• Updated for inclusiveness, and equitability. • Revised text for better grammar and flow. • Updated Federal, State, and Local authorities and ordinances. • Moved Authority, pertinent laws, to Appendix F (References and Authority)	Oct 2024	KCDEM
The Planning Process	• Heavily updated Planning Process section. Due to changes in community vulnerabilities since 2019 plan approval. • Updated new stakeholder and public engagement processes. • Updated information about the recent 2022 Kitsap County Threat and Hazard Identification.	Aug 2024	KCDEM / Partner Cities
Kitsap County Profile	• Reviewed and Updated Kitsap County and partner city profiles to better capture and outline the Kitsap County population, economy, built environment, and natural environment and how the County may be impacted by hazards, to include updates to City profiles and information, and how these vulnerabilities have changed sing the last approved plan. • Updated section with the most recent 2022 THIRA information. • Updated emergency/disaster history information.	Aug 2024	KCDEM / LEPC / Partner Cities
Mitigation Strategies & Recommendations	• Reviewed, edited and updated mitigation strategies from City Profiles. • Updated maps, tables, and statistics. • Updated tables to house mitigation strategies for easier readability and reference. • Reviewed and updated mitigation strategies.	Nov 2024	KCDEM with review from Cities and LEPC lead agencies
Future Actions & Goals	• Reviewed and updated goals.	Nov 2024	KCDEM
Appendices	• Reviewed, edited and updated all appendixes to reflect current status and THIRA information	Nov 2024	KCDEM

Table 1: Record of Changes.

Executive Summary

The 2002 federal government enacted the Disaster Mitigation Act (DMA 2000; P.L. 106- 390) requires states, local jurisdictions, and tribal governments to have an approved mitigation plan in place to be eligible for mitigation funding. In 2022 under FP 206-21-0002 FEMA revised their "Local Mitigation Planning Policy Guide", which became effective April 19, 2023.[1] During the 2024 review, edit, and update of Kitsap County's MHMP the updated FEMA guidance was reviewed to ensure Kitsap County's MHMP is compliant. Kitsap County's Department of Emergency Management (KCDEM) remains 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, its cities, Tribal partners, and the unincorporated regions within Kitsap County.

It is vital for Kitsap County to have a proactive, coordinated approach to mitigation for it is these mitigation measures that save lives, reduce injuries, and prevent or decrease financial losses from the many hazards our region faces. For the 2024 MHMP review and update, past mitigation programs and strategies were reviewed, new mitigation measures were examined that could reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs. 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.

The Kitsap County Multi-Hazard Mitigation Plan (MHMP) is a living document and is now undergoing its second major update since 2013. KCDEM acknowledges that the update process was delayed due to challenges related to the global pandemic.

To align with FEMA and the Department of Homeland Security in 2022 – 2023 Kitsap County moved to and completed a Threat and Hazard Identification and Risk Assessment (THIRA), which is a three-step risk assessment process that helps communities understand their risks, determine capabilities and gaps, and develop mitigation strategies. The three steps revolve around the following three questions:

1. What threats and hazards can affect our community?
2. If they occurred, what impacts would those threats and hazards have on our community?
3. Based on those impacts, what capabilities should our community have, and what gaps are there.[2]

KCDEM started the MHMP review, edit, and update process with a review of the THIRA and current hazards effecting Kitsap County. The process included a review of information related to the integrate the effects of Climate Change and its effects on each hazard. The 2024 update also ensured compliance with the 2022 update to FEMA's "Local Mitigation Planning Process Guide (publication FP 206-21-0002). The THIRA, which identifies and describes the hazards that may impact the County, informs the actions in the MHMP and was completed during 2022 with assistance from WA EMD. A note of interest, Kitsap County was impacted by its first significant tornado, a high F2, in December 2018.

KCDEM conducted the formal MHMP Stakeholder Steering Committee and lead agencies Kick-off Meeting on 16 August 2022. In April 2023 KCDEM stood up a Local Emergency Planning

Committee (LEPC) to routinely bring the stakeholders together ensuring all parties remained informed of the actions related to mitigation efforts and their impacts on the community.

The 2024 edition of the MHMP is a product of the review and updates from participation from Kitsap County internal government departments/agencies, local government city jurisdictions, fire and utility districts, special purpose districts, school districts, KCDEM, State of Washington Emergency Management Division (State EMD), with final approval from 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 201.6(c)(1), and FP 206-21-0002. Many local jurisdictions, communities, governmental agencies, along with the public were involved in the MHMP editing, updating and critical review processes.

While many elements of the 2013 and 2019 MHMP have retained their integrity, statistics, strategies, studies, and research information were heavily reviewed ensuring the most recent and up-to-date information was utilized to guide the development of the 2024 MHMP, and to ensure the plan continues 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 2024. 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 since the approval on 27 Jan 2020. 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 2024 reflects Kitsap County and its emergency management program, and partner cities. Upon approval by FEMA, this document will be due for its next formal review in 2028 for submission to FEMA and Promulgation by December 2029.

Contact

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

Jan Glarum
Director, Kitsap County Department of Emergency Management
8900 Imperial Way SW, Bremerton WA. 98312
360-535-9988
dem@co.kitsap.wa.us

Introduction

Definition of Hazard Mitigation

FEMA defines hazard mitigation as the efforts to reduce the loss of life and property by lessening the impact of hazards or disasters[25, 39]. 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 protecting against risk)[25]. 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.

In accordance with paragraph 2.2 of FP 206-21-0002[25], local governments may work together to create a multijurisdictional plan. For multi-jurisdictional plans, one community should be designated as the lead jurisdiction. For Kitsap County's multi-jurisdictional MHMP Kitsap County Department of Emergency Management (KCDEM) is identified as the lead jurisdiction, further delineated in the planning section below in the Lead Agency and Stakeholder Steering Committee Participation section. As such KCDEM is responsible for ensuring each participating jurisdiction meets the requirements laid out in Section 4 "local planning requirements", of FP 206-21-0002[25] prior to submitting the plan to the state, and then FEMA, for approval. KCDEM is also responsible for coordinating the plan submission and adoption by all participating jurisdictions. KCDEM will ensure that jurisdictions participating in Kitsap County's multi-jurisdictional plan meet the mitigation planning requirements, adopt the plan and provide documentation to FEMA (via the state).

Mission Statement

The mission of the Kitsap County Department of Emergency Management (KCDEM) [88] 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. KCDEM provides support and assistance to the City of Bainbridge Island (COBI) who currently manages their own Emergency Management Program.

Purpose

According to FEMA, developing hazard mitigation plans enables state, tribal, and local governments to [25, 39]

1. Increase education and awareness around threats, hazards, and vulnerabilities.
2. Build partnerships for risk reduction involving government, organizations, businesses, and the public.
3. Identify long-term, broadly supported strategies for risk reduction.

4. Align risk reduction with other state, tribal, or community objectives.
5. Identify implementation approaches that focus resources on the greatest risks and vulnerabilities.
6. Communicate priorities to potential sources of funding.

The purpose of Kitsap County's 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/risk information identified in the current THIRA. 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.

Before agencies, groups, and individuals can prepare for and mitigate against hazards that have the potential to strike Kitsap County, it is necessary to understand the history and projected future hazard activity within Kitsap County, and how vulnerable the citizens may be to hazards within that context. The THIRA 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 develops plans, educates the public, provides training for first responders, and develops exercises / drills to practice the skills and apply knowledge to better prepare for the hazards that may occur within Kitsap County. ***The MHMP takes the hazard information from the THIRA and makes it actionable through mitigation strategies.***

Kitsap County has an active mitigation program working with County agencies, City, and special purpose districts to identify and mitigate hazards in Kitsap County. 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 Kitsap County's Stakeholder Steering Committee and Local Emergency Planning 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.

Kitsap County has the responsibility to ensure that the plan's mitigation strategies comply with all applicable legal requirements related to civil rights, to ensure nondiscrimination. To achieve this, during the 2024 review, edit, and update process, mitigation strategies were reviewed to ensure they provide equitable mitigation effects throughout the community to achieve equitable outcomes, including underserved communities and socially vulnerable populations.

Kitsap County's current THIRA covers both natural and technological hazards. Kitsap County is in alignment with Washington State emergency Management Department (WAEMD) which conducted a THIRA at the State level, and in local public planning specific to those threats. This MHMP focuses on the *natural hazards* that affect Kitsap County but also takes into consideration the current and possible future impacts of Climate Change.

This page intentionally left blank.

The Planning Process

A1. DOES THE PLAN DOCUMENT THE PLANNING PROCESS, INCLUDING HOW IT WAS PREPARED AND WHO WAS INVOLVED IN THE PROCESS FOR EACH JURISDICTION? (44CFR § 201.6(C)(1))

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. Kitsap County's 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: [25, 28]

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.

FEMA require each local participant seeking approval for a mitigation plan to engage in the

planning and public participation process to review and revise the plan[25,28,39]. Updated plans must specifically address the requirements for plan updates (Element E), along with each of the sub-elements, as detailed in Section 4. Communities must review all the other required elements for local mitigation plans for continued relevance and revise them accordingly. During the 2024 review, edit, and update each jurisdiction met with KCDEM to review their mitigations strategies, and changes in the hazards effecting their jurisdiction, specific interval emergencies and disasters were also reviewed. Mitigation measures were reviewed for status and to determine their continued applicability. Each jurisdiction participating in the review, edit, and update of the 2024 MHMP will provide the final MHMP which has been approved by the County Board of Commissioners and FEMA to their respective governing body for adoption.

D.3 DOES THE PLAN DESCRIBE A PROCESS BY WHICH EACH COMMUNITY WILL INTEGRATE THE REQUIREMENTS OF THE MITIGATION PLAN INTO OTHER PLANNING MECHANISMS, SUCH AS COMPREHENSIVE OR CAPITAL IMPROVEMENT PLANS, WHEN APPROPRIATE? (44CFR § 201.6(c)(4)(II))

D.3 C FOR MULTI-JURISDICTIONAL PLANS, DOES THE PLAN DESCRIBE EACH PARTICIPANT'S INDIVIDUAL PROCESS FOR INTEGRATING INFORMATION FROM THE MITIGATION STRATEGY INTO THEIR IDENTIFIED PLANNING MECHANISMS?

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. Changes in vulnerability for Kitsap and the Partner Cities were reviewed and taken into consideration during the review, edit, and update process, specifically when determining appropriate mitigation strategies and how each would be prioritized.

The 2024 review, edit, and update of Kitsap County's MHMP included a review of existing land use policies and regulatory ordinances while considering any plans for new policies and ordinances that improve and extend protection of the public health, safety and welfare. Information regarding hazards and threats from the current THIRA are integrated into the MHMP along with information from various local plans such as emergency operations plans and hazard mitigation plans for Bainbridge Island, Bremerton, Port Orchard, and Poulsbo, Kingston, Hansville, as well as other unincorporated towns, and special districts as applicable. Businesses, schools, and other community elements can also take advantage of the information provided in the THIRA and MHMP to build, review, and update their own emergency and mitigation plans.

A1-B DOES THE PLAN LIST THE JURISDICTION(S) PARTICIPATING IN THE PLAN THAT SEEK APPROVAL, AND DESCRIBE HOW THEY PARTICIPATED IN THE PLANNING PROCESS?

Partner Cities and Jurisdictions who participated in the review, edit and update will present the

MHMP to their approval body for adoption after the County Board of Commissioners and FEMA have approved the plan. The goal is to have all partner Cities and Jurisdiction adopt the plan by mid-2025.

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. 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 review, edit, and updating process and invited them via hybrid (online and in person) during the THIRA and MHMP initial review/edit meeting held on 16 Aug 2020. During 2023 – 2024 as a portion of the MHMP review, edit and update process Kitsap County with assistance from WAEMD conducted a County Emergency Preparedness Assessment (CEPA), this assessment also assisted in guiding hazard mitigation strategies as it identifies Risks, Capabilities, Response Capacity, Resource Inventory and Needs, along with Strengths, Weaknesses Opportunities and Threats.

KCDEM acknowledges the contribution of many individuals for their hard work and dedication that made this 2024 Kitsap County MHMP update possible and is grateful to the Kitsap County MHMP edit / update Stakeholder Steering Committee members and agencies named in Table 2 who were invited or participated in the THIRA and MHMP review, update, and planning process.

A1-a. Does the plan document how the plan was prepared, including the schedule or timeframe and activities that made up the plan's development, as well as who was involved?

A2-a. Does the plan identify all stakeholders involved or given an opportunity to be involved in the planning process, and how each stakeholder was presented with this

Each participating jurisdiction have committed to a continuous improvement plan providing opportunities for public review and participation during the five-year period and during this plan's continuous update process. This includes town hall meetings and open periods at city and county council meetings along with opportunities provided via social media during crucial periods of plan review and updating.

Participating Stakeholders, Jurisdictions, Agencies, & Organizations			
Representative	**Agency/Organization**	**Title**	**Participation Status (Invited/Participating)**
Kitsap County			
Jan Glarum	KCDEM	Director	Participating
Krista Carlson	Kitsap County Board of County Commissioners	KC Board of Commissioners	Participating
Brian Nielson	KCDEM	PT&E Officer	Participating
Michael Robinson	KCDEM	Logistics and Operations Officer	Participating
Michele Moen	KCDEM	Administrative Manager	Participating
Dave Rasmussen	KCDEM	Public Information Officer	Participating
Linda Tsubaki	KCDEM	EMAT/CERT	Participating
Herb Jewell	KCDEM	EMAT	Participating
Jay Lovato	KCDEM	EMAT	Participating
Jacques Dean	Public Works Department, Roads	Senior M&O Manager	Participating
Joe Vlach	Central Kitsap School District	Director of Operations	Participating
Carl Borg	Kitsap County Human Services	Housing and Homelessness Program Manager	Participating
Doug Washburn	Kitsap County Human Services	Department Director	Participating
Jamie Donley	Kitsap 911 - CENCOM	Assistant Director of Operations	Participating
Dustin Rodrigues	Kitsap Transit	Operations Supervisor	Participating
Mike Merlino	North Kitsap School District	Executive Director of Business, Finance, and Operations	Participating
Gib Marrow	Kitsap Public Health District	Health Officer	Participating
Amy Anderson	Public Health District	Emergency Preparedness, Public Health Educator	Participating

Nathan Anderson	Kitsap Public Health District	Emergency Preparedness, Public Health Liaison	Participating
Jessica Guidry	Public Health District	Emergency Preparedness Manager	Participating
Kym Pleger	Public Works	Senior Program Manager	Participating
Andy Nelson	Public Works	Public Works Director	Participating
Michelle Perdue	Public Works	Senior Program Manager	Participating
Alexis McKinnion	Public Works	Public Works Department, Solid Waste	Participating
Shawn Alire	Public Works	GIS Department Director	Participating
Josh Miller	Kitsap County Sheriff's Office	Lieutenant	Participating
William Sapp	Kitsap County Sheriff's Office	Lieutenant	Participating
Travis Linares-Hengen	South Kitsap School District	Director for Safety, Security & Emergency Management	Participating
Anne Bakker	Port of Bremerton	Director of Business Development	Participating
Robert Kleinpaste	Kitsap Transit	Emergency Response	Participating
Jeff Faucett	South Kitsap Fire & Rescue	Chief	Participating
Ryan Buchanan	North Kitsap Fire & Rescue	Training Officer / BC	Participating
Bainbridge Island			
Ellen Schroer	City of Bainbridge Island	Deputy City Manager	Participating
Jeremy Mendola	Deputy Fire Chief	Fire / EMS	Participating
Chris Wierzbicki	Public Works Director	BI PW Director	Participating
Tom Edwards	City of Bainbridge Island	Assistant PW Director	Participating

Anne Lesage	City of Bainbridge Island	Emergency Management Coordinator	Participating
Loren Bast	Bainbridge Prepares	President	Participating
Bremerton			
Pat McGanney	Bremerton Fire Department	Fire Chief, Emergency Management Coordinator	Participating
John Payne	Bremerton Fire Department	Operations Chief	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
Denis Ryan	Public Works	Public Works Director	Participating
Matt Brown	Police Department	Police Chief, Emergency Management Coordinator	Participating
Melinda Lohre	City of Port Orchard	Emergency Operations Center Manager	Participating
Poulsbo			
Dan Schoonmaker	City of Poulsbo	City Emergency Manager	Participating
Heather Wright	Planning & Economic Development	Planning Director	Participating
April Allen	Poulsbo Police department	Detective	Participating
Jim Gillard	Poulsbo Fire Department	Chief	Participating
Silverdale			
Jeannie Screws	Silverdale Water District	Fiscal Manager	Participating
Morgan Johnson	Silverdale Water District	General Manager	Participating

Tribal			
Misty A. Ives	Port Gamble S'Kallam Tribe	Emergency Management Director	Participating
Nickolas Miller	Port Gamble S'Kallam Tribe	Police emergency Management	Participating
Cherrie May	Suquamish Tribe	Emergency Management Director	Participating
Eric Quitslund	Suquamish Tribe Office of Emergency Management	Operations Officer	Participating
Washington State			
Lit Dudley	Washington Department of Transportation	Regional Emergency Manager	Participating
Military			
Alan Spicer	US Navy NW Region	Radiological Emergency Planner	Participating
Linda Gonzalez	Puget Sound Naval Shipyard & Intermediate Maintenance Facility	Emergency Management Specialist	Participating
Daniel DeBuysere	US Navy	Radiological Control Technician	Participating
Heather Parker	US Navy NW Region	On scene coordinator	Participating
Sean Horan	Naval Base Kitsap	Radiological Control Technician	Participating
George Nixon Jr	Naval Base Kitsap	Radiological Control Technician	Participating
Kent Catlin	Puget Sound Energy	Emergency Management and Resiliency Manager	Participating
Non-Governmental/Non-Profit Organizations			
Stephen Finley	American Red Cross	Disaster Program Manager	Participating
Lance Walter	Salvation Army	Area Captain	Participating
Adam Smith	CHI Franciscan	Emergency Management Specialist	Participating
Jennifer Kriedler- Moss	Peninsula Community Health SVCS	Chief Executive Officer	Participating
Kathy Maurer	Kitsap Mental Health	Safety & Security Manager	Participating

Table 2: List of Jurisdictions participating in the review, edit, and update process.

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 hazard risks vs. resources.
3. Select the highest estimated return on investment mitigation recommendations.
4. Review existing plans to ensure alignment with current and updated MHMP.
5. Review available studies, reports and other technical information and bring to the group to ensure the newest and most relevant information guides the update process.
6. Review planning drafts, recommendations, and updates.
7. Identify and implement long and short-term goals.
8. Integrate the plan with all phases of Comprehensive Emergency Management Planning.
9. Provide for the implementation of committee decisions.
10. Encourage, coordinate, and provide a methodology for the implementation of input from the public, elected officials, and agency personnel.
11. Establish committee tasks.
12. Determine implementation ability and constraints for proposed Hazard Mitigation planning steps and measures.
13. Bring forward community concerns.
14. Identify implementation resources.
15. Provide for the update of Comprehensive Emergency Management Plans on a scheduled basis.
16. Evaluate and carry out mitigation activities.
17. Assist in the identification of funding sources and the procurement of funds to support hazard mitigation.

2024 Plan review & update

Specific to the 2024 MHMP development process:

1. All City and Special Purpose District planning partners were contacted in August 2020 to advise them of the review and update of the Kitsap County's HIVA to a THIRA leading up to the update of the MHMP. All were asked to review and update their County and jurisdictional profile information.

2. The THIRA Kick-Off meeting was held on 16 August 2020 and the attending partners agreed on the milestones for agency-specific documentation deliverables.

3. THIRA / MHMP Stakeholder Steering Committee meetings took place on between August 2022 and December 2022. 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, discuss strategies, and answer any stakeholder questions.

4. The final MHMP Stakeholder Steering Committee meeting took place on 14 November 2024 in order to present the final draft of the 2024 MHMP and discuss the next steps regarding approval, and lessons learned from the planning process.

Stakeholder update responsibilities

1. Review the 2013 and 2019 MHMP.
2. Update their jurisdiction/agency profile and provide updates, revisions, and additions to sections of the MHMP.
    a. In person and virtual meetings were the source of capturing stakeholder updates, revisions, and additions to the MHMP. Information related to edits and updates was provided to stakeholders in an efficient and user-friendly process, as well as to document how they were involved in the planning process. Information was also captured through in- person/webinar meetings, conference calls, emails. Stakeholders were encouraged to provide information in any method they deemed easiest.
3. Evaluate and update their profiles to reflect changes in hazard risk assessments.
4. Evaluate strategies and update profiles for potential terrorist threats and mitigation strategies.
5. Report on completed mitigation strategies.
6. Develop new mitigation strategies.
7. Report any concerns that may warrant further action or changes to the process.
8. Collaborate with other functional organizations on mitigation strategies.

A2. Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process? (44CFR § 201.6(b)(2))

Kitsap County MHMP Review, Edit, Update, and Development – 2024			
Date	**Activity**	**Subject**	**Action Items**
Jan 27 2020	FEMA approved Kitsap County MHMP	FEMA approval	Approval
Aug 25-29 2021	Kitsap Fair and Stampede/Rodeo	Community review and comment on MHMP	Informational and comment

Dec 2019 – May 2023	COVID restrictions and limited in person meetings	Due to activities related to the 2019 – 2023 COVID 19 Pandemic multiple stakeholder meetings were canceled and multiple had minimal attendance.	Informational
16 Aug 2022	THIRA Stakeholder Meeting	Kickoff meeting for Kitsap County THIRA	Informational
Aug 22 – 28 2022	Kitsap Fair and Stampede/Rodeo	Community review and comment on MHMP	Informational and comment
Dec 2022	THIRA Stakeholder meeting	Update and review data from 16 Aug THIRA meeting	Reviewed Draft THIRA
11 April 2023	Initial Kitsap - Local Emergency Planning Committee (LEPC)	Review of mitigation Strategies related to HAZMAT.	Review Draft and Mitigation Strategies
12 Jul 2023	Kitsap LEPC Meeting	• Reviewed Evacuation plan and mitigation strategies.	Review and update Mitigation Strategies
Aug 23 – 27 2023	Kitsap Fair and Stampede/Rodeo	• Community review and comment on MHMP	Informational and comment
02 Nov 2023	Kitsap LEPC Meeting	• Reviewed Wildfire mitigation with relationship to Maui fires. • Reviewed Puget Sound Electricity Mitigation strategies related to electrically initiated fires.	Review and update specific Mitigation Strategies.
02 May 2024	Kitsap LEPC Meeting	• Reviewed Flooding Mitigation strategies, Update from WSDOT related to flood mitigation projects.	Review and update specific Mitigation Strategies.
Aug 21 – 25 2024	Kitsap Fair and Stampede/Rodeo	• Community review and comment on MHMP	Informational and comment

Table 3: Record of Review, Edit, and Update process.

A4. DOES THE PLAN DESCRIBE THE REVIEW AND INCORPORATION OF EXISTING PLANS, REPORTS, AND TECHNICAL INFORMATION? (44CFR § 201.6(b)(3))

A4-a. DOES THE PLAN DOCUMENT WHAT EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION WERE REVIEWED FOR THE DEVELOPMENT OF THE PLAN, AS WELL AS HOW THEY WERE INCORPORATED INTO THE DOCUMENT?

Update History

An in-depth review of the update history of Kitsap County's MHMP can be found in Appendix C: MHMP Update History noting changes from 1998 through 2024.

Items reviewed during the 2024 review, edit, and update process. The following is a listing (non-inclusive) of items reviewed during the process:

1. FEMA – Local Mitigation Planning Policy Guide.
2. FEMA Flood maps and GIS data, and HAZUS data[37,38,47,48,49, 8]
3. City Specific Hazards, and their historic events. [57,64,16,20,37,42,]
4. Studies related to Seattle Fault modeling. [42, 38,5,59,16]
5. Kitsap County plans related to:
    a. Debris removal.
    b. Disaster Response.
    c. Evacuation plans. [88]
    d. THIRA. [60]
    e. Washington State Enhanced Mitigation Plan[22]
6. Fire code, and fire mitigation. [40,]
7. LIDAR mapping. [10, 11,]
8. U.S. Census Data. [1, 33]
9. Kitsap County Vulnerable population data. [33,34,35,36,1,44,]
10. FEMA NFIP participation and structures that have been damaged in the past.
11. County and Partner City owned properties. [55, 56, 57, 70]
12. Significant properties within Kitsap County and renovations that have been completed. [9,32]
13. County and Partner City Capacity and capabilities, and gaps. [70, 84]
14. City and County Ordinances related to Disaster and Emergency response. [9, 40, 43, 41, 44, 70]

The above-mentioned plans, policies, studies and technical information were used by the review and update committee, the steering committee, and the agencies involved in the review, edit and updates to the 2024 MHMP incorporating the most current data and information into the plan to ensure a holistic, community based, equitable, and inclusive plan was developed. Each partner city reviewed data related to their specific City profile and made updates as required.

Funding

The MHMP update was funded through Kitsap County general funds, no grant funding was or utilized for this review and update.

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

Threat and Hazard Identification and Risk Assessment (THIRA) Process

B1. DOES THE PLAN INDICATE A DESCRIPTION OF THE TYPE, LOCATION, AND EXTENT OF ALL NATURAL HAZARDS THAT CAN AFFECT THE JURISDICTION? DOES THE PLAN ALSO INCLUDE INFORMATION ON PREVIOUS OCCURRENCES OF HAZARD EVENTS AND ON THE PROBABILITY OF FUTURE HAZARD EVENTS? (44CFR § 201.6(c)(2)(II))

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.

FEMA in the Threat and Hazard Identification and Risk Assessment (THIRA) and Stakeholder Preparedness Review (SPR) Guide Comprehensive Preparedness Guide (CPG) 201 describes the National Preparedness Goal as "*A secure and resilient Nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk*" [25] (pg 5).

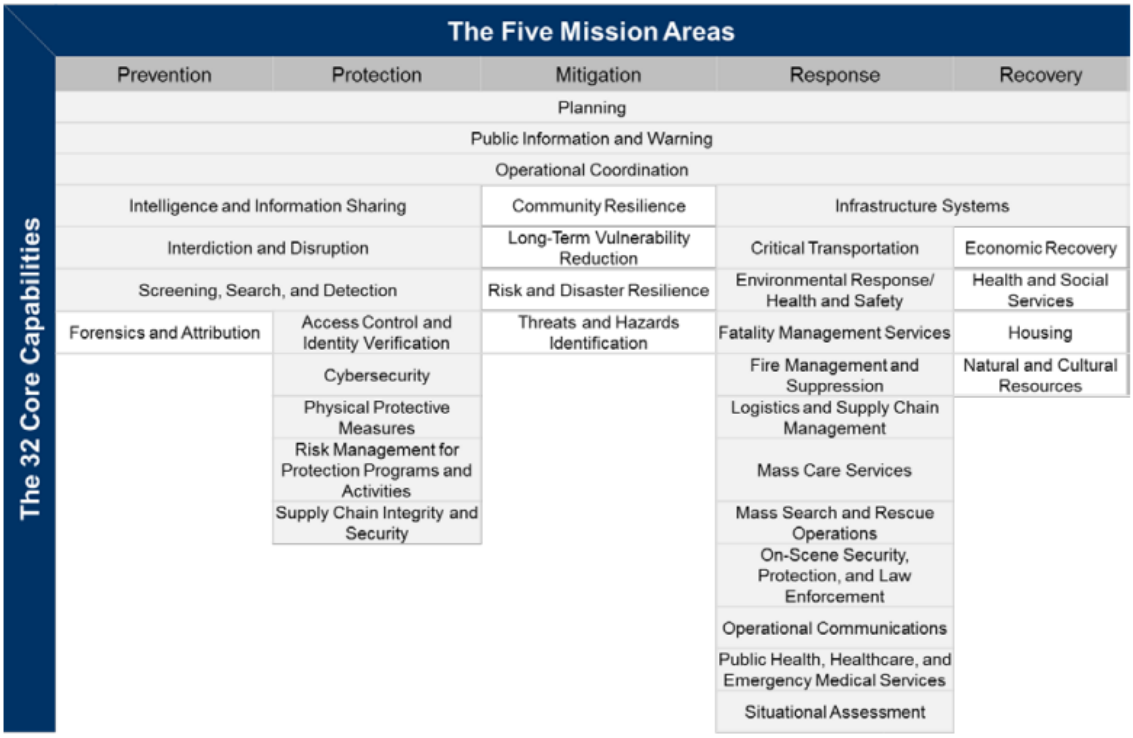


Figure 1: Five mission areas organize the 32 core capabilities needed to address threat and hazards.

The National Preparedness Goal describes the five mission areas with 32 core capabilities figure 1 identifies how the core capabilities relate to the mission areas., the five mission areas are as follows: [25]

1. Prevention:
2. Protection:
3. **Mitigation: Reduce the loss of life and property by lessening the impact of future disasters.**
4. Response:
5. Recovery:

During the review, edit, and updating process of the MHMP the mission area of mitigation was focused on with its associated core capabilities. The THIRA risk assessment provides 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, along with an evaluation of the available resources to respond to, and recover from any hazardous event, in order to identify, plan for, and respond to any hazard in a community. 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 THIRA process adds an additional step where the risk to the region was determined, this was determined through an evaluation of the available resources and possible needs. The MHMP Stakeholder Steering Committee, led by KCDEM, reviewed the 2022 THIRA determine the hazards that most likely would impact Kitsap County along with a review of disaster history of Kitsap County and its cities to determine the need to address those hazards identified through the THIRA process as shown in Table 5.

The current Kitsap County THIRA[64] drew from 2 FEMA resources; first the 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 second resource used in the development of Kitsap County's 2022 THIRA was FEMA's National Risk Index (NRI) for Census tract 53035090501, Kitsap County, Washington.

FEMA's HAZUS risk assessment and modeling tool was used in developing the 2015, 2019, and 2024 reports to estimates losses that may result from flooding or earthquakes. The Hazus model incorporated a complete list of buildings 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.

B1-a. DOES THE PLAN DESCRIBE ALL NATURAL HAZARDS THAT CAN AFFECT THE JURISDICTION(S) IN THE PLANNING ARE, AND DOES IT PROVIDE THE RATIONAL IF OMITTING ANY NATURAL HAZARDS THAT ARE COMMONLY RECOGNIZED TO AFFECT THE JURISDICTION(S) IN THE PLANNING AREA?

The hazards, risks, and the impacts that were identified likely to affect Kitsap County are representative of those identified in the 2023 Washington State Enhanced Hazard Mitigation Plan (SEHMP), as such Kitsap County utilized data from WA SEHMP in the development of our THIRA and the 2024 review, edit and update to Kitsap County's MHMP

The results from the Stakeholder Risk Rating and printed/electronic Public Community Surveys were reviewed and compared with the historical and quantitative hazard information reviewed during the 2022 Kitsap County THIRA development.

Risk Assessment Overview

Risk assessment 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. [25] Specifically, three levels of risk assessment included in this THIRA are "Low," "Moderate," and "High."

Table 4 provides an adjective description (High, Moderate, or Low) summarizing 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.

THIRA Risk Ratings 2022					
Hazard/Threat	**Overall Risk**	**People**	**Damages**	**Economy**	**Environment**
Natural Hazards					
Droughts	Low (>10%)	Low	Low	Low	Moderate
Earthquake	High (<80%)	High	High	High	High
Flooding	Moderate (>80%)	Low	Moderate	Low	Low
Forest & Urban Fires	Moderate (>40%)	High	Moderate	Low	Moderate
Landslides	Moderate (>75)	Low	Moderate	Low	Low
Severe Storms/Tornadoes	Moderate (>80%)	Low	Moderate	Moderate	Moderate
Tsunamis	Moderate (>60)	Low	High	Moderate	Moderate
Volcanic Ash Fall	Low (,10%)	Low	Low	Low	Moderate
Technological & Human-Caused Hazards					
Cyber Attack	Moderate (>75%)	High	Moderate	Moderate	Moderate
Dam Failures	Low (<30%)	Low	Low	Low	Low
Energy Emergencies	Moderate (>75%)	Moderate	Moderate	Moderate	Moderate
Hazardous Materials	Moderate (>50%)	Moderate	Moderate	Moderate	Moderate
Radiological	Moderate (>55%)	Low	Moderate	High	High
Search & Rescue	Low (<25%)	Moderate	Low	Low	Low
Terrorism	Moderate (>75%)	Moderate	Moderate	Moderate	Moderate
Transportation-MCI	Moderate (>80%)	Moderate	Moderate	Moderate	Moderate
Epidemics/Pandemics	Moderate (>80%)	Moderate	Moderate	Moderate	Moderate

Table 5: 2022 Kitsap THIRA Risk Ratings.

The overall ratings for hazards from the 2015 and 2019 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. The Epidemics risk was updated to include Pandemics to give a better understanding of this hazard.

Hazard Mitigation Process for Kitsap County

Kitsap County's 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, 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

Information from the capability assessment led to the development of seven goals which form the basis for the objectives in the following section, these seven goals align with FEMA's mission area "**Mitigation: Reduce the loss of life and property by lessening the impact of future disasters."** These goals are ranked 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:
    a. Communication and warning systems.
    b. Emergency medical services and medical facilities mobile resources.
    c. Critical facilities.
    d. 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:

1. Identifying at least one person, agency, or organization responsible for implementation.
2. Projecting a time frame for implementation.
3. Explaining how the project will be financed, including the conditions for financing and implementation as information is available.
4. Being consistent with, supporting, and helping implement the goals and objectives of hazard mitigation plans already in place for the geographic area in question.
5. Being based on the Kitsap County Hazard Identification & Vulnerability Assessment.
6. 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.
7. Being the most practical, cost-effective, and environmentally sound alternative after consideration of the options.
8. 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.
9. Meeting applicable permit requirements.
10. Discouragement of development in hazardous areas.
11. Contributing to both the short- and long-term solution to the hazard vulnerability risk problem.
12. Ensuring the benefits of a mitigation measure are equal to or exceed the cost of implementation.
13. Having manageable maintenance and modification costs.
14. 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.
15. Using existing resources, agencies, and programs, when possible, to implement the project.

Thirty-three organizations, and partner City’s participated in the THIRA development process and the MHMP review and update effort, bodies that participated are listed above in Table 2, however every effort was taken to be totally inclusive of all agencies, but the structure of government there were some agencies who were represented by their overarching governmental agency.

1. Other Factors Impacting Community:
    a. Existing Hazard Mitigation/Management/ Damage Reduction Plans.
    b. Existing County agencies and programs.
    c. Hazard mitigation measures currently implemented.
    d. Financial constraints and the ability to implement mitigation strategies.
    e. State and Federal lands contained within Kitsap County impacting upon County resources.
    f. State and Federal transportation links serving Kitsap County and impacting upon County resources.
    g. Response and recovery from the COVID pandemic.

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. [25] 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:

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

a. Can this strategy be quickly accomplished compared to those that would take a long time to obtain the necessary approvals or funding?

7. **Post-disaster mitigation**
   a. Is this strategy more feasible in a post-disaster setting?
   b. 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.

1. **Social**
   a. Is the proposed strategy socially acceptable to the community?
   b. Are there equity issues involved that would mean that one segment of the community is treated unfairly?
2. **Technical**
   a. Will the proposed strategy work?
   b. Will it create more problems than it solves?
3. **Administrative**
   a. Can the community implement the strategy?
   b. Is there someone to coordinate and lead the effort?
4. **Political**
   a. Is the strategy politically acceptable?
   b. Is there public support both to implement and to maintain the project?
5. **Legal**
   a. Is the community authorized to implement the proposed strategy?
   b. Is there a clear legal basis or precedent for this activity?
6. **Economic**
   a. What are the cost and benefits of this strategy?
   b. Does the cost seem reasonable for the size of the problem and the likely benefits?
7. **Environmental**
   a. How will the strategy impact the environment?
   b. 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

Ease of implementation and funding availability were critical factors in prioritizing strategies. 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) [27] 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.* [27]

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 2024 MHMP update, the mitigation strategies were grouped into one section (Mitigation Strategies & Recommendations) and the strategies that were previously in individual City Profiles remain in the City Profile portion for this revision. If a mitigation strategy had been in previous plans and not completed due to funding or lack of political drive, it was verified to determine its relevance and removed if not realistically achievable nor intended to be implemented during the tenure of this 2024 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.

A3-a. DOES THE PLAN DOCUMENT HOW THE PUBLIC WAS GIVEN THE OPPORTUNITY TO BE INVOLVED IN THE PLANNING PROCESS AND HOW THEIR FEEDBACK WAS INCLUDED IN THE PLAN?

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 from 2021 through 2024, at town/county meetings, and electronically via the KCDEM website and social media accounts. In 2022 Kitsap DEM revised our whole community outreach campaign which now centers around “The Big One Disaster Prep”, at the natural conclusion of the “Put A Big Foot Forward Towards Risk Reduction” campaign.

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.

Opportunity for Public Input During the Planning Process

The public was engaged in the MHMP development process in various in-person methods; 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.

MHMP Draft for Public Review and Town Hall Public Outreach: On August 19, 2024, 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 October 2024 and included a direct link to the draft plan.

Incorporation of Public Feedback

During the Planning/Development Process

Community Survey Results	
Hazard	**Average RII Rating**
Natural Hazards	
Earthquakes	1.96
Wildfires & Urban Fires	1.02
Severe Storms/Tornados	0.68
Landslides & Erosion	0.51
Floods	0.58
Tsunami & High Waves	0.28
Extreme Cold	0.76
Extreme Heat	0.35
Drought	0.15
Technological/Human-Made Hazards	
Power/Utility Failure	1.36
Telecommunication Failure	0.68
Cyber Attack	0.86
Terrorism	0.45
Human & Animal Epidemics	0.32
Transportation Accident - Vehicle	0.84
Civil Disturbance	1.56
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
Pandemic	0.98

Table 6: Community Survey Results.

Relative Importance Index (RII) 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

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.

Public feedback regarding the perception of the effect of natural and technological/human-made hazards was gathered during the MHMP review, update and editing process through the above-mentioned venues. 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. Community members were asked 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 at the Kitsap County Fair and Stampede between August 21 to 25th, 2024; 198 surveys were

completed during the 2023 Kitsap County Fair and Stampede between August 21 to 25th, and 292 surveys were completed between the 2021 and 2022 Kitsap Fair and Stampede, for a total of 586 responses from Fair attendees. Another 152 surveys were received at community outreach events held from 2021 – 2024 for a grand total of 738 responses. Calculations were made based on the Relative Importance Index (RII) formula to find the means. The survey also included several questions on the overall preparedness levels of the respondent and their households. Results of the surveys can be found in Appendix C: Stakeholder and Public Engagement Records.

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).

An overview of public feedback received and how it was incorporated into the MHMP document can be found in the table 7 below.

Feedback Received	Method Received	Action Taken
Concerns were expressed about liquefaction in the Hansville area, liquefaction was discussed as a relevant topic during the flooding hazard discussion during the THIRA, and those sections were reviewed for the attendees.	Public Town Hall in Poulsbo	These issues are covered in the THIRA and those sections were reviewed for the attendees. The liquefaction maps included in the MHMP were reviewed and updated to ensure a comprehensive liquefaction description of the county is accounted for in the 2024 update to the MHMP.
Multiple members of the counties Yacht Clubs stated their willingness and want to help during an emergency.	Public Town Hall in Poulsbo Keyport Town Hall meeting.	KCDEM discussed current work with the building of a “Marine Unit”. The development of a County sponsored volunteer marine unit for emergency and disaster response was briefed at the THIRA noting the marine unit’s ability to cover some gaps in resources.
One member wanted to see if there was any new data regarding what the resulting tides, or tsunamis would be when the Seattle fault moves.	Public Town Hall in Poulsbo	More information regarding a Seattle fault earthquake and the 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 was concerned with the increase in developments in the northern portion of the county and how that will impact liquefaction and possible mud/landslides.	Public Town Hall in Poulsbo	At the current time the maps in HAZUS have not been updated to include the new developments and construction in the norther portion of the county and the impact of these. The next review and update of the MHMP starting in mid-2025 will request updated mapping though HAZUS and include any changes in liquefaction areas in that update.
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 asked whether there were risk assessments completed for various hazards simultaneously.	Public Town Hall in Port Orchard/Email	Risk assessments in the THIRA and MHMP were completed for each hazard separately to capture as much information for each hazard as possible, looking gat compounding hazards is not a time useful endeavored.
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 7: Overview of Community Feedback and actions taken.

A1-B DOES THE PLAN LIST THE JURISDICTION(S) PARTICIPATING IN THE PLAN THAT SEEK APPROVAL, AND DESCRIBE HOW THEY PARTICIPATED IN THE PLANNING PROCESS?

Stakeholder Review & Adoption Process

In April 2023 Kitsap County Department of Emergency Management convened the first meeting of our Local Emergency Planning Committee (LEPC) establishing Kitsap County's LEPC.

The LEPC is comprised of stakeholders from local partners and are key to making emergency management successful. Members of the LEPC include:

Cities:

- Bainbridge Island
- Bremerton
- Port Orchard
- Poulsbo

Local agencies:

- Fire Districts
- Law Enforcement Agencies
- Port Districts
- Public Utility Districts
- School Districts
- Water Districts
- Navy Region NW

County-level government functions:

- Housing Kitsap
- Kitsap County Government
- Kitsap Public Health District
- Kitsap Public Works
- Kitsap Transit

Local Non-For-Profit organizations:

- American Red Cross
- Empact Northwest
- Kitsap Community Foundation
- Kitsap Community Resources
- United Way of Kitsap County
- Kitsap Economic Development Alliance
- Kitsap Medical Society

Local Medical Partners:

- Kitsap Mental Health Service
- Peninsula Community Health Services
- St. Michael Medical Center
- Washington Veterans Home at Retsil

Together, these partners produce and exercise the Kitsap County region's Comprehensive Emergency Management Plan, Multi-Hazard Mitigation Plan, and Comprehensive Disaster Recovery Plan.

1. The LEPC meets every 4 months and reviews different aspects of Kitsap County's plans to ensure they are current, equitable and inclusive.

2. Agencies report out on mitigation strategy updates during these meetings allowing partners to better understand how the mitigation strategies are being completed and the effect on the population and communities.

Plan Review & Adoption Process

Four partner city 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:

1. 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, 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 October 2024 through November 2024.

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 (2024)			
Organization/Agency	**Adopting Authority**	**Past Adoption Date(s)**	**New Adoption Date(s)**
Emergency Management Authority			
Countywide Emergency Management Program	Kitsap County Emergency Management Council	1/26/2020	
Kitsap County Government			
Kitsap County Government	Kitsap County Board of County Commissioners	01/27/2020	
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	
Kitsap County Public Works	Kitsap County Public Works	01/16/2020	
Kitsap County Regional Library	Kitsap County Rural Library District Board of Directors	01/26/2020	
Kitsap Public Utilities District	Kitsap Public Utilities District Board of Commissioners	01/26/2020	
Kitsap Transit	Kitsap Transit Board of Commissioners	02/16/2020	
Cities			
Bainbridge Island	Bainbridge Island City Council	08 Sep 2020	
Bremerton	Bremerton City Council	16 Sep 2020	
Port Orchard	Port Orchard City Council	08 Sep 2020	
Poulsbo	Poulsbo City Council	16 Sep 2020	

Table 8: Kitsap County MHMP Agency Review and Adoption.

D2. IS THERE A DESCRIPTION OF THE METHOD AND SCHEDULE FOR KEEPING THE PLAN CURRENT (MONITORING, EVALUATING, AND UPDATING THE MITIGATION PLAN WITHIN THE FIVE-YEAR CYCLE)? (44CFR § 201.6(c)(4)(I))

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 at a minimum on an annual basis, (As a part of the pre-budget development process in April/May. The MHMP will also be reviewed 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, next due in 2029, 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 will 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.

This review should discuss at a minimum:

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

Following, the KCDEM Planning, Training, and Exercise 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. KCDEM 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 all or portions of the annual MHMP update at the first meeting of the calendar year.

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

Related Tasks of The KCDEM Planning, Operations, and GIS Officers

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, implementation, and effectiveness of those programs and mitigation strategies already identified
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.
6. 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 - 2008	Reviews, completed and submitted findings September annually.
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 - 2015	Reviews, completed and submitted findings September annually.
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 2020 - 2023	Reviews, completed and submitted findings November annually
April-Aug 2024	5-year update cycle
Dec 2024	Updated MHMP completed and sent for commissioner review.
* Jan 2025	2025 – 2029 MHMP approved by Kitsap County Board of Commissioners.
*Jan 2025	New Plan Adopted and Promulgated by Cities and County
*Best case projected timeline, the target is to get approved MHMP for FEMA approval mid Jan 2025	

Table 9: Historic MHMP Review, Evaluation, and Update (2005 - 2024).

D.3 DOES THE PLAN DESCRIBE A PROCESS BY WHICH EACH COMMUNITY WILL INTEGRATE THE REQUIREMENTS OF THE MITIGATION PLAN INTO OTHER PLANNING MECHANISMS, SUCH AS COMPREHENSIVE OR CAPITAL IMPROVEMENT PLANS, WHEN APPROPRIATE? (44CFR § 201.6(C)(4)(II))

Integration with other Local Plans

Information in this MHMP in meant to 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. This plan has been developed in partnership with local partners and member cities within Kitsap County. As with previous editions the plan has been reviewed, edited, and updated with the assistance of the member cities within Kitsap County and will be provided to the member cities for adoption after final FEMA approval.

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[25]. Accordingly, the land inventories, data, and other findings from 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 collaborative planning and implementation. Integrated and collaborative planning allows key community officials to better 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.

During the review, edit and update process our Tribal partners participated and provided guidance as to the collaboration related to our partnerships and the collaborative efforts during a disaster or emergency. We continue to reinforce our collaborative partnerships through mutual agreements, training, drills, and exercises. These activities continue to reinforce our joint resolve to ensure the wellbeing of all who live, work and travel through Kitsap County.

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 2: 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.[1, 9, 32, 35, 44,100] 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. [71]
- Bremerton is Kitsap's most populated city, home to the area's largest employer, the Puget Sound Naval Shipyard. [44]
- Port Orchard lies across Sinclair Inlet from Bremerton and is known for its downtown shops and antiques. [44]
- Poulsbo, on the northern shore of Liberty Bay, is known as "Little Norway" due to its many residents of Norwegian descent. [44]

In Washington, special purpose districts are limited purpose local governments separate from a city, town, or county government. [89] 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.[89]

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.[89]

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.[89]

Other Kitsap County cities have also conducted a number of annexations for urban growth areas.[32, 71, 41, 90, 91]

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 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. Kitsap County has seen 16 Federally declared disasters since 1953, including six flood events, four severe storms, two earthquakes, two biological events, 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 2020, an estimated 275,611(+9.7% from 2010) people call Kitsap County their home.[1, 9, 30, 32, 100] 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, and median household income, and fifth in per capita income according to 2024 Esri Demographics[1, 9, 30, 32], Information related to persons living with disabilities derived from Kitsap Public Health's 2024 Kitsap County Populations with Functional and Access Needs Estimates. [34]

Kitsap County Most Recent Population Estimates[32, 100]					
Location	**Population**	**Population Density**	**Number of Households**	**Median Household Income**	**Living with a disability Disability**
Kitsap County	283,073 (2024)	716 per sq. mi (2024)	117,442 (2024)	$99,445 (2024)	13.49% (2022)
City of Bainbridge Island	25,177 (2024)	912 per sq. mi (2024)	10,354 (2024)	$157,856 (2024)	8.45% (2022)
City of Bremerton	44,633 (2024)	1,570 per sq. mi (2024)	17,703 (2024)	$70,194 (2024)	18.43% (2022)
City of Port Orchard	17,536 (2024)	1,818 per sq. mi (2024)	6,485 (2024)	$90,302 (2024)	*14.76% (2022)
City of Poulsbo	12,403 (2024)	2,600 sq. mi (2024)	45,042 (2024)	$97,958 (2024)	**12.44% (2022)

Table 10: Kitsap County Most Recent Population Estimates.
(Includes South Kitsap County ** Includes North Kitsap County)*

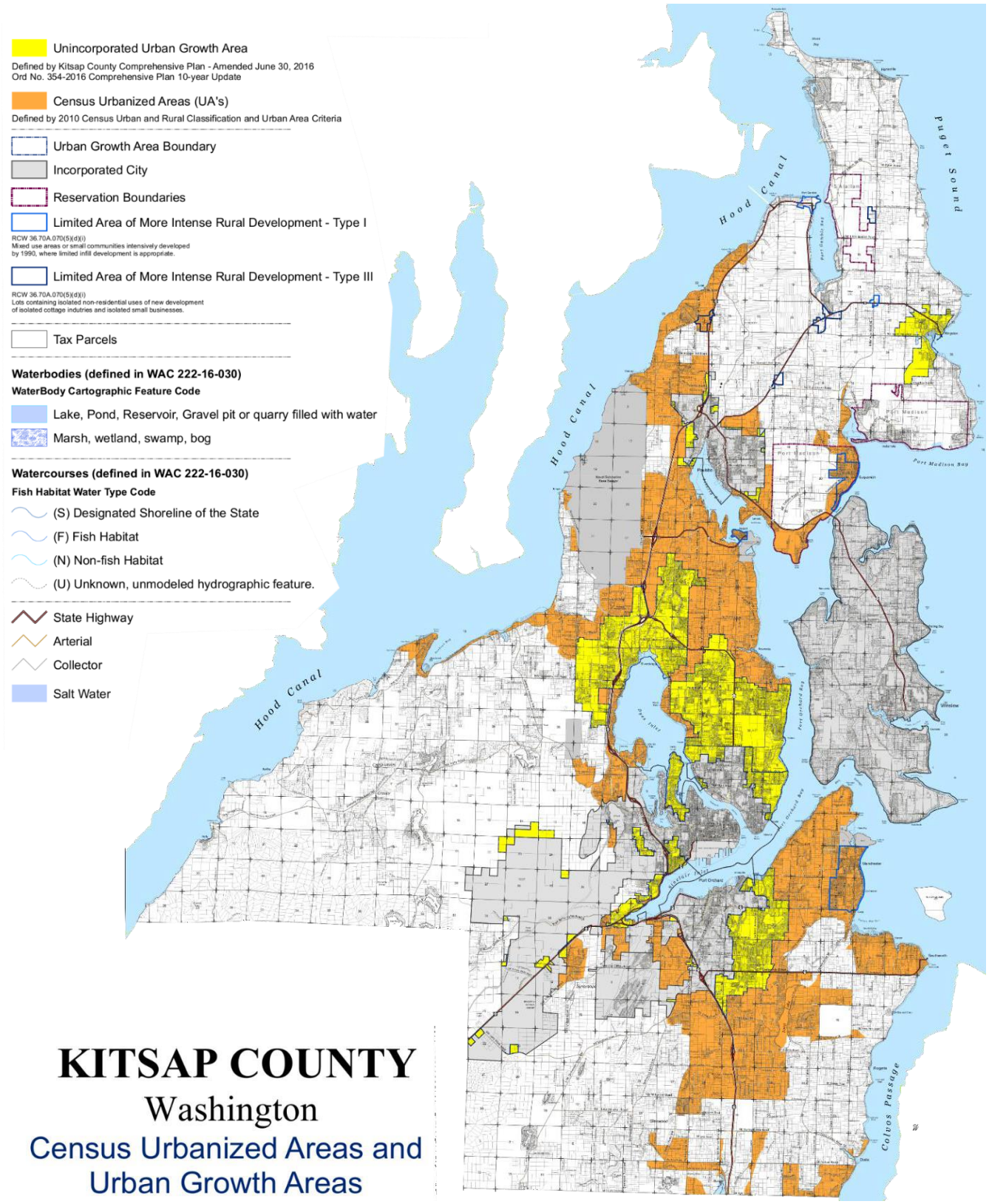


Figure 3: Map of Census Urbanized Areas & Urban Growth.

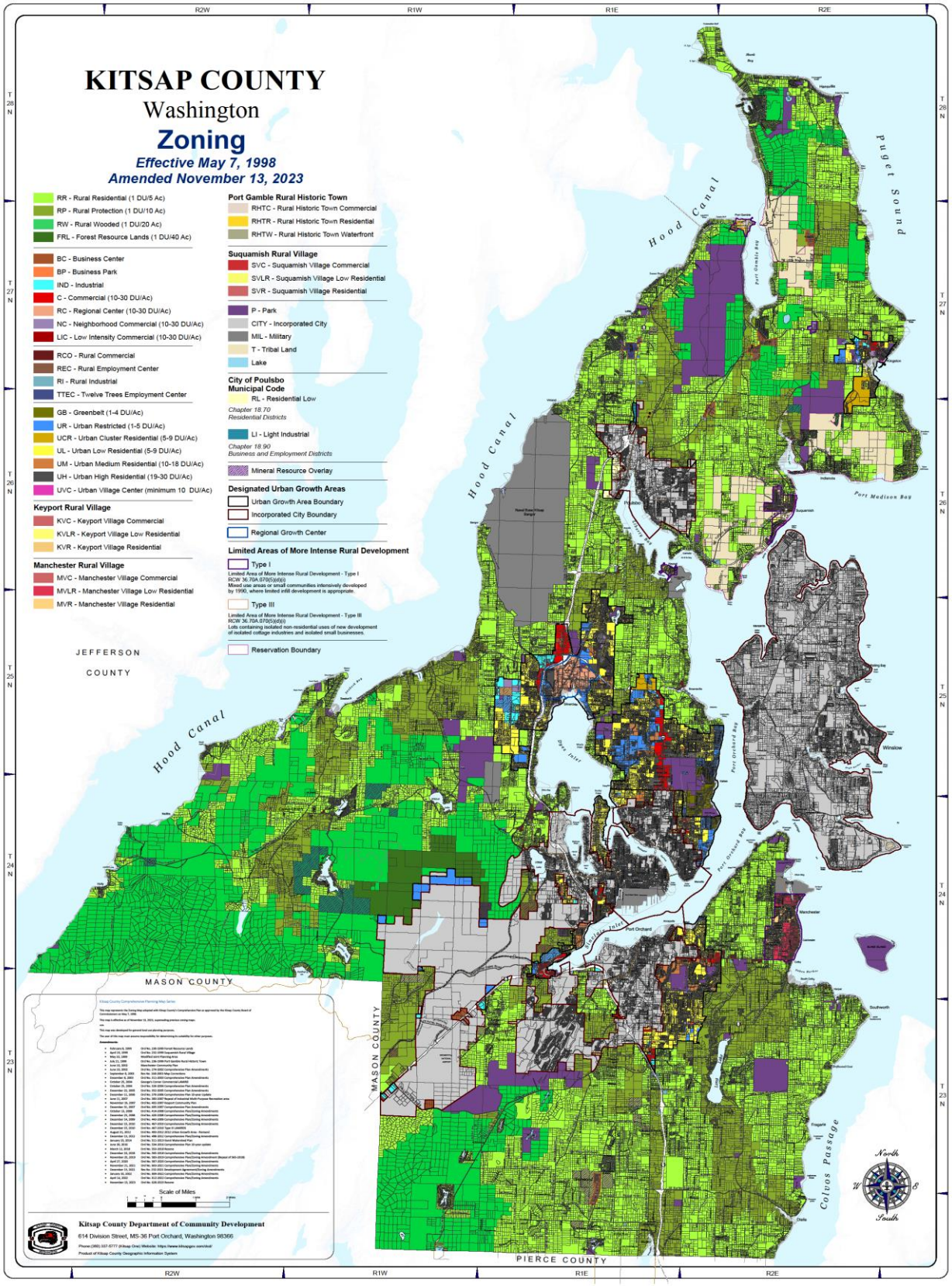


Figure 4: Kitsap Zoning Map amended Nov 13, 2023.

Age Distribution

Figure 4 below show the distribution of Kitsap County by age, sex and race. Residents 65 years and older make up approximately 21 percent of the population, this is a 3 percent increase over 2017 data[100]. Kitsap's population of 65 and over is higher than Washington states' over 65 population at 17 percent. There are also proportionately fewer residents under 18 years of age and less than five years of age in Kitsap County compared to Washington state. Kitsap County has a mediun age slightly above that of Washington State at 40.4 years compared to 38.6 years of age for Washington. [1, 9, 30, 32, 100]

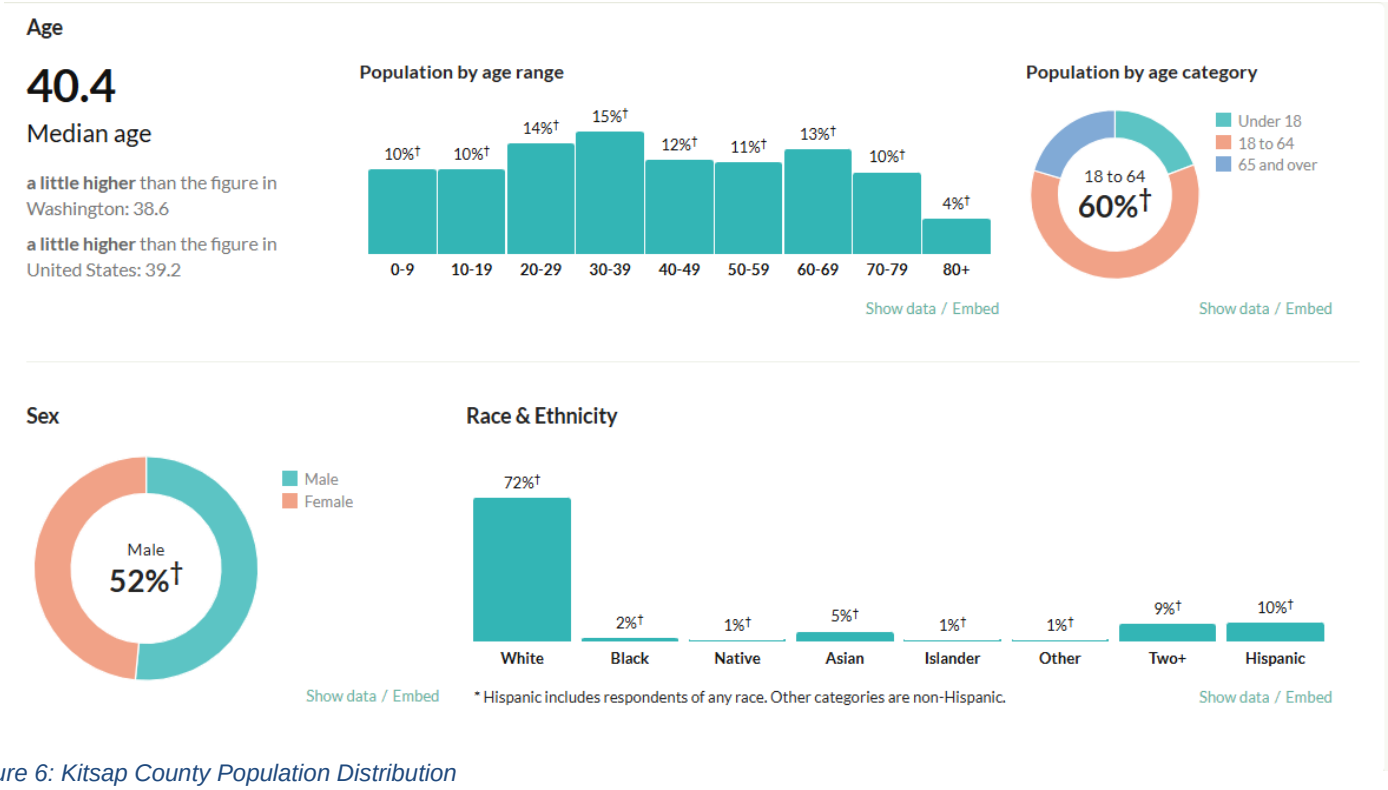


Figure 6: Kitsap County Population Distribution

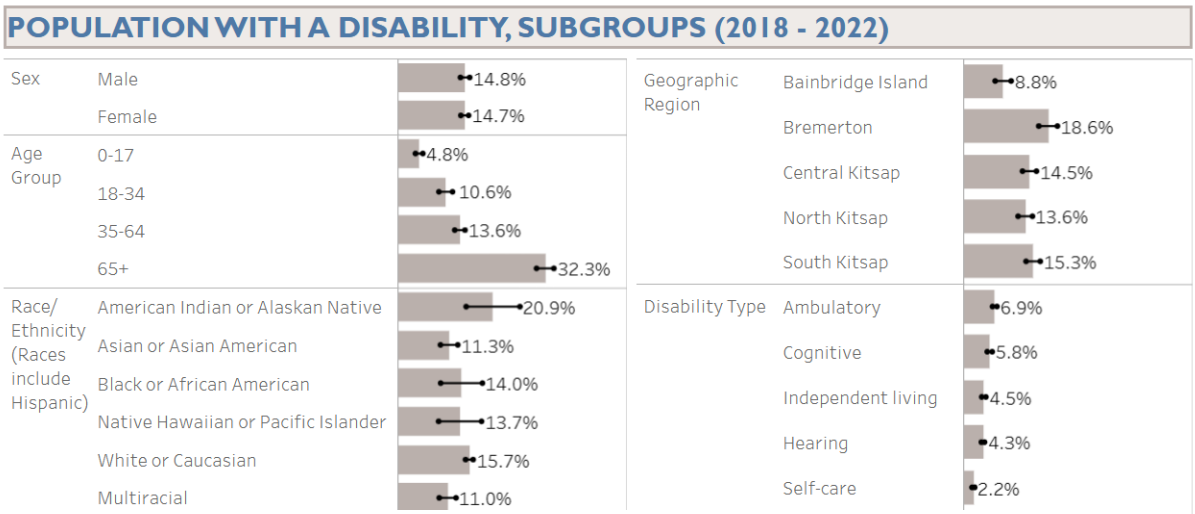


Figure 5: Kitsap County Population with a Disability by subgroups.

Functional Needs and Vulnerable Populations

Kitsap County's access and functional needs populations are outlined in figure 5 below. Kitsap's population with disabilities has increased approximately 1.5 percent since 2019 this includes the population with ambulatory difficulty those who are electrically dependent. [34, 100]

Kitsap County Populations with Functional and Access Needs Estimates

(Updated July 2024)

This report provides estimated numbers of people who might need additional assistance or have special needs during an emergency. These estimates can be used for emergency planning or other health or planning work.

Use the drop down filter to show data for the geographic region of interest. Click on any count (light beige columns) to show that data for each sub-county area on the map in the center. Lean more about each indicator by hoving over the count.

Number of Births	2022	2,935
Children and Youth (Age Birth-19)	2023	62,396
Seniors (Age 85+)	2023	5,466
Seniors Living Alone (Age 65+)	2018-22	11,834
People Immigrating to the US (entering since 2010)	2018-22	3,845
People With Limited English or No English Proficiency	2018-22	6,659
People Living Below 100% Poverty	2018-22	22,101
Children 0-17 Living Below 100% Poverty	2018-22	5,661
People With Food Insecurity	2022	30,890
Households with No Vehicle Available	2018-22	4,595
People Commuting 45+ Minutes	2018-22	25,548

Kitsap County

None, None

Legend

Kitsap County Population

Total Kitsap Population	283,200	100%
Unincorporated Population (outside city limits)	183,500	65%
Incorporated Population (inside city limits)	99,700	35%
Incorporated Population (% of Inc.): Bainbridge Island	25,180	25%
Bremerton	44,640	45%
Port Orchard	17,480	18%
Poulsbo	12,400	12%
Kitsap County Households	106,031	

38,204	2018-22	People With a Disability^
17,979	2018-22	People with Ambulatory Difficulty (Age 5+)
3,967	2023	People With Developmental Disability (Age 3-17)
11,292	2018-22	People With Hearing Difficulty
5,266	2018-22	People With Vision Difficulty
2,210	2024	Electricity-Dependent Adults
51,603	2022	Medically Dependent Adults
11,062	2021	People With Serious Mental Illness (Age 18+)*
47,357	2022	People With Substance Use Disorder (Age 12+)**
610	2023	Point in Time Count of People Experiencing Homelessness
710	2023-24	Public school students experiencing homelessness
7,889	2018-22	People Living in Group Quarters

Notes: All counts are estimates. When available, 95% confidence intervals are provided in the popup when you hover over the data. ^ Civilian, noninstitutionalized only; * County estimate based on U.S. national estimates; **County estimate based on Washington State estimates; # The number is suppressed due to unreliability and/or data is not available. When the number is highly unreliable, the confidence interval in the tooltip will also be suppressed/blank.

July 2024 Kitsap Public Health District, Public Health Emergency Preparedness and Response Program, prepare@kitsappublichealth.org 1

Figure 7: Kitsap County Populations with Functional and Access Needs.

Economy

In 2023, the civilian labor force in Kitsap County averaged 131,014, higher than the 2019- 2022 levels. On an annual average basis, there have been yearly increases in the labor force since 2014, another indicator of a healthy job market. In 2023, the county unemployment rate was 4.1 percent steady from 2022. Unemployment during the 2019-2022 pandemic spiked with a high of 7.7 percent in 2020.[32, 35, 44]

The largest component of Kitsap County nonfarm employment is government. This sector typically accounts for over a third of the nonfarm total with a 2021 total of 32,600 jobs. Of that total, 20,200 was federal government employment. The second-largest group was local government, with 10,700 jobs. [1, 9, 30, 32, 35]

Five military installations are located within Kitsap County and are a critical factor in the County's economic balance. The remaining workforce 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. [1, 9, 30, 32]

Built Environment

As of 2023, Kitsap County has 118,680 housing units and 2,258 building permits issued, housing unit occupancy and structure type is noted in table 12 below. Figure 8 offers a view of comprehensive land use in the County. [1, 9,100]

The most current Hazus risk assessment from FEMA's Risk Report was utilized to identify 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, 100]					
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 11: 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. [32, 41, 71, 90, 91] 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.

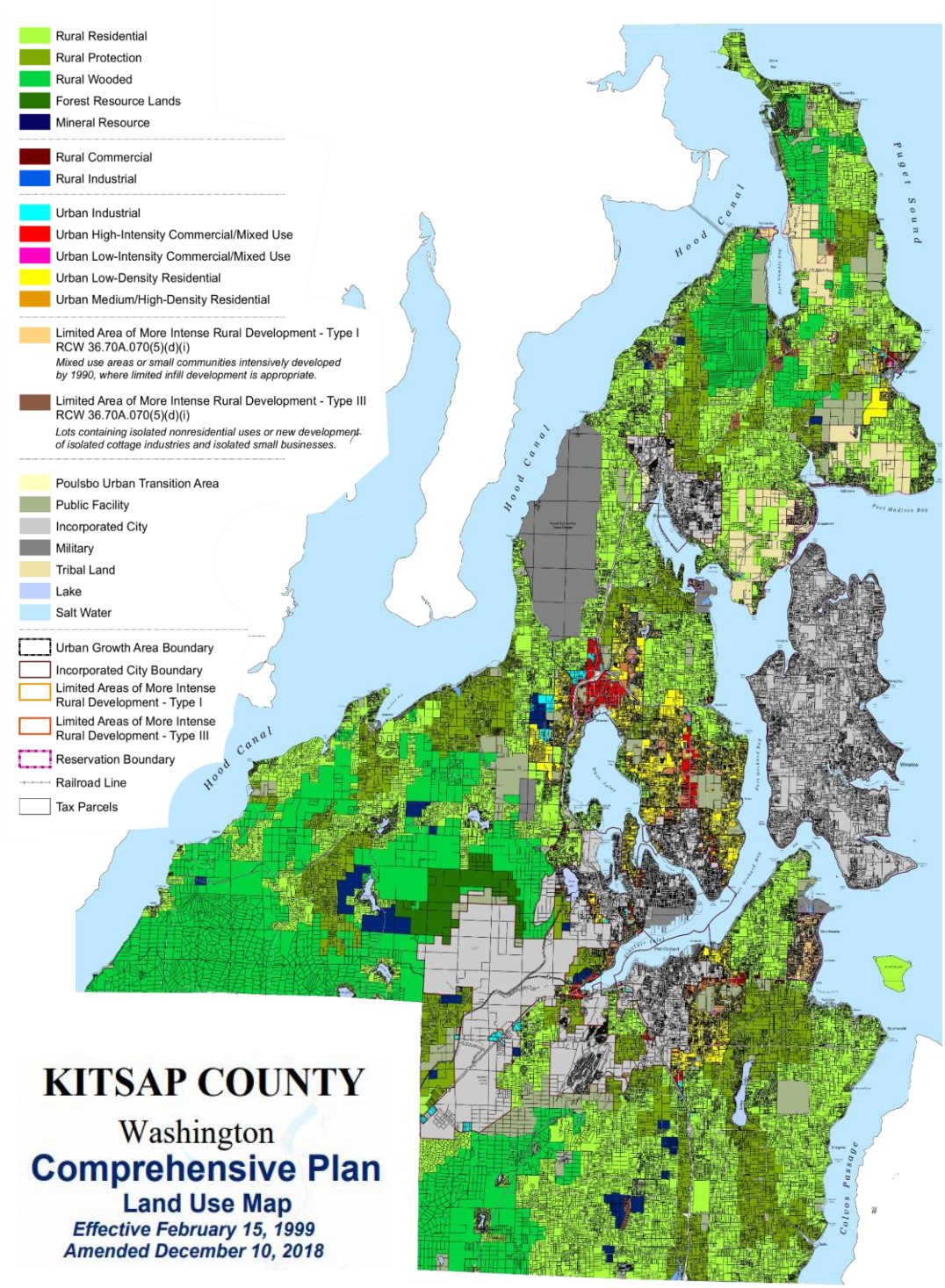


Figure 8: Kitsap County Comprehensive Land Use (2023).

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 2023: [1, 44]

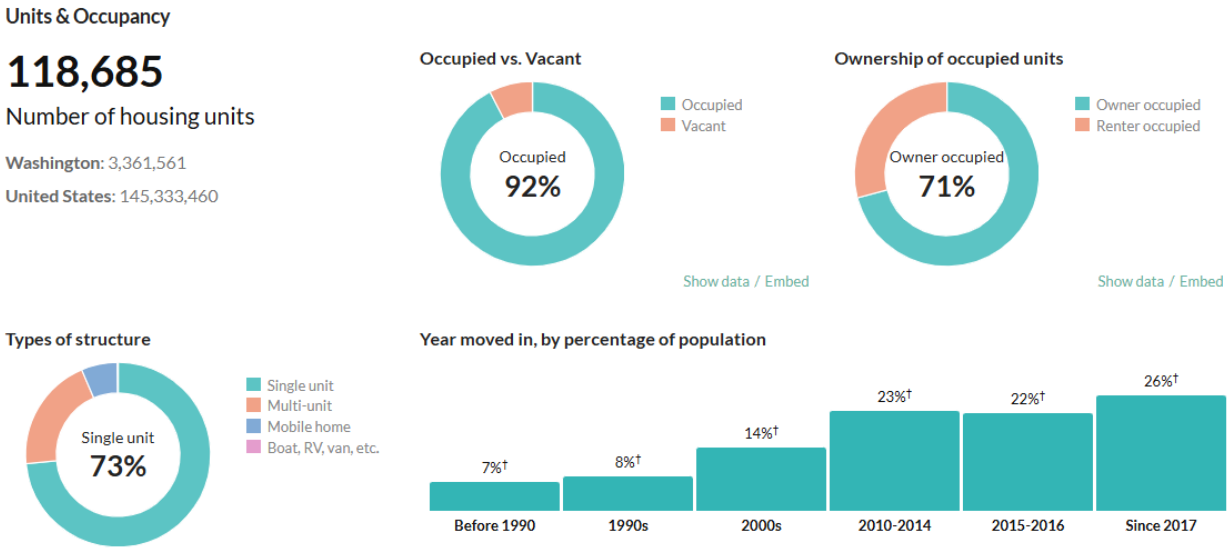


Figure 9: Kitsap County Housing Characteristics - American Community Survey (2023).

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. [1, 44]

The Hood Canal Floating Bridge is critical to Clallam and Jefferson Counties as their main supply route which may be impacted by various hazards. [1, 44]

Transportation Concerns

1. The Tacoma Narrows is the major route for commercial traffic into the county and may be affected by various hazards.
2. 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.
    a. 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.
3. All other bridges on SR16 including those in Pierce County.
    a. This is the main route for getting things into Kitsap County.
4. The three Ferry Terminals (Bremerton, Bainbridge, and Southworth).
5. The Agate Pass Bridge, as it is the only land connection to Bainbridge Island.

Kitsap County enjoys all the communications available to major Puget Sound cities. These include

high-speed internet and cable TV services, which are available to its citizens. Kitsap County built a 911 Center in 2004 as a hazard mitigation strategy. Since the original construction 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, along with both the pole and underground electrical grid, 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		
Type	**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
Bridge	East Bremerton Bridge (Warren Ave)	Service to East Bremerton from Bremerton
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. Two critical infrastructure aspects are healthcare and water, figures 8 and 9 identify these critical portions of Kitsap County's infrastructure. [9, 8, 44]

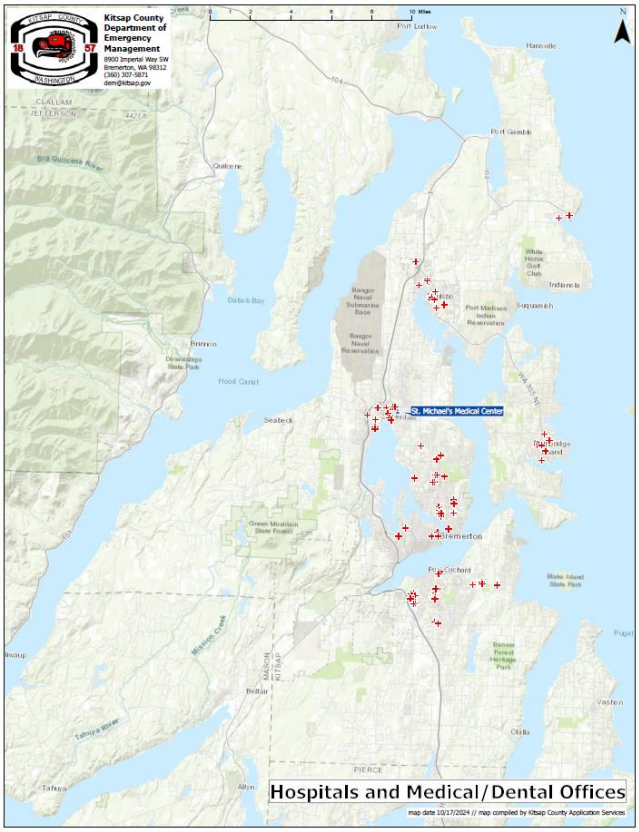


Figure 10: Critical facilities; Medical / Dental Faculties.

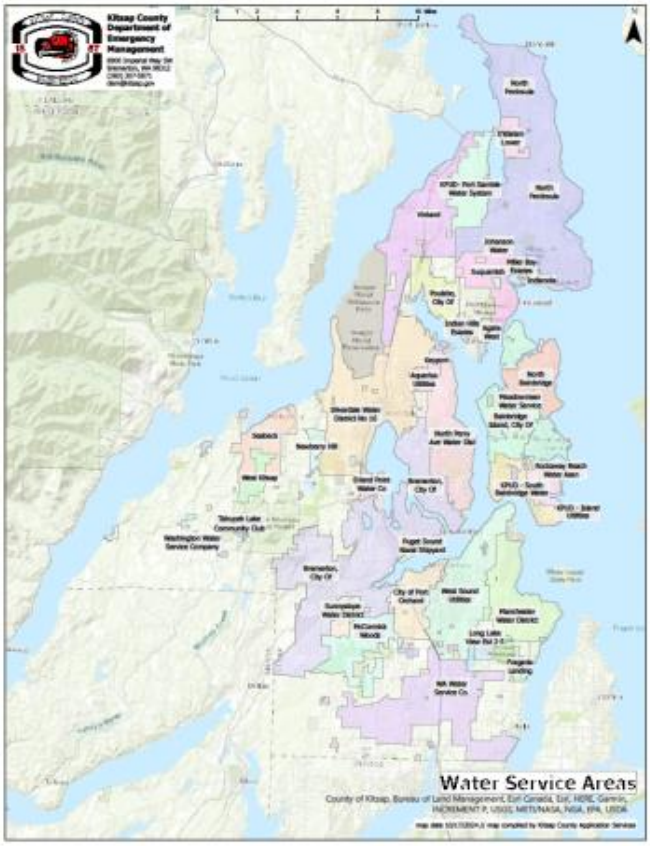


Figure 11: Critical facilities; Water service areas.

Asset Inventory

Inventories of geo-referenced assets for Kitsap County, including Bainbridge, Bremerton, Port Orchard, Poulsbo, Hansville and Kingston, were compiled to identify and characterize the properties potentially at risk to identified hazards[36]. By understanding the type and number of assets and where they are in relation to known hazard areas, the relative risk and vulnerability for such assets can be assessed. Under this assessment, two categories of physical assets were created and then further assessed through GIS analysis. Additionally, social assets are addressed to determine population at risk to the identified hazards. These are presented in Table 12 below. [9, 32, 44, 55, 56]

Kitsap County Critical Facilities & Cultural Resources		
City/Jurisdiction	**Type/Name**	**Notes**
Kitsap County	Department of Emergency Management	Location of County Emergency Operations Center (EOC) & Primary Ballot processing facility.
Kitsap County/ Bremerton	Emergency Medical Services	Private and Fire service
Kitsap County	Kitsap911	Consolidated Emergency Dispatch

Kitsap County/ Port Orchard / Poulsbo	Community Development / Emergency Medical Services	St Michael's Medical Center, The Doctors Clinic Urgent Care locations, Kizer Permanente Medical Center
Kitsap County/ Silverdale	Emergency Medical Services	Private and Fire service
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 • 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 4 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.
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	Olympic College has multiple campuses within Kitsap County.
Bremerton	Bremerton School District	As of 2019, the Old East High/Junior High School was demolished, and 10,000 square feet were 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, St Francis Medical Center, Virginia Mason Franciscan Health.
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 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 currently
Poulsbo	Water Tanks	9 water tanks wastewater lift stations

Table 12: Kitsap County Critical Facilities & Cultural Resources.

Physical and Improved Assets

The two categories of physical assets consist of:

1. **Improved Property:** Includes all improved properties in Kitsap County according to local parcel data provided by the cities. The information has been expressed in terms of the number of parcels and total assessed value of improvements (buildings) that may be exposed.

2. **Critical Facilities:** Critical facilities vary by jurisdiction. Each city provided data from their respective critical facilities. Identified critical facilities are fire stations, police stations, medical care facilities, schools, government facilities, emergency operation centers, or other important buildings. It should be noted that this listing is not all- inclusive for assets located in the region.

While potentially not all-inclusive for the jurisdictions in Kitsap County, “georeferenced” assets include those assets for which specific location data is readily available for connecting the asset to a specific geographic location for purposes of GIS analysis.

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. [32, 72, 73, 74, 75,]

1. Kitsap Historical Society & Museum
2. Kitsap Maritime Heritage
3. Kitsap Regional Library
4. Military Historic Sites & Memorials
5. Puget Sound Navy Museum
6. South Kitsap Arts Association
7. 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. [32, 72, 73, 74, 75]

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. [32, 72, 73, 74, 75]

Kitsap is home to several world-class gardens including the internationally renowned Bloedel Reserve, the legendary Heronswood Gardens, and Elandan Garden's Bonsai Collection. [32, 72, 73, 74, 75]

The strong cultural influences of the Suquamish and Port Gamble S'Klallam tribes are integral to the Kitsap Peninsula. [92, 93] 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 usual and accustomed (U&A) to be sacred and sensitive[92, 93]. 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. [92, 93] Figure 15 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.

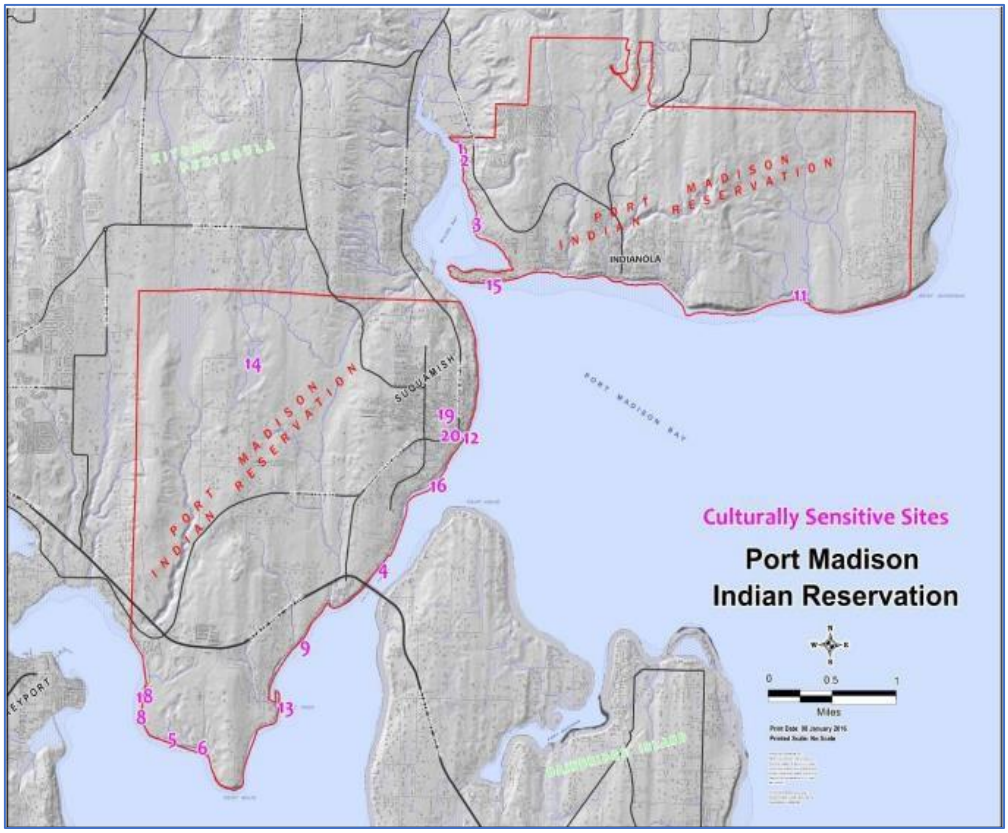


Figure 12: Map of Culturally Sensitive Sites Port Madison Indian Reservation.

Culturally Sensitive Sites	
Site ID Number	**Description**
1	Archaeological Site 45KP32 – Shell Midden
2	Archaeological Site 45KP33 – Shell Midden
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
11	Doe-Kag-Wats Marsh Complex
12	House of Awakening Cultural Complex
13	Kians Lodge Complex
14	Marsh Complex Island
15	Miller Bay Split Complex
16	Old Man House Archaeological Site (45KP2) and Historic Village
17	Sacred Place
18	Sacred Place
19	St. Peter Mission
20	Suquamish Cemetery

Table 13: Listing of Culturally Sensitive Sites Port Madison Indian Reservation.

In June 2021, 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 13) 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 13 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,

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. [11, 52]

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 areas. Many areas in Kitsap County are defined as "geological critical" areas with soft soil and a higher risk of shaking during earthquakes. [5, 11, 16]

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. [4, 37, 52]

Critical Areas

Figure 13 displays 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, and waterbodies), geologically hazardous areas, and frequently flooded areas. [4, 11,16, 37. 52]

Critical Areas of Kitsap County

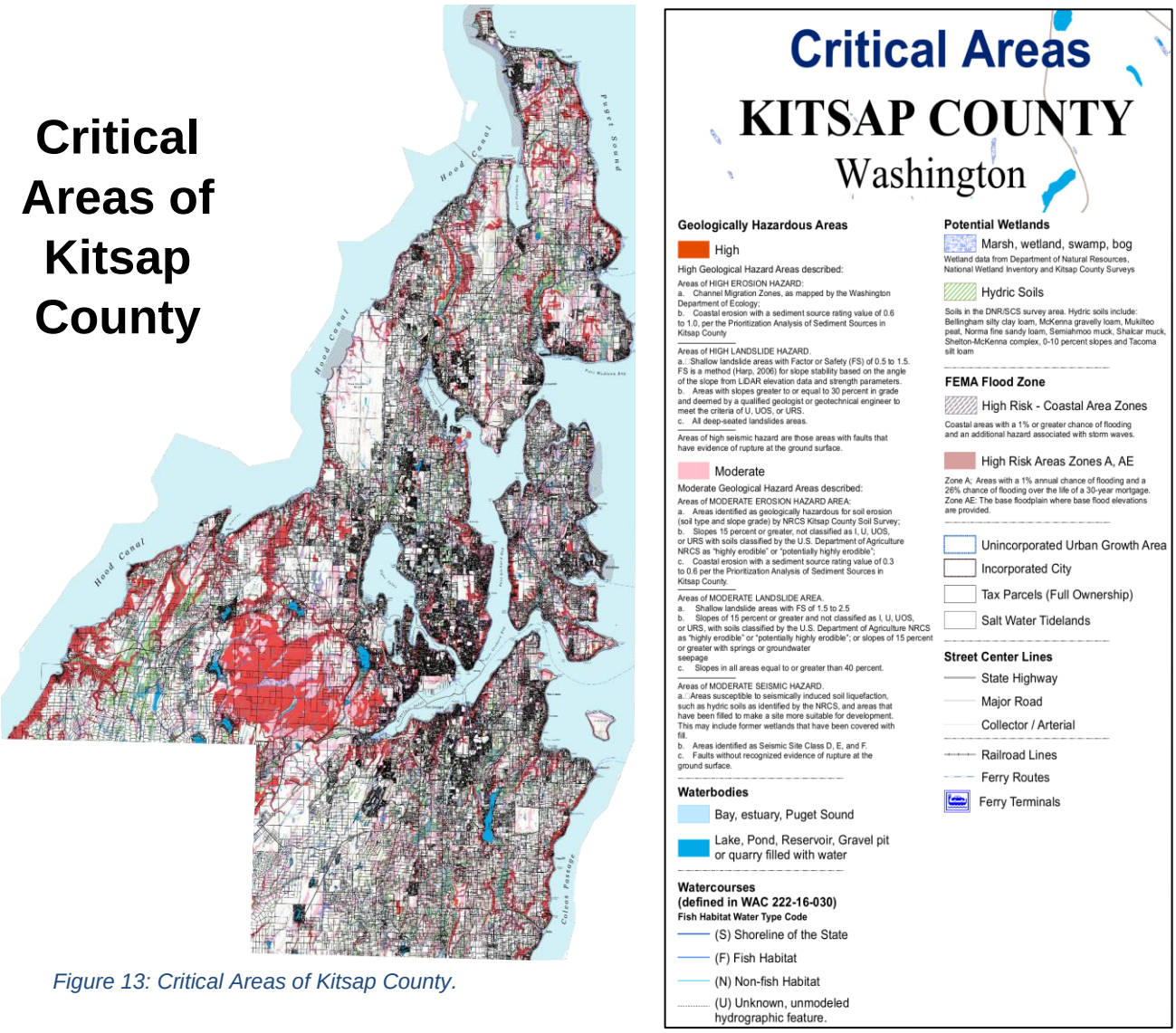


Figure 13: Critical Areas of Kitsap County.

B1- b. Does the plan include information on the location of each identified hazard?

Kitsap County Hazard & Disaster History

The frequency of historic events determines the prioritization of mitigation strategies and recommendations. Table 14 lists a historical perspective of disasters that have affected Kitsap County. Some general conclusions arise out of Kitsap County's disaster history: [5, 11, 12, 94, 95]

1. 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. [94, 95]

2. Since 1962, earthquakes have had the biggest economic impact on the county relative to costs and community disruptions. [94, 95]

3. 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. [94, 95]
4. 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.
5. From a historical perspective, mitigation efforts should concentrate on reducing the impact of winter storms, flooding, and earthquakes. [94, 95]

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 mitigation efforts targeted to control flooding, runoff, and other issues caused by winter storms. [94, 95]

Kitsap County's previous Mitigation efforts have been related to building resilience and improving community preparedness. A review of hazard-prone areas including those near landslide prone areas, tsunami and flood regions during this review, edit, and update of the Multi-Hazard Mitigation Plan shows that while previous mitigation strategies have improved resilience, there is much work still to be completed. Much of this is due to the ever-growing population of Kitsap County and the Partner Cities. While the population continues to grow the county continues to see an increase in the certain hazards. One area of increased hazard is the Urban Wildfire interface and thus an increase in mitigation strategies has been implemented. Another area of increased hazard is flooding and landslides, with the increased population there is also an increase in the built environment within Kitsap County, while community planning and development take this into account there is still a correlation between increase in built environment and increases in flooding and landslides. Flooding continues to be a hazard especially in the low-lying areas such as Kingston and Hansville along with Port Orchard; all of which have seen increases in flood activity since the 2019 approved MHMP. The flooding mitigation strategies from the 2019 plan have improved a number of culverts and flood zones within Kitsap County, however, there is still a large amount of continued work to be done.

Kitsap County Emergency/Disaster History 1962-2024[94, 95]			
Date of Incident	**Type**	**Declared**	**Comments**
2020	2 Biological Disasters	Federal Declaration	COVID and MPOX
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
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.
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.			

Table 14: Kitsap County Emergency/Disaster History 1962-2024.

Hazard Losses for Kitsap County

Kitsap County cumulative Hazard Losses 1960-2024 [95]			
Number of Hazard Events	**Number of Casualties**	**Property Damage**	**Crop Damage**
298	510	$311,670,381	$703,234

Table 15: Kitsap County Hazard Loss 1960 - 2024.

This page intentionally left blank.

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. [94, 95] Hazard assessment information from the 2022 THIRA is provided to build a comprehensive narrative on each specific hazard to present the mitigation strategies. The hazards and their mitigation

B2. DOES THE PLAN INCLUDE A SUMMARY OF THE JURISDICTION'S VULNERABILITY AND THE IMPACTS ON THE COMMUNITY FROM THE IDENTIFIED HAZARDS? DOES THIS SUMMARY ALSO ADDRESS NFIP-INSURED STRUCTURES THAT HAVE BEEN REPETITIVELY DAMAGED BY FLOODS?? (44CFR § 201.6(c)(2)(II))

B1-a. DOES THE PLAN DESCRIBE ALL NATURAL HAZARDS THAT CAN AFFECT THE JURISDICTION(S) IN THE PLANNING ARE, AND DOES IT PROVIDE THE RATIONAL IF OMITTING ANY NATURAL HAZARDS THAT ARE COMMONLY RECOGNIZED TO AFFECT THE JURISDICTION(S) IN THE PLANNING AREA?

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, and is not included in this plan.

Mitigation Strategy Updates from 2019 MHMP

A collection of completed Mitigation Strategies since the last MHMP update (2019) 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.[5, 16, 38, 45, 59,] 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).

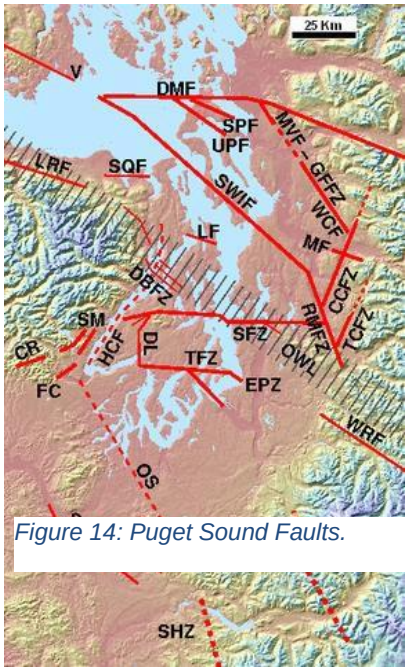


Figure 14: Puget Sound Faults.

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.[5,16, 59]

B1- b. Does the plan include information on the location of each identified hazard?

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 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.[1, 36,66]

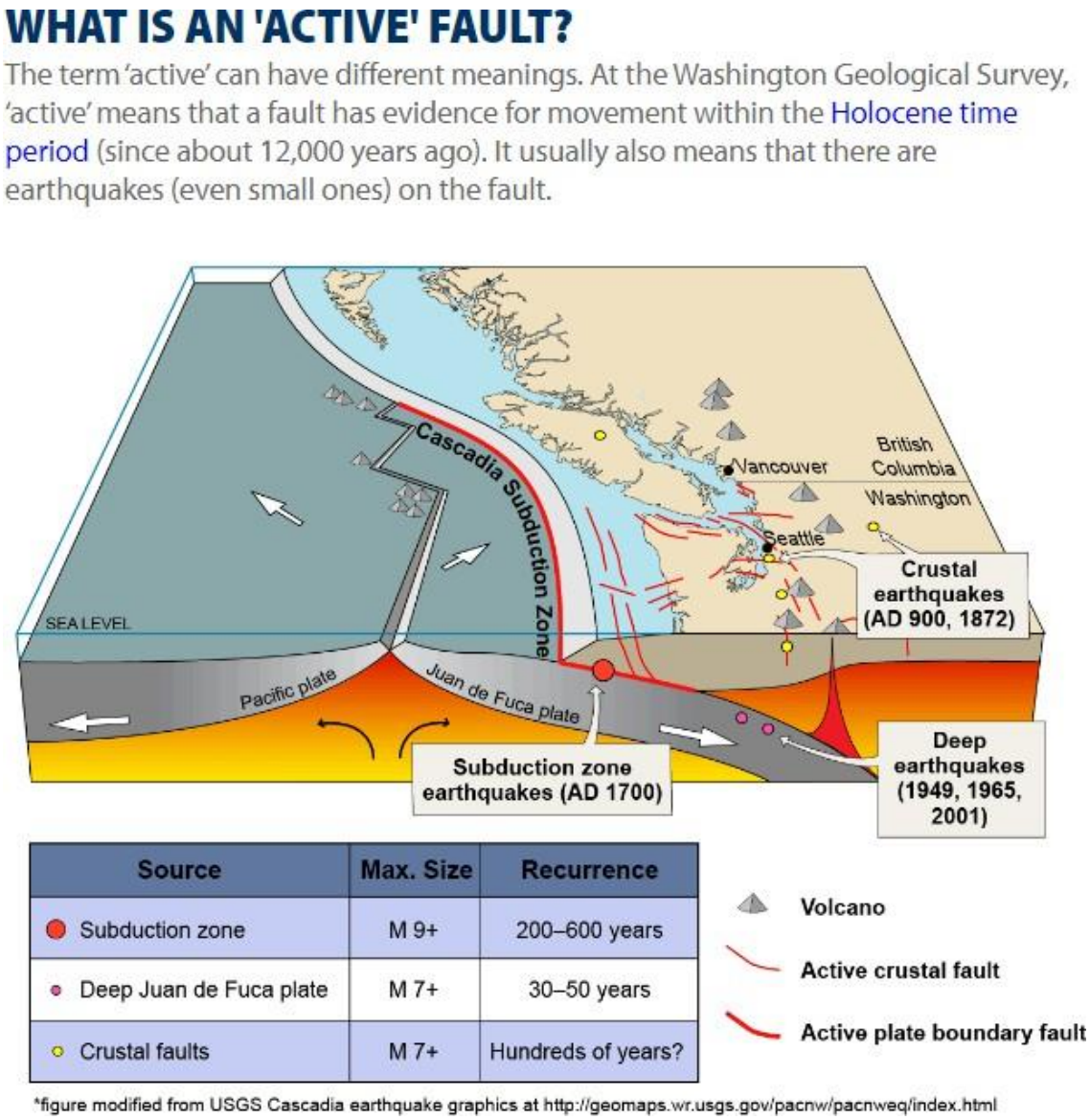


Figure 15: USGS Cascadia earthquake graphic.

'Normal' faults[96, 97]

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.

'Shallow' Faults[96, 97]

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' Faults[96, 97]

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 Faults[96, 97]

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. [96, 97, 98, 99] 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 / Extent

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[98, 34]. Depending on the

B1- c. Does the plan describe the extent for each identified hazard?

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[96, 97, 98, 99].

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: [96, 97, 98, 99]

- Broken water and sewer mains
- Downed electric lines
- Downed or damaged bridges
- 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.[16]

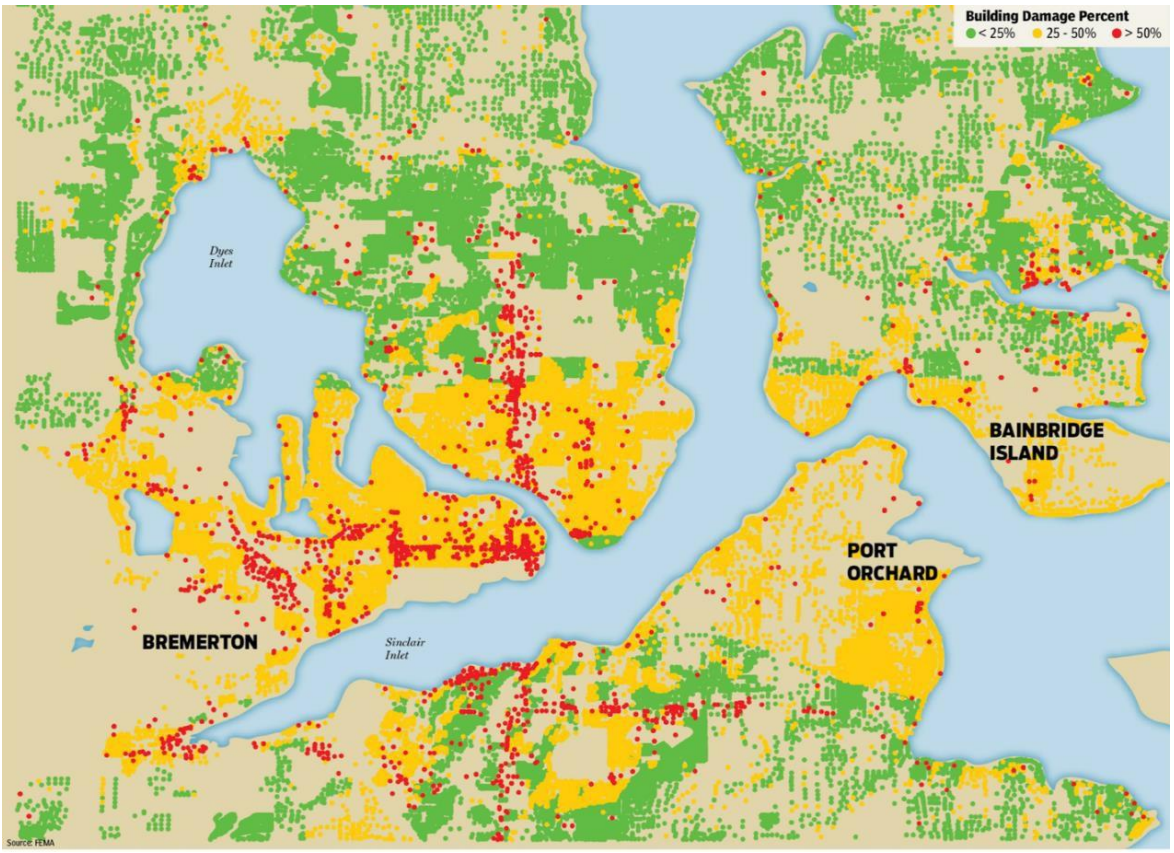
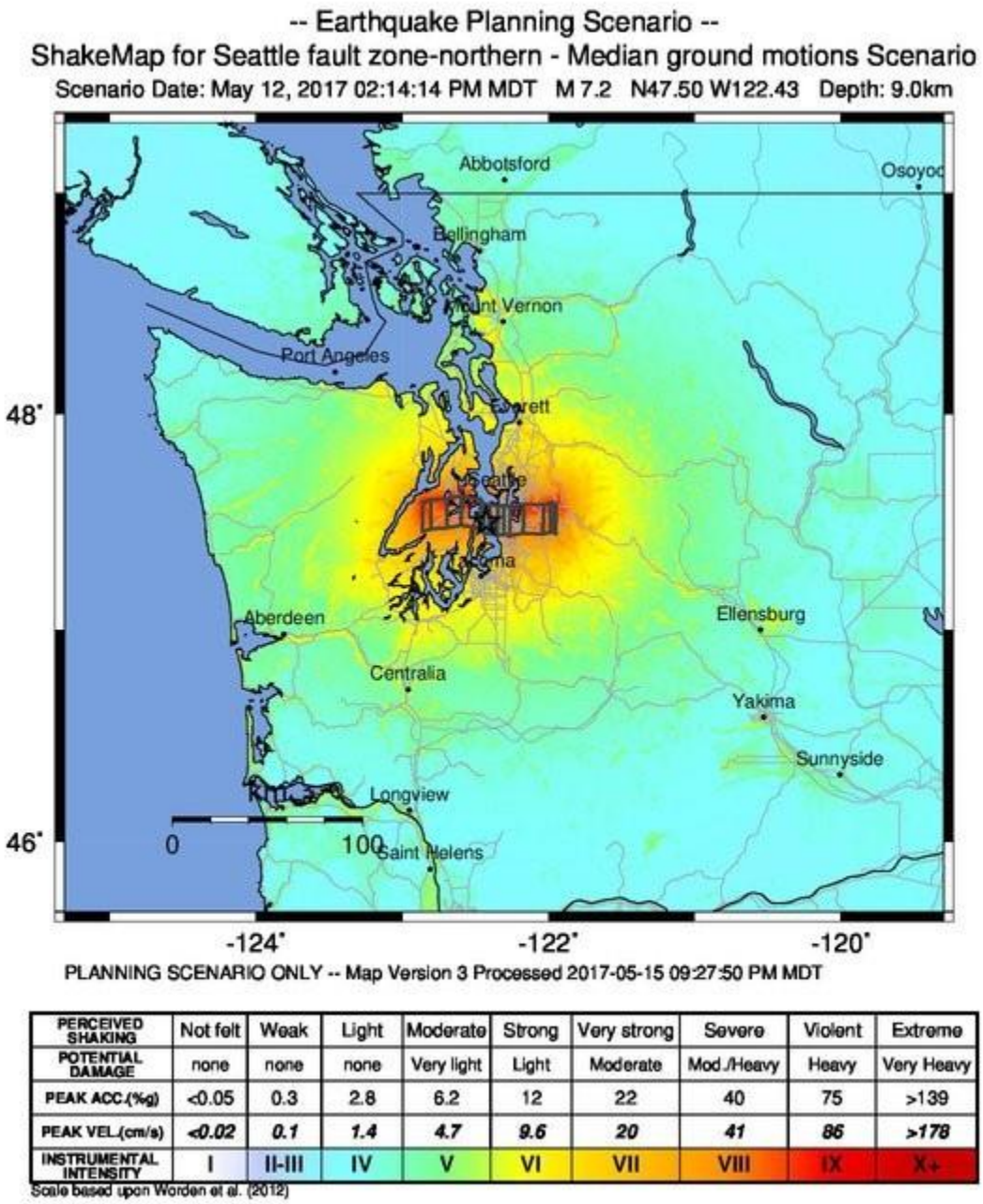


Figure 16: Building Damage Percent during a 7.2M Earthquake on the Seattle Fault.

An earthquake with such a magnitude (7.0+) would cause tremendous damage and economic disruption throughout the central Puget Sound region. 2022 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. [16, 96, 97] 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. [16]



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL.(cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Worden et al. (2012)

Figure 17: 7.2 Seattle Fault Zone ground motion scenario.

A severe (6.5+) 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[16, 96, 97]. 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.

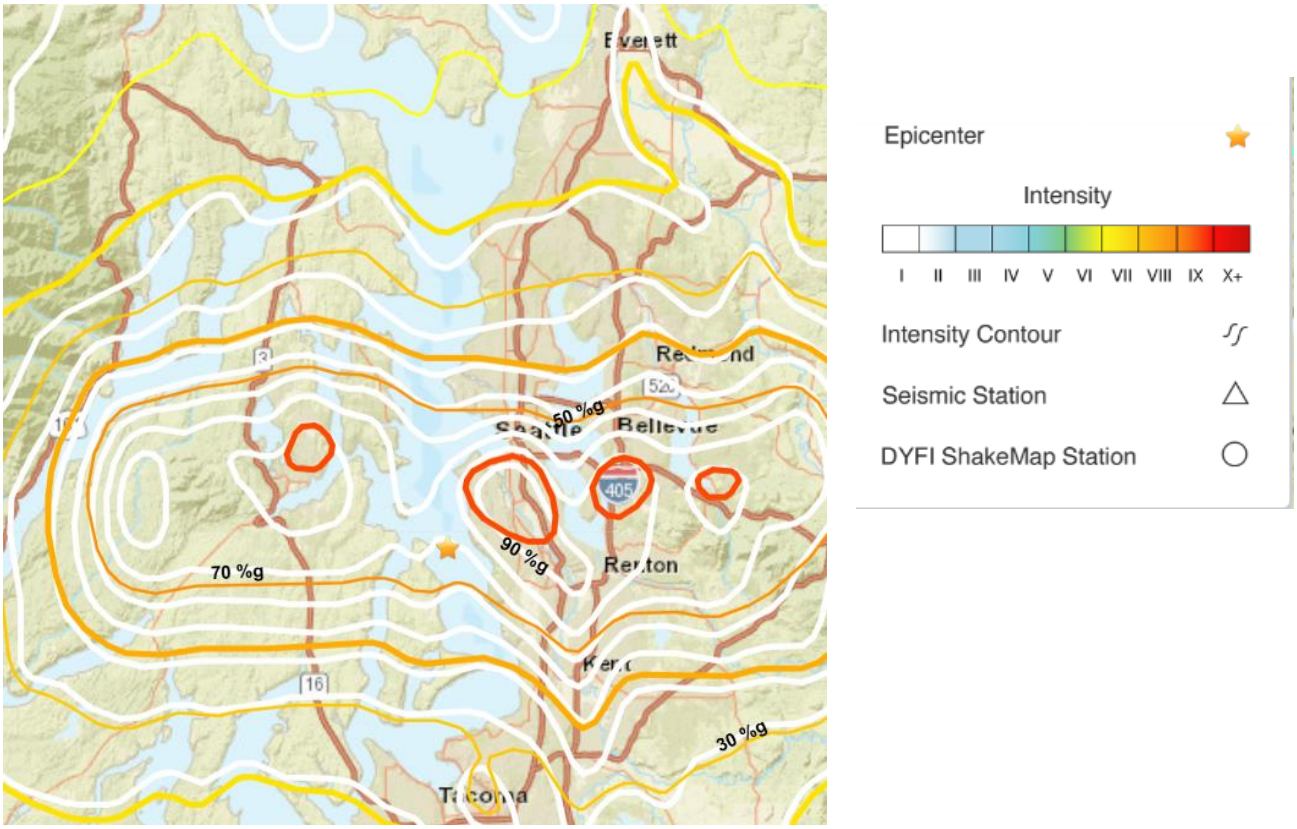


Figure 18: Estimated intensity of an 7.2 magnitude Seattle Fault earthquake.

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[38, 41, 98, 99]

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.

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
2.6 N JCT SR 303	SR 308 (LUOTO RD)	SR 3
2.6 N JCT SR 303	SR 308 (LUOTO RD)	SR 3
0.7 N JCT SR 304	SR 3	WERNER/LOXIE EAGAN
15.2 E JCT US 101	HOOD CANAL	SR 104
4.6 N JCT SR 302	BURLEY-OLLALA RD	NB SR 16
4.6 N JCT SR 302	BURLEY-OLLALA RD	SB SR 16
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 NARROWS	SR 303
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 Bridge was not evaluated as part of this 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[16], 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) [16] 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.

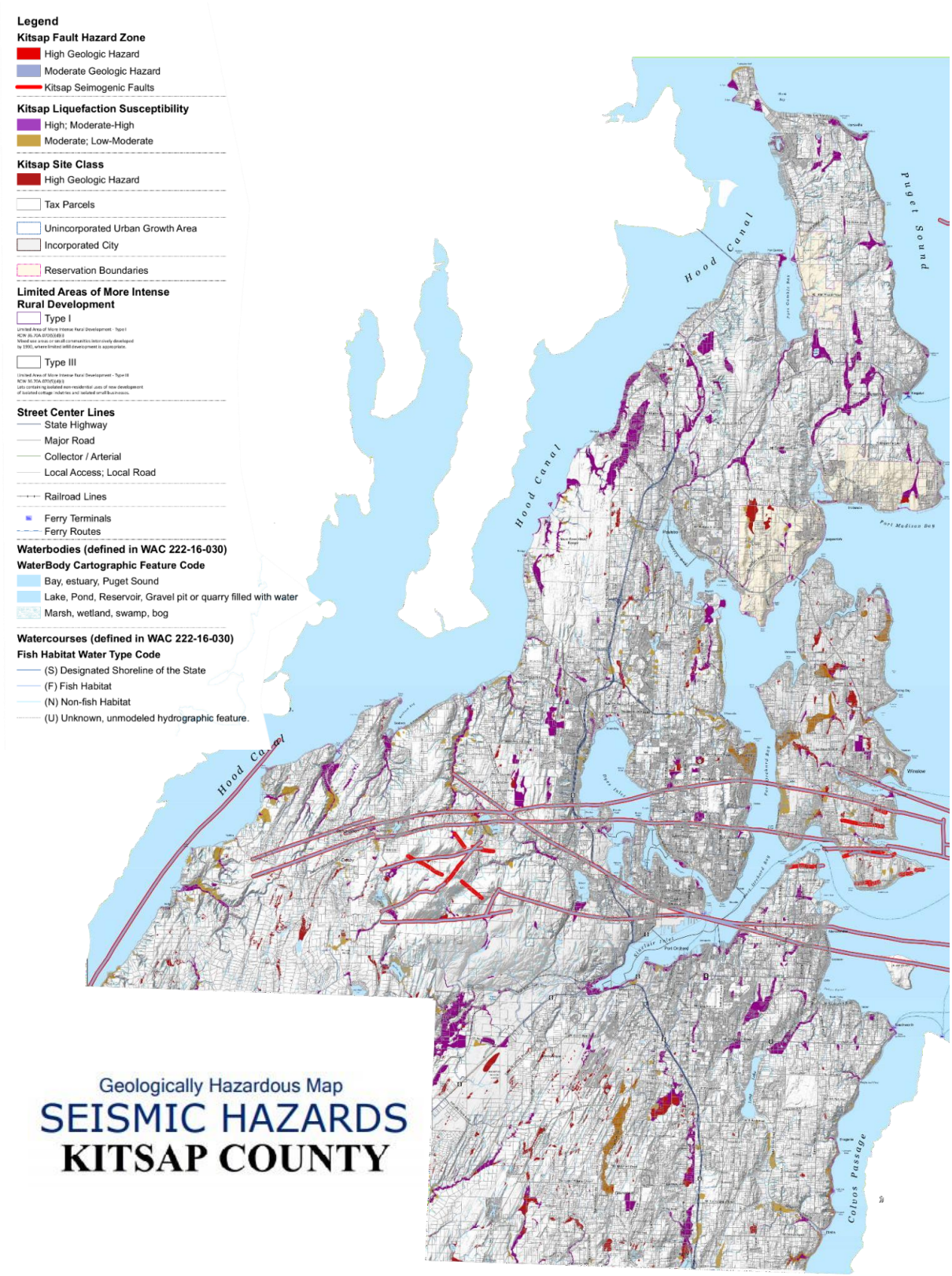


Figure 16: Seismic Hazards

B1- c Does the plan describe the extent for each identified hazard?

Expected 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[16, 96, 97]		
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	III	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.
7.3	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

ShakeMaps, maps depicting shaking intensity and ground motion following an earthquake, 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. Figure 19 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 Orchard, and

Bremerton, are all located in the severe (instrumental intensity VIII) to extreme (instrumental intensity X+) shake zones. [16, 96, 97]

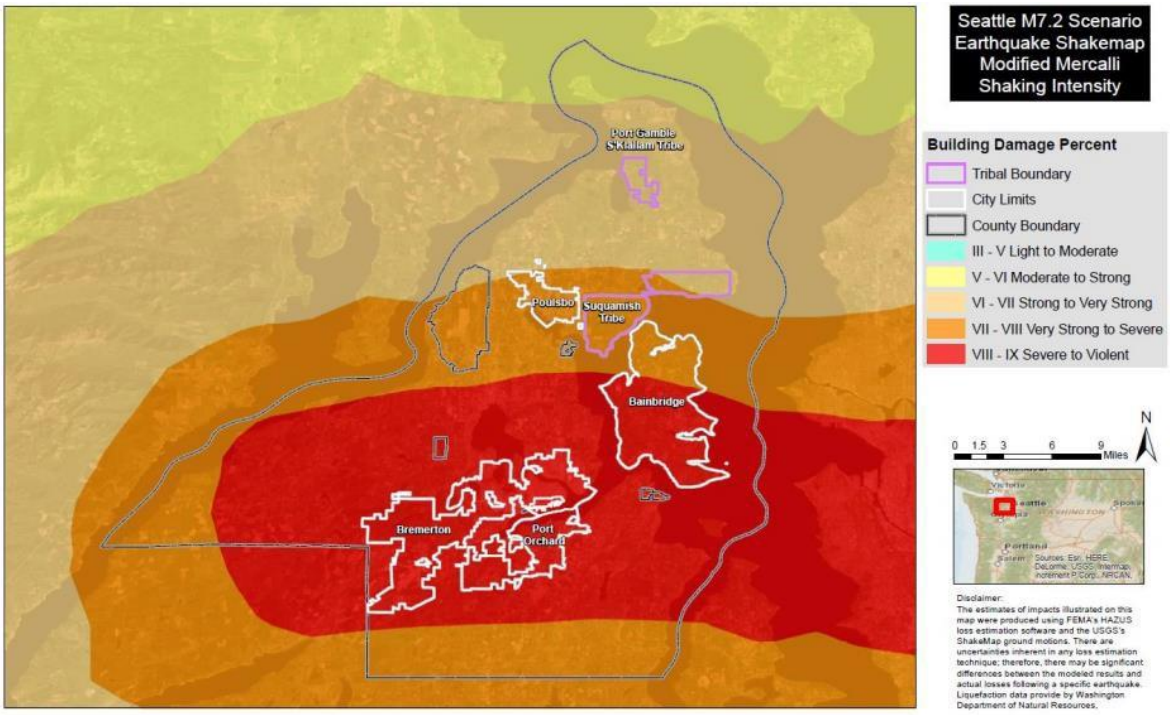


Figure 19: Shaking Intensity for a 7.2 Seattle Fault Earthquake.

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 to exceed $3.6 billion.

Hazus Earthquake Results for a Seattle M 7.2 Earthquake[16, 71, 32, 88, 89, 41]						
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
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 16: 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 2020 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; 91 medical facilities out of 184 are expected to have a greater than 50 percent chance of being damaged; and 16 fire stations out of 48 are expected to have a greater than 50 percent chance of being damaged. Transportation damage is not shown in the report.

Pre-Code versus Moderate Code Building in Kitsap County[10, 71, 32, 88, 89, 41]				
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
Unincorporated County	17,278	30%	40,523	70%
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: 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 17: Pre-Code versus Moderate Code Building in Kitsap County.

B1- d. Does the plan include the history of previous events for each identified hazard?

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 quake 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.[54]Previous deep earthquakes included a 6.5-magnitude quake near Des Moines in King County in 1965 and a 7.0-magnitude 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:

1. A magnitude of 7.5 incident of 40 or more kilometers in depth.
2. of 6.5 incident at a shallow depth in the vicinity of Mount St. Helens.
3. A magnitude of 7.5 incident at a shallow depth anywhere in western Washington of uncertain probability.
4. Subduction plate earthquakes of magnitudes greater than 8.0.

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

Table 18: Washington State Earthquakes

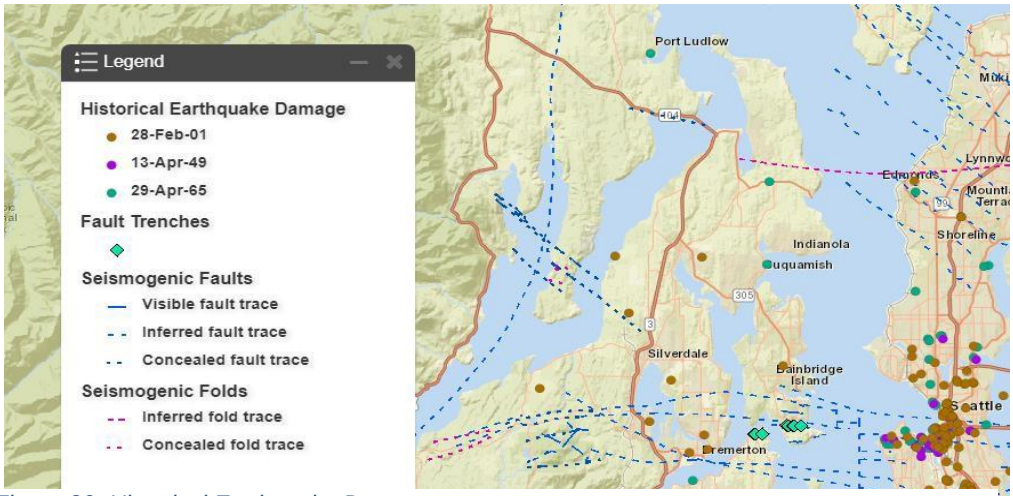


Figure 20: Historical Earthquake Damage.

B1- e. Does the plan include the probability of future events for each identified hazard?

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 Resources,[21] earthquakes occur nearly every day in the state. Like other counties, Kitsap County takes advantage of various available technologies to assess the likelihood and effect of earthquakes in the region. Such technology includes GIS mapping, Hazus, and evaluation of LIDAR (Light, Detection, and Ranging) and USGS studies about the country. Programs available from the USGS, such as the Washington State Earthquake Scenario Catalog, provide a variety of HAZUS modeling studies on

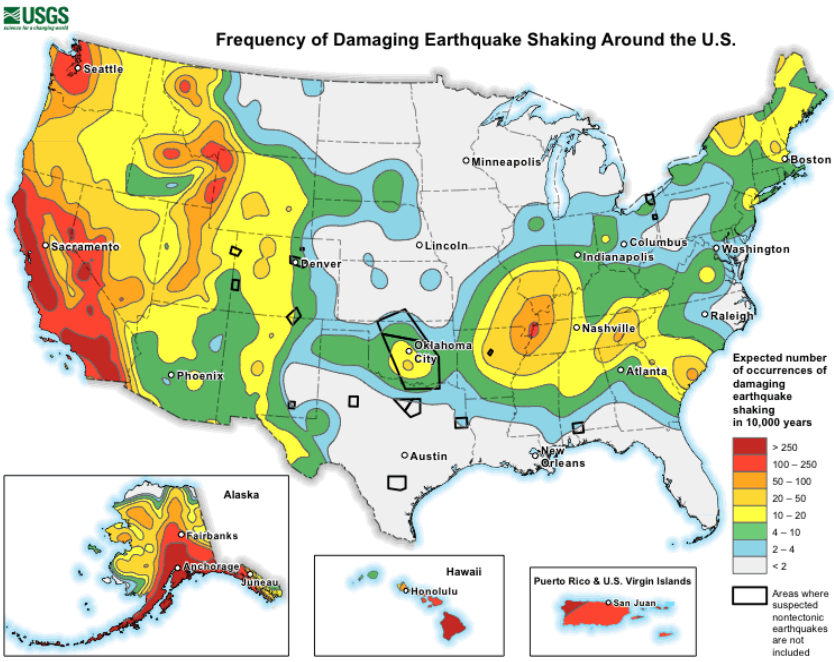


Figure 21: Frequency of Damaging Earthquake Shaking Around the US.

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.

B1- e. Does the plan describe the effects of future conditions, including climate change on the type, location, and range of anticipated intensities of identified Hazards?

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. [2, 14, 13, 21]

Vulnerability Summary

1. 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.
2. This hazard mitigation plan identified through collaboration with the partner cities details many of the most vulnerable structures within Kitsap County, these structures were chosen due to either their construction materials, or due to the fact that they have not yet been seismically upgraded or a combination of these. While the structures listed are considered the most vulnerable any and all structures within Kitsap County are at risk from earthquakes, and their aftershocks.
3. 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.
4. 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.
5. 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
6. 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.

a. 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 lies within multiple fault zones and as such will experience the effects from a major earthquake from activity of any of these faults. Earthquakes are identified as a high (>80%) risk due to the effects a major earthquake will have on the people, infrastructure, economy, and environment. Any major earthquake (>7.2 has a great potential to make Kitsap County an island limiting the ability to receive needed resources from outside the area. Within Kitsap County a major earthquake (>7.2) will also divide the county into impassable “micro-islands” that will require the development of unique methods to restock supplies and needed resources to provide for the population and their recovery Mitigation efforts must be instituted and maintained to decrease potential problems from major earthquakes. They are:

1. Examination, evaluation, and enforcement of effective building and zoning codes.
2. Public education on what to do before, during, and after an earthquake.
3. 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

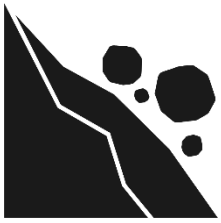
Earthquake/Tsunami Mitigation Strategy 1	
Promote public seismic risk retrofit for residential sector to include educational workshops on foundation bolting, tie downs, and necessary bracing actions.	
GOAL Reduce injury from falling objects through information and education. • Lead agency will continue 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
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
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	Ongoing, will be continued through the 2025-2029 period.

Earthquake/Tsunami 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
Jurisdictions incorporated into this strategy	Bremerton, Port Orchard, Kitsap County
Implementation Time	1-5 years
Implementation Cost	Estimated $100,000-$500,000
Potential Funding Source	Local, State
Status	Continued. To be completed. Feasibility studies to beeval;uated and started.

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
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	Moderate
Implementation Time	By 2024
Implementation Cost	Estimated up to $100,000
Potential Funding Source	Local, State
Status	Ongoing, will be continued through the 2025-2029 period.

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
Jurisdictions incorporated into this strategy	Bainbridge Island, Poulsbo, Kitsap County
Priority	Moderate
Implementation Time	1-5 years
Implementation Cost	Estimated $50,000
Potential Funding Source	Local, State, Federal
Status	Ongoing, Kitsap in 2024 has started the development of a “Marine Unit” This will continue through at a minimum the 2025-2029 period.

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.[5, 11] 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. [5, 11] 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[5, 11]. 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: [5, 11]

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

B1- b. Does the plan include information on the location of each identified hazard?
B1- c. Does the plan describe the extent for each identified hazard?

Location/Extent

Kitsap County is subject to landslides and soil erosion due to wind, water, and flooding at all times of the year figure 22 shows susceptibility to landslides in Kitsap County. 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[5, 21, 46, 48, 51]. 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 zone[5, 21, 46, 48, 51].

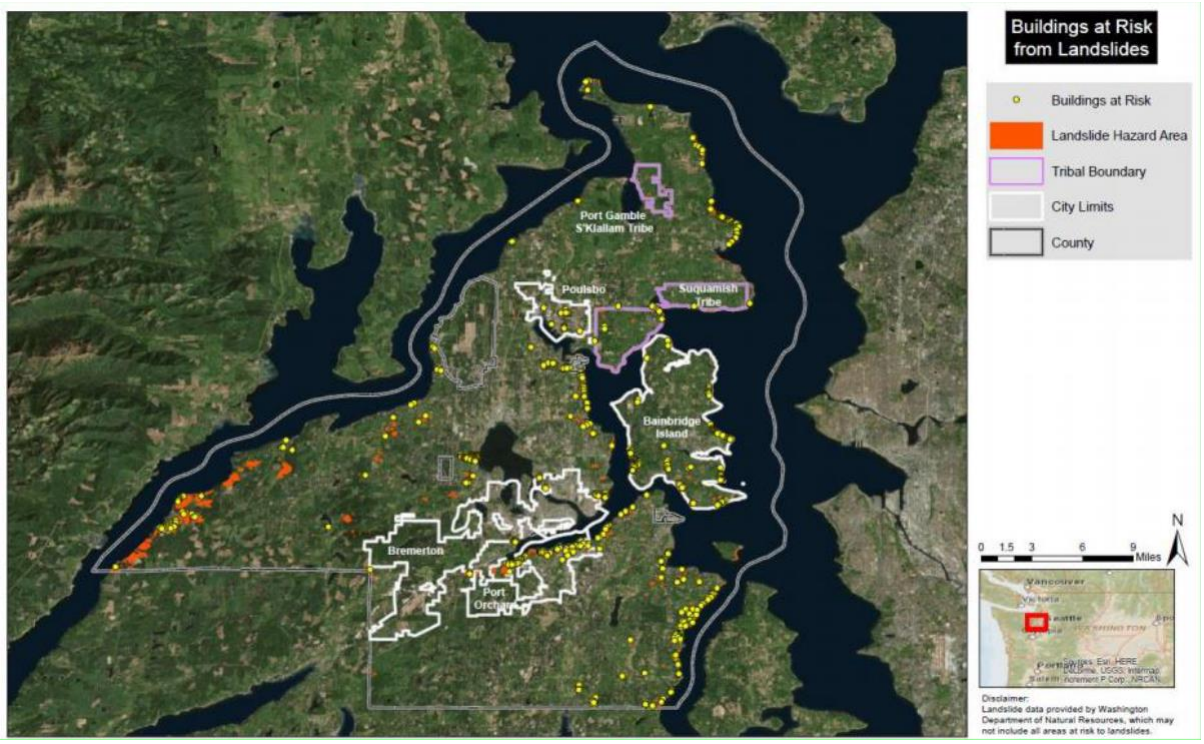


Figure 22: Shallow Landslide Susceptibility Zones and Building Impacts.

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 centric 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 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 [32, 47]		
Community	**Buildings within Landslide Zone**	**Building Value with Landslide 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 19: Building Exposure to Landslides.

B1- d. Does the plan include the history of previous events for each identified hazard?

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.[12, 17] 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.[50]

B1- e. Does the plan include the probability of future events for each identified hazard?

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. Landslides on the 2023 Risk hazard for Kitsap County is moderate (>75%) due to the county's history of landslides, the areas that have the highest probability to landslide

(high population areas), and the damages that would result from large landslides within Kitsap County. Figure 24 shows highly probable areas within Kitsap county for landslides, however, 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, Information from the Washington Department of Natural (WA DNR) LIDAR Portal was utilized to retrieve and model 2018 data.

Kitsap County LIDAR Defined Landslides (2018)[11]			
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 20: Kitsap County LIDAR Defined Landslides (2018).

Landslide events often occur within the boundaries of pre-existing deep-seated landslide deposits. Like the 2008 LIDAR data, the most current WA DNR (2018) LIDAR data modeling identified, a total of 231 landslides[11], 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 Zone	Building Value with Landslide 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 21: Building Exposure to Landslides.

Landslides are common in areas with steeper slopes and wet environments, which are also often locations of greater ecological diversity [96, 97]. Landslides mobilize soil and often stress rehabilitative regeneration processes within upland denuded areas. This soil loss is often permanent. 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, soil losses detrimental to upland ones. [96, 97]

The Landslide

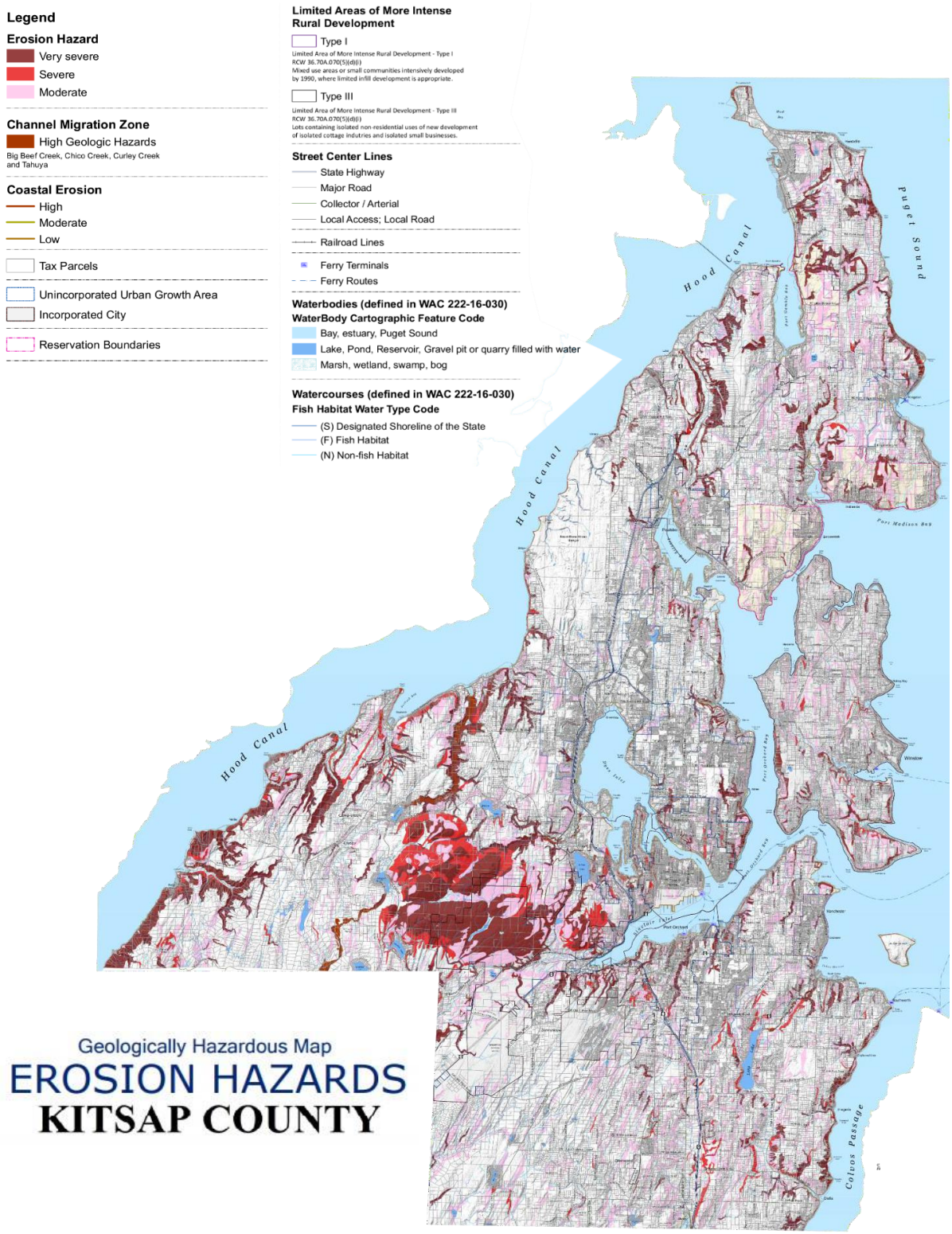


Figure 23: Kitsap County Erosion Hazard Map

Hazard map 23 and 24 show detailed information on deep and shallow landslides, as well as limited areas of more intense rural development, waterbodies, and watercourses of Kitsap County. Figure 23 is an Erosion Hazard map moderate to severe land and coastal erosion. 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.

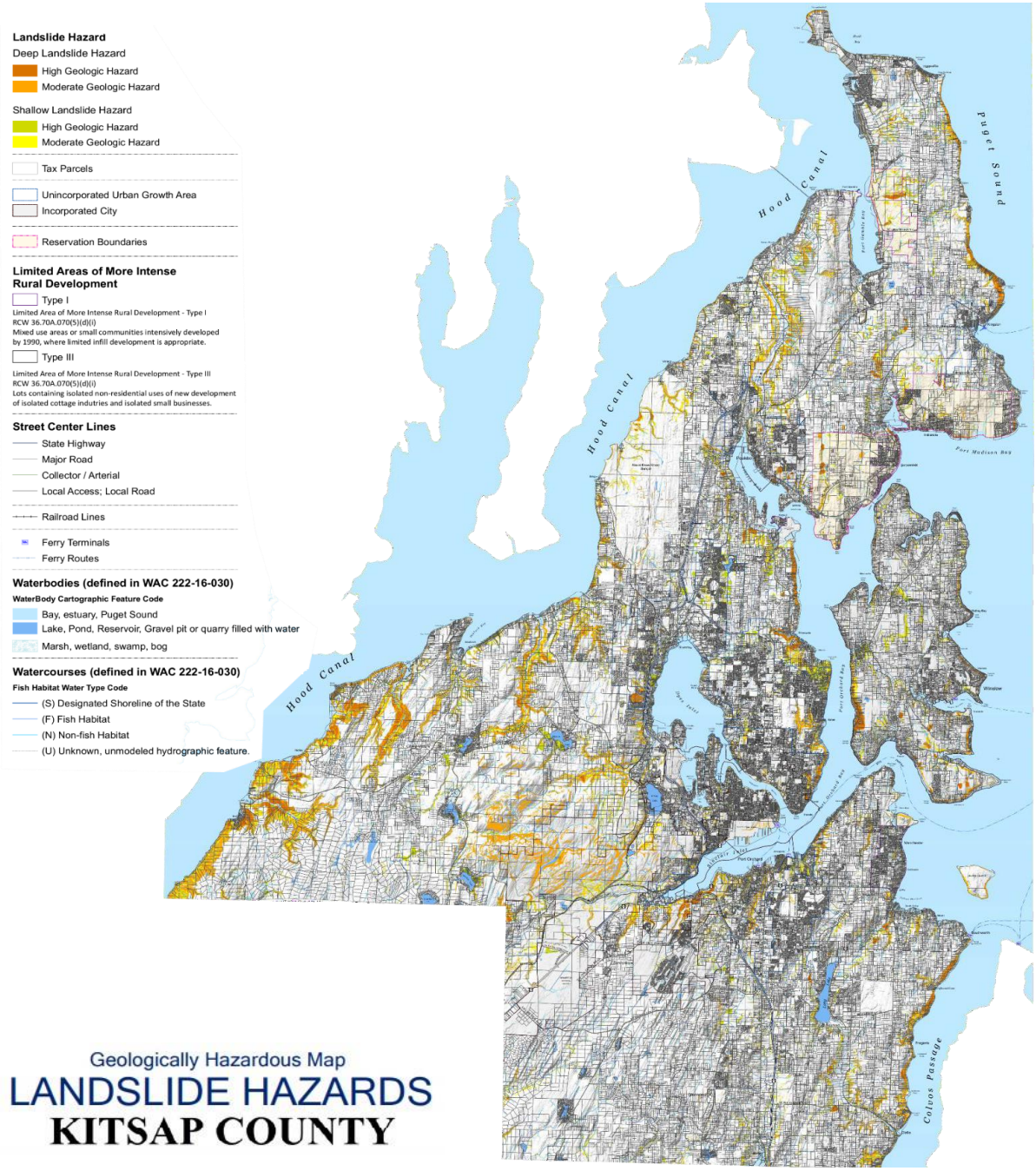


Figure 24: Kitsap County Landslide Hazard Map

B1- e. Does the plan describe the effects of future conditions, including climate change on the type, location, and range of anticipated intensities of identified Hazards?

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[2.]. Climate change predicts that the region will see increased rainfall and flooding which increases the likelihood of landslides in the region.

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.[2, 11, 17] 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.[2]

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. [2, 5]

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.[2] 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. [2 Most] 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.[2] Higher seas could limit the transport of sediment from rivers to Puget Sound and increase the rate of erosion in some coastal areas. [2, 11, 17]

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. [2, 11, 17]

Vulnerability Summary

1. Landslide/erosion vulnerability and effect on Kitsap is considered **"moderate,"** (>75%) meaning there is moderate potential for a disaster of less than major proportions during the next 25 years.

2. 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[9, 10, 11, 42, 47].

3. 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.

4. The State of Washington rates landslide losses second to flood losses for Washington state.

5. The most significant effects of landslides are injury or death, disruption of transportation, and the destruction of property.[96, 97]

6. 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.

7. 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.

8. In conjunction with the Growth Management Act (RCW 36.70A), Kitsap County and its local jurisdictions have identified landslide 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. Kitsap County and the participating jurisdictions will be looking for grant funding to conduct this geotechnical investigative work along with developing preventive improvements in the region.

9. 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[11].

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:

1. Kitsap County Critical Areas Ordinance, December 2017[32,]
2. City of Bainbridge Island Critical Area Ordinance, January 2019[70]
3. City of Poulsbo Chapter 16.20 Critical Area Ordinances, July 2007[55]
4. Port Orchard Critical Ordinance, December 2009[56]
5. *Port Orchard Municipal Code, June 11, 2019*
6. City of Bremerton Critical Lands Ordinance, June 2016[57]

However, the County and partner city jurisdictions need to conduct more public education concerning the construction of single-family structures in slide hazard areas and to reduce efforts to develop these areas. These public education programs will be areas for future grant funding efforts. 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. All of these strategies are areas where Kitsap County and the partnering City Jurisdictions will be looking for future grant funding opportunities.

Mitigation Strategies

Landslide & Erosion 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.	
Goal - Reduce the hazard to life, property and infrastructure.	
Lead	Department of Community Development with support from KCDEM
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	High
Implementation Time	3 years
Implementation Cost	Estimated $1,000-$5,000
Potential Funding Source	Local, State
Status	Ongoing, resources from the WA DNR were utilized for this review and edit, however, new data and modeling is needed due to the increase in development within Kitsap County.

Landslide & Erosion Mitigation Strategy 2	
Utilize Public Access Television to educate on the causes of erosion and how to mitigate further erosion.	
Goal - Reduce the hazard to life, property and infrastructure.	
Lead	The lead agency would be Community Development in coordination with Public Works.
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
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	Ongoing will continue through the 2025 – 2029 MHMP at a minimum.

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[96, 97]. These waves can travel 500 miles per hour in the open ocean[96, 97]. As they approach the coast, their speed decreases, and their amplitude increases, potentially reaching heights of over 100 feet[96, 97]. 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[96, 97].

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[96, 97]. 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. Figures 25 and 26 show projected maximum inundation depths and potential inundation zones.

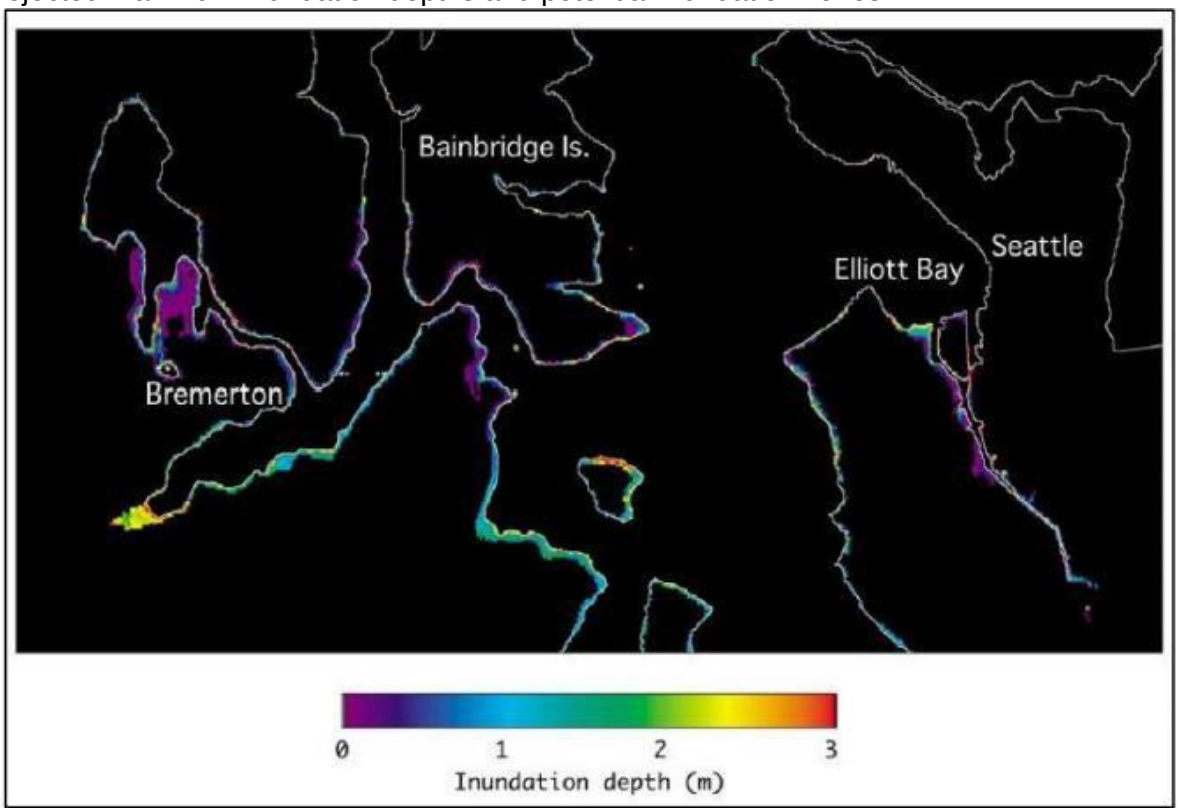


Figure 25: Maximum Inundation Depths for the Tsunami Generated by the Seattle Fault Scenario.

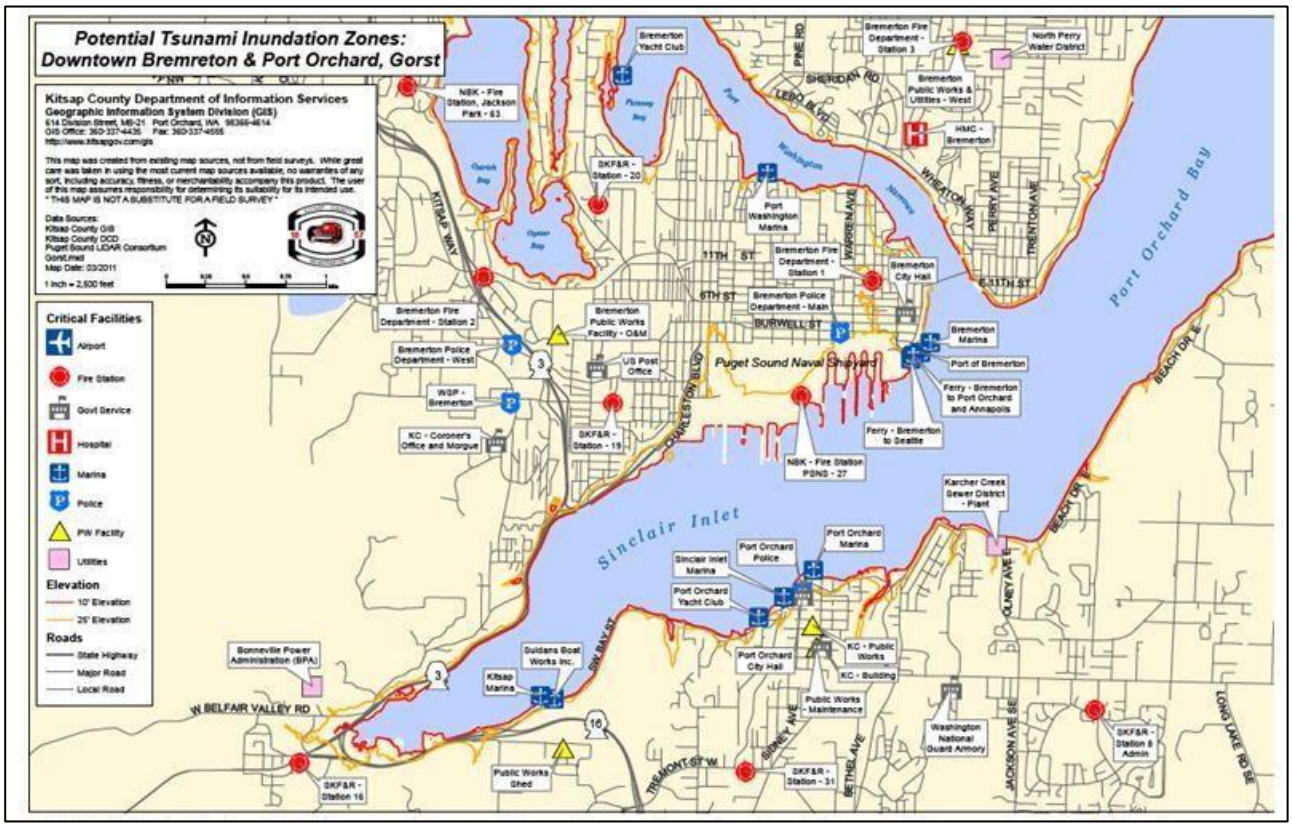


Figure 26: Potential Tsunami Inundation Zone for Bremerton and Port Orchard (Kitsap County GIS (2022)

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[37, 47, 49, 52]. Even an order-of-magnitude smaller Tacoma fault-generated tsunami would generate strong currents in the narrow straits and harbors near Gorst[37, 47, 49, 52]. 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. Table 22 identifies and breaks down the structures in the hazard area[37, 47, 49, 52].

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
Port Gamble S'Klallam Reservation	270	4	1.5	5	0	0
Totals (Kitsap)	**129,380**	**6377**	**4.9%**	**513**	**27**	**5.2**

Table 22: Building Stock and Critical Facilities by Jurisdiction Affected by Tsunami.

Table 23 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.[96, 97]

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

Table 23: Types of Tsunami Risk (WADNR).

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[96, 97].

Deep (Benioff zone) earthquakes do not produce tsunamis. However, they may trigger landslides that could generate tsunamis.[5]

Cascadia Subduction Zone Earthquakes[75]

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. [5, 21]

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).

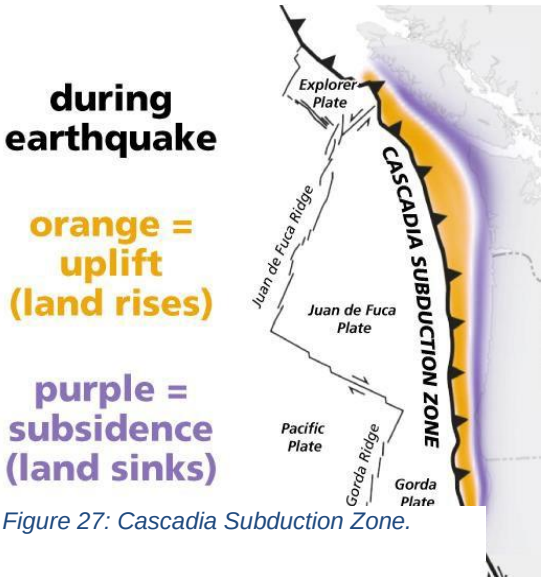


Figure 27: Cascadia Subduction Zone.

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 landslide-generated tsunami deposits that were triggered by 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.

B1- d. Does the plan include the history of previous events for each identified hazard?

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. [94 96, 97]

An earthquake-induced landslide in 1949 at Salmon Beach in the Tacoma Narrows generated a 6-8-foot tsunami that hit Gig Harbor[94 96, 97]. 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[21].

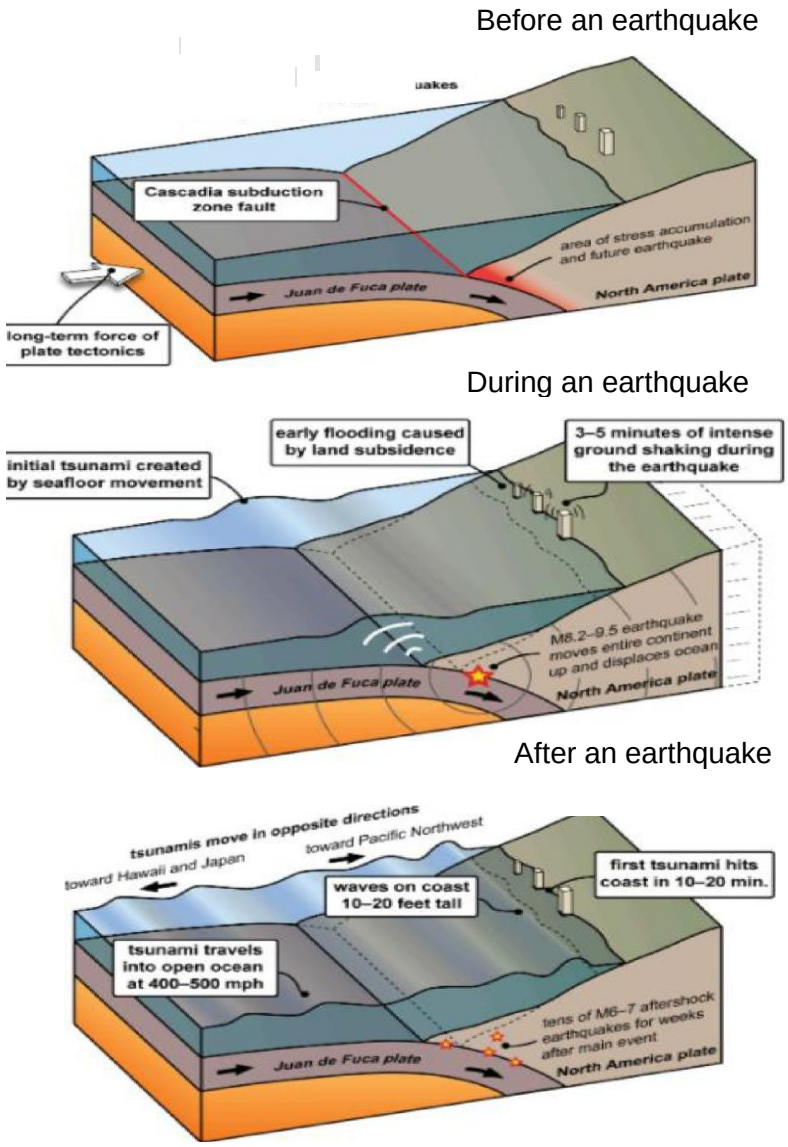


Figure 28: earthquake modeling

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.[16]

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

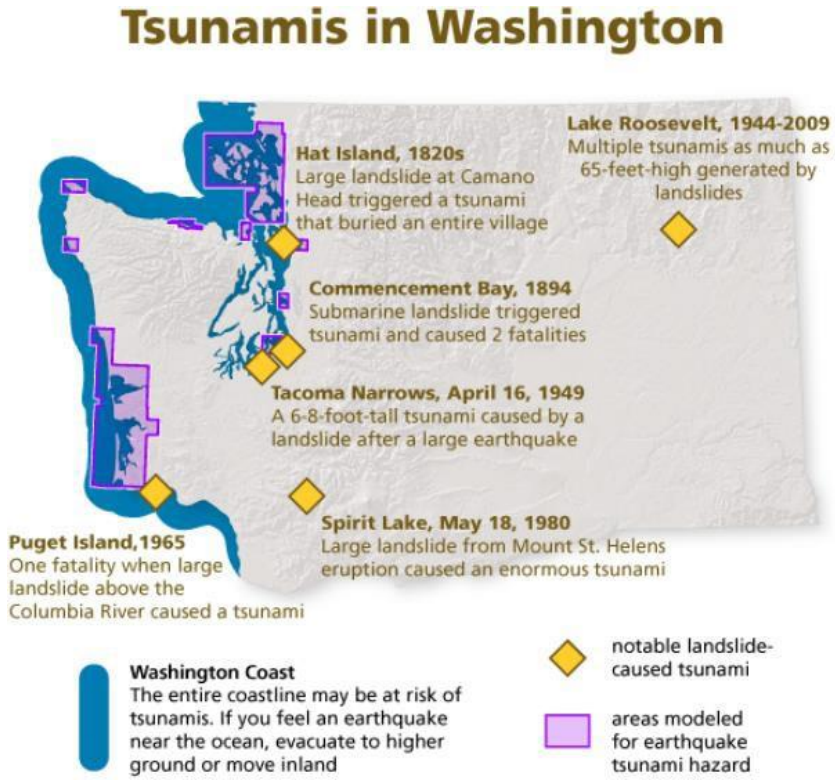


Figure 29: Tsunamis in Washington.

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.

B1- e. Does the plan describe the effects of future conditions, including climate change on the type, location, and range of anticipated intensities of identified Hazards?

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[2].

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," (>60%)** meaning there is a moderate potential for a disaster of less than major proportions during the next 25 years. Kitsap County's tsunami risk assessment is based on the facts that the damages to the built environment, economy and people would be moderate to high, and the probability of a tsunami is relatively low, however there are indicators that Kitsap County and the partnering city jurisdictions will see tsunami impacts from any large subduction zone activity. 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 most likely will 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.

Conclusions

Within Kitsap County earthquakes will occur and will most likely 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.

This hazard mitigation plan identified through collaboration with the partner cities details many of the most vulnerable structures within Kitsap County, these structures were chosen due to either their, location close to Tsunami susceptible areas, or their elevation (<100ft) above the water line in a tsunami possible area or a combination of these. While the structures listed are considered the most vulnerable many structures within Kitsap County are at risk from tsunamis depending on the severity, height of the waves, and length of the tsunami activity.

Kitsap County and the participating City Jurisdictions will continue to pursue grant funding to provide and complete the mitigations strategies that are provided in this plan along with any new or revised mitigation strategies developed. 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.	
Goal – Reduce the hazard to life, property and infrastructure • Workshops should serve to educate local waterfront facilities and businesses to the nature of the tsunami threat, inform them of all available options for evacuation, and train them in assessing their particular facility. This project will require a minimum of 3 workshops: (1) Tsunami Preparedness and Mitigation for Waterfront Businesses, (2) Facility Assessment Training, and (3) Evacuation Planning for Waterfront Businesses. • This strategy should be approached in a manner consistent with the Education & Outreach Plan Washington State EMD and its Inner Coastal Tsunami Workgroup, proposed by Washington Sea Grant for the Reducing Earthquake Tsunami Hazards in Pacific Northwest Ports & Harbors project.	
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, especially those within low lying or tsunami hazard zones as noted, will be requested. Additional resources may be available through the Washington Sea Grant Program
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
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, and pursuing any grand funding related to tsunamis.
Status	This is an ongoing project, and is included in every presentation done by Kitsap County Department of Emergency Management

Tsunami Mitigation Strategy 2	
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.	
Goal - Reduce the hazard to life and property.	
Lead	KCDEM Outreach and Education
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	High
Implementation Time	Ongoing
Implementation Cost	No immediate cost
Potential Funding Source	Loca and pursuing any grand funding related to tsunamis.
Status	In progress. Continued through the period of this plan. This is an ongoing initiative. During this plan period this strategy may be combined with Tsunami Mitigation Strategy #2.

Tsunami Mitigation Strategy 3	
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.	
Goal - Reduce the hazard to life and property. • 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.
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
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, and pursuing any grand funding related to tsunamis.
Status	Ongoing, Delayed due to the global pandemic. This strategy will be implemented with WA State partnership in the next biennium.

Tsunami Mitigation Strategy 4	
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.	
Goal – Build Capacity and Resilience • 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
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	High
Implementation Time	1 to 2 years
Implementation Cost	In kind
Potential Funding Source	In Kind, Local, and pursuing any grand funding related to tsunamis.
Status	To be completed. This is being planned for a 2026 Tabletop exercise.

Tsunami Mitigation Strategy 5	
Public warning and education regarding tsunami hazards.	
Goal - Reduce the hazard to life and property. Goal – Increase Community Resilience • 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 Support agency WA DNR.
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	High
Implementation Time	1 year
Implementation Cost	Total cost: $5,000
Potential Funding Source	Local, Stat, and pursuing any grand funding related to tsunamis.
Status	In progress, Ongoing. 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."

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
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	Moderate
Implementation Time	By 2024
Implementation Cost	Estimated up to $100,000
Potential Funding Source	Local, state, Federal, and pursuing any grand funding related to tsunamis.
Status	To be completed. Ongoing as funding becomes available, continued review of projects and feasibility to funding.

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 • Bainbridge Island Prepares, Bainbridge Flotilla, Kitsap Marine Unit.	
Lead	Washington Department of Transportation and KCDEM,
Jurisdictions incorporated into this strategy	Bainbridge Island, Poulsbo, Kitsap County
Priority	Moderate
Implementation Time	1 to 5 years
Implementation Cost	Estimated $50,000
Potential Funding Source	Local, state, Federal, and pursuing any grand funding related to tsunamis
Status	Ongoing, work on the newly developed Kitsap Marine Unit with an exercise involving BP, BIF, and KCMU in 2027.

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[63]. 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[63].

B1- b. Does the plan include information on the location of each identified hazard?

Location

With much of the county in various stages of forestation, nearly all areas are vulnerable to fire. Human- caused fires in both urban and wild environments can happen during all times of the year[62, 63]. More prevalent use of synthetic building and furniture materials can also significantly accelerate fires once ignited. Figure 30 below shows the historic locations of wildfires within Kitsap County[63.]

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[62, 63].

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.[94, 95]

B1- c. Does the plan describe the extent for each identified hazard?

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.[63, 94, 95]

B1- d. Does the plan include the history of previous events for each identified hazard?

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

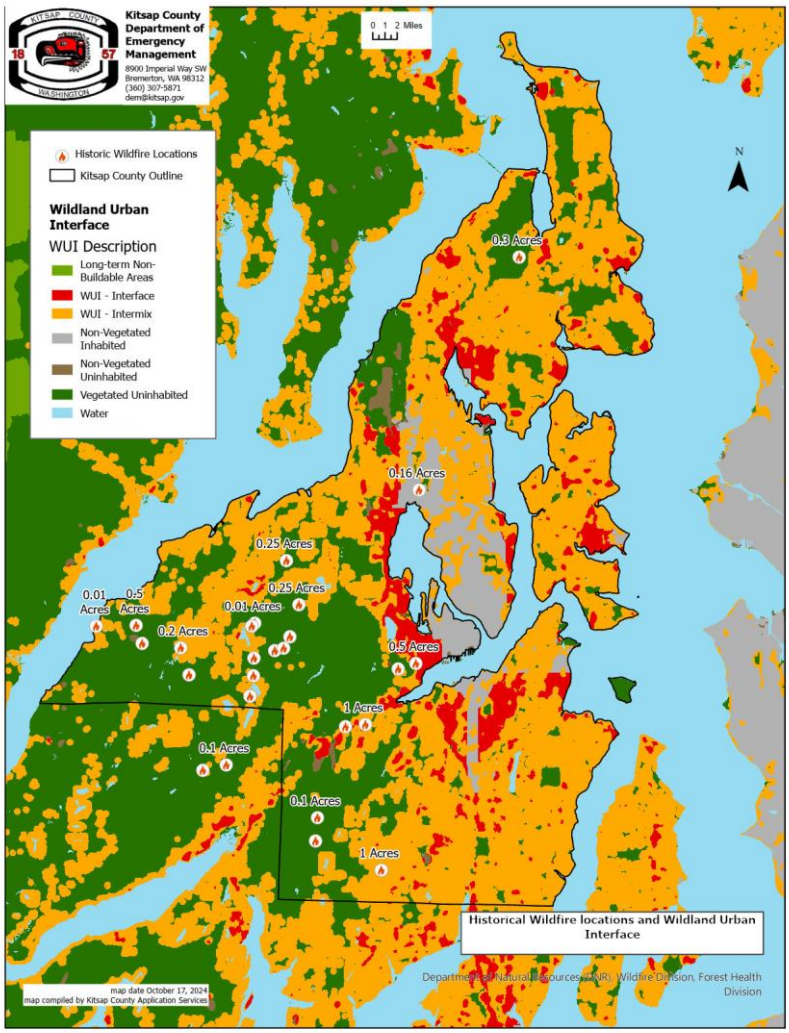


Figure 30: Historical Wildfire locations and Wildland Urban Interface.

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[94, 95]. 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[94, 63].

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[63]. 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.

B1- e. Does the plan include the probability of future events for each identified hazard?

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,[63] such as failing to extinguish smoking materials or campfires properly.
Washington State's fire season usually runs from July through October,[53, 63] although large fires can occur during the winter. The probability of an interface fire in any one locality on a particular day 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.

There are 53,679 properties in Kitsap County that have some risk of being affected by wildfire over the next 30 years. This represents 45% of all properties in Kitsap County [53, 101] In addition to damaging properties, wildfire can also cut off access to utilities, emergency services, impact evacuation routes, and may impact the overall economic well-being of an area. Overall, Kitsap County has a moderate risk of wildfire over the next 30 years. This is based on the level of risk the properties face rather than the proportion of properties with risk according to the US Forest Service (USFS) data and modeling. Figure 31 identifies the areas within Kitsap Couty at highest fire risk. According to the most current USFS Landfire data (2021) 38 percent of residential homes, 21 percent of commercial properties, and 38 percent of the infrastructure are at least a moderate risk for WUI fire. This risk hazard is expected to grow substantially over the next 30 years at which time it is expected that over 85 percent of the residential properties will be at moderate or higher risk from WUI fires [101, 102, 103].

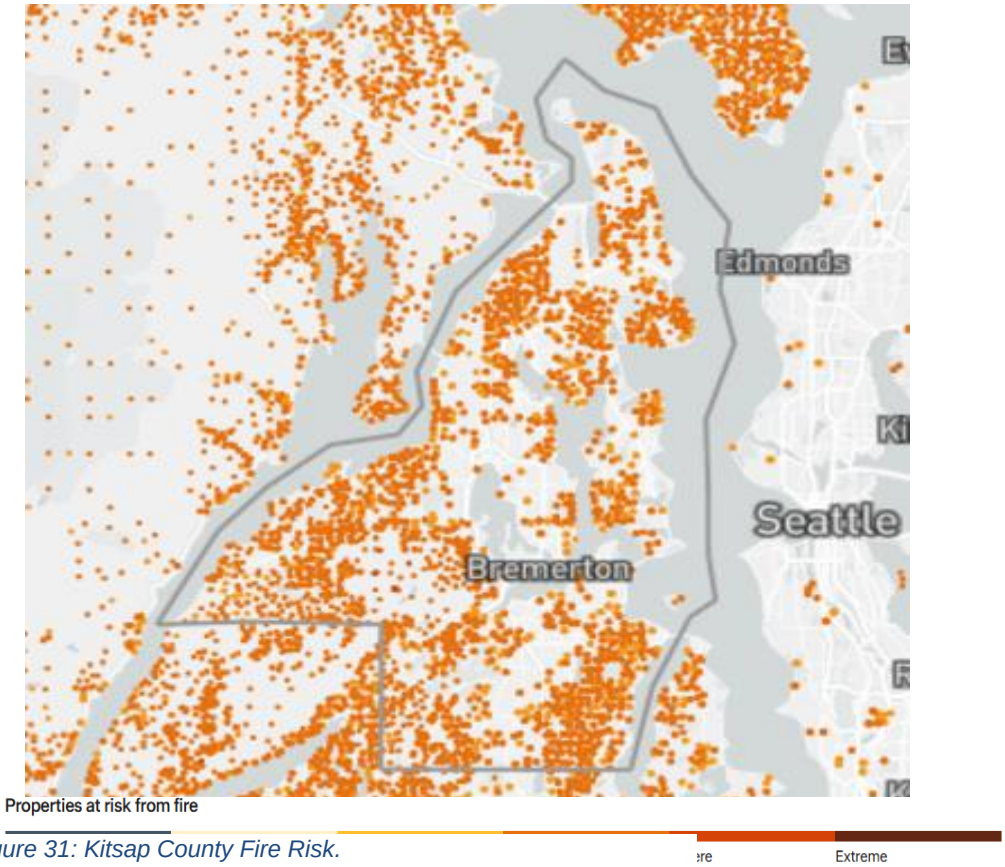


Figure 31: Kitsap County Fire Risk.

Population by Jurisdiction Affected by Fire in Kitsap County (2012)[101]			
Jurisdiction	**Total Population**	**Population in Hazard Area**	**% Population Affected by Hazard**
Unincorporated Kitsap County	183,500	183,500	100
Bainbridge Island	25,180	25,180	100
Bremerton	44,640	44,640	100
Port Orchard	17,480	17,480	100
Poulsbo	12,400	12,400	100
Port Madison Suquamish Reservation	5600	5600	100
Port Gamble S'Klallam Reservation	1200	1200	100
Totals	**290,000**	**290,000**	**100%**

Table 24: Population by Jurisdiction Affected by Fire in Kitsap County (2024).

Building Stock and Critical Facilities by Jurisdiction Affected by Fire[10, 101]

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 25: Building Stock and Critical Facilities by Jurisdiction Affected by Fire.

B1- e. Does the plan describe the effects of future conditions, including climate change on the type, location, and range of anticipated intensities of identified Hazards?

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 landscape2. 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 dry[2]), 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

1. Forest and urban fire vulnerability and effect on Kitsap are considered **"moderate,"** (>40%) meaning there is moderate potential for a disaster of less than major proportions during the next 25 years.

2. This hazard mitigation plan identified through collaboration with the partner cities details many of the most vulnerable structures within Kitsap County, these structures were chosen due to either their construction materials, location close to large urban wildfire interface susceptible areas or a combination of these. While the structures listed are considered the most vulnerable any and all structures within Kitsap County are at risk from Urban wildfires.

3. 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.

4. 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:

1. Since most forest and wildland fires are started by humans, fire prevention education and enforcement programs can significantly reduce the total number of forest fires.
2. 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.

3. 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.

4. 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.

5. Fire-safe development planning by County and City government planners is essential.

6. Encourage citizens to incorporate defensible space planning when landscaping their property.

7. Road criteria should ensure adequate escape routes for new sections of development in forest areas with both ingress and egress planned.

8. Road closures should be increased during peak fire periods to reduce access to fire-prone areas.

Mitigation Strategies

Kitsap County is implementing a multi-pronged approach for wildfire and urban interfaced fire mitigation. The first mitigation strategy is related to evacuation in response to an urban wildfire,

the second mitigation strategy is aimed at reducing the chance of large scale urban interfaced fire. The second mitigation strategy will encourage citizens to incorporate and enhance their defendable space around buildings. The Department of Natural Resources also has programs in Kitsap County targeted at reducing the chance of large scale urban interfaced fires like the program the City of Bainbridge Island initiated where the fire department through grant funding evaluates communities and provides Fire Wise USA © recommendations on undergrowth cleanup and then once citizens have completed the cleanup the fire department contracts equipment to remove the brush piles thus reducing fire risk and increasing defendable areas. The Kitsap Conservation District a partnership between County, Nonprofit and educational institutions providing guidance through their website and community outreach events related to defending property from urban interfaced wildfire. Kitsap County will continue to add mitigation strategies during the annual review process as guided by the Fire Districts and Community groups and grant funding.

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 plan as noted in RCW 43.43.961.	
Goal - Reduce the hazard to life and property. Goal – Increase Community Resilience • 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	City of Bainbridge Island, North Kitsap Fire and Rescue, Poulsbo Fire Department, Bremerton Fire Department, Central Kitsap Fire and Rescue, and South Kitsap Fire and Rescue with support of KCDEM
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	High
Implementation Time	2 years
Implementation Cost	$2,000
Potential Funding Source	Local, State
Status	Ongoing, initial implementation has begun, needs to be incorporated into larger efforts county wide.

Wildfire & Urban Fires Mitigation Strategy 2	
In coordination with local stakeholders and Fire Districts, develop a plan and funding to establish an assist citizens incorporate, and enhance the defendable space around buildings.	
Goal - Reduce the hazard to life and property. Goal – Increase Community Resilience • Develop educational materials and provide outreach regarding defendable space around buildings. • Develop a procedure by which citizens can request and receive support enhancing the defendable space around buildings.	
Lead	City of Bainbridge Island, North Kitsap Fire and Rescue, Poulsbo Fire Department, Bremerton Fire Department, Central Kitsap Fire and Rescue, and South Kitsap Fire and Rescue with support of KCDEM, CERT, and Bainbridge Prepares.
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	High
Implementation Time	5 years
Implementation Cost	$2,000 – 10,000 per year
Potential Funding Source	Local, State
Status	Ongoing, initial implementation has begun, needs to be incorporated into larger efforts county wide.

Wildfire & Urban Fires Mitigation Strategy 3	
In coordination with local stakeholders and Fire Districts, develop a plan, outreach and possible funding to educate and provide assistance for creating fire resistant buildings during the construction, retrofitting, updating or remodeling phases.	
Goal - Reduce the hazard to life and property. Goal – Increase Community Resilience • Develop educational materials and provide outreach regarding fire resistant buildings. • Develop a process by which, when available funds can be utilized by community members to make their building more fire resistant.	
Lead	City of Bainbridge Island, North Kitsap Fire and Rescue, Poulsbo Fire Department, Bremerton Fire Department, Central Kitsap Fire and Rescue, and South Kitsap Fire and Rescue with support of KCDEM with support of KCDEM, Kitsap Building Association and volunteer organizations like CERT and Bainbridge Prepares.
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	High
Implementation Time	5 years
Implementation Cost	$5,000 – 25,000 per year
Potential Funding Source	Local, State, Federal
New	New mitigation strategy.

This page intentionally left blank.

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[37, 38, 48, 52]. Approximately 10-15% of the county area lies within flood zones with a 1 to 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. Kitsap County experiences flooding due to runoff, ground saturation, and tidal flooding; with structures within floodplain areas at an increased susceptibility to more frequent flooding[37, 38].

B1- b. Does the plan include information on the location of each identified hazard?

B1- c. Does the plan describe the extent for each identified hazard?

Location/Extent

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)[37, 38] 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] Figures 32 shows the Flood Hazard Areas of Kitsap County.

Kitsap County Public Works has updated the Stormwater Comprehensive Plan to identify areas that may require additional flood mitigation or water quality improvements. The update was completed in 2022 with areas of emphasis including climate change, coastal flooding, and severe storm impacts[48, 52].

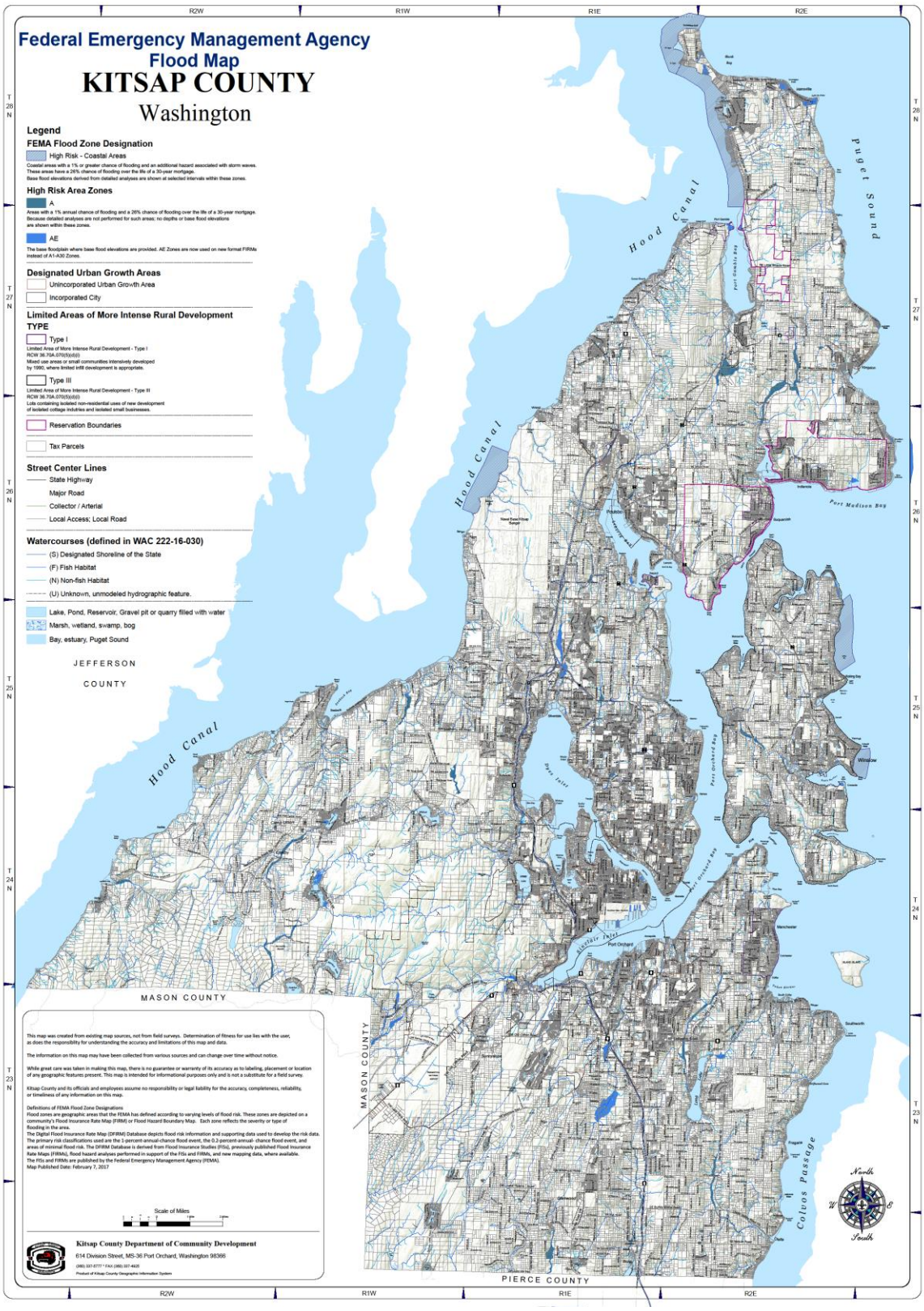


Figure 32: FEMA Flood Mapping, Kitsap County.

In 2017, FEMA created new Flood Insurance Rate Maps (FIRMSs) for Kitsap County[37], 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[100, 70, 55, 56,41, 37]. In addition to new FIRMs, flood risk assessment products were developed and used in this risk report. Depth grids for the 1% 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[37].

In addition to the depth grid, a Base Flood Elevation (BFE)+ grid the figures 33 and 34 show the locations where flooding is 1, 2, and 3 feet above the elevation of the 1-percent-annual-chance flood (BFE)[37]. 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 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.

B1- d. Does the plan include the history of previous events for each identified hazard?

History

Kitsap County issued disaster or emergency declarations for flooding in 1990, 1994, 1995, 1996, 1997, 1999, 2003, 2006, and 2007[51, 52, 94, 95]. 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.[37, 38, 21]

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 (2017 data) and the U.S. Census Bureau (2023 data) [51, 52, 94, 95].

Figure 34: BFE Plus 1-, 2-, and 3- foot grids for the City of Bremerton area.

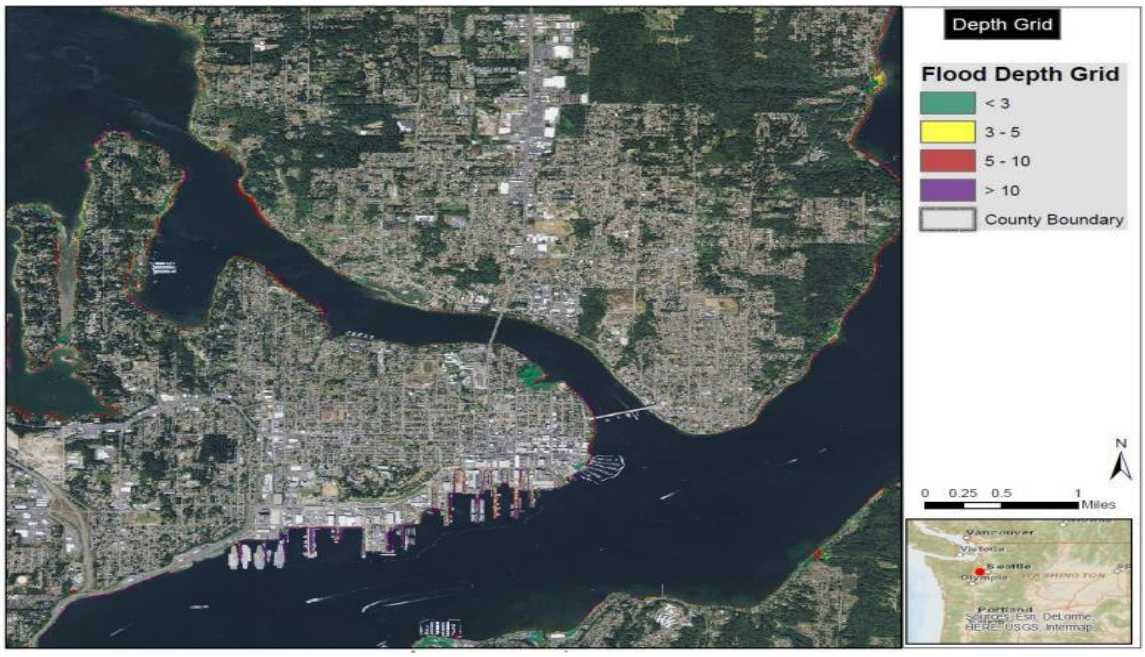


Figure 33: 1% Annual Chance Depth Grid (in feet) for the city of Bremerton area.

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[100, 70, 55, 56,41, 37]						
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
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
Total	$16.3 billion	<1%	$13.4 million	<1%	355	183

Table 26: 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.

Note *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.*

National Flood Insurance Program (NFIP)

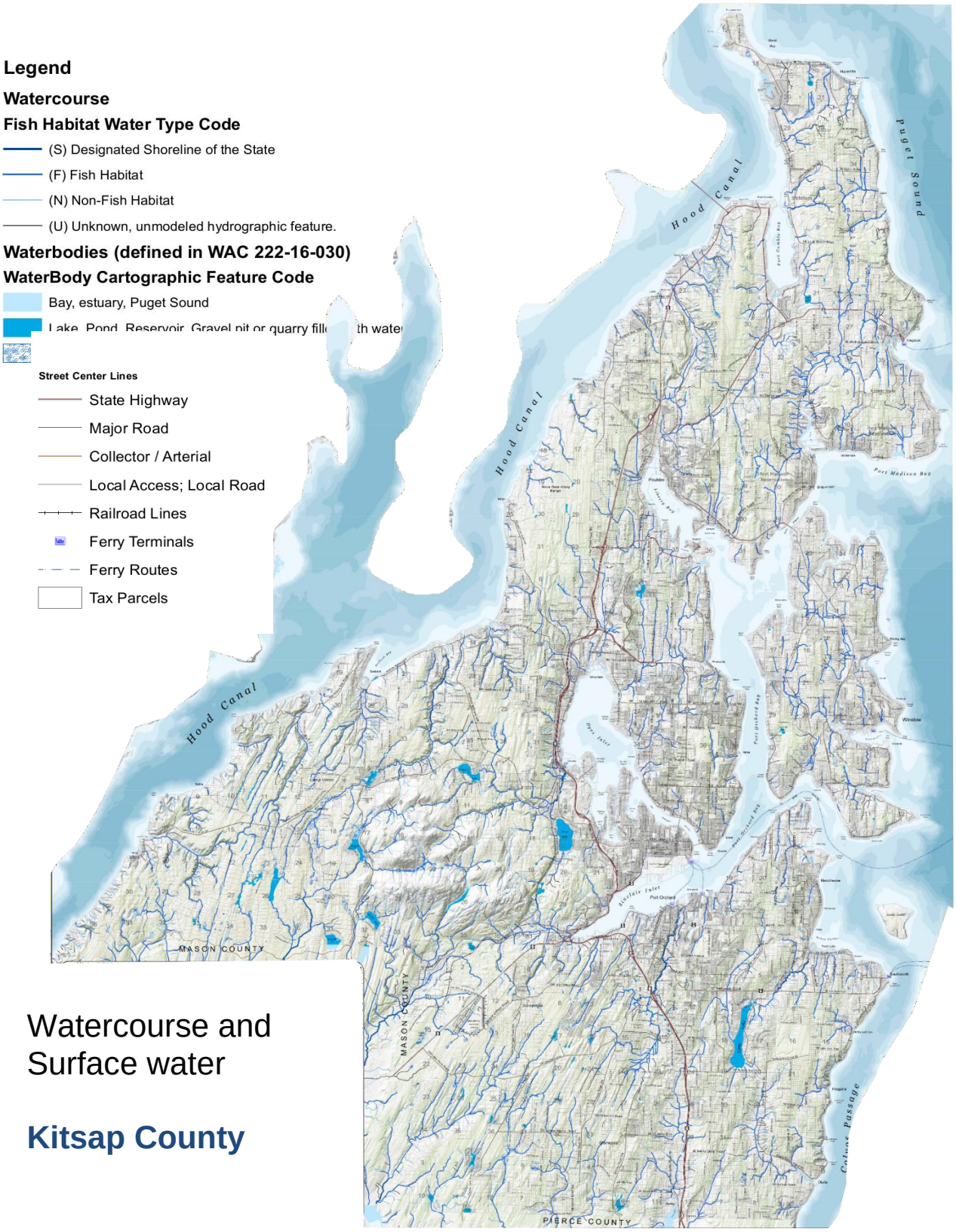
Kitsap County and its four cities participate in the National Flood Insurance Program (NFIP). Each community entered into the Program at various times. Below is a brief history of Kitsap County's participation in the NFIP.

NFIP Kitsap County Historical Data[104]

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 two instances of repetitive or severe repetitive loss properties identified in the planning area; [04,] one on Bainbridge Island and one in unincorporated Kitsap County, both being residential type structures.

NFIP Information[104]									
Community	Total Population	CRS Community	Flood Claims	Repetitive Loss Properties	Type of property	Total Policies	Total Insurance Coverage	Date Entered	Current Map Date
Bainbridge	23,025	N	6	1	Res	234	$64 million	7/11/75	2/3/17
Bremerton	37,729	N	5	0	n/a	52	$15 million	5/27/75	--
Port Gamble S'Klallam Tribe	851	N	0	0	n/a	0	$0	--	--
Suquamish Tribe	7,434	N	0	0	n/a	0	$0	--	--
Port Orchard	11,144	N	0	0	n/a	25	$6.8 million	6/21/74	2/3/17
Poulsbo	9,200	N	0	0	n/a	49	$8.7 million	12/6/74	2/3/17
Unincorporated County	170,035	N	58	1	Res	566	$155 million	--	--
Total	**259,418**	**0**	**69**	**2**	**Res**	**926**	**$318 million**		

Table 27: National Flood Insurance Information.



Watercourse and Surface water

Kitsap County

Figure 35: Watercourse and Surface Water.

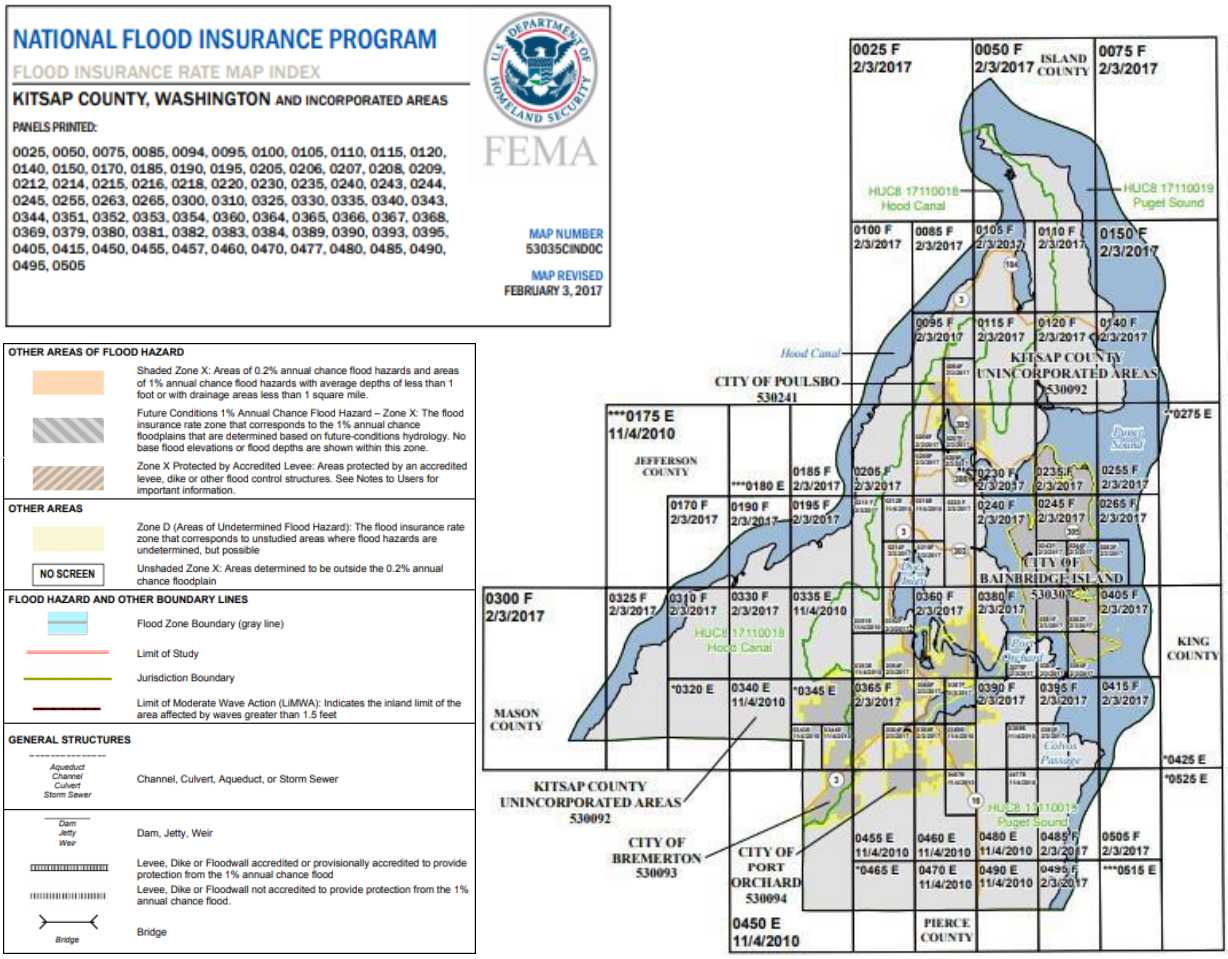


Figure 36: NFIP FIRMS Panel Map (2022).

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel
City of Bainbridge Island	530307	17110019	53035C0230F, 53035C0235F, 53035C0240F, 53035C0243F, 53035C0244F, 53035C0245F, 53035C0263F, 53035C0265F, 53035C0379F, 53035C0380F, 53035C0381F, 53035C0382F, 53035C0383F, 53035C0384F, 53035C0405F
City of Bremerton	530093	17110018, 17110019	53035C0335E, 53035C0343E, 53035C0344E, 53035C0345E*, 53035C0352F, 53035C0353E, 53035C0354F, 53035C0360F, 53035C0364F, 53035C0365F, 53035C0366F, 53035C0367F, 53035C0368F, 53035C0380F, 53035C0390F, 53035C0450E, 53035C0455E
City of Port Orchard	530094	17110019	53035C0364F, 53035C0365F, 53035C0366F, 53035C0367F, 53035C0368F, 53035C0369E, 53035C0390F, 53035C0455E, 53035C0457E, 53035C0460E
City of Poulsbo	530241	17110019	53035C0094F, 53035C0095F, 53035C0115F, 53035C0206F, 53035C0207F, 53035C0209F, 53035C0230F
Kitsap County Unincorporated Areas	530092	17110019	53035C0025F, 53035C0050F, 53035C0075F, 53035C0085F, 53035C0094F, 53035C0095F, 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 28: Community FIRM Information.

City of Bainbridge Island

The City of Winslow entered the Emergency Program on August 14, 1975[104], then converted to the National Flood Insurance Program (NFIP) effective February 5, 1986[104]. 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.

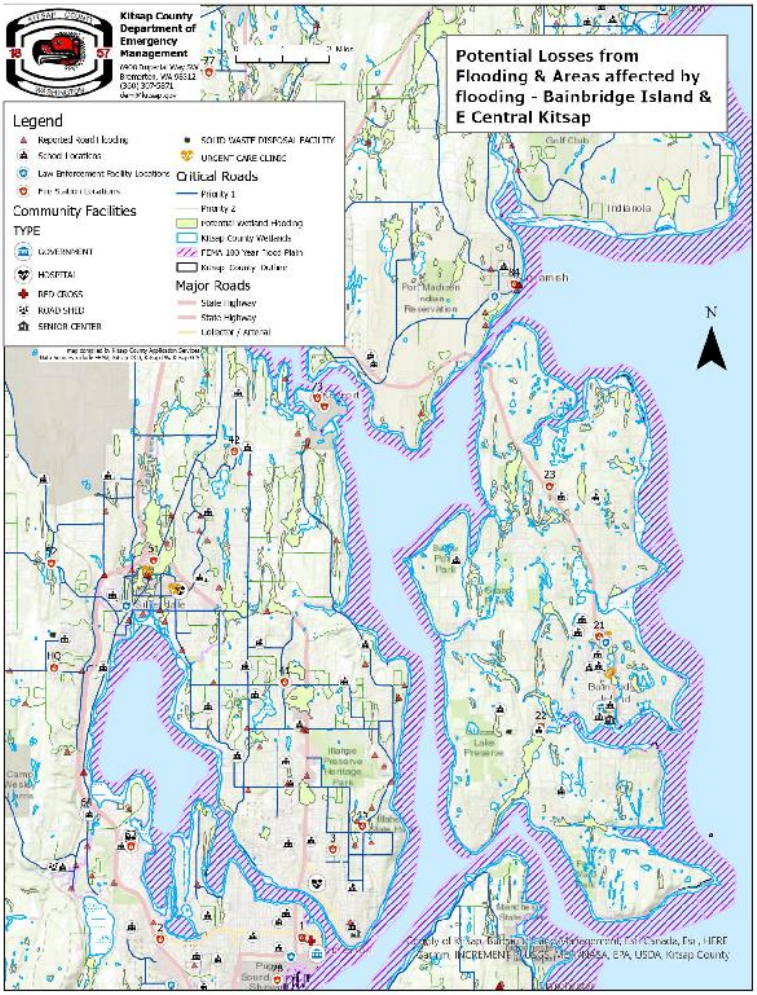


Figure 37: Potential flooding areas for East Central Kitsap County and Bainbridge Island.

City of Bremerton

The City of Bremerton entered the National Flood Insurance Program on May 27, 1975[104]. 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. [104]

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

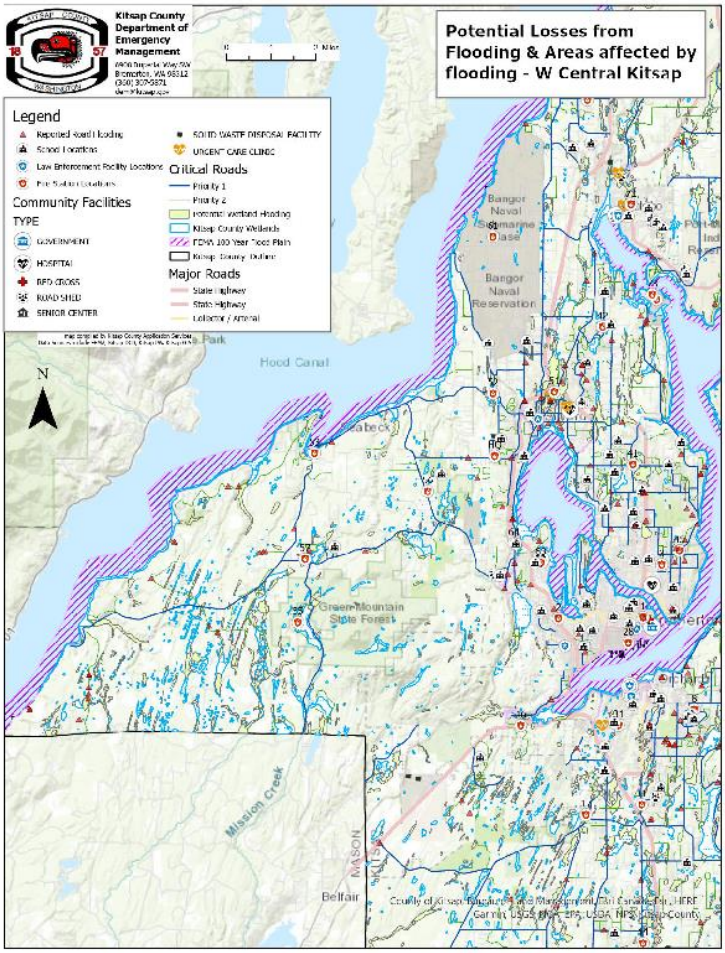


Figure 38: Potential flooding losses West Central Kitsap County.

City of Port Orchard

The City of Port Orchard entered the National Flood Insurance Program in 1978[104]. 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.

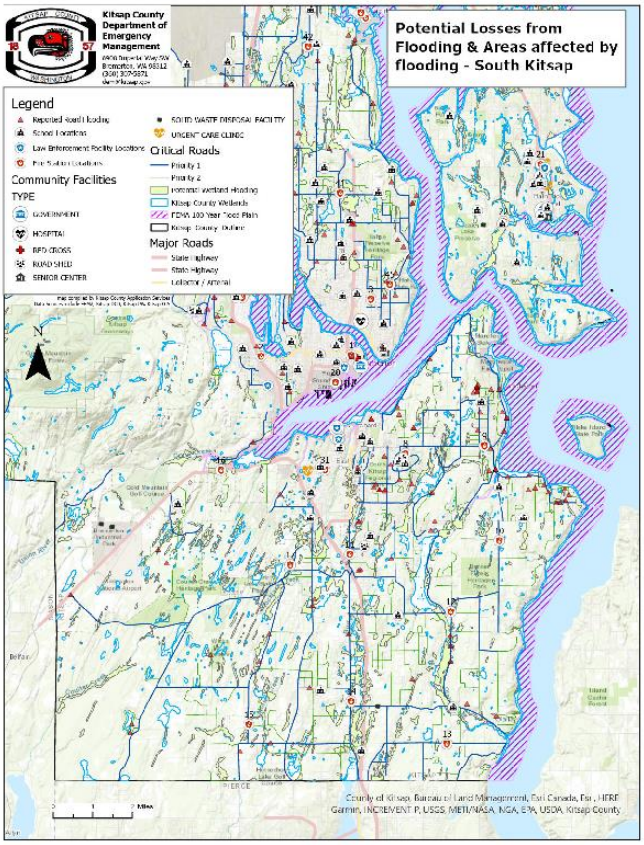


Figure 39: Potential flooding South Kitsap and Port Orchard Areas.

City of Poulsbo

The City of Poulsbo entered into the National Flood Insurance Program in 1979[104]. 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.

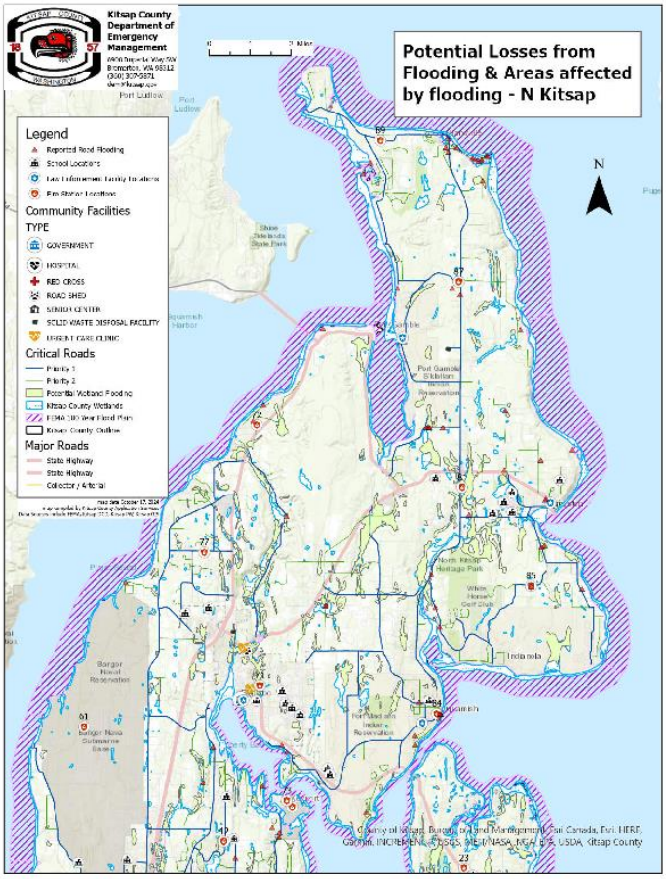


Figure 40: Potential flooding for North Kitsap and Poulsbo areas.

NFIP Updates

In recent years, NFIP Flood Insurance Rates Maps (FIRM) have been revised[37, 38, 104]. 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)[105] 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[105]	
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 29: 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.

B1- e. Does the plan describe the effects of future conditions, including climate change on the type, location, and range of anticipated intensities of identified Hazards?

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[2]. 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 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[9]. 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[37,47, 52]. 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.

This hazard mitigation plan identified through collaboration with the partner cities details many of the most vulnerable structures within Kitsap County, these structures were chosen due to either their location in a flood zone, historic flooding in the area, or the level above sea level of the structure, or a combination of these. While the structures listed are considered the most vulnerable any many structures within Kitsap County are at risk from flooding depending on the height of the flooding event and the amount of ground saturation prior to the event.

More than any other natural hazard, flooding represents the single biggest repetitive event that has a damaging impact on Kitsap County property and resources[37,47, 52]. 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[37,47, 52].

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[37,47, 52]. 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.

Kitsap County has many under sized culverts that during heavy rain periods when the ground is saturated, do not allow for proper diversion of waterflow causing damage to roadways and infrastructure including but not limited to power distribution when trees and other debris fall on or affect the power grid. Kitsap county has seen numerous power outages due to trees on power lines caused by heavy rains and winds like the 20 Nov 2024 rainstorm and subsequent flooding that left over 1400 Kitsap County residence without power for up to 2 days due to trees damaging power transmitting lines.

Mitigation Strategies

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

Flood Mitigation Strategy 1	
Convene an annual meeting of County and Partner City officials including other interested parties to discuss Local, State, and Federal regulatory requirements related to maintenance activities in flood-prone areas.	
Goal – Increase Community Resilience • 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	Kitsap Department of Community Development with KCDEM as supporting agency
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	High
Implementation Time	Annual
Implementation Cost	There should be no cost to hold such a meeting.
Potential Funding Source	Local, State
Status	Ongoing, as flood risk and mitigation continues to be high. Areas completed from 2019 – 2024 Flood mitigation: Gorst, Newberry Hill, Port Orchard.

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.	
Goal – Build capacity and Increase Community Resilience • 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. • Work with FEMA to update Kitsap County Flood maps, to possibly include a Flood Risk report.	
Lead	Public Works
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
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	Ongoing - Public Works continues working to complete this strategy and developing maps of flood areas and potential projects to mitigate flooding by upgrading or changing culverts and drainage ways. This strategy feeds data into strategy 3.

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.	
Goal – Build capacity and Increase Community Resilience ***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. Decrease in annual flooding through Kitsap County and a reduction in failure to infrastructure.	
Lead	Public Works, Roads
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
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	Ongoing, partially completed. LEPC and other groups will continue to evaluate roads, culverts, and drainage to improve stormwater run-off and reduce flooding.

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.	
Goal – Build capacity and Increase Community Resilience • Distribute National Flood Insurance Program (NFIP) information in utility bills on an annual basis prior to flood season. The program lead for this strategy will work with the National Flood Insurance Program to coordinate 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 emergency use sandbags would be the Public Works Department, for mitigation and prevention homeowners would be lead, with Kitsap County Department of Emergency Management and Public Works providing information on resource availability.	
Lead	The lead agencies for are the Department of Community Development and the Public Works Departments.
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	High
Implementation Time	Ongoing
Implementation Cost	No immediate cost
Potential Funding Source	Local, State
Status	Ongoing, reworded to identify roles.

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.	
Goal – Build capacity and Increase Community Resilience, Reduce the hazard to life and property	
Lead	The lead agencies would be the Public Works Departments in coordination with KCDEM.
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	High
Implementation Time	Ongoing
Implementation Cost	No immediate cost
Potential Funding Source	Local
Status	On going. Just in time messaging prior to King Tide storms and general flooding preparedness messaging

Severe Storms/Tornado Mitigation Strategies

Lead Agencies	Support Agencies
Kitsap County Department of Emergency Management	City/County/Regional Organizations
Water Purveyor Association of Kitsap (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[38, 94, 95]. 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[13, 14, 47, 94].

B1- b. Does the plan include information on the location of each identified hazard?

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.

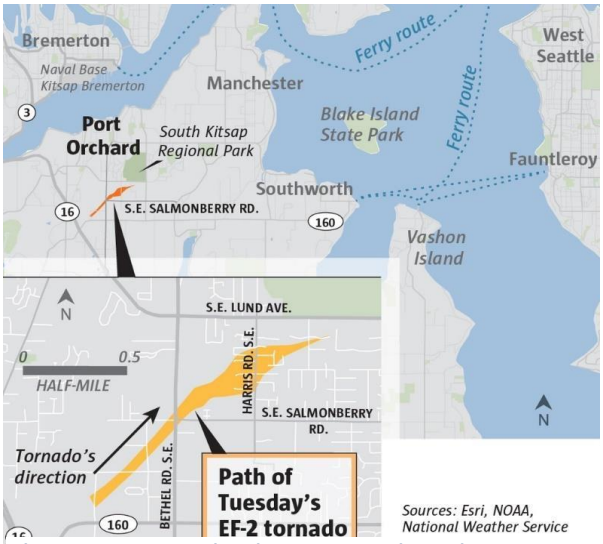


Figure 41: Port Orchard 2018 Tornado Path

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 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.

B1- c. Does the plan describe the extent for each identified hazard?

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 Port Orchard EF-2 tornado in 2018 was the strongest tornado to hit Washington State since 1986[94, 106, 107]. The tornado wind speeds were estimated to be 120-130 mph and was on the ground for approximately 1.4 miles[106, 107, 108, 109]. The path of the twister started at Geiger Road and ended at SE Kerri Court. It was approximately 300 yards wide.[106,107,108,109]. The extent of severe weather damage depends on the type of event, duration, and severity. The table below describes the Enhanced 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 30: Fujita Tornado Intensity Scale.

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	35,580	35,580	100	249	249	100
Bainbridge Island	10,639	10,639	100	83	83	100
Bremerton	48,524	48,524	100	64	64	100
Port Orchard	6,728	6,728	100	39	39	100
Poulsbo	5,288	5,288	100	66	66	100
Port Madison Suquamish Reservation	3,703	3,703	100	7	7	100
Port Gamble S'Klallam Reservation	215	215	100	5	5	100
Kingston	5,846	5,846	100	**	**	**
Hansville	2,165	2,165	100	**	**	**
Totals (Kitsap)	**118,685**	**118,685**	**100%**	513	513	**100%**

Table 31: Building Stock and Critical Facilities by Jurisdiction Affected by Severe Storms.

** Note, Information related to critical infrastructure was included in the total for unincorporated Kitsap County.

B1- d. Does the plan include the history of previous events for each identified hazard?

History

As stated above, the 2018 Port Orchard EF-2 tornado was the strongest tornado to hit Washington State since 1986[106, 107108, 109]. 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 hurricane- force winds.[95, 95, 100] 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.[94]

B1- e. Does the plan include the probability of future events for each identified hazard?

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.

B1- e. Does the plan describe the effects of future conditions, including climate change on the type, location, and range of anticipated intensities of identified Hazards?

Climate Change Impacts

Severe weather events are a part of the natural climatic cycle[,2, 14, 96]. 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[94, 95, 110].

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 days110. 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.[111]

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 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 sector to prepare and maintain 14 days of emergency preparedness supplies.	
Goal – Build capacity and Increase Community Resilience, Reduce the hazard to life and property • Grant funding has been identified and other grant opportunities will be pursued for this initiative.	
Lead	KCDEM, with Kitsap Public Health District
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
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	Ongoing, receiving ongoing support with KPHD becoming a secondary lead agency.

Severe Storm/Tornado Mitigation Strategy 2	
Reduce the risk of casualties due to lost/reduced 911 and EOC Capabilities.	
Goal – Build capacity and Increase Resilience, • Procure an emergency generator with backup failover UPS for the Emergency Operations Center Facility.	
Lead	KCDEM
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
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

This page intentionally left blank.

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.[67]" The condition perceived as "drought" 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[67, 68]. 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."[67]

B1- b. Does the plan include information on the location of each identified hazard?

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 43 inches;(average over past 34 years) with a high of 62.19 inches and a low of 27.81 inches[110, 111]. however, there is a considerable difference in precipitation levels within the county due to elevations and wind patterns. 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 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.

B1- c. Does the plan describe the extent for each identified hazard?

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 32: Drought Severity Classification.

Building Stock and Critical Facilities by Jurisdiction Affected by Drought						
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	35,580	35,580	100	249	249	100
Bainbridge Island	10,639	10,639	100	83	83	100
Bremerton	48,524	48,524	100	64	64	100
Port Orchard	6,728	6,728	100	39	39	100
Poulsbo	5,288	5,288	100	66	66	100

Port Madison Suquamish Reservation	3,703	3,703	100	7	7	100
Port Gamble S'Klallam Reservation	215	215	100	5	5	100
Kingston	5,846	5,846	100	**	**	**
Hansville	2,165	2,165	100	**	**	**
Totals (Kitsap)	**118,685**	**118,685**	**100%**	513	513	**100%**

Table 33: Building Stock and Critical Facilities by Jurisdiction Affected by Drought.

B1- d. Does the plan include the history of previous events for each identified hazard?

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[110, 94, 111]. Multiple measurable and documented droughts have hit the region in the past 100 years, but the following three are the most notable:

1. April 1934 – March 1937: The longest drought in the region's history[94].
2. 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[94].
3. January – March 2001: the second driest winter on record in 106 years. Stream flows approached the low levels of the 1976-77 droughts[94].

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.[94]

B1- e. Does the plan include the probability of future events for each identified hazard?

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.

B1- e. Does the plan describe the effects of future conditions, including climate change on the type, location, and range of anticipated intensities of identified Hazards?

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[2, 14]. 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 patterns are already being observed, reducing the supply of water and causing far-reaching ecological and socioeconomic consequences[2, 14].

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.[110, 111]

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 Likert 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.

Drought, and drought like conditions will continue to occur in Kitsap County, history suggests a moderate probability of drought 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.

Conclusions

Droughts will continue to occur in Kitsap County. Drought-related Forest and other wildfires will continue to occur in Kitsap 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

Drought Mitigation Strategy 1	
Identify cost-effective water conservation measures to be developed and implemented.	
Goal – Build capacity and Increase Community Resilience, • **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 Districts, and Tribal Nations are recommended as support agencies.
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County, Tribal Nations
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 agencies in their actions to conduct 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.	
Goal – Build capacity and Increase Community Resilience, • 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 Districts
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County, Water 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	Ongoing. Emergency Management Public Utility Departments, Water Purveyors and Tribal Nations will continue to provide ongoing mitigation through outreach, policy development, and policy implementation.

This page intentionally left blank.

Multi-Hazard Mitigation Strategies

Lead Agencies	Support Agencies
Kitsap County Department of Emergency Management	Kitsap Transit
City/County Public Works Departments	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 [112, 113]. 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[9, 94]. 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[9, 941, 113].

Mitigation Strategies

Multi-Hazard Mitigation Strategy 1	
The plans, training, and exercises committee within the LEPC will evaluate an "all risks road plan". Examining potential road closures related to all hazards risks and make recommendations for a plan that identifies alternate access areas in cooperation with State and community officials. The committee will also review State, and Federal resources available to determine best practices.	
Goal – Build capacity and Resilience, • It is recommended that the committee include the transit system, fire, Tribal Nations, Washington State Ferry System, state, county, and city law enforcement. • This will be an ongoing mitigation strategy. • Both Kitsap Transit and Emergency Management have worked closely on this project/strategy and have been significantly involved over the last 3 years with the Puget Sound Regional Catastrophic Planning. As part of this plan, Kitsap County 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	Local Emergency Preparedness Committee (LEPC) with Public Works
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
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	Ongoing.

Multi-Hazard Public Education Programs Mitigation Strategies

Lead Agencies
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[9, 94, 111]. 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[9, 94]. 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 www.kitsapdem.org 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 Worker /registered volunteer programs.
  • Community Emergency Response Team (CERT)
  • Medical reserve Corps.
  • Kitsap Armature Radio Service.
  • Kitsap Marine Unit.
  • Kitsap Severe Weather Shelter workers.
  • programs 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.
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	High
Implementation Time	1 to 5 years
Implementation Cost	$20,000 – 25,000 annually
Potential Funding Source	Local, State, Federal
Status	In progress. Kitsap County continues to promote volunteerism

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:	
1. 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. 2. It is recommended that business and family emergency communication and preparedness plans be included in flyers available to the public. 3. Work to develop additional preparedness education programs targeted towards Local business preparedness, including how to stay in business without power for 14 days. 4. **Note:** KCDEM has initiated methods for Kitsap County residents to 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.
Jurisdictions incorporated into this strategy	Bainbridge Island, Bremerton, Port Orchard, Poulsbo, Kitsap County
Priority	High
Implementation Time	3-10 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	Ongoing, multiple lines of effort through community outreach and training.

Mitigation Strategies Updates from the 2019 Plan

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

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	Removed from MHMP, will be reevaluated in future edits.

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 soil-related 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). • Local funding resources are recommended for potential budget availability.	
Status	Removed. Funding not available.

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	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 cost-benefit 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.	
Status	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 Emergency Management Agency Disaster Housing/Home Repair Program to include mitigation measures for the private sector for multi-hazard risks.	
Status	Removed. Funding not available.

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

This page intentionally left blank.

B1- f. For participating jurisdiction in a multi-jurisdictional plan, does the plan describe any hazards that are unique to and /or vary from those affecting the overall planning area?

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 2024.

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 new NPDES Permit 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. https://www.bainbridgewa.gov/DocumentCenter/View/8145

2024 Bainbridge Island Mitigation Strategies

1) Bainbridge Island is incorporated into the following Kitsap County Mitigation strategies.
    a) Earthquake/Tsunami mitigation strategies 1, 3, 4
    b) Landslide and Erosion mitigation strategies 1, 2
    c) Tsunami mitigation strategies 1, 2, 3, 4, 5, 6, 7
    d) Wildfire and Urban Fire mitigation strategies 1, 2, 3
    e) Flood mitigation strategies 1, 2, 3, 4, 5
    f) Severe Strom and Tornado mitigation strategies 1, 2
    g) Drought mitigation strategies 1, 2
    h) Mult hazard mitigation strategies 1
2) In addition to Bainbridge Islands participation in the identified County Mitigation Strategies Bainbridge Island has the following jurisdictional specific mitigation strategies.

Bainbridge Island 2024 Mitigation Strategies

City of Bainbridge Island Mitigation Strategy 1	
Ensure implement 2018 updates to the City Fire and Building Code. 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 2026
Implementation Cost	$25,000
Potential Funding Source	Local
Status	Completed, Fire code updates adopted in 2020.

City of Bainbridge Island Mitigation Strategy 2	
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	2024-2028
Implementation Cost	$10,000 per year
Benefit to Cost	Low, most vulnerable areas involve residential homes.
Potential Funding Source	Local
Status	To be completed. Retained for the 2024 update. 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 3	
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	2024-2028
Implementation Cost	$30,000 per year
Potential Funding Source	Local, State
Status	Ongoing, retained in the 2024 plan.

City of Bainbridge Island Mitigation Strategy 4	
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	2024-2028
Implementation Cost	$10,000
Potential Funding Source	Local
Status	Ongoing, retained in the 2024 plan.

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-year Capital Improvement Plan. Includes seismic protection of Jackson Park/NAD water main, seismic restraint/isolation valves on the Warren Avenue Bridge main	6 years	Completed in 2017.
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

2024 Bremerton Mitigation Strategies

1) Bremerton is incorporated into the following Kitsap County Mitigation strategies.
    a) Earthquake/Tsunami mitigation strategies 1, 2, 3
    b) Landslide and Erosion mitigation strategies 1, 2
    c) Tsunami mitigation strategies 1, 2, 3, 4, 5, 6
    d) Wildfire and Urban Fire mitigation strategies 1, 2, 3
    e) Flood mitigation strategies 1, 2, 3, 4, 5
    f) Severe Strom and Tornado mitigation strategies 1, 2
    g) Drought mitigation strategies 1, 2
    h) Mult hazard mitigation strategies 1
2) In addition to Bremerton's participation in the identified County Mitigation Strategies Bremerton has the following jurisdictional specific mitigation strategies.

2024 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	This project is ongoing and involves a continued effort to get neighborhoods involved in preparedness The following efforts have been implemented from 2024-2029: Outreach: Kids day each year. BlackBerry festival each year. Bridge Blast each year. Bremerton Air Show. Kitsap County Fair and Stampede each year.

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. Projects completed in the 2024-2029 period. Boeing has been brought onboard to provide training and community education for homeowners.

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. Projects completed in the 2024-2029 period. Chico Creek culvert replacement Gorst interchange culverts Newberry Hill drainage and culverts

City of Port Orchard

Updates from the 2013/2019 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.

Port Orchard Mitigation Strategies

1) Port Orchard has incorporated into the following Kitsap County Mitigation strategies.
    a) Earthquake/Tsunami mitigation strategies 1, 2, 3
    b) Landslide and Erosion mitigation strategies 1, 2
    c) Tsunami mitigation strategies 1, 2, 3, 4, 5, 6
    d) Wildfire and Urban Fire mitigation strategies 1, 2, 3
    e) Flood mitigation strategies 1, 2, 3, 4, 5
    f) Severe Strom and Tornado mitigation strategies 1, 2
    g) Drought mitigation strategies 1, 2
    h) Mult hazard mitigation strategies 1
2) In addition to Port Orchards participation in the identified County Mitigation Strategies Port Orchard has the following jurisdictional specific mitigation strategies.
3)

2024 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	Ongoing. In progress. Data collected gave multiple possibilities, the city is now developing plans to implement some of the proposed mitigations strategies. Cost estimates to be updated when data is available. One mitigation strategy from the data work to procure funding to raise city streets 18 inches to mitigate effects of flooding and improve runoff. This is a multi-year project.

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	Ongoing. 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	Ongoing. In progress.

Port Orchard Mitigation Strategy 3	
Pursue seismic upgrades to equipment, infrastructure, and critical facilities.	
Lead	City of Port Orchard 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, State
Options & Discussion	None
Status	Ongoing, 2 city buildings have been updated multiple more require updating. Ongoing retrofit as part of capital improvement plan implementation.

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. Ongoing.

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.

Port orchard continues to participate in the following mitigation related reviews on a routine basis to ensure current mitigation strategies are adequate and to add new strategies as needed.

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 Shore zone 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 and 2019 Plans

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.

Port Orchard Mitigation Strategies

1) Poulsbo is incorporated into the following Kitsap County Mitigation strategies.
    a) Earthquake/Tsunami mitigation strategies 1, 3, 4
    b) Landslide and Erosion mitigation strategies 1, 2
    c) Tsunami mitigation strategies 1, 2, 3, 4, 5, 6, 7
    d) Wildfire and Urban Fire mitigation strategies 1, 2, 3
    e) Flood mitigation strategies 1, 2, 3, 4, 5
    f) Severe Strom and Tornado mitigation strategies 1, 2
    g) Drought mitigation strategies 1, 2
    h) Mult hazard mitigation strategies 1
2) In addition to Port Orchards participation in the identified County Mitigation Strategies Port Orchard has the following jurisdictional specific mitigation strategies.

2024 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	Ongoing, In progress. This strategy has and continues 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	Ongoing, 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	
Improve citizen preparedness 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.
Status	Ongoing. Update for 2024 MHMP. This project is ongoing as the city continues to improve their efforts to get neighborhoods involved in preparedness. Multiple CERT courses have been offered in the city. The city continues to develop an increased CERT presence within the communities.

This page intentionally left blank.

Kitsap County
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 2024 City and Special Purpose District Planning Partners, the Department of Emergency Management and the input of the community.

This 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 will 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) will 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.

1. The KCDEM PT&E officer, Operations officer, Public Information officer, and Administrative officer will perform annual reviews 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.
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.
3. The PT&E officer, Operations officer, POI, and Administrative officer will meet annually with the Kitsap County Hazard Mitigation Planning Committee to provide a status update to the MHMP program.
4. The PT&E officer will 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:	Build capacity in 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:	Grows mitigation strategies 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 34: Long-Term Goals & Strategies.

Appendix A: Participating City Profiles

B2-b. FOR EACH PARTICIPATING JURISDICTION, DOES THE PLAN DESCRIBE THE POTENTIAL IMPACTS OF EACH OF THE IDENTIFIED HAZARDS ON EACH PARTICIPATING JURISDICTION?

In this section, each jurisdiction is described, including its community assets at risk to hazards. Information is taken from the 2022 Threat and Hazard Identification and Risk Assessment (THIRA). 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
- History of disasters
- Hazard assessment, and impact for the jurisdiction
- National Flood Insurance Plan

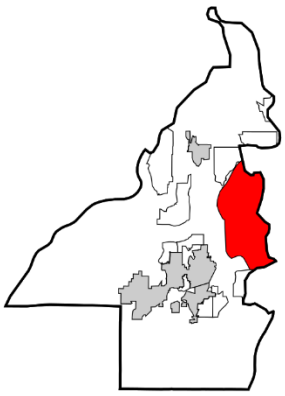
Although all assets may be affected by hazards, some assets are more vulnerable because of their physical characteristics or socioeconomic uses.

The profiles are presented in the following order:

- Bainbridge Island
- Bremerton
- Poulsbo
- Port Orchard

This page intentionally left blank.

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 24,681, making it the second-largest city in the County.[9, 41, 4, 43, 44]

As a non-charter 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[41].

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 of Bainbridge Island is mostly rural with an urban center (formerly the City of Winslow) located at the ferry landing.

Bainbridge Island Population Information[33]				
Population	**Population Density**	**Number of Households**	**Median Household Income**	**Under 65 with a Disability**
24,681 (2022)	893.8 per sq. mi (2022)	9,580 (2022)	$151,290 (2022)	8.6% (2022)

Table 35: 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 senior/assist facilities on the island, mostly located in the city's urban center. The senior population has grown consistent with national trends.

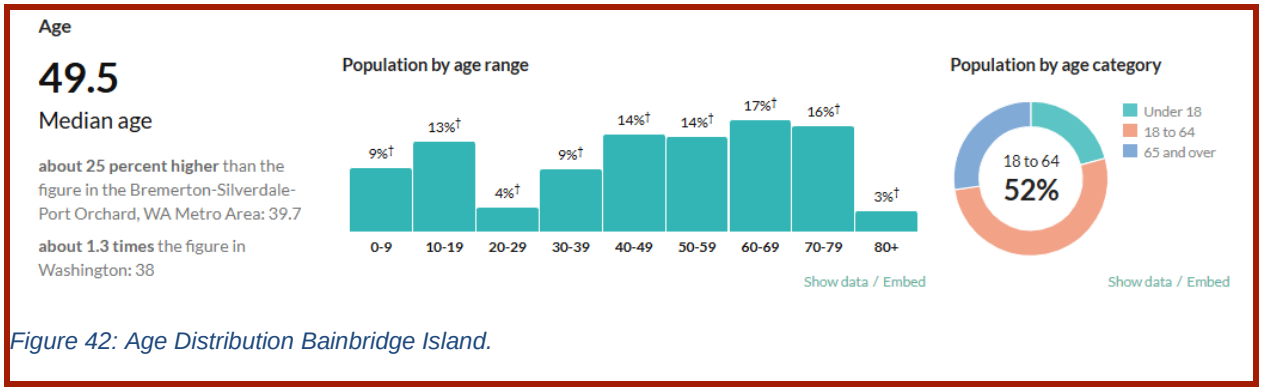
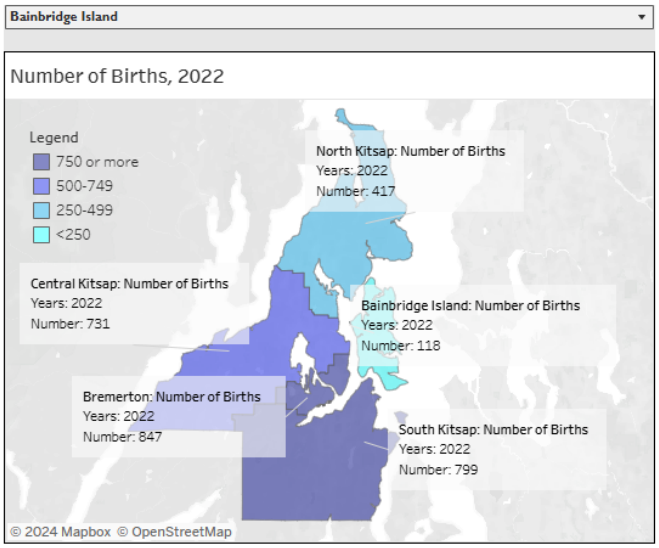


Figure 42: Age Distribution Bainbridge Island.

Number of Births	2022	118
Children and Youth (Age Birth-19)	2023	5,316
Seniors (Age 85+)	2023	612
Seniors Living Alone (Age 65+)	2018-22	1,206
People Immigrating to the US (entering since 2010)	2018-22	#
People With Limited English or No English Proficiency	2018-22	#
People Living Below 100% Poverty	2018-22	721
Children 0-17 Living Below 100% Poverty	2018-22	#
People With Food Insecurity	2022	3,122
Households with No Vehicle Available	2018-22	#
People Commuting 45+ Minutes	2018-22	4,497



Kitsap County Population

Total Kitsap Population		283,200	100%
Unincorporated Population (outside city limits)		183,500	65%
Incorporated Population (inside city limits)		99,700	35%
Incorporated Population (% of Inc.)	Bainbridge Island	25,180	25%
	Bremerton	44,640	45%
	Port Orchard	17,480	18%
	Poulsbo	12,400	12%
Bainbridge Island	Population	25,180	9%
	Households	9,850	

2,127	2018-22	People With a Disability^
828	2018-22	People with Ambulatory Difficulty (Age 5+)
374	2023	People With Developmental Disability (Age 3-17)
810	2018-22	People With Hearing Difficulty
#	2018-22	People With Vision Difficulty
106	2024	Electricity-Dependent Adults
2,666	2022	Medically Dependent Adults
731	2021	People With Serious Mental Illness (Age 18+)*
4,047	2022	People With Substance Use Disorder (Age 12+)**
#	2023	Point in Time Count of People Experiencing Homelessness
16	2023-24	Public school students experiencing homelessness
191	2018-22	People Living in Group Quarters

Notes: All counts are estimates. When available, 95% confidence intervals are provided in the popup when you hover over the data. ^ Civilian, noninstitutionalized only; * County estimate based on U.S. national estimates; **County estimate based on Washington State estimates; # The number is suppressed due to unreliability and/or data is not available. When the number is highly unreliable, the confidence interval in the tooltip will also be suppressed/blank.

July 2024 Kitsap Public Health District, Public Health Emergency Preparedness and Response Program, prepare@kitsappublichealth.org 1

Figure 43: Bainbridge Island Vulnerable Population.

Bainbridge Island Population Density

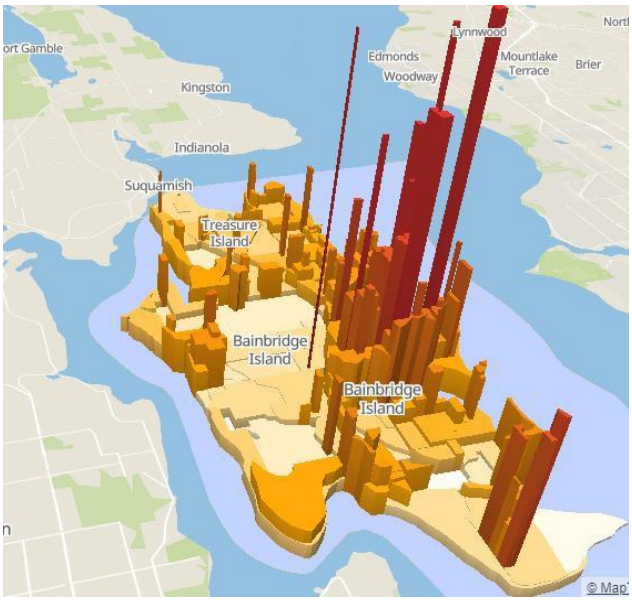


Figure 44: Bainbridge Island Population Density, © OpenStreetMap Contributors.

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.[41, 44]

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 over 2000 businesses licensed on Bainbridge Island, Table 34 shows the distribution of business licenses[41].

Business Licenses (2022)

Industry Area	Number of Licenses
Professional, scientific, and technical services	772
Construction	768
Other services (except public administration)	403
Retail trade	388
Administrative, support, and waste management	327
Health care and social assistance	321
Wholesale trade	138
Real estate, rental, and leasing	135
Manufacturing	122
Accommodation and food services	160
Arts, entertainment, and recreation	115
Educational services	90
Finance and insurance	96
Information	94
Transportation and warehousing	35
Agriculture, forestry, fishing and hunting	25
Management of companies and enterprises	13
Utilities	9
Mining, quarrying, and oil and gas extraction	2
Public administration	1

Source: City of Bainbridge Island 2023-2024 Budget

Figure 45: Business Licenses on Bainbridge Island..

Built Environment

Land Use

Land use on Bainbridge Island is primarily residential with some commercial, light manufacturing, recreation, agriculture, and open space[70]. 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 in areas 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	$730,460	$360,620	49%	Flood
Hyla Middle School	7861 NE Bucklin Hill Road	$426,885	$388,360	91%	Earthquake
Single Family Home	5151 Crystal Springs Dr. NE	$731,460	$533,965	73%	Earthquake, Landslide
Shopping Center/Mixed Retail	4569 Lynwood Center Rd. NE	$3.49 million	$3.45 million	96%	Earthquake

Table 36: 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 over $60M in value.[113] Table 35 shows the number of occupied and unoccupied structures on the island. Figure 42 shows Bainbridge Islands housing occupancy by ownership and type of structure. Figure 42 also shows the age of structures on Bainbridge Island.

Residential Structures[33, 70]		
Type	**Estimate**	**Percent**
Housing Occupancy		
Total housing units	10,639	100%
Occupied housing units	9,958	93.6%
Vacant housing units	681	6.4%
Homeowner vacancy rate		7%
Rental vacancy rate		0.0%

Table 37: Bainbridge Island Housing / residential structures.

fi

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[9, 70]. 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.

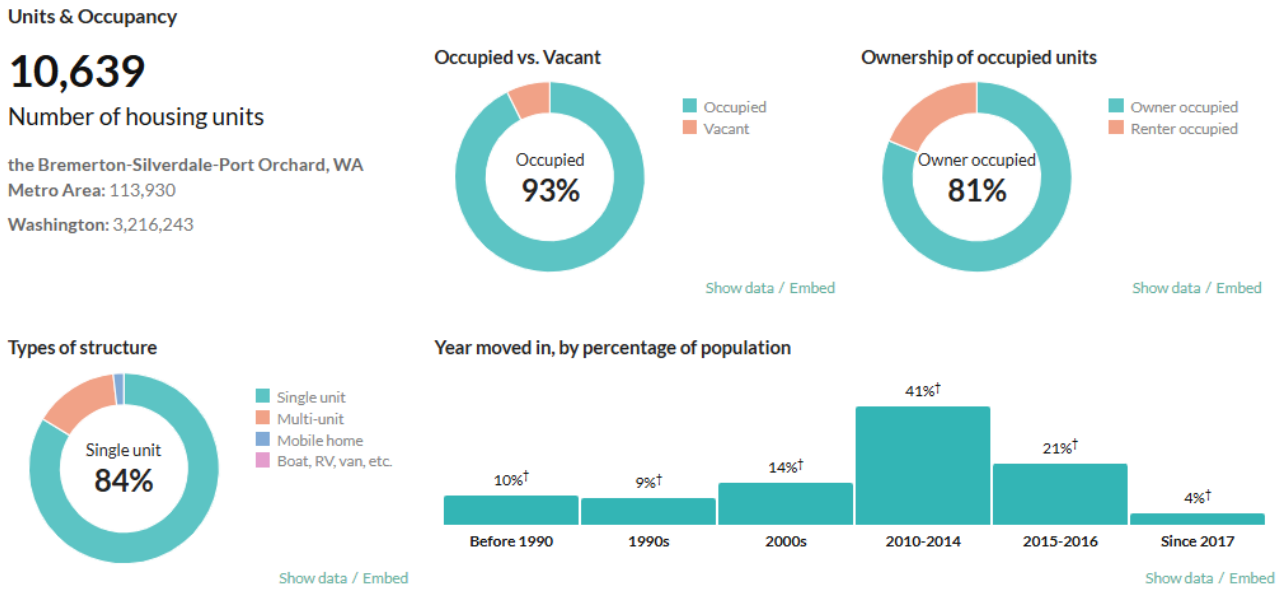


Figure 46: Bainbridge Island Units and Occupancy 2023.

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[9, 70].

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 38.

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.[70, 72] 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 38 below includes some of the most critical cultural facilities.

Bainbridge Island Critical Facilities			
#	Name	Address	Description
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

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
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	691 Winslow Way West	Dry pit pump station
36	Village	920 Hildebrand Lance NE	Dry pit pump station
37	Wing Point	6481 Wing Point Drive NE	Dry pit pump station
38	Sakai Village	1879 Sakai Loop	Wet pit pump station
39	Ferry Terminal	Olympic Drive	Wet pit pump station
40	Rockaway	3900 Rockaway Beach Road	Wet pit pump station
41	Vineyard Lane	682 State Highway 305	Wet pit pump station
42	Woodward School	9125 N.E. 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 Pl 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

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	Island Wood	4450 Blakely Ave NE	Learning Center
74	Bloedel Reserve	7571 NE Dolphin Dr	Nature Reserve
75	Island Church	9624 Sportsman Club Rd	Church
76	Battle Point 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 38: 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[70, 71]. The plan can be found here: https://www.bainbridgewa.gov/615/Navigate-Bainbridge-Comprehensive-Plan-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[70, 71]. In April of 2018, there were 11,061 units. This translates into an average growth of 66 residential units per year[70, 71]. 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[71]. The topography is generally of low rolling hills with several ridges oriented mostly north to south at 250 to 300 feet elevation[42].

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[10].

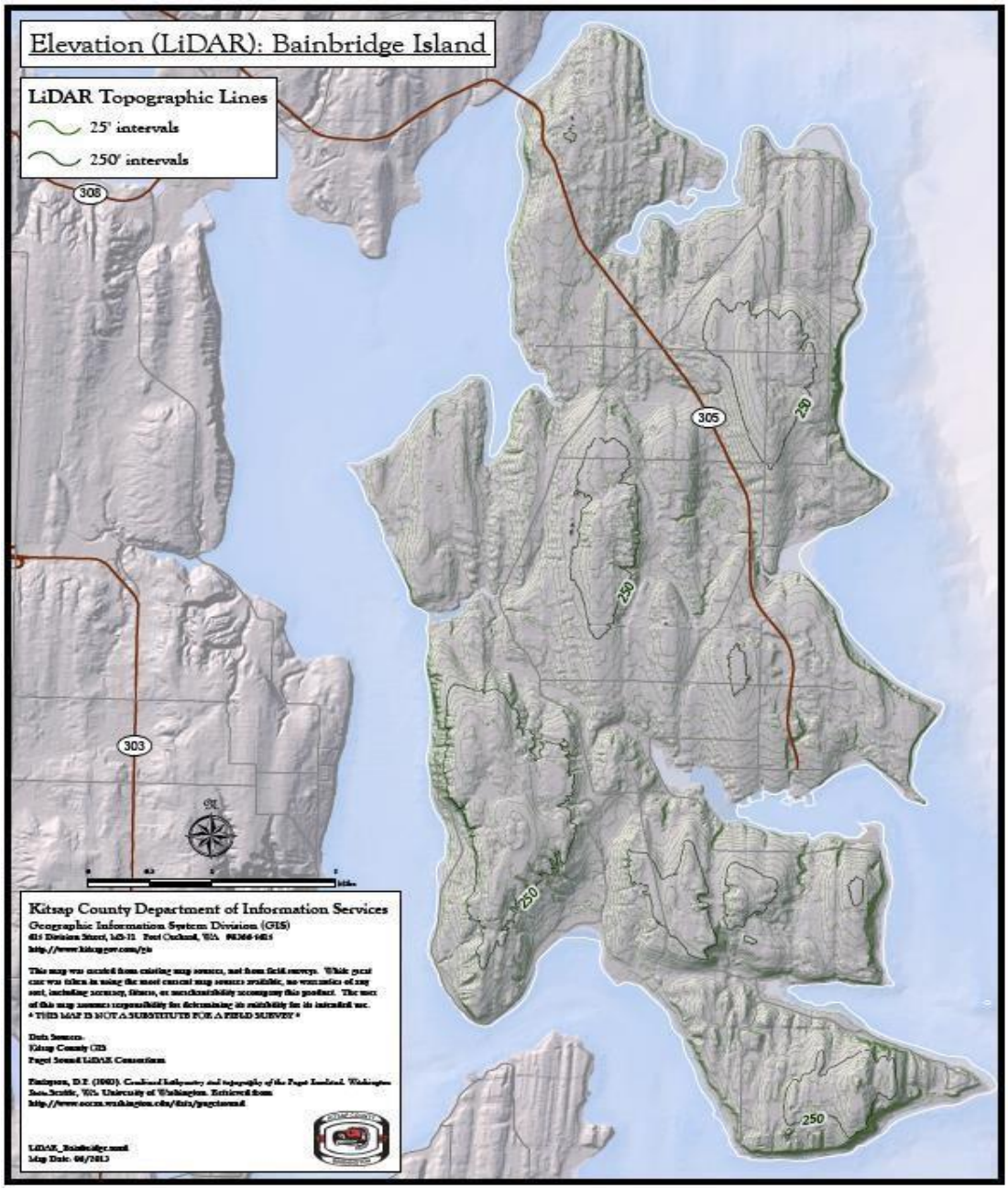


Figure 47: Topography of Bainbridge Island.

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. Table 39 outlines the history of events on Bainbridge Island[94]. As noted in the last 10 years, Bainbridge Island has been mostly affected by severe winter storms, most of which were not serious enough to reach the Public Assistance (PA) threshold for federal assistance.

Event Date	Type of Event	Declaration	Comments

December 2022	King Tides, Low Atmospheric pressure	No	Did not meet the PA Threshold
2020	2 Biological Disasters	Federal Declaration	COVID and MPOX
February 2019	Severe winter storm	Local, State, Federal	Local PA 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 39: 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.

Integrated 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.. 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.

   a. Preserve the special character of the Island.

b. Protect fragile water resources.
c. Foster diversity.
d. Consider costs and benefits to property owners when making land-use decisions.
e. 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 approved in 2024 identifies and prioritizes Parks, Opens Spaces and Shoreline Improvements and mitigation between 2024 and 2029. 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.

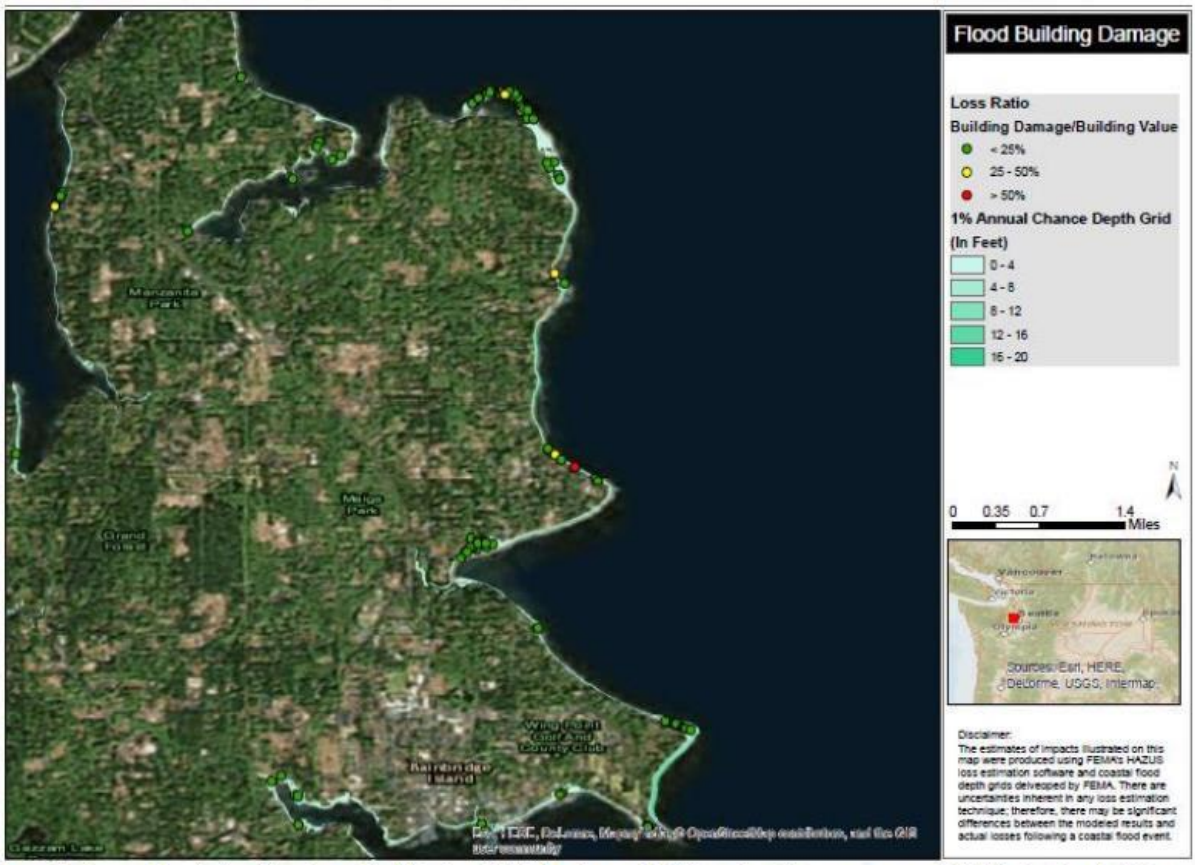
In 2019, the City updated the Flood Damage Protection Ordinance (FDPO) to update the requirements for FEMA compliance related to the NFIP. The City has also been involved with a Community Assistance Visit (CAV) process as FEMA has audited for compliance measures of the City's Flood Ordinance as adopted. 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. Table 40 identifies Bainbridge Island's special flood hazards area assessment noting the number of buildings in the area and the 1% loss estimates.

More NFIP information can be found in the Kitsap County Profile section.

Special Flood Hazard Area Assessment for Bainbridge Island42, 43					
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
$3.8 Billion	1.5%	$5.26 Million	1.4%	136	8
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.					

Table 40: Special Flood Hazard Area Assessment for Bainbridge Island.

Figure 48 shows building damage percentage (Loss Ratio) and Figure 49 show Flood Zones for the City of Bainbridge Island.



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 48: Building Damage Percentage (Loss Ratio) for Bainbridge Island.

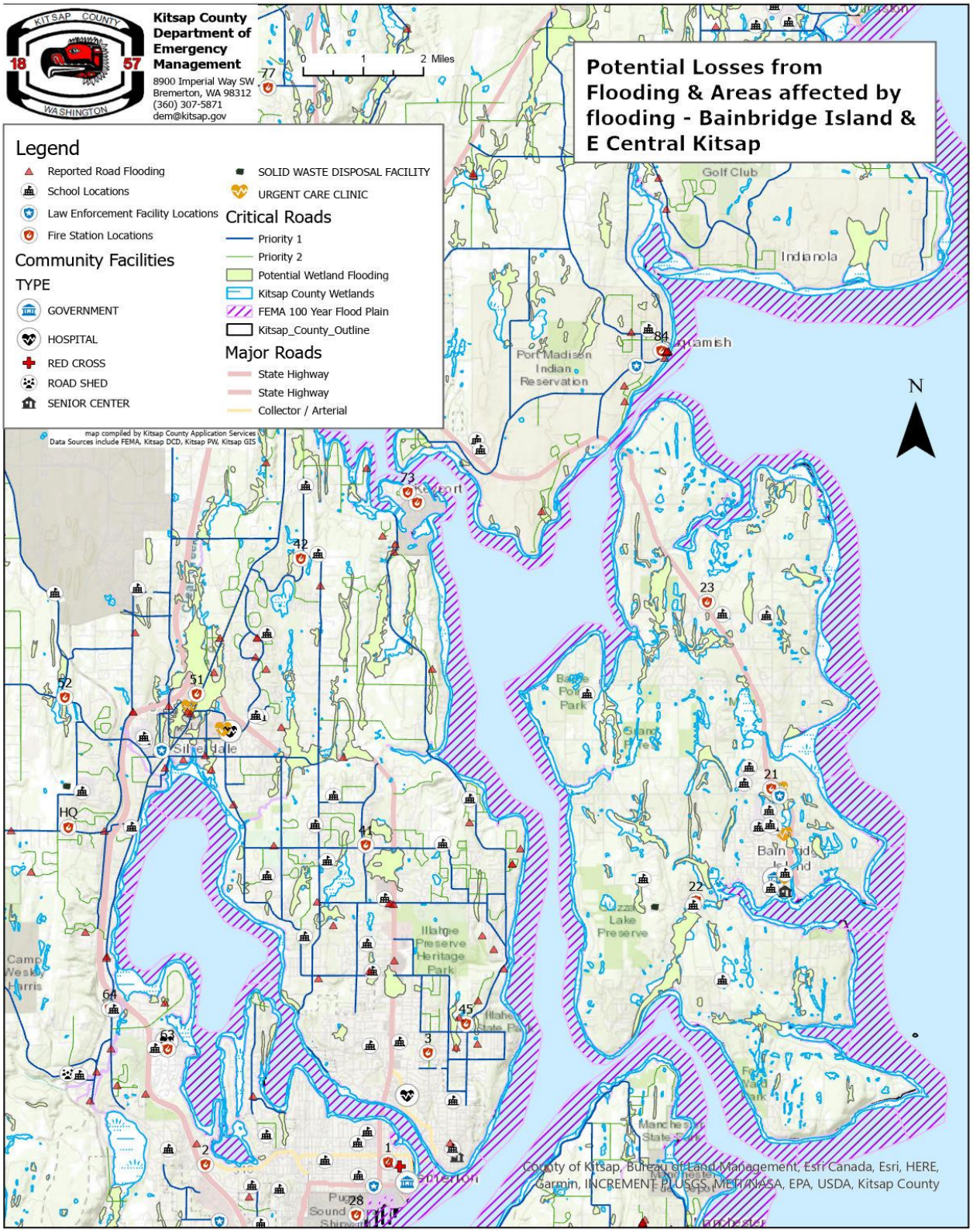


Figure 49: Flood Zones: Bainbridge Island.

Figure 50: Streams and Surface Water, City of Bainbridge Island, (Kitsap County GIS Department).

Severe Storms/Tornados

Probability of Occurrence: High

The City of Bainbridge Island is vulnerable to severe weather, typically in the winter months[13, 1494]. 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[94]. 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, [5, 11] as identified in Figure 51, 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[5, 11]. 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[94, 95]. 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 50: Building Exposure to Landslides

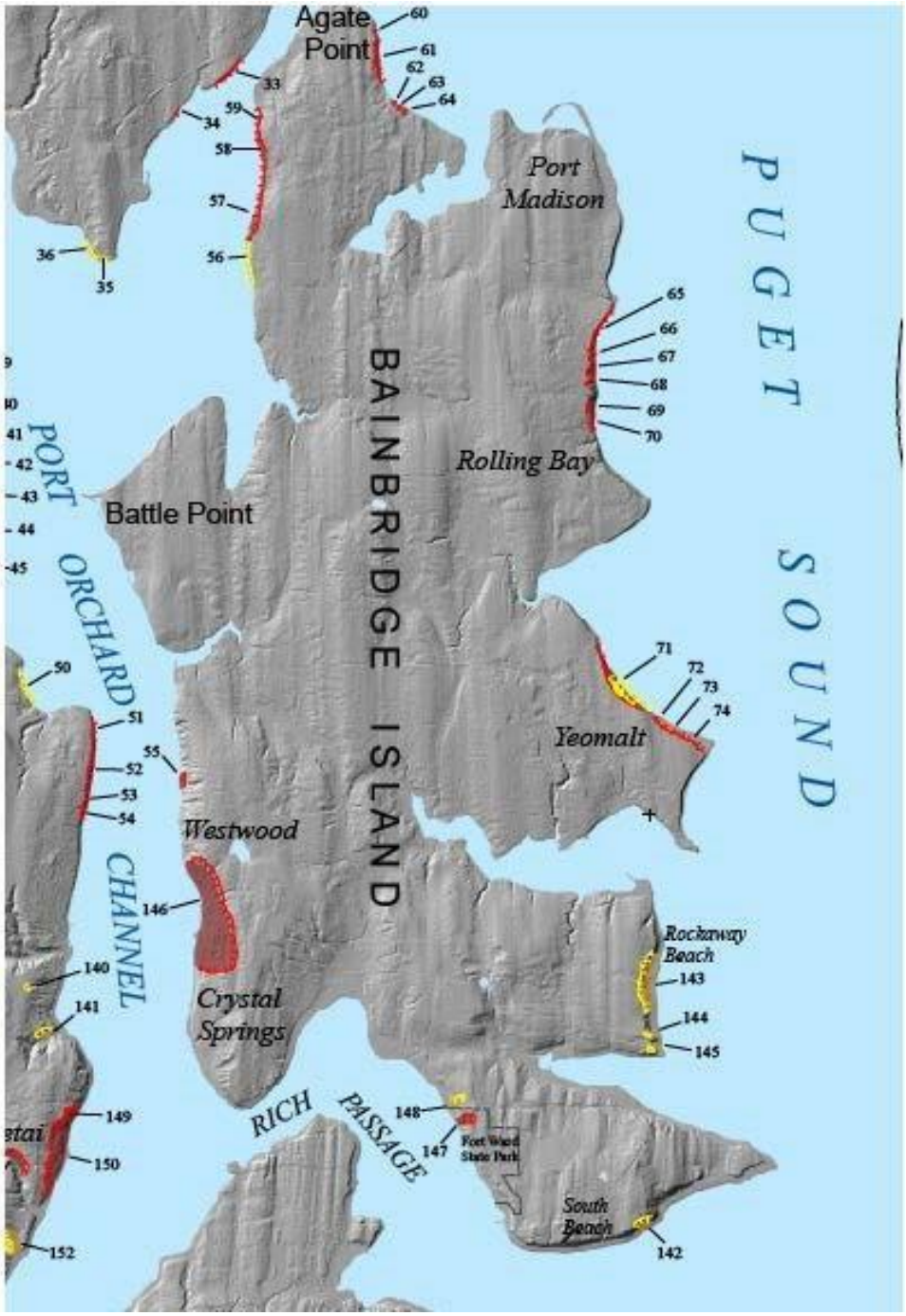


Figure 51: LIDAR Data on Landslide: Bainbridge Island (USGS).

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 zones[5].

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[5, 16].

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, table 41 below shows the data related to buildings pre and post 1975 building code, table 42 shows the estimated dollar value for these units. Bainbridge Island has the third-highest average building loss ratio of 34 percent after the City of Bremerton at 45 percent and Port Orchard at 39 percent[41, 70].

Pre-Code versus Moderate Code Building on Bainbridge Island				
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%
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 41: Pre-Code versus Moderate Code Building in Bainbridge Island.

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.

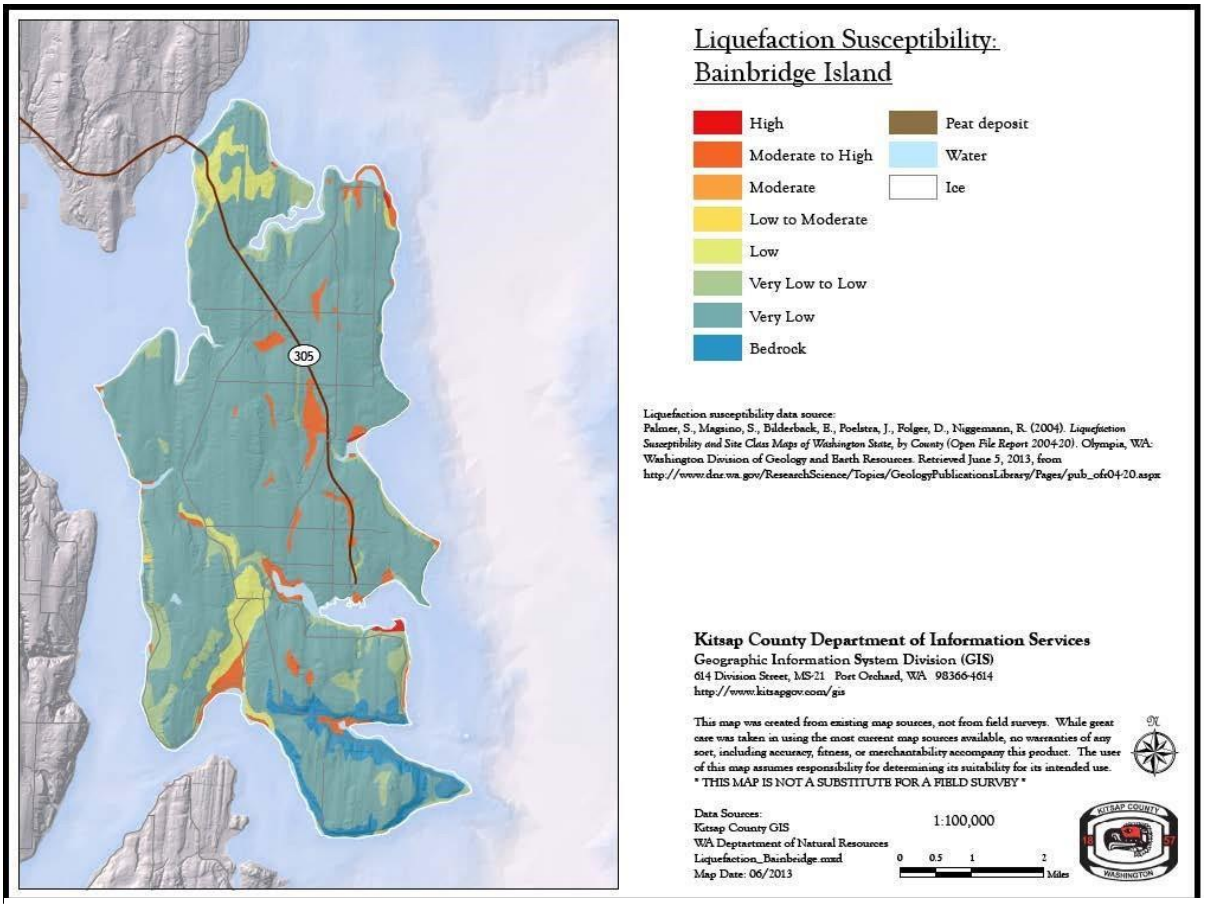


Figure 52: Liquefaction on Bainbridge Island.

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	$3.8 Billion	9,094	384	4%	$785 Million	21%

Table 42: Estimated dollar value for damages from a M7.2 Seattle Fault Earthquake, Bainbridge Island.

Note: The above table shows the estimated total 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.

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[5, 16, 41, 44, 48]. 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[5, 16, 41, 44, 48, 70].

Bainbridge Island is vulnerable to subduction as well as to fracture faults. The Island lies within Seismic Risk Zone 3, which requires buildings to be designed to withstand major earthquakes measuring 7.5 in magnitude[5, 16, 41, 44, 48]. It is anticipated, however, that earthquakes caused from subduction plate stress in the region could reach a magnitude greater than 8.0. The Seattle fault is recognized as a significant seismic hazard; evidence has indicated that it was the cause of a major 7.0 magnitude earthquake approximately 1,100 years ago [94, 95]. The potential effects of a comparable 7.2 magnitude earthquake were modeled for the Seattle Fault zone by the Washington State Department of Natural Resources (WADNR). The scenario predicts that thousands of injuries and fatalities would occur throughout the region, and thousands of buildings would collapse or be in imminent danger of collapse. The Seattle Fault cuts across Puget Sound (through Seattle and Bainbridge Island) and can create a tsunami that affects the island immediately. The northern portion of the island subsides, increasing the level of flooding in Eagle Harbor and other coastal regions to the north. The southern portion of the island is uplifted, and very little inundation is observed in these regions. However, very strong currents are observed in many locations all around the island; see Figures 17, and 29. Other potential sources have not been considered in this study. In particular the smaller Seattle Fault event SF-S that has been used in some past tsunami studies in Puget Sound was found to have negligible impact and was not modeled in detail. Several other fault zones cross Puget Sound, but potential sources from these faults have not been considered in the WA DNR and WSU studies.

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

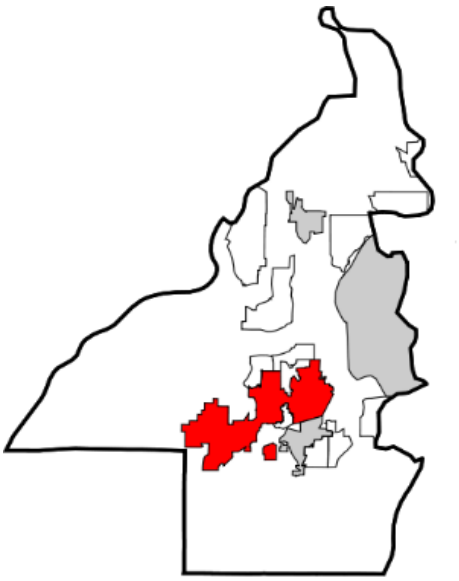
Location COBI Facilities (Critical Facilities: High, Medium and Low)	Zip Code	Prop. Value	Contents	Year Built	Type of Construction	Stories	Square Footage	Type of Protection	Critical Facility (Yes/No)
280 Madison Ave, Bainbridge Island, WA City Hall (High)	98110	$ 2,461,605	$10,906,441	1999	Wood	2	19,051 ft2	Alarm System	Yes
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
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
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 43: 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[5, 16, 41, 44, 48].

The City was incorporated on October 14, 1901 and operates as a charter city with a Mayor/Council form of government[71]. The current form of government was established by a 1983 charter that eliminated a decade old 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 43,983, table 44 shows Bremerton's population and population data.,[123] making it the largest city in Kitsap County. during the day Bremerton's population swells with another 9,000 employees coming in to work at the Puget Sound Naval Shipyard and support organizations. This population is expected to increase by of 13,000 – 15,000 by end of year 2025. [5, 16, 41, 44, 48]

Bremerton Population Information[5, 9, 35]				
Population	**Population Density**	**Number of Households**	**Median Household Income**	**Under 65 with a Disability**
43,983 (2022)	*1,547 per sq. mi (2022)*	*17,740 (2022)*	*$68,556 (2022)*	*15.6% (2022)*

Table 44: Bremerton Population Information.

Age Distribution, Vulnerable Population, and Population Density

Figure 53 shows the distribution of age in Bremerton, figure 54 identifies The City's vulnerable populations, and figure 55 shows a graphic of The City's population density[5, 9, 35]. The senior population has grown consistent with statistics nationwide[34].

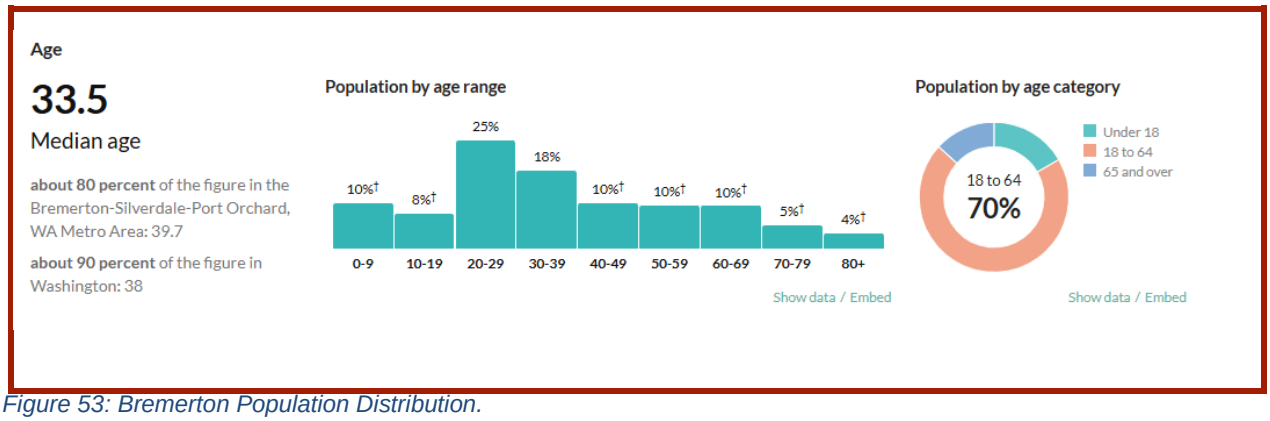
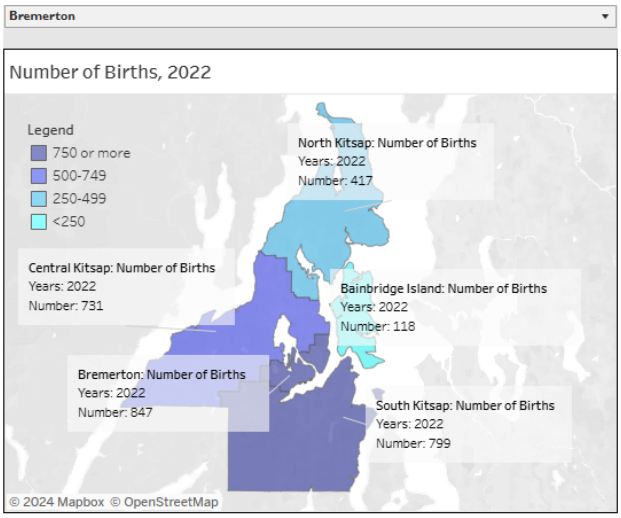


Figure 53: Bremerton Population Distribution.

Number of Births	2022	847
Children and Youth (Age Birth-19)	2023	10,126
Seniors (Age 85+)	2023	1,191
Seniors Living Alone (Age 65+)	2018-22	2,709
People Immigrating to the US (entering since 2010)	2018-22	1,335
People With Limited English or No English Proficiency	2018-22	2,010
People Living Below 100% Poverty	2018-22	6,241
Children 0-17 Living Below 100% Poverty	2018-22	1,222
People With Food Insecurity	2022	5,991
Households with No Vehicle Available	2018-22	1,947
People Commuting 45+ Minutes	2018-22	4,027



Kitsap County Population

Total Kitsap Population	283,200	100%
Unincorporated Population (outside city limits)	183,500	65%
Incorporated Population (inside city limits)	99,700	35%

Incorporated Population (% of Inc.)		
Bainbridge Island	25,180	25%
Bremerton	44,640	45%
Port Orchard	17,480	18%
Poulsbo	12,400	12%

Bremerton	Population	67,179	24%
	Households	20,197	

8,230	2018-22	People With a Disability^
3,934	2018-22	People with Ambulatory Difficulty (Age 5+)
840	2023	People With Developmental Disability (Age 3-17)
2,030	2018-22	People With Hearing Difficulty
1,306	2018-22	People With Vision Difficulty
534	2024	Electricity-Dependent Adults
14,786	2022	Medically Dependent Adults
1,834	2021	People With Serious Mental Illness (Age 18+)*
11,915	2022	People With Substance Use Disorder (Age 12+)**
#	2023	Point in Time Count of People Experiencing Homelessness
125	2023-24	Public school students experiencing homelessness
3,721	2018-22	People Living in Group Quarters

Notes: All counts are estimates. When available, 95% confidence intervals are provided in the popup when you hover over the data. ^ Civilian, noninstitutionalized only; * County estimate based on U.S. national estimates; **County estimate based on Washington State estimates; # The number is suppressed due to unreliability and/or data is not available. When the number is highly unreliable, the confidence interval in the tooltip will also be suppressed/blank.

July 2024 Kitsap Public Health District, Public Health Emergency Preparedness and Response Program, prepare@kitsappublichealth.org 1

Figure 54: Bremerton's vulnerable populations.

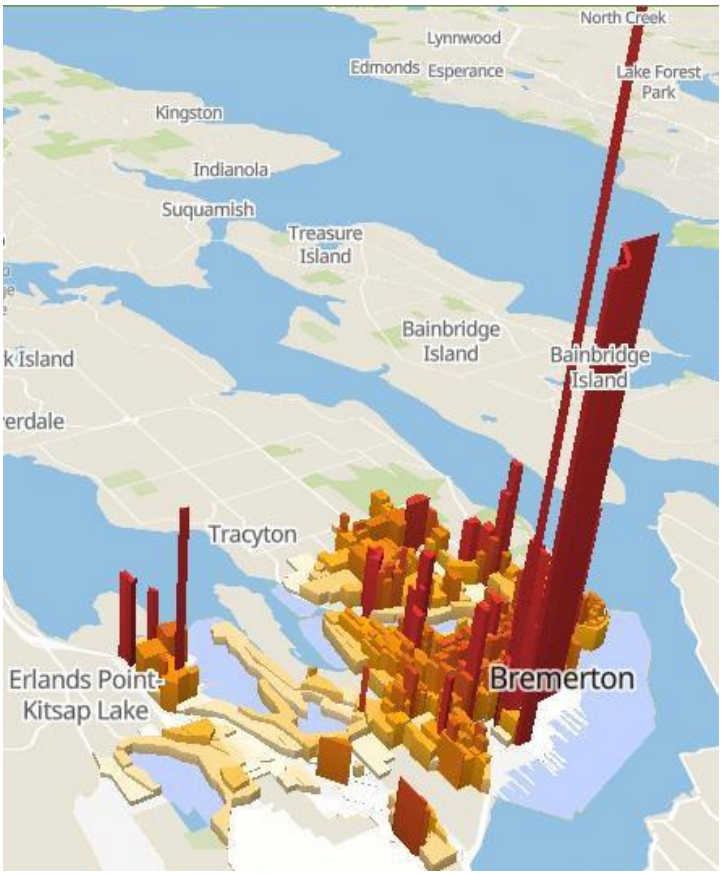


Figure 55: Bremerton Population Density.

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 Virgina Mason Franciscan Medical Center's Northwest Washington Family Medicine Residency center[71].

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 1- percent annual chance flood.[37, 38]

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[71]					
Community Building Name	**Address**	**Building Value**	**Loss Value**	**Loss Ratio**	**Hazard Type**
Bremerton Post Office	602 Pacific Ave. Bremerton	$461,360	$440,920	96%	Earthquake
Kitsap Regional Library	612 5th St. Bremerton	$1.6 Million	$1.54 Million	96%	Earthquake
Bremerton High School (Multiple buildings)	1313 Ohio Ave. Bremerton	$14.02 million	$8.5 million	61%	Earthquake
Fire Station #2 Bremerton	5005 Kitsap Way	$639,480	$390.082	61%	Earthquake

Table 45: 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[5, 71].

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[1, 71, 32, 35].

Residential Structures[1, 9]		
Type	**Estimate**	**Percent**
Housing Occupancy		
Total housing units	18,930	100%
Occupied housing units	17,794	94.0%
Vacant housing units	2,025	10.9%
Homeowner vacancy rate		(6%)
Rental vacancy rate		(1.2%)

Table 46: Bremerton Housing Characteristics 2020-2024 (US Census, 2022).

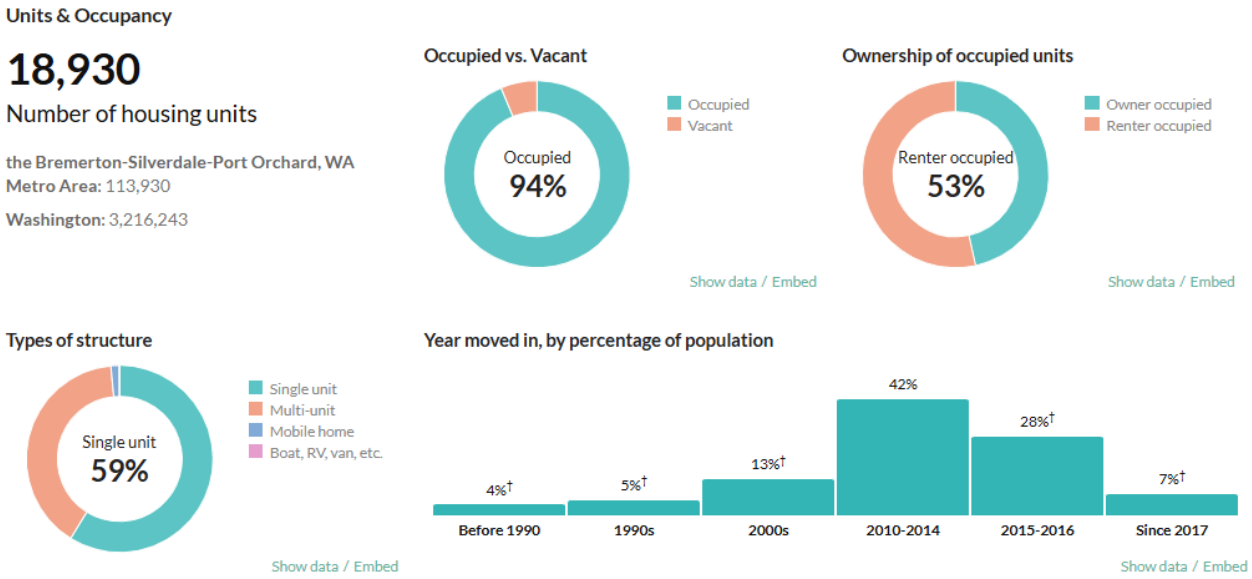


Figure 56: Housing units and Occupancy rates, Bremerton 2023.

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[9, 71]. 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:

1. The Norm Dicks Building, housing City government and Kitsap Public Health
2. Public Works campus
3. Olympic College
4. 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.
5. The East Bremerton Boys and Girls club, which was a portion of the old East High/Junior high School.
6. Casad Dam
7. Bremerton Fire Department and facilities
8. Bremerton Police Department and Courthouse
9. Kitsap Mental Health Services
10. American Red Cross

Both fire stations in Bremerton are brick, and have been inspected, and show they should not sustain significant damage in earthquake.

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[71].

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[9]. 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.

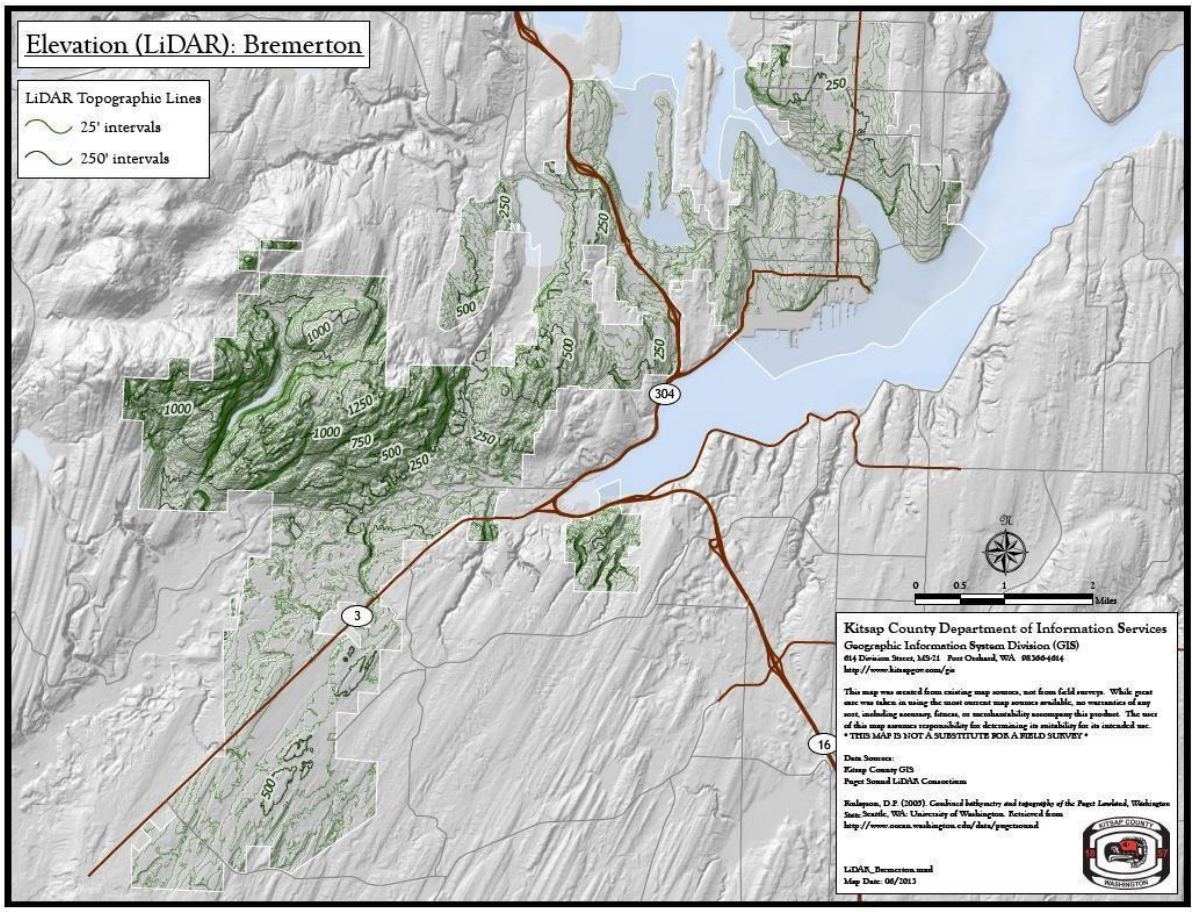


Figure 57: Topographical Feature, City of Bremerton.

History of Disasters

Bremerton's history of emergency/disasters is much like the remainder of the county[94, 95]. 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
December 2022	King Tides, Low Atmospheric pressure	No	Did not meet the PA Threshold
2020	2 Biological Disasters	Federal Declaration	Yes. COVID and MPOX
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.

November 2012	Mud Slide, Illahee	Local	Did not meet PA threshold
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 47: 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 THIRA 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[71], 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. Bremerton's comprehensive land use plan is in

revision as of November 2024.

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 2021 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[9, 71]. 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[9,94, 95]. 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 58 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[104, 105]. 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.

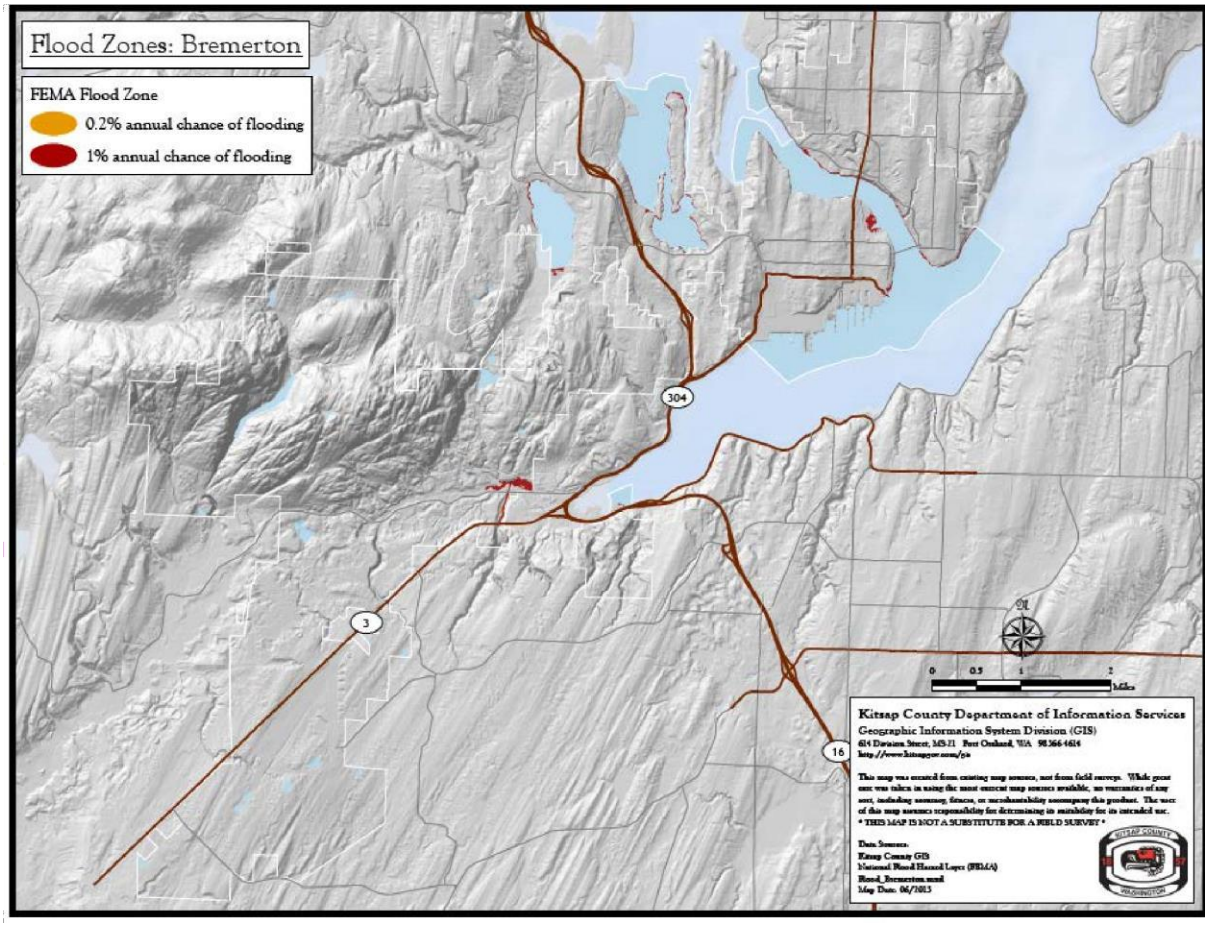


Figure 58: Bremerton Flood Zones.

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. More information regarding the NFIP can be found in the Kitsap County Profile section.

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*	$2.48 Billion	<1%	$589,840	<1%	21	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 48: Special Flood Hazard Area Assessment.

Flood Risk Community Characteristics[129]						
Community	**Total Population**	**CRS Community**	**Flood Claims**	**Repetitive Loss Properties**	**Total Policies**	**Total Insurance Coverage**
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 49: Flood Risk Community Characteristics.

Watercourse & Surface Water Map of Bremerton

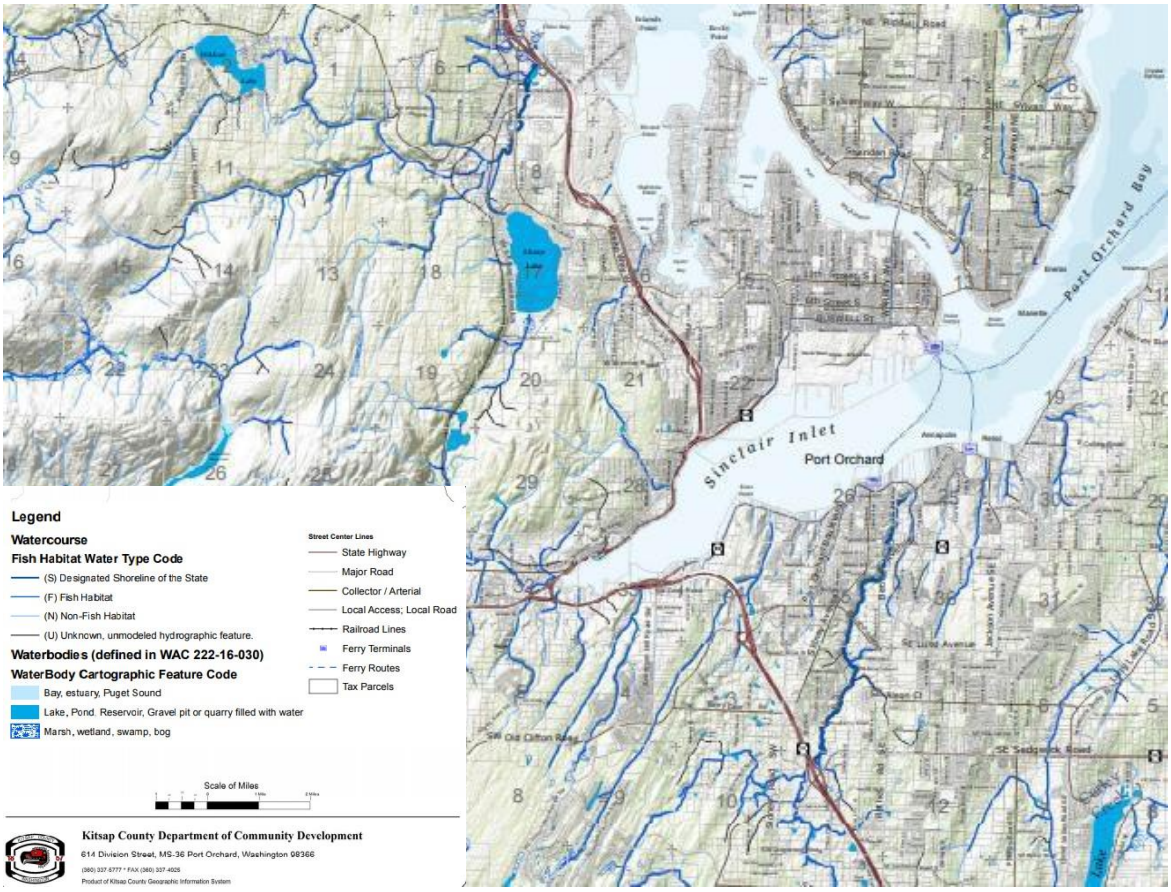


Figure 59: Watercourse & Surface Water Map of Bremerton (Kitsap GIS Department).

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, and low-lying areas like Mannette, would overflow and flood with areas downstream along the shoreline. 100% of the Bremerton 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.

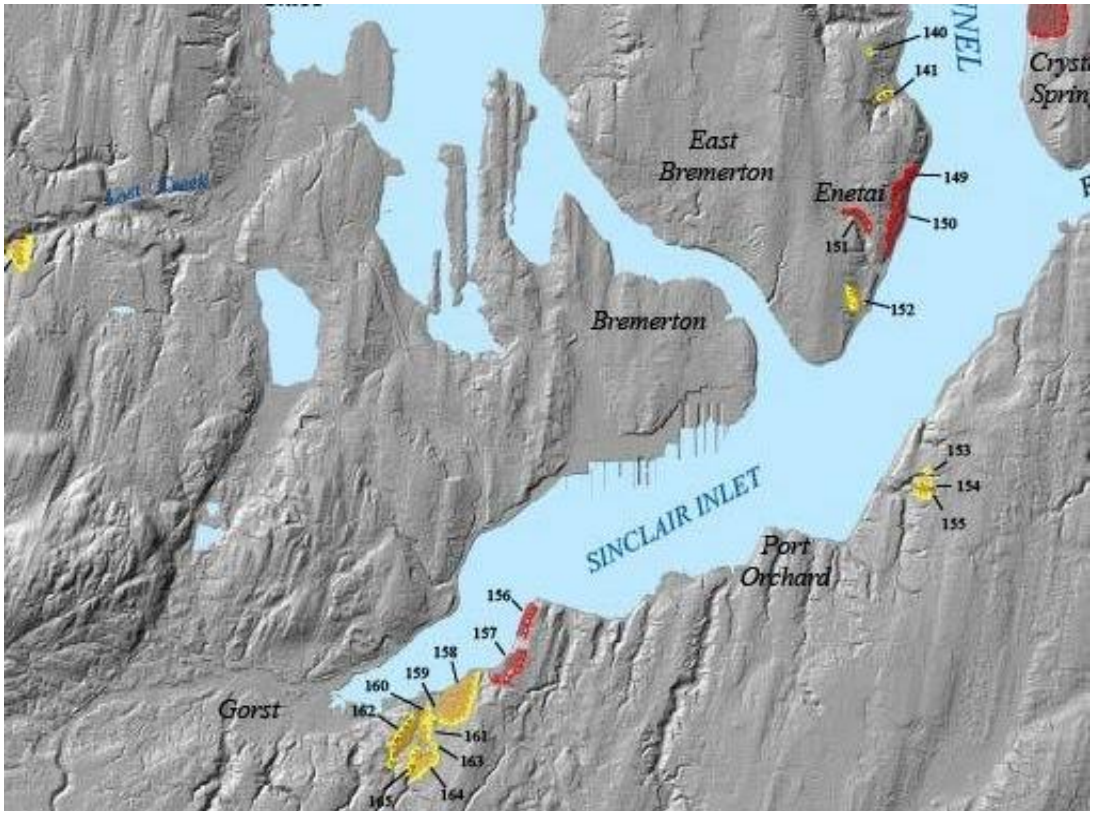


Figure 60: LIDAR Data on Landslide, Bremerton (USGS).

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[5, 16]. 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[4]. 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.

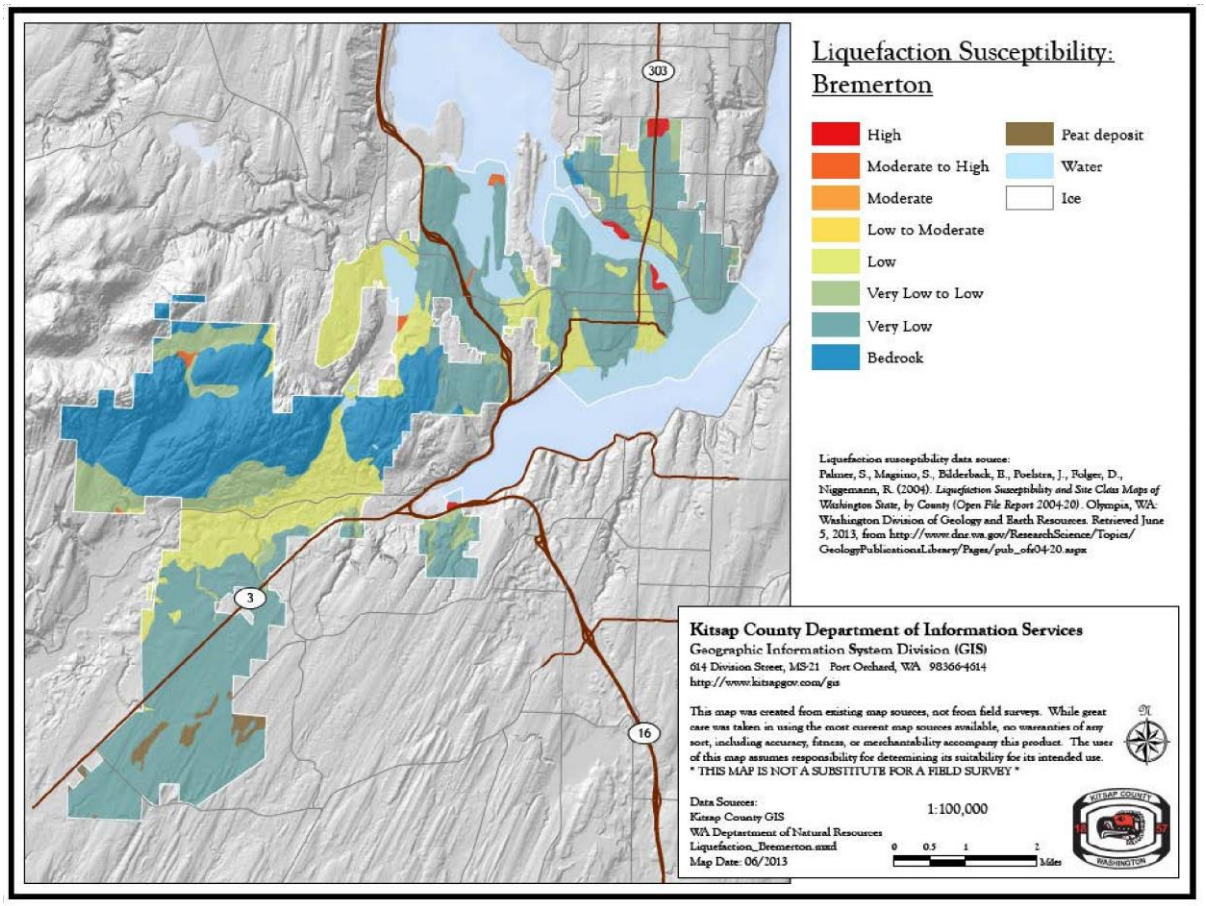


Figure 61: Liquefaction Areas, City of Bremerton (Kitsap County GIS Department).

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	$2.49 Billion	10,899	116	1%	$1.1 Billion	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 50: Hazus Earthquake Results for a Seattle M 7.2 Earthquake.

Pre-Code versus Moderate Code Building in Bremerton				
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	12,694	67.1%	6236	32.9%
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 51: Pre-Code versus Moderate Code Building in Kitsap County.

Tsunamis & High Waves

Probability of Occurrence: Moderate

Bremerton can be affected by tsunamis, mostly in the area along the shipyard[38]. 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 62. 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.

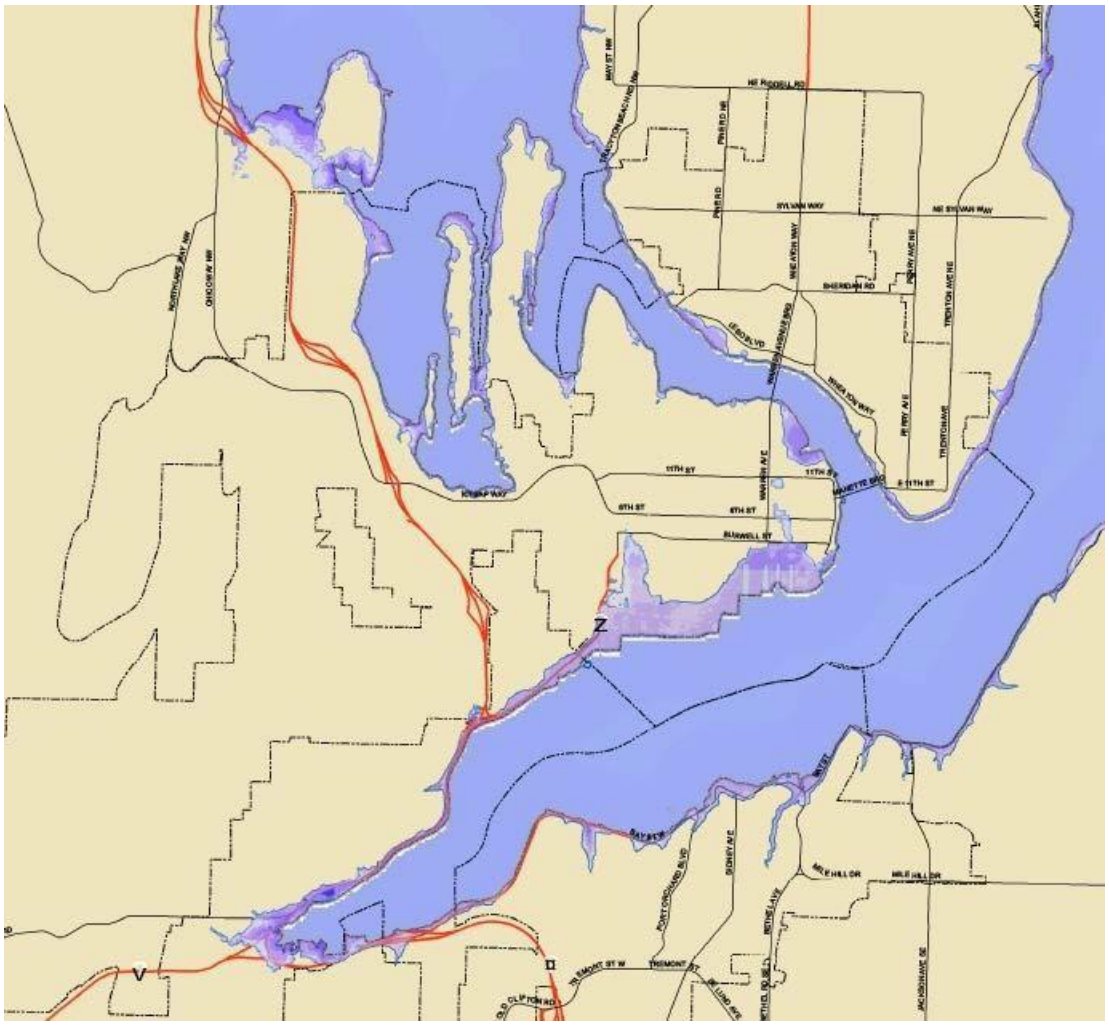


Figure 62: Tsunami Inundation, City of Bremerton.

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[57, 71]

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	*10,610,793*	*1,725,124*	*No*	*Masonry Joisted*	*1*	*7,782*	*1979*	*No*	*98310*	*Fire*
M. Meigs Fire Station 5005 Kitsap Way	*10,577,765*	*1,225,124*	*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*	*N/A*	*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*	*N/A*	*Yes*	*Fire Resistive*	*1*		*1921*	*No*	*98312*	*Water*
Reservoir #5	*3,217,662*	*N/A*	*Yes*	*Fire Resistive*	*1*		*1954*	*No*	*98311*	*Water*
Reservoir #6	*446,898*	*N/A*	*Yes*	*all steel*	*1*		*1950*	*No*		*Water*

Reservoir #21	*2,681,385*	*N/A*	*Yes*	*all steel*	*1*		*1983*	*No*		*Water*
Reservoir #8	*2,502,626*	*N/A*	*Yes*	*all steel*	*1*		*1970*	*No*		*Water*
Reservoir #11	*1,644,583*	*N/A*	*Yes*	*Fire Resistive*	*1*		*1930s*	*No*		*Water*
Reservoir #12	*2,046,282*	*N/A*	*Yes*	*Fire Resistive*	*1*		*1930s*	*No*		*Water*
Reservoir #13	*893,795*	*N/A*	*Yes*	*Fire Resistive*	*1*		*1930s*	*No*		*Water*
Reservoir #15	*1,275,814*	*N/A*	*Yes*	*all steel*	*1*		*1960s*	*No*		*Water*
Reservoir #16	*1,161,934*	*N/A*	*Yes*	*all steel*	*1*		*1970s*	*No*		*Water*
Reservoir #17	*1,258,854*	*N/A*	*Yes*	*all steel*	*1*		*1970s*	*No*		*Water*
Reservoir #18	*1,235,325*	*N/A*	*Yes*	*all steel*	*1*		*1970s*	*No*		*Water*
Reservoir #19	*1,889,595*	*N/A*	*Yes*	*all steel*	*1*		*1970s*	*No*		*Water*
Reservoir #20	*1,220,334*	*N/A*	*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*
Senior Citizens Center 1140 Nipsic	*1,200,552*	*210,120*	*No*	*Frame*	*1*	*5,000*	*1940s*	*No*	*98310*	*Parks*
Reservoir #10	*1,488,904*	*N/A*	*No*	*all steel*	*1*		*1970s*	*No*		*Water*
Anderson Creek Well #8	*156,632*	*N/A*	*No*	*Masonry Joisted*	*1*	*104*	*1970s*	*No*		*Water*

Bridle Ridge Well #9	*317,524*	*N/A*	*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*	*N/A*	*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*	*N/A*	*Yes*	*Masonry Joisted*	*1*	*180*	*1990s*	*No*		*Water*
Pump Station #8	*880,405*	*N/A*	*Yes*	*Masonry*	*1*	*950*	*2003*	*No*		*Water*
Pump Station #11	*112,618*	*N/A*	*Yes*	*Masonry Joisted*	*1*	*225*	*1991*	*No*		*Water*
Pump Station #12	*112,618*	*N/A*	*Yes*	*Masonry Joisted*	*1*	*323*	*1966*	*No*		*Water*
Pump Station #14	*112,618*	*N/A*	*Yes*	*Masonry Joisted*	*1*	*160*	*1995*	*No*		*Water*
Pump Station #4	*71,761*	*N/A*	*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*
Sewage Treatment Plant 1600 Oyster Bay Avenue	*54,582,393*	*10,112,285*	*No*	*Fire Resistive*	*3*	*100,082*	*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*	*N/A*	*No*	*Fire Resistive*			*1940S*	*No*		*Water*
Pump Station CE1	*9,892,550*	*N/A*	*Yes*	*Fire Resistive*	*2*	*4,182*	*1984*	*No*		*WW*

Pump Station WB3	*8,795,029*	*N/A*	*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*	*N/A*		*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*	*N/A*	*Yes*	*Fire Resistive*	*1*		*1942*	*No*		*Water*
Pump Station #17 4398D W Belfair Valley Rd	*303,890*	*N/A*	*Yes*	*Masonry Joisted*	*1*	*480*	*1991*	*No*		*Water*
Well #2R	*115,413*	*N/A*	*No*	*Fire Resistive*	*1*	*30*	*1980*	*No*		*Water*
Well #3	*115,413*	*N/A*	*No*	*Fire Resistive*	*1*	*30*	*1950*	*No*		*Water*
Well #7	*148,388*	*N/A*	*No*	*Fire Resistive*	*1*		*1992*	*No*		*Water*
Well #13	*117,100*	*15,056 -*	*No*	*Frame*	*1*	*80*	*1990*	*No*		*Water*
Well #15	*115,413*	*N/A*	*No*	*All Steel*	*1*	*80*	*1992*	*No*		*Water*
Well #18 8301B W. Old Belfair Highway	*115,413*	*N/A*	*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*	*N/A*	*Yes*	*Fire Resistive*	*1*		*1981*	*No*		*Water*
Gorst Production Well	*63,036*	*N/A*	*Yes*	*Fire Resistive*	*1*		*1993*	*No*		*Water*
Booster Station #6	*35,752*	*N/A*	*Yes*	*Fire Resistive*	*1*		*1992*	*No*		*Water*
Booster Station #7 1527 Cook Rd SW	*35,752*	*N/A*	*Yes*	*Fire Resistive*	*1*		*1992*	*No*		*Water*
Pump Station CE-2	*839,657*	*N/A*	*Yes*	*All Steel*	*1*	*36*	*1970s*	*No*		*WW*
Pump Station CE-3	*1,648,758*	*N/A*	*Yes*	*Fire Resistive*	*2*	*450*	*1970s*	*No*		*WW*
Pump Station CE-4	*7,419,412*	*N/A*	*Yes*	*Fire Resistive*	*2*	*3,906*	*1980s*	*No*		*WW*
Pump Station CE-6	*3,832,723*	*N/A*	*Yes*	*Fire Resistive*	*2*	*966*	*1980s*	*No*		*WW*
Pump Station CW-2	*1,321,891*	*N/A*	*Yes*	*Fire Resistive*	*0*	*264*	*1940s*	*No*		*WW*
Pump Station CW-3	*700,602*	*N/A*	*Yes*	*All Steel*	*1*	*36*	*1970s*	*No*		*WW*
Pump Station CW-4	*824,379*	*N/A*	*Yes*	*Fire Resistive*	*0*	*100*	*1960s*	*No*		*WW*

Pump Station EB-2	*5,602,577*	*N/A*	*Yes*	*Fire Resistive*	*2*	*400*	*1970s*	*No*		*WW*
Pump Station EB-3	*2,473,137*	*N/A*	*Yes*	*Fire Resistive*	*2*	*480*	*1970s*	*No*		*WW*
Pump Station EB-4	*350,301*	*N/A*	*Yes*	*All Steel*	*0*	*48*	*1960s*	*No*		*WW*
Pump Station EB-5	*700,602*	*N/A*	*Yes*	*All Steel*	*1*	*36*	*1970s*	*No*		*WW*
Pump Station EB-6	*1,541,325*	*N/A*	*Yes*	*Fire Resistive*	*1*	*144*	*1940s*	*No*		*WW*
Pump Station EB-8	*736,053*	*N/A*	*Yes*	*All Steel*	*1*	*36*	*1970s*	*No*		*WW*
Pump Station EB-9	*726,071*	*N/A*	*Yes*	*All Steel*	*0*	*12*	*1970s*	*No*		*WW*
Pump Station KL-1	*1,541,325*	*N/A*	*Yes*	*Fire Resistive*	*2*	*675*	*1970s*	*No*		*WW*
Pump Station KL-2	*1,541,325*	*N/A*	*Yes*	*Fire Resistive*	*2*	*630*	*1970s*	*No*		*WW*
Pump Station KL-3	*1,071,693*	*N/A*	*Yes*	*Fire Resistive*	*2*	*450*	*1970s*	*No*		*WW*
Pump Station KL-4	*1,071,693*	*N/A*	*Yes*	*Fire Resistive*	*2*	*450*	*1970s*	*No*		*WW*
Pump Station PB-1	*1,236,569*	*N/A*	*Yes*	*All Steel*	*1*	*64*	*1970s*	*No*		*WW*
Pump Station PB-2	*1,648,758*	*N/A*	*Yes*	*All Steel*	*1*	*64*	*1970s*	*No*		*WW*

Pump Station OB-1	*7,561,264*	*N/A*	*Yes*	*Fire Resistive*	*2*	*1,260*	*1970s*	*No*		*WW*
Pump Station OB-2	*2,473,137*	*N/A*	*Yes*	*Fire Resistive*	*2*	*480*	*1970s*	*No*		*WW*
Pump Station OB-3	*2,473,137*	*N/A*	*Yes*	*Fire Resistive*	*2*	*450*	*1970s*	*No*		*WW*
Pump Station OB-4	*2,473,137*	*N/A*	*Yes*	*Fire Resistive*	*2*	*450*	*1970s*	*No*		*WW*
Pump Station OB-5	*824,379*	*N/A*	*Yes*	*Fire Resistive*	*2*	*480*	*1970s*	*No*		*WW*
Pump Station OB-7	*824,379*	*N/A*	*Yes*	*Masonry Joisted*	*1*	*240*	*1990s*	*No*		*WW*
Pump Station MD-1	*824,379*	*N/A*	*Yes*	*Fire Resistive*	*1*	*56*	*1990s*	*No*		*WW*
Pump Station WB-4 432 Constitution Ave	*736,053*	*N/A*	*Yes*	*All Steel*	*1*	*36*	*1970s*	*No*		*WW*
Odor Control Station #3	*494,627*	*N/A*	*Yes*	*Fire Resistive*	*1*	*120*	*1990s*	*No*		*WW*
Odor Control Station #1	*494,627*	*N/A*	*Yes*	*Fire Resistive*	*1*	*240*	*1990s*	*No*		*WW*
Odor Control Station #2 200 High Ave	*494,627*	*N/A*	*Yes*	*Fire Resistive*	*1*	*336*	*1990s*	*No*		*WW*
Composite Sampling Station SS-1	*123,657*	*N/A*	*Yes*	*Fire Resistive*	*1*	*100*	*1980s*	*No*		*WW*
Composite Sampling Station SS-2	*123,657*	*N/A*	*Yes*	*Fire Resistive*	*1*		*1980s*	*No*		*WW*
Corrosion Control Facility 1650 3rd Ave	*1,716,150*	*N/A*	*Yes*	*Masonry*	*2*	*1,290*	*1998*	*No*		*WW*
Generator Storage Facility at Well 14 5853 S Central Valley Rd NE	*19,278*	*N/A*	*Yes*	*Frame*	*1*	*240*	*1997*	*No*		*Water*

W Branch Water Intake Facility 5200 Rd Bremerton Watershed	*1,045,834*	*N/A*	*Yes*	*Fire Resistive*	*1*		*1990s*	*No*		*Water*
McKenna Falls Water Intake Facility 5000 Rd Bremerton Watershed	*1,016,473*	*N/A*	*Yes*	*Masonry Joisted*	*1*		*1990s*	*No*		*Water*
Booster Station #10 5785 Imperial Way SW	*175,313*	*N/A*	*Yes*	*Masonry Joisted*	*1*	*504*	*1970s*	*No*		*Water*
Fire Department Warehouse 3031 Olympus	*290,540*	*105,060*		*Steel Frame*		*5,000*	*2003*	*No*		*Fire*
Pump Station WB-6 299 Callow Avenue S	*5,602,577*	*N/A*	*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	*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*			
6851 W Belfair Valley Road										
TOTAL	**$139,536,051**	**$4,526,872**								

Table 52: Asset Profile City of Bremerton.

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[9, 90]. 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[90]. 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 farmer's 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 15,820.[1, 33,] Many professionals' transit daily to downtown Seattle. The city is characterized by professional, scientific employment, construction, and education. Table 53 shows the City's population density and urbanization figure 63 shows a breakdown by age of The City's population.

Port Orchard Population Information				
Population	**Population Density**	**Number of Households**	**Median Household Income**	**Under 65with a Disability**
15,820 (2022)	1,640 per sq. mi (2022)	6,269 (2022)	$82,650 (2022)	12.9% (2022)

Table 53: Port Orchard Population Information.

Age Distribution, Vulnerable Population, and Population Density

Figure 63 shows the distribution of age in Port Orchard, figure 64 identifies The City's vulnerable populations, and figure 65 shows a graphic of The City's population density.

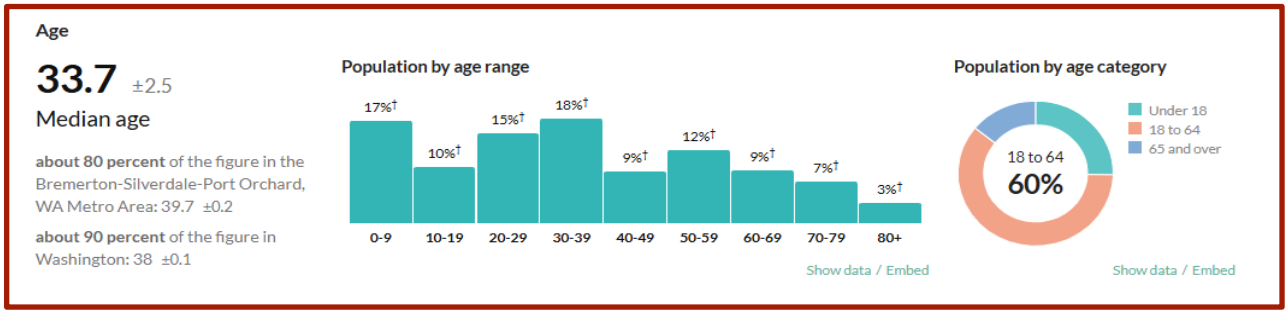


Figure 63: Port Orchard population distribution by age.

Number of Births	2022	799
Children and Youth (Age Birth-19)	2023	18,015
Seniors (Age 85+)	2023	1,227
Seniors Living Alone (Age 65+)	2018-22	2,424
People Immigrating to the US (entering since 2010)	2018-22	610
People With Limited English or No English Proficiency	2018-22	1,440
People Living Below 100% Poverty	2018-22	7,179
Children 0-17 Living Below 100% Poverty	2018-22	2,569
People With Food Insecurity	2022	9,160
Households with No Vehicle Available	2018-22	1,013
People Commuting 45+ Minutes	2018-22	8,321

South Kitsap

None, None

Legend

Kitsap County Population

Total Kitsap Population		283,200	100%
Unincorporated Population (outside city limits)		183,500	65%
Incorporated Population (inside city limits)		99,700	35%
Incorporated Population (% of Inc.)	Bainbridge Island	25,180	25%
	Bremerton	44,640	45%
	Port Orchard	17,480	18%
	Poulsbo	12,400	12%
South Kitsap	Population	76,047	27%
	Households	28,545	

11,226	2018-22	People With a Disability^
5,275	2018-22	People with Ambulatory Difficulty (Age 5+)
1,117	2023	People With Developmental Disability (Age 3-17)
3,018	2018-22	People With Hearing Difficulty
1,311	2018-22	People With Vision Difficulty
667	2024	Electricity-Dependent Adults
14,209	2022	Medically Dependent Adults
2,449	2021	People With Serious Mental Illness (Age 18+)*
12,258	2022	People With Substance Use Disorder (Age 12+)**
#	2023	Point in Time Count of People Experiencing Homelessness
192	2023-24	Public school students experiencing homelessness
945	2018-22	People Living in Group Quarters

Notes: All counts are estimates. When available, 95% confidence intervals are provided in the popup when you hover over the data. ^ Civilian, noninstitutionalized only; * County estimate based on U.S. national estimates; **County estimate based on Washington State estimates; # The number is suppressed due to unreliability and/or data is not available. When the number is highly unreliable, the confidence interval in the tooltip will also be suppressed/blank.

July 2024 Kitsap Public Health District, Public Health Emergency Preparedness and Response Program, prepare@kitsappublichealth.org 1

Figure 65: South Kitsap Vulnerable Population, includes Port Orchard.

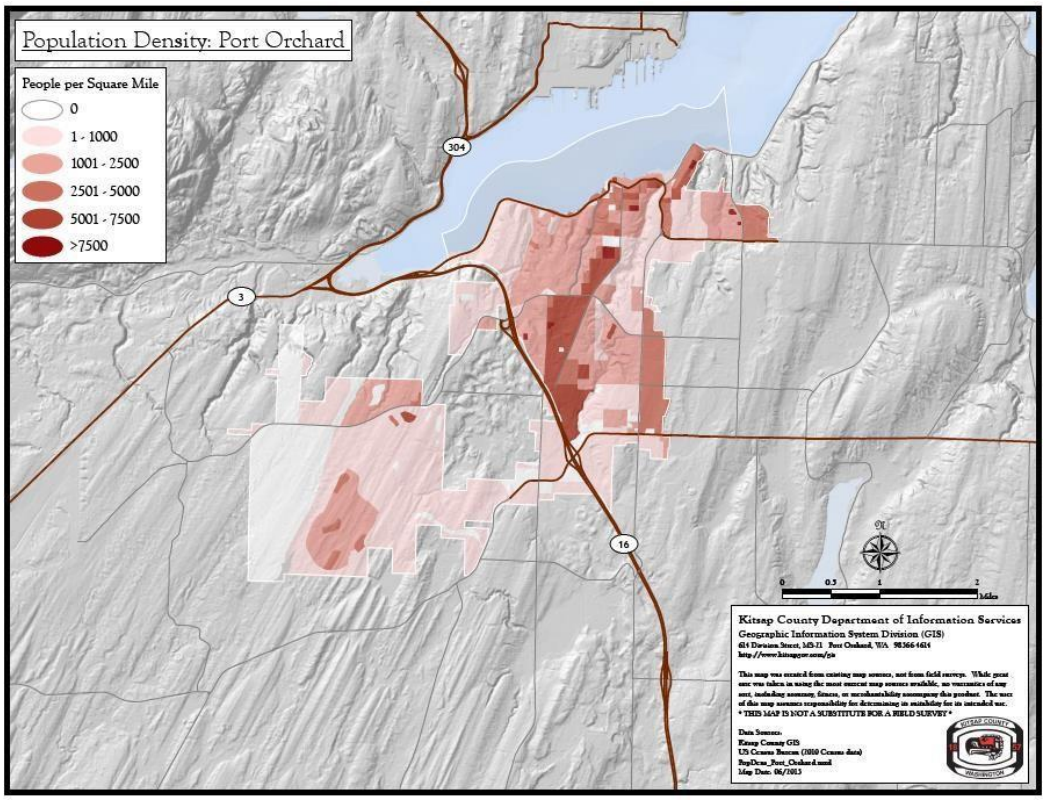


Figure 64: Port Orchard Population Density.

Economy

The 2020 economic census data 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.[9, 90]

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[90]. 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[9, 90]. 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[90]. 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[9, 96, 97].

City of Port Orchard Areas of Mitigation Interest[56]					
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 54: City of Port Orchard Areas of Mitigation Interest.

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[1, 56].

Residential Structures		
Type	**Estimate**	**Percent**
Housing Occupancy		
Total housing units	6,728	100%
Occupied housing units	6,257	93%
Vacant housing units	471	7%
Homeowner vacancy rate		6%
Rental vacancy rate		5.3%

Table 55: Port Orchard Housing Characteristics 2017-2022 (US Census, 2022).

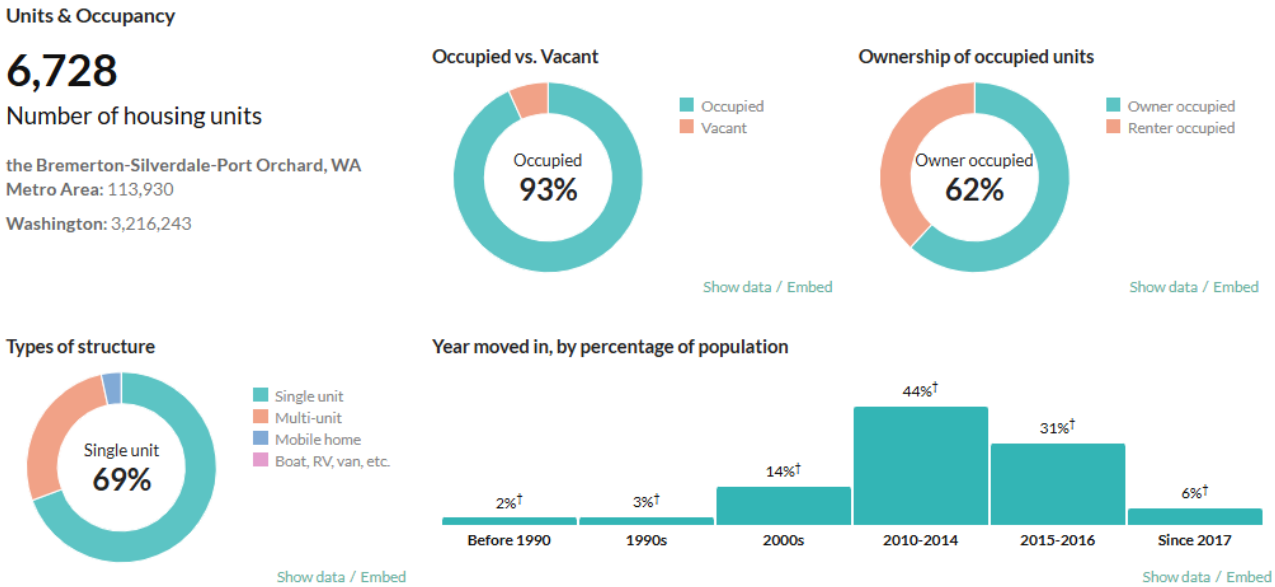


Figure 66: Port Orchard Housing, Units and Occupancy.

Infrastructure

Transportation, Communications, and Utilities

Major thoroughfares include State Highway 16, Bay Street, Tremont Street, Sidney Avenue, Sedgwick, Port Orchard Blvd, and Bethel[56]. 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, both the new EOC and City Hall have been updated and retrofitted over the past 5 years[56].

Critical Facilities

Critical structures[56] include:

1. City of Port Orchard City Hall and Public Works shop.
2. South Kitsap School District: South Kitsap High School, Cedar Heights Jr. High.
3. Givens Community Center.
4. Kitsap County Courthouse Complex and county jail.
5. Fire District #7 – Fire Station #31, (Port Orchard EOC).
6. Health Facilities: Group Health Coop of Puget Sound, Harrison Memorial.
7. 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 Places[72], The Sidney Museum and Arts Association[73] with cultural assets such as a gallery, art museum, and log cabin museum, The Western Washington Center for the Arts[74] which acts as a community theater, The Veteran's Living History Museum[72], and The Fathoms 'O' Fun Festival[75], 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, https://portorchardwa.gov/city-comprehensive-plan/ As of 2020, 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. Figure 67 shows Port Orchards City growth through annexation since 2008, Port Orchard continues to evaluate its city limits and will grow as

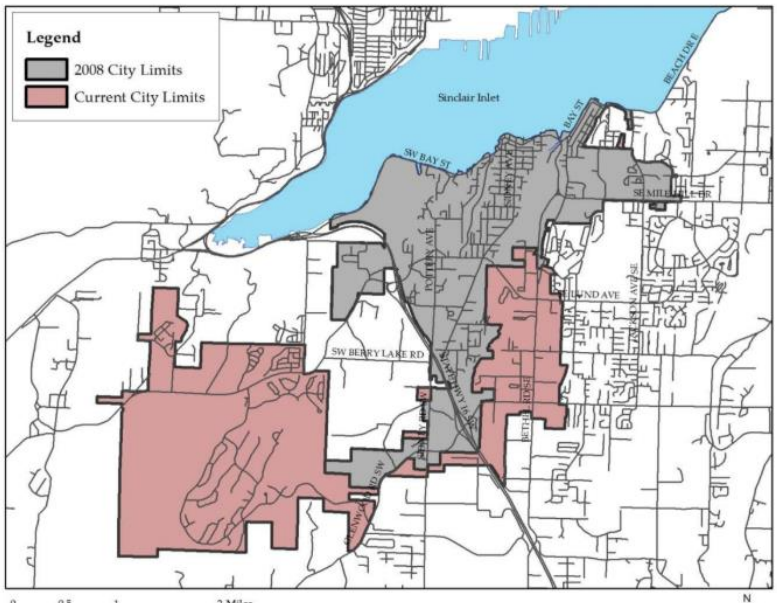


Figure 67: Port Orchard City Limit growth due to annexation since 2008.

needed and able.

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 as seen in figure 68 below[9, 21]. Marinas, merchants, and parking areas border the waterfront. The city includes some waterways.

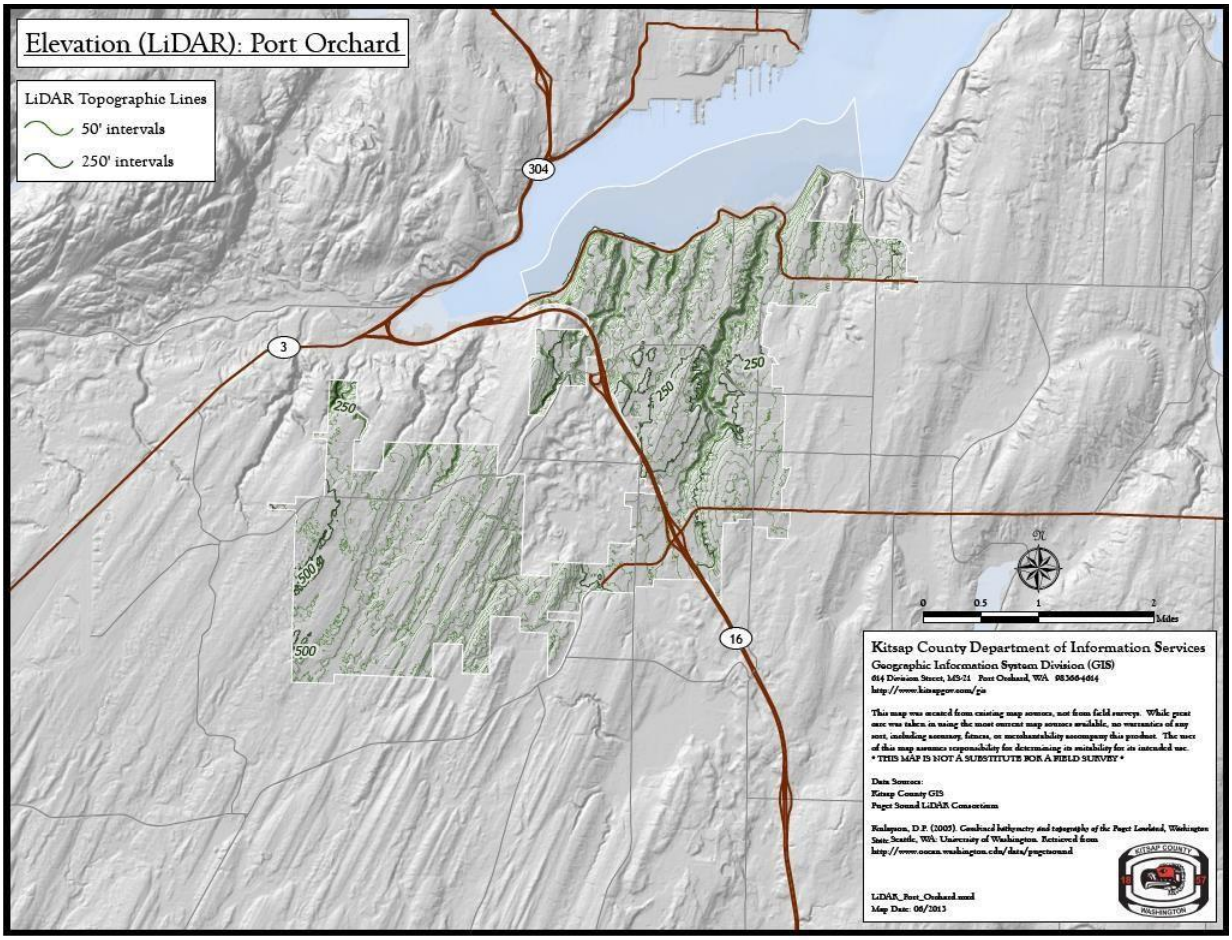


Figure 68: Elevation (LiDAR): Port Orchard.

History of Disasters

Table 56 below shows the history of natural hazards in Port Orchard[94, 95]. 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
December 2022	King Tides, Low Atmospheric pressure	No, Did not meet the PA Threshold
February 2021	Severe Winter Storm	Local

Dec 2020	2 Biological Emergencies	Federally declared
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
05/65	Earthquake	Local, State, Federal
10/62	Severe Storm – Wind	Local, State, Federal

Table 56: 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 THIRA 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 Port Orchard

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 December 2024 (Ordinance 014-16), most recently amended on June 14, 2019, by Ordinance 014-16.**
   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 man-made 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 2021 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[104, 105]						
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 57: Special Flood Hazard Area Assessment.

Flood Risk Community Characteristics[104, 105]						
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 the U.S. Census and were current as of November 23, 2022						

Table 58: Flood Risk Community characteristics.

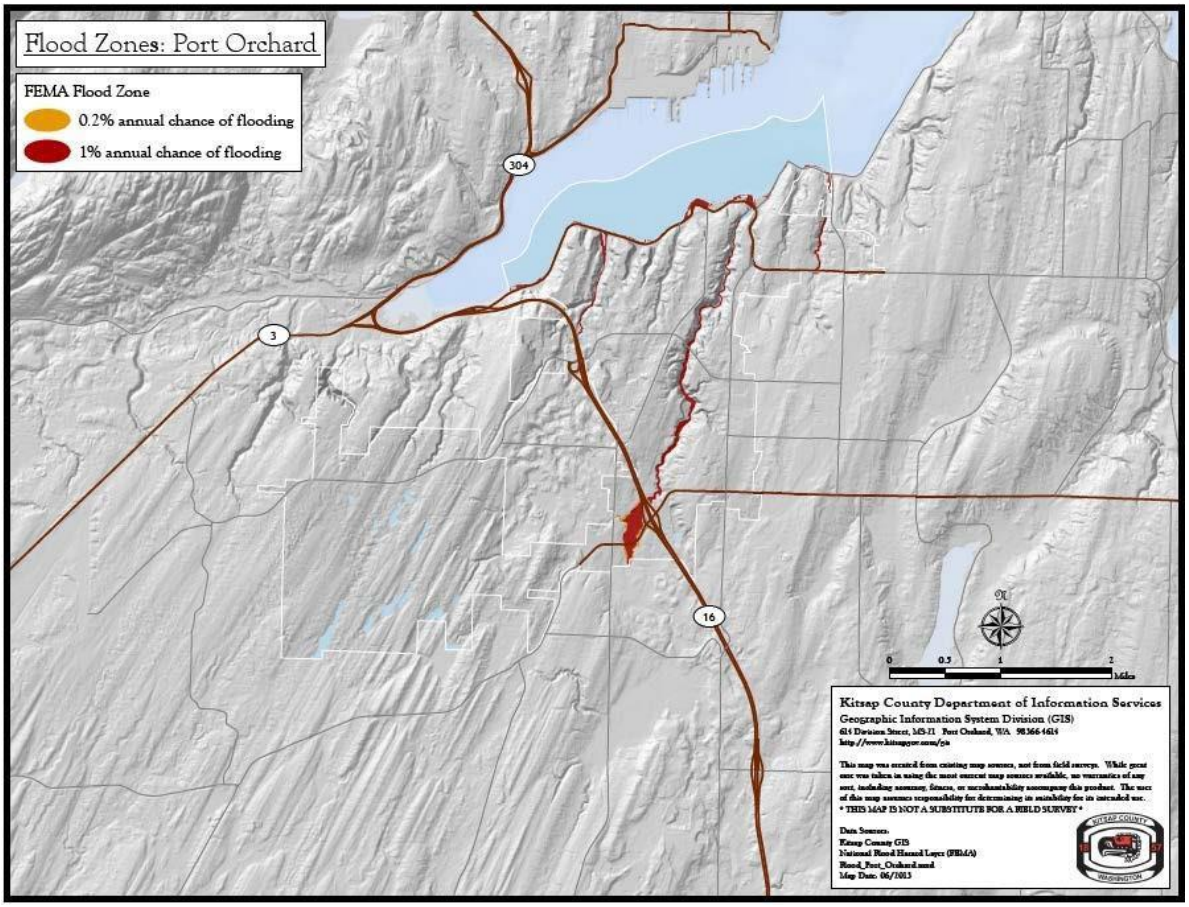


Figure 69: Flood Zones City of Port Orchard (Kitsap County GIS Department 2022).

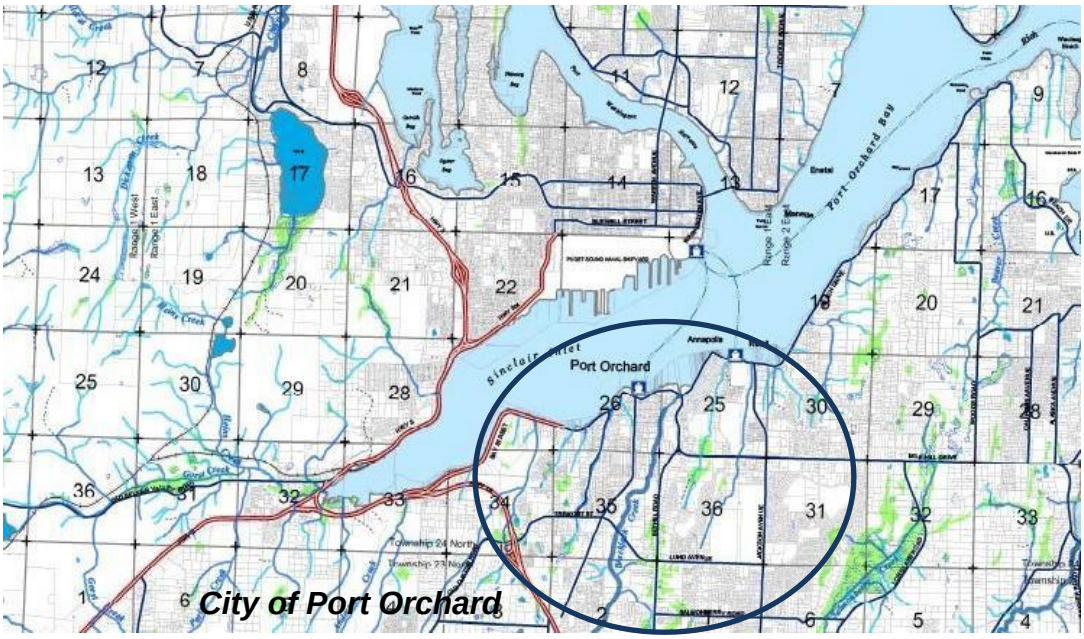


Figure 70: Streams and Surface Waters, City of Port Orchard (Kitsap County GIS Department 2022).

Severe Storms/Tornados

Probability of Occurrence: High

During severe winter weather in December 2018, an EF-2 tornado caused catastrophic damage to over 250 homes and commercial buildings[106,107,108,109]. Tornadoes in Kitsap County are rare due to irregularities in geography and elevation of the area[94, 95]. The geography is not typically conducive to forming tornadoes large enough to be destructive, however, according to NOAA, there have been two tornados in Kitsap County: one in December 2018 that hit Port Orchard and one in April 1991 that struck Tracyton, pelting the area with record-setting hail, and damaging homes.

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[5, 11, 111]. 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.

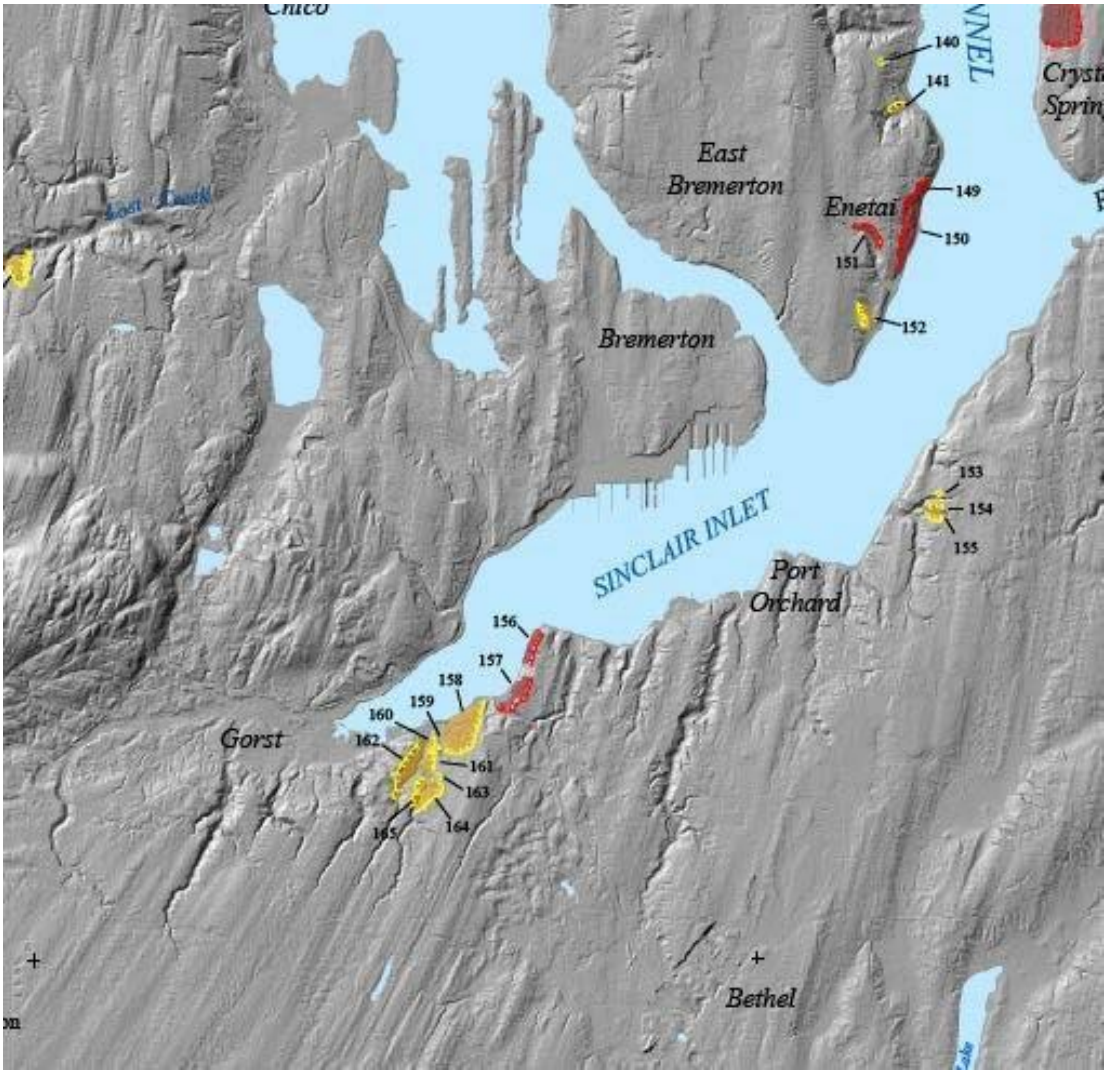


Figure 71: LIDAR Data on Landslide Port Orchard (USGS).

Building Exposure to Landslides[5, 90]		
Community	**Buildings within Landslide Zone**	**Building Value with Landslide Zone**
Port Orchard	66	$8.1 Million

Table 59: Port Orchard 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 72 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 corridor are apartment complexes and senior assist facilities. Road damage would disrupt life-safety response and alternative routes into downtown.

Hazus Earthquake Results for a Seattle M 7.2 Earthquake[5, 90]						
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.						

Table 60: Hazus Earthquake Results for a Seattle M 7.2 Earthquake.

Pre-Code versus Moderate Code Building in Port Orchard[1, 90]				
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 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 61: Pre-Code versus Moderate Code Building in Port Orchard.

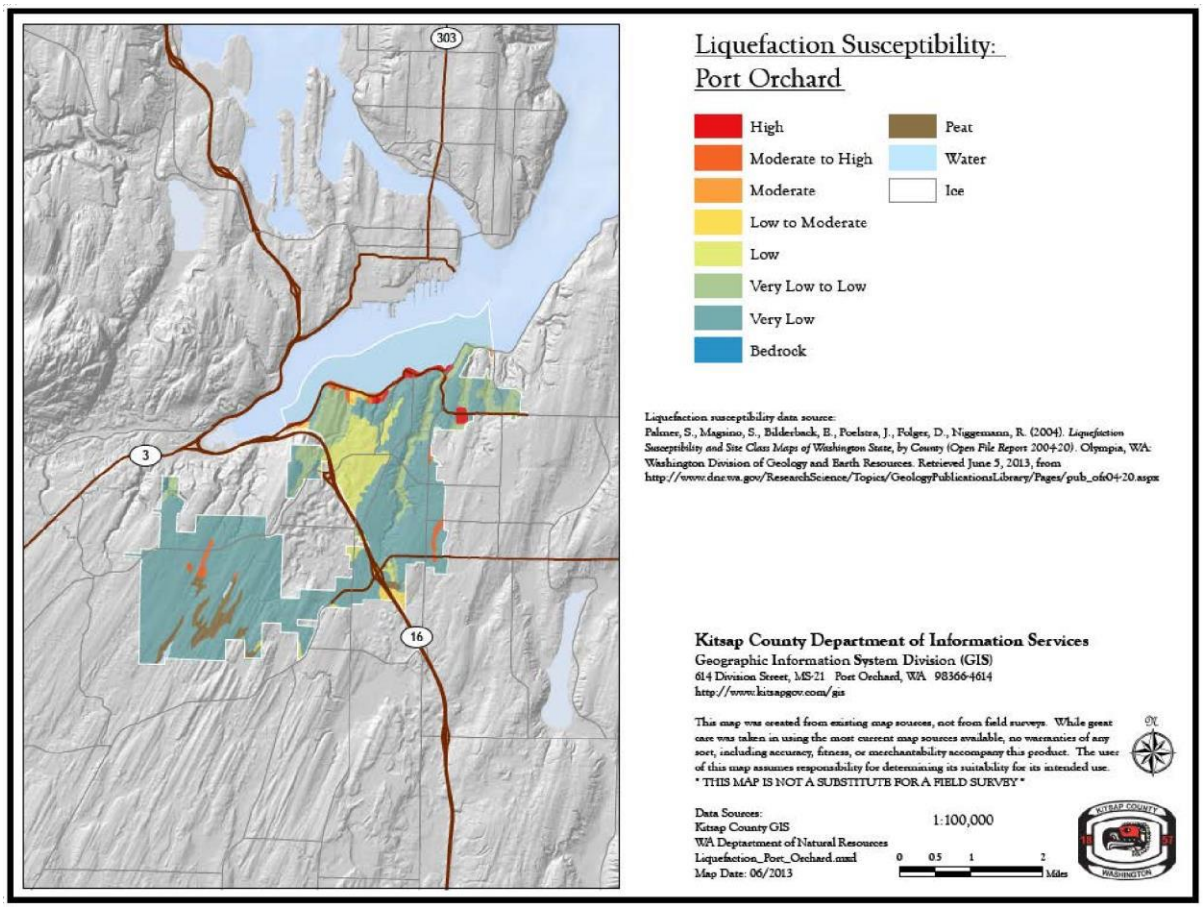


Figure 72: Liquefaction on Port Orchard (Kitsap County Department of Information Services).

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 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 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[90]

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
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
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

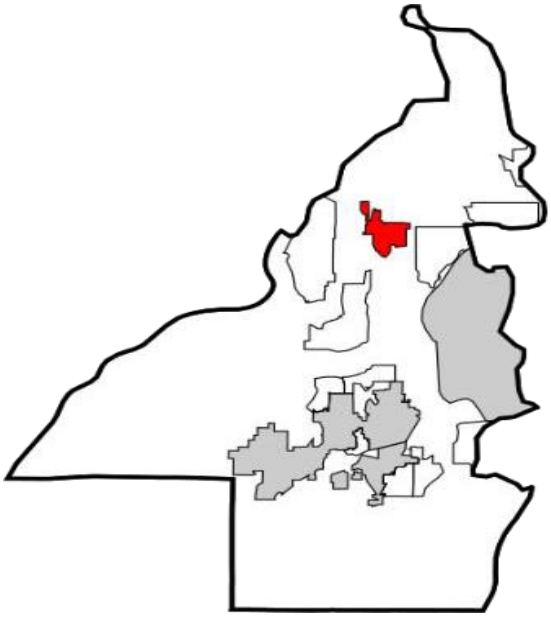
Marina Sewer Pump Station	98366	$3,000,000	$500,000	1984	Concrete	1	1,000	Locked	Yes
Cedar Heights Sewer Pump Station, Pottery Avenue	98366	$400,000	$35,000	1969	Concrete			Locked	Yes
Harrison Sewer Pump Station, SK Blvd	98366	$500,000	$50,000	1995	Concrete			Fenced	Yes
Eagle Crest Sewer Pump Station,	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 Station	98366	$500,000	$50,000	1998	Concrete			Fenced	Yes
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
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
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 Total Values:		**$44,195,000**	**$4,250,000**						

Table 62: Asset Profile City of Port Orchard.

Poulsbo



Poulsbo located in north-central Kitsap County was settled by Scandinavians who 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 3,072 acres. Poulsbo maintains a mayor-council structure but also staffs a city administrator.

People

Population Overview

The population of Poulsbo is 13,010[1, 9]. 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. Table 63 below shows the city's population, density and population data.

Poulsbo Population Information				
Population	**Population Density**	**Number of Households**	**Median Household Income**	**Under 65 with a Disability**
13,010 (2023)	4.65 sq. mi (2024)	5,288 (2022)	$85,579 (2022)	6.9% (2024)

Table 63: Poulsbo Population Information.

Age Distribution, Vulnerable Population, and Population Density

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[1, 33]. The senior population has grown consistent with statistics nationwide.

Figure 73 shows the distribution of age in Port Orchard, figure 74 identifies The City's vulnerable populations, and figure 75 shows a graphic of The City's population density[1, 33]

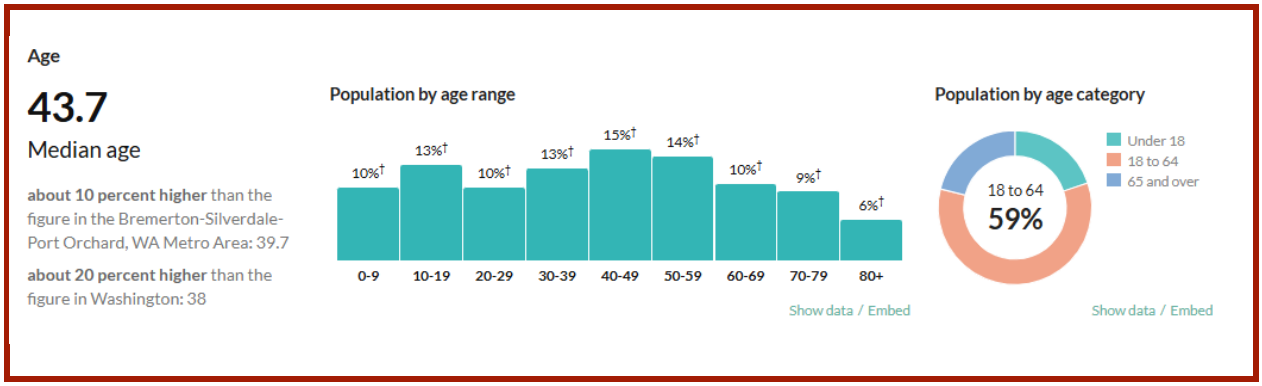
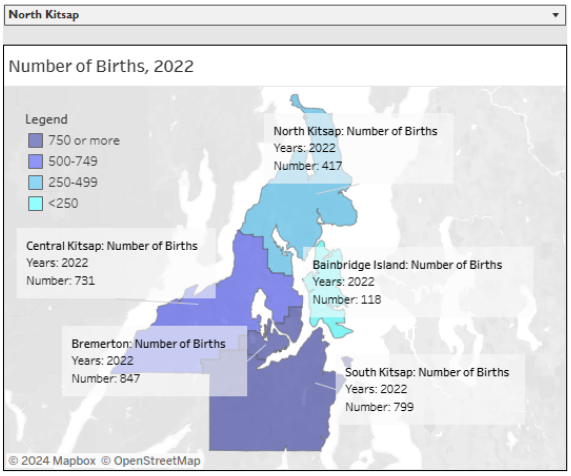


Figure 73: Poulsbo Population Distribution.

Number of Births	2022	417
Children and Youth (Age Birth-19)	2023	10,736
Seniors (Age 85+)	2023	1,190
Seniors Living Alone (Age 65+)	2018-22	2,687
People Immigrating to the US (entering since 2010)	2018-22	#
People With Limited English or No English Proficiency	2018-22	914
People Living Below 100% Poverty	2018-22	3,262
Children 0-17 Living Below 100% Poverty	2018-22	539
People With Food Insecurity	2022	6,282
Households with No Vehicle Available	2018-22	646
People Commuting 45+ Minutes	2018-22	4,438



Kitsap County Population

Total Kitsap Population	283,200	100%
Unincorporated Population (outside city limits)	183,500	65%
Incorporated Population (inside city limits)	99,700	35%
Incorporated Population (% of Inc.): Bainbridge Island	25,180	25%
Bremerton	44,640	45%
Port Orchard	17,480	18%
Poulsbo	12,400	12%
North Kitsap: Population	52,522	19%
Households	20,069	

6,535	2018-22	People With a Disability^
3,027	2018-22	People with Ambulatory Difficulty (Age 5+)
705	2023	People With Developmental Disability (Age 3-17)
2,316	2018-22	People With Hearing Difficulty
1,090	2018-22	People With Vision Difficulty
416	2024	Electricity-Dependent Adults
8,667	2022	Medically Dependent Adults
1,611	2021	People With Serious Mental Illness (Age 18+)*
8,570	2022	People With Substance Use Disorder (Age 12+)**
#	2023	Point in Time Count of People Experiencing Homelessness
83	2023-24	Public school students experiencing homelessness
210	2018-22	People Living in Group Quarters

Notes: All counts are estimates. When available, 95% confidence intervals are provided in the popup when you hover over the data. ^ Civilian, noninstitutionalized only; * County estimate based on U.S. national estimates; **County estimate based on Washington State

Figure 74: North Kitsap Vulnerable Population, including Poulsbo.

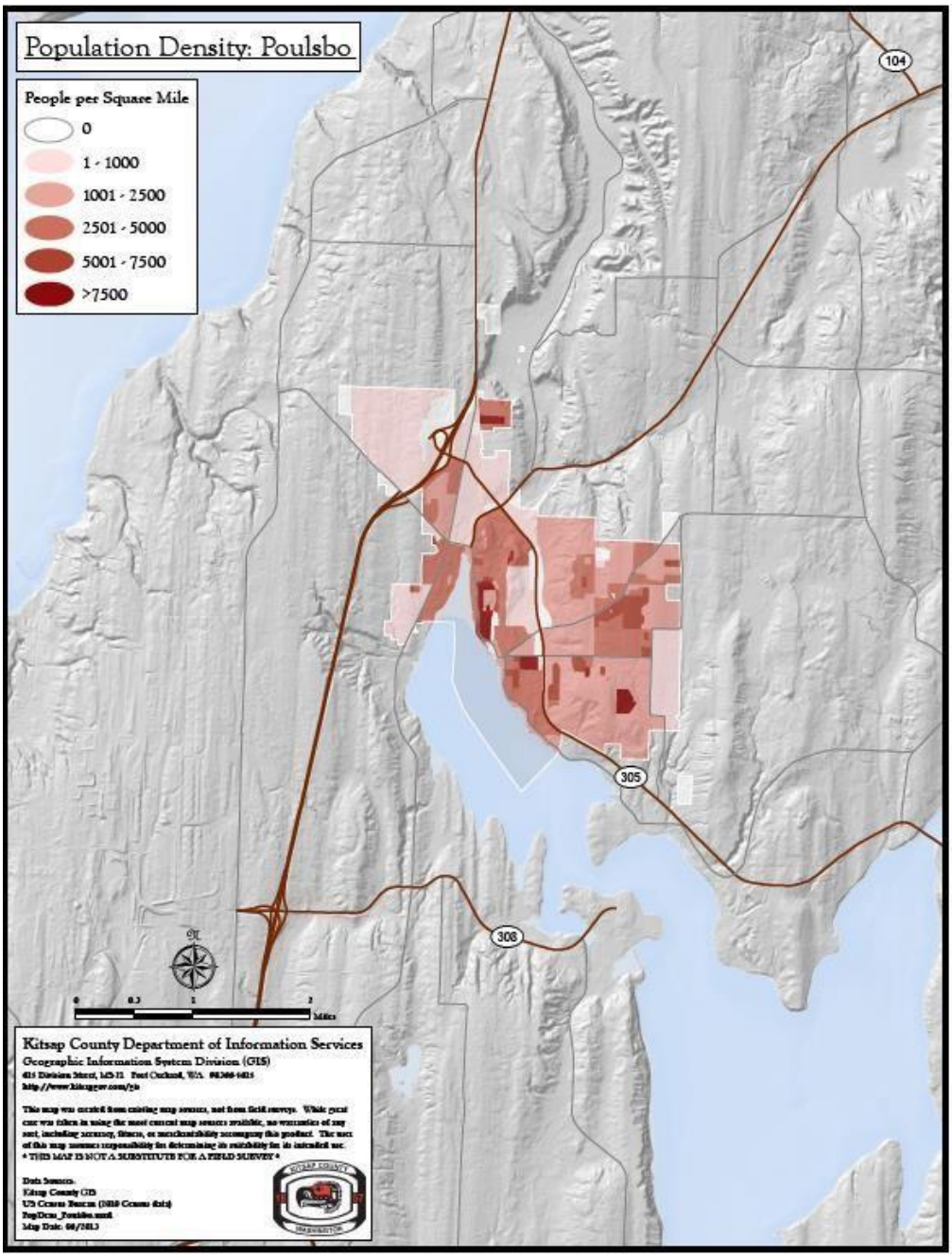


Figure 75: Population Density: City of Poulsbo.

Economy

Community leaders, residents, and business interests strive to maintain a small-town character while continuing to thrive and grow[90]. 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[90]. 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 Town and Country 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 7 buildings in the Special Flood Hazard Area, representing $740,000 in loss from a 1-percent annual chance flood. It also has 40 buildings within the landslide zone representing $9.8M in value[90].

Based on the 2015 Hazus risk assessment, table 64 below highlights some of the buildings in Poulsbo that are affected by flooding, tsunami, earthquake, and landslide.

City of Poulsbo Areas of Mitigation Interest[90]					
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 Pl. NE	$2.1 million (9 Homes)	N/A	N/A	Landslide

Table 64: City of Poulsbo Areas of Mitigation Interest.

Housing

Most building stock is residential homes of wood frame construction[33]. Poulsbo is part of the County's Damage Assessment Program for disasters and has identified critical facilities as part of the program.

Residential Structures		
Type	**Estimate**	**Percent**
Housing Occupancy		
Total housing units	5,288	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)

Table 65: Poulsbo Housing Characteristics 2017-2022 (US Census, 2022).

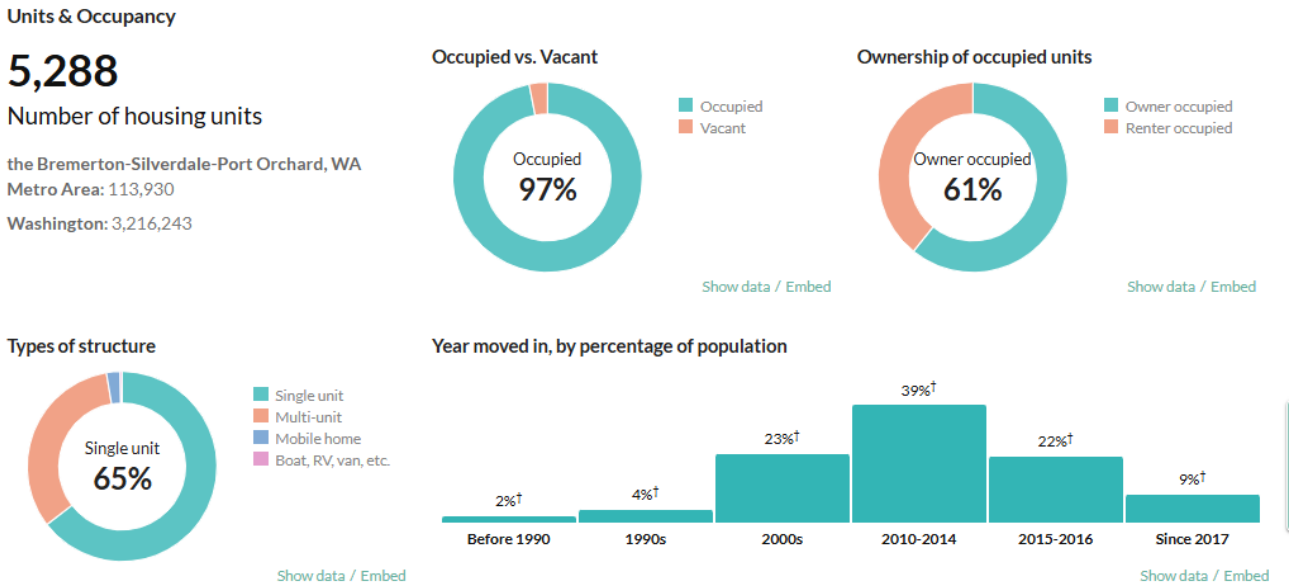


Figure 76: Poulsbo Housing Units and Occupancy (US. Census, 2022)

Infrastructure

Transportation, Communications, and Utilities

Poulsbo is served by SR 305, the main corridor to Poulsbo, and the Washington State Ferry System. SR 305 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[1, 9, 33, 90].

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:

1. City of Poulsbo City Hall
2. City of Poulsbo Public Works office and shop
3. North Kitsap School District:
    a. Administration Building
    b. North Kitsap Senior High School
    c. Poulsbo Junior High School
    d. Poulsbo and Vinland Elementary Schools
        e. 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.
4. Olympic College Poulsbo Branch Campus
5. Fire District #18 Headquarters/Fire Station #71
6. Health facilities:
    a. Poulsbo Village Medical Center with Regional Hospitals as backup
    b. North Kitsap Medical Center
7. Wastewater treatment plant: Brownsville via pressurized pipe under Liberty Bay
8. There are six operational wells.
9. 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[56, 90]. 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[90].

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[9].

Natural creeks like Dogfish Creek are spawning streams for salmon and drain into Liberty Bay. Figure 64 shows topographic information on the Poulsbo area.

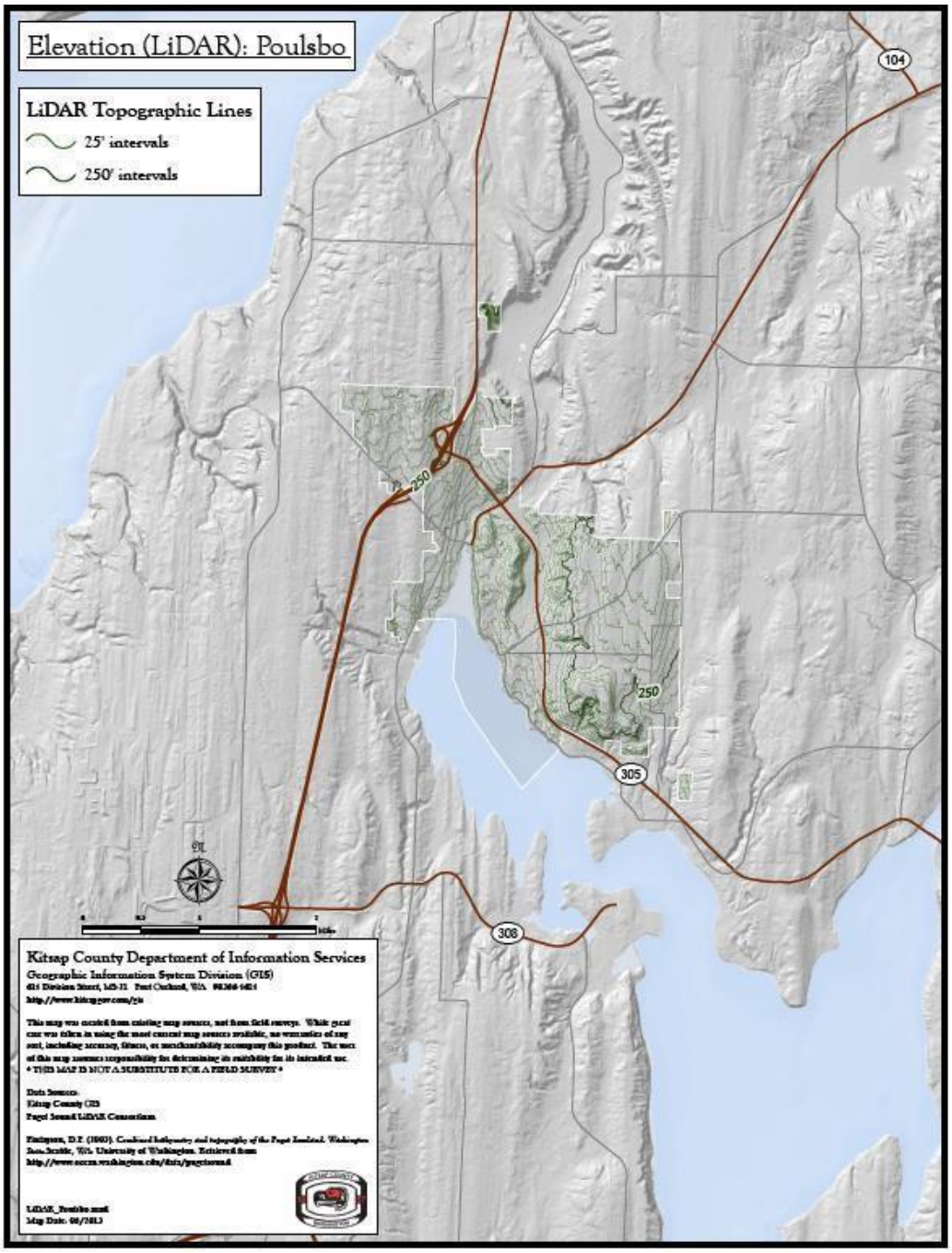


Figure 77: Poulsbo Elevation using LiDAR.

History of Disasters

The table below shows the history of natural hazards in Poulsbo[94, 95]. Any damage that has occurred has associated with heavy rains and high tides or landslides[109,110,111]. 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
December 2020	2 Biohazard events	Yes, Local, Federal, and State	COVID / POX
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 66: 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 Kitsap County's THIRA 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 THIRA and MHMP RFI Trackers, reviewed drafts of the document, and communicated via emails and one-on-one discussions. Additionally, the City solicited for inputs from City Departments, City Council, and the citizens of Poulsbo.

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 2021 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.

More information about the NFIP can be found in the Kitsap County Profile section.

Special Flood Hazard Area Assessment[104, 105]						
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. *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: Poulsbo Special Flood Hazard Area Assessment.

Flood Risk Community Characteristics[104, 105]						
Community	**Total Population**	**CRS Community**	**Flood Claims**	**Repetitive Loss Properties**	**Total Policies**	**Total Insurance Coverage**
Poulsbo	13,010	No	0	0	49	$10.068 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 December 10, 2024						

Table 68: Poulsbo Flood Risk Community Characteristics.

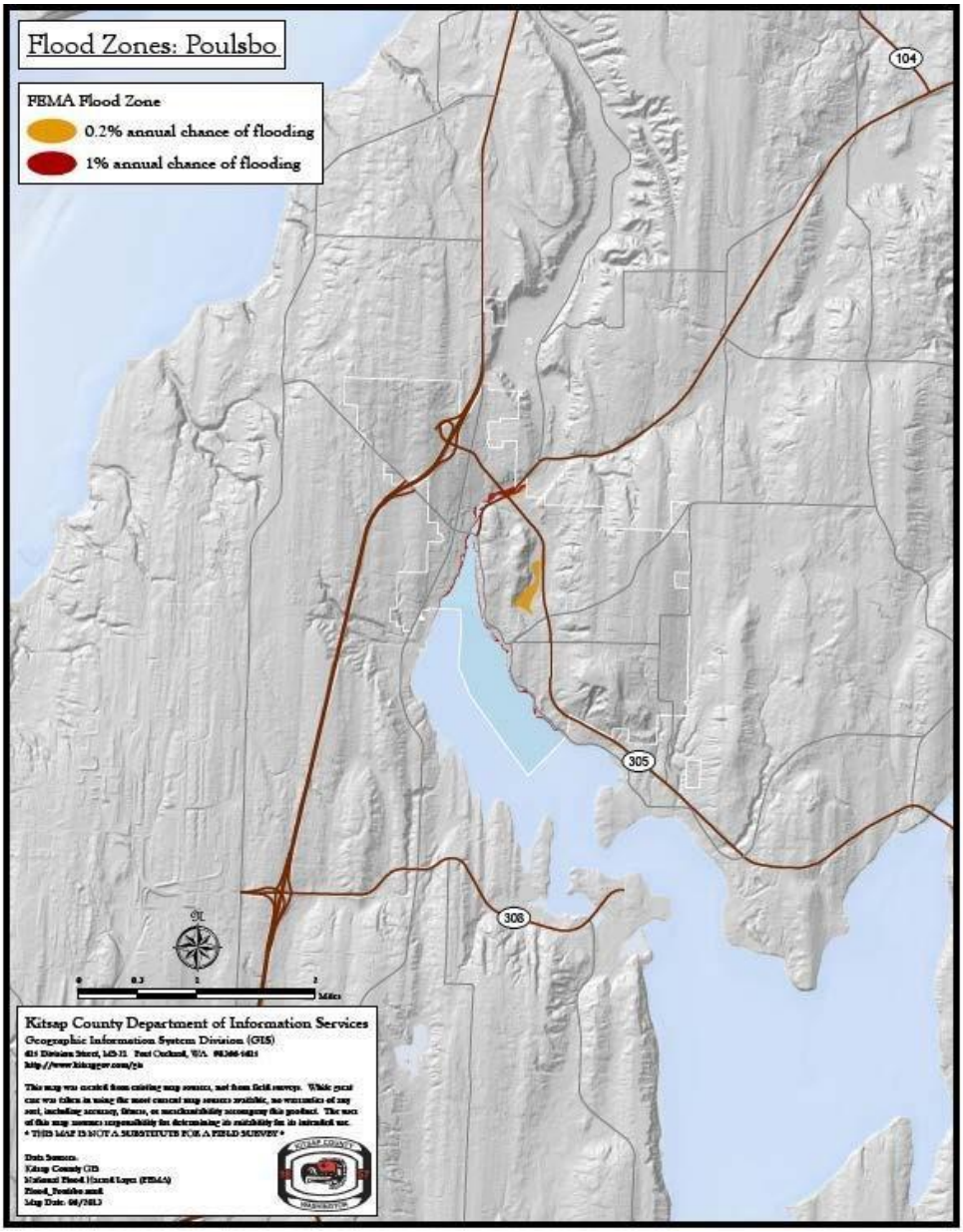


Figure 78: City of Poulsbo Flood Zones (Kitsap County Department of Information Services 2020).

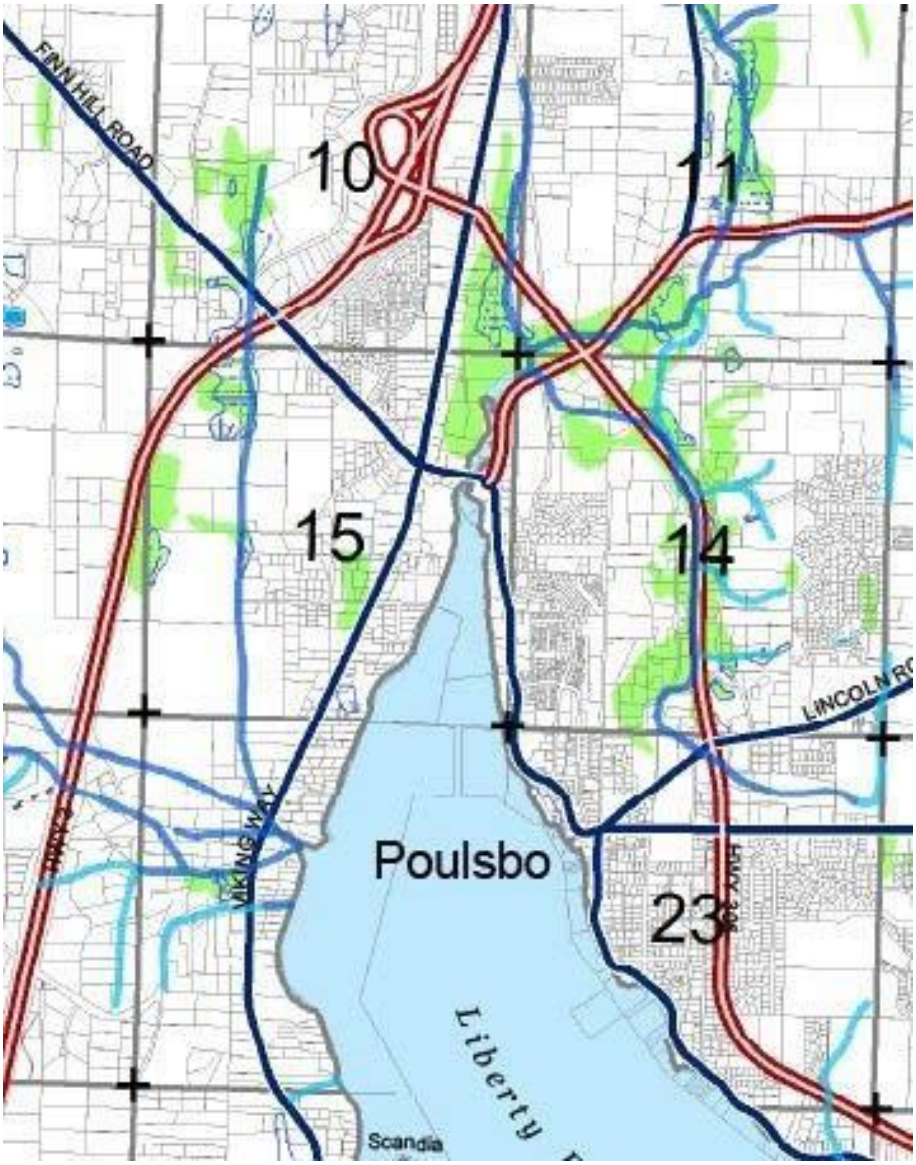


Figure 79: Streams and Surface Water, City of Poulsbo (Kitsap County GIS Department).

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 79 shows the streams and surface water in the City of Poulsbo. Figure 80 provides hydrology information for the City of Poulsbo. 100% of the city has the potential for damage and loss of life from severe storms.

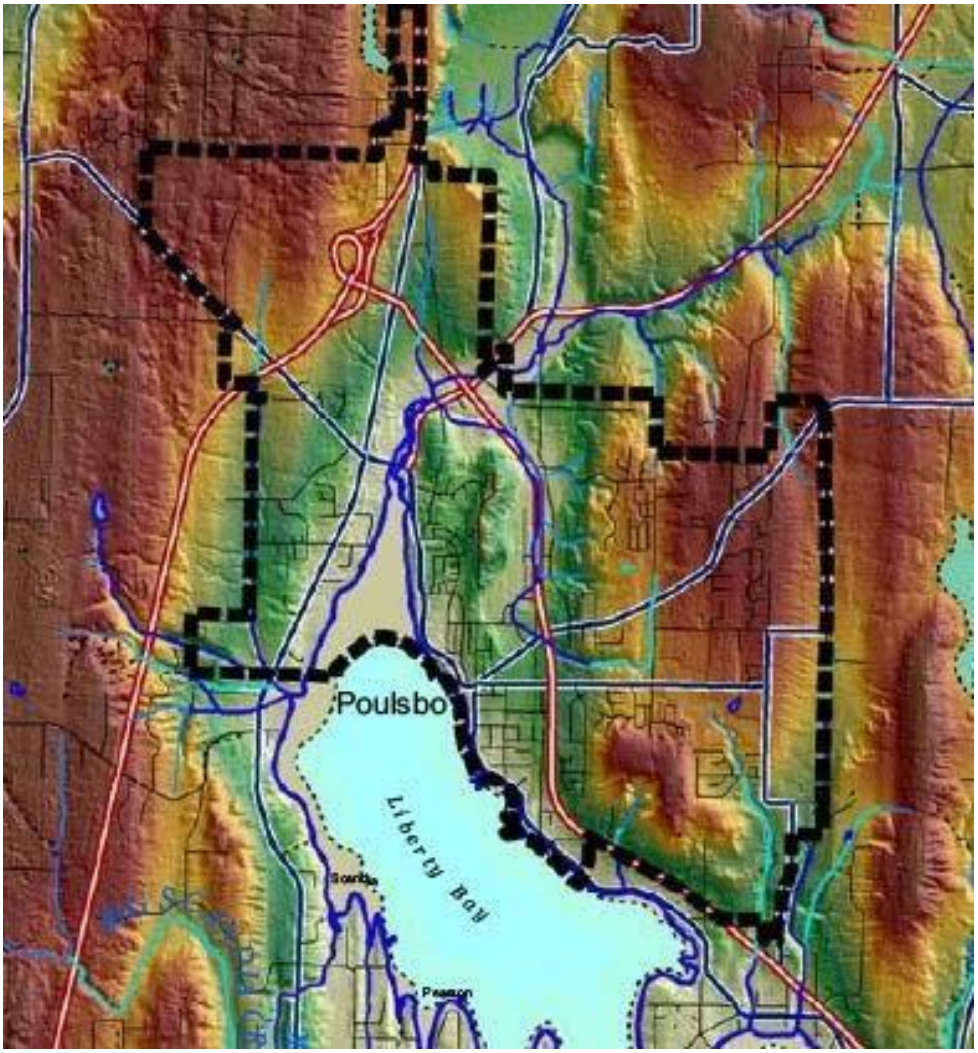


Figure 80: City of Poulsbo Water Hydrology (Kitsap County GIS Department).

Landslides & Erosion

Probability of Occurrence: Low

The City of Poulsbo has only a slight vulnerable to Landslides based on previous LIDAR studies. Some areas outside the city are vulnerable, as noted in Figure 81.

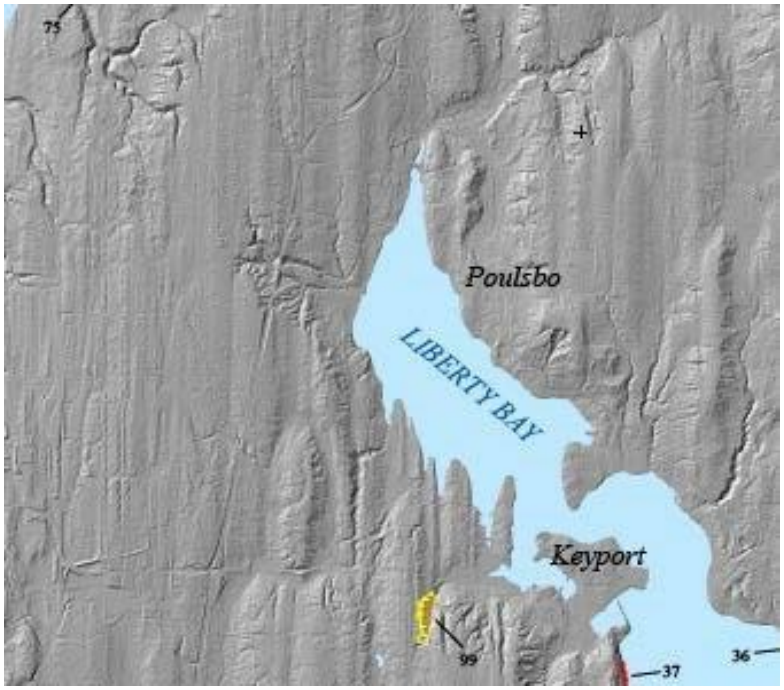


Figure 81: LIDAR Data on Landslide, City of Poulsbo (USGS).

Building Exposure to Landslides[11]		
Community	**Buildings within Landslide Zone**	**Building Value with Landslide Zone**
Poulsbo	40	$9.8 Million

Table 69: Poulsbo 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 82 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.

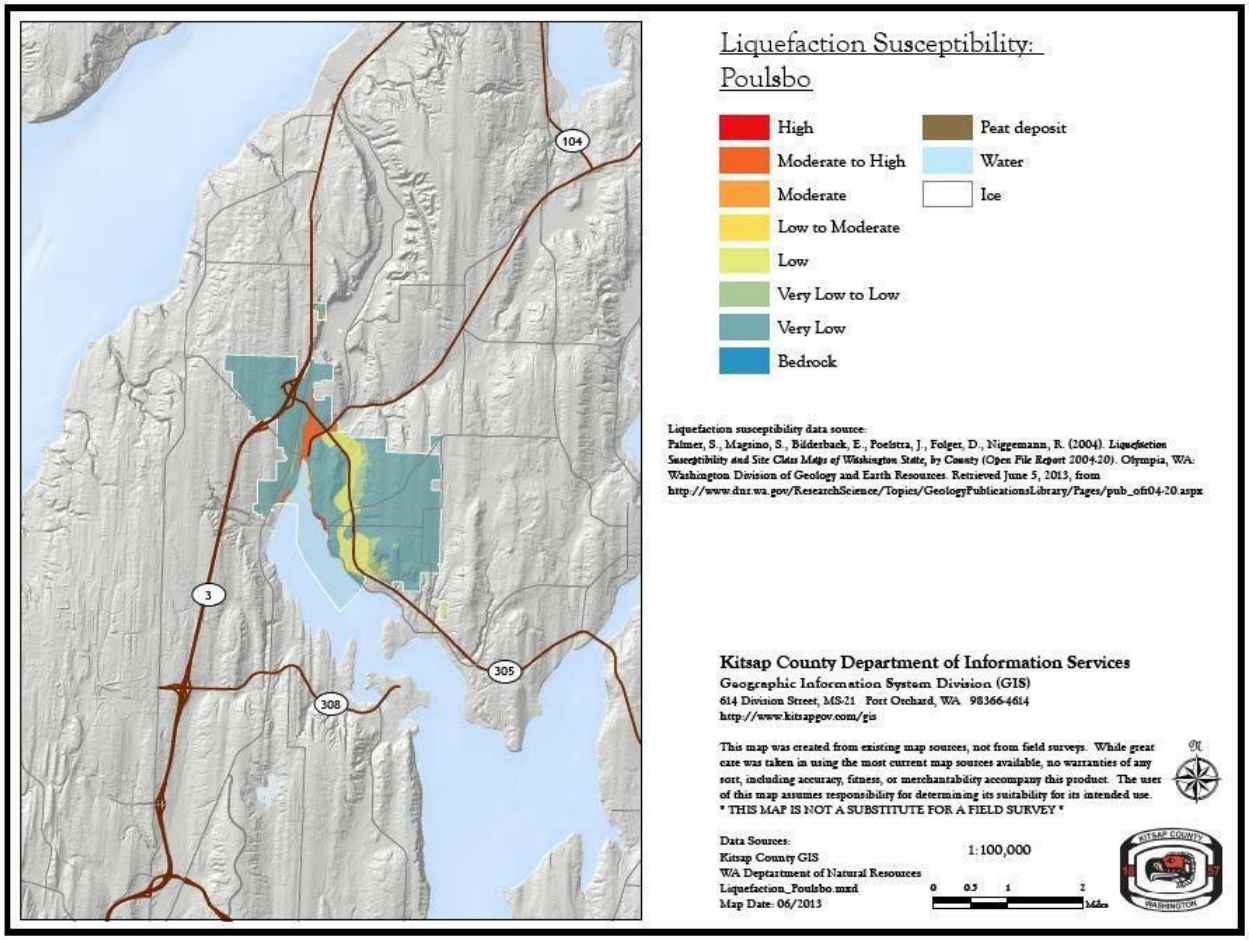


Figure 82: Liquefaction in Poulsbo.

Hazus Earthquake Results for a Seattle M 7.2 Earthquake[5, 96, 97]						
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%

Table 70: 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, 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.

Pre-Code versus Moderate Code Building in Poulsbo [90, 33]				
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	1359	23%	3929	77%
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 71: 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 83: Tsunami Models, City of Poulsbo (Kitsap County GIS Department).

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[90]

Location Poulsbo, WA	Year Built	Type of Construction	Bldg. Sq.	Building & Contents Value	Number of Stories	Type of Protection	Critical Facility (Yes/No)
American Legion Park	2004	Playground, Tables, Restrooms	200	$1,500,000	1	Locked	No
Austurbruin Park	1999	Playground, Tables		$200,000		Fenced	No
Betty Iverson Kiwanis Park	1986	Playground, Tables, Picnic Shelter, BBQs		$750,000			No
Centennial Park	1968	Tables, Pergolas, Bridge, Observation Deck	1,800	$75,000			No
City Hall	2010	All Combustible	30,000	$15,000,000	3	Locked	Yes
Decant Facility/SW Transfer Station	2016		3,956	$2,500,000		Fenced	No
Decant Facility/SW Transfer Station Restroom Building	2016		300	$100,000		Fenced Locked	No
Forest Rock Hills Park	1999	Playground, Tables, Benches		$255,000		Locked	No
Lincoln Water Treatment Plant	2018		589	$1,500,000		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	$8,000,000	1		No
Nelson Park-Log Cabin/Museum	1996	All Combustible	480	$75,000	1	Locked	No
Nelson Park	2004	Picnic Shelter, Tables, Windmill, Playground		$600,000	1		No
Nelson Park Caretakers Residence	1996	All Combustible	1,200	$500,000	2	Locked	No
Nelson Park Restroom/Storage Building (one unit)	1996	All Combustible	864	$500,000	1	Locked	No
Net Shed Vista Park	2000	Tables		$75,000		Fenced	No
Oyster Park	2000	Pier, Ramp, Float	3,000	$1,500,000			No
Parks & Rec Bldg	1987	All Combustible	15,000	$5,000,000	2	Locked	No
Poulsbo's Fish Park	2002	Boardwalk, Platforms, Bridges, Pergola		$1,400,000			No
Public Works Facility (Iverson Shops)	1960	All Combustible	12,994	$1,000,000	1	Locked	Yes
PW Admin Bldg (Quansethut)	1970	Metal	2,623	$750,000	1	Locked	Yes

Raab Park	2007	Picnic Shelter, Tables, Playground, Play-for-All Playground, Skate Park, Basketball Court	1,860	$1,000,000			No
Raab Park Caretaker's Mobile Home	1972	All Combustible	1,440	$300,000	1	Locked	No
Raab Park Restrooms	2008	All Combustible	800	$500,000	1	Locked	No
Raab Park Storage Garage	2009	All Combustible	640	$300,000	1	Locked	No
Sewer Lift Station - 6th Ave	2015	(N-C)		$750,000		Fenced Locked	Yes
Sewer Lift Station - 9th Ave	2015	(N-C)		$600,000		Fenced Locked	Yes
Sewer Lift Station - Applewood	1992	(N-C)		$500,000		Fenced Locked	Yes
Sewer Lift Station - Bond	2007	(N-C)		$3,000,000		Fenced Locked	Yes
Sewer Lift Station - Liberty	2017	(N-C)		$600,000		Fenced Locked	Yes
Sewer Lift Station - Lindvig	2000	(N-C)		$1,500,000		Fenced Locked	Yes
Sewer Lift Station - Marine Science Center	1991	(N-C)		$2,000,000		Fenced Locked	Yes
Sewer Lift Station - Village/7th Ave	2017	(N-C)		$1,500,000		Fenced Locked	Yes

Water Station - 10th Ave PRV	1991	(N-C)		$100,000		Fenced Locked	Yes
Water Station - Caldart PRV	2006	(N-C)		$100,000		Fenced Locked	Yes
Water Station - Commerce PRV	2017	(N-C)		$100,000		Fenced Locked	Yes
Water Station - Finn Hill/Staffordshire PRV	0	(N-C)		$100,000		Fenced Locked	Yes
Water Station - Forest Rock PRV	1996	(N-C)		$100,000		Fenced Locked	Yes
Water Station - Mesford PRV	0	(N-C)		$150,000		Fenced Locked	Yes
Water Station - Olhava PRV	2000	(N-C)		$150,000		Fenced Locked	Yes
Water Pump Station – Poulsbo Place Booster	2003	(N-C)		$100,000		Locked	Yes
Water Pump Station – Pugh (and Pugh Tank)	1989	(N-C)	598	$5,000,000		Fenced Locked	Yes
Water Station - Stendahl Ridge PRV	2007	(N-C)		$150,000		Fenced Locked	Yes
Water Station - Swanson PRV	0	(N-C)		$100,000		Fenced Locked	Yes
Water Station - Viking Ave PRV	2017	(N-C)		$150,000		Locked	Yes
Water Station - Vikings Landing PRV	2014	(N-C)		$100,000		Fenced Locked	Yes

Water Pump Station - Wilderness Booster	0	(N-C)		$75,000		Fenced Locked	Yes
Water Station - Wilderness PRV	0	(N-C)		$100,000		Fenced Locked	Yes
Water Tank - 4th Ave	1975	(N-C)		$1,250,000		Fenced Locked	Yes
Water Tank - Raab Park	1967	(N-C)		$2,000,000		Fenced Locked	Yes
Water Tank - Wilderness Park Tank	1980	(N-C)	200	2,500,000		Fenced Locked	Yes
Water Tank - Caldart (2)	1990	(N-C)		$1,500,000		Fenced Locked	Yes
Water Tank - Finn Hill	1981	(N-C)		$1,000,000		Fenced Locked	Yes
Water Tank - Olhava	2004	(N-C)	200	$3,500,000		Fenced Locked	Yes
Well - Bus Barn Well	1940	(N-C)	288	$500,000		Locked	No
Well - Lincoln Rd Well #2	1968	(N-C)	200	$1,000,000		Fenced Locked	Yes
Well - Lincoln Rd Well #1	1968	(N-C)	276	$750,000		Fenced Locked	Yes
Well – Pugh (see Pugh Pump Station)	1988	(N-C)				Fenced Locked	Yes
Well - Westside	2003	(N-C)	200	$1,500,000		Fenced Locked	Yes

Well - Big Valley	1975	Masonry Combustible	286	$1,500,000		Fenced Locked	Yes
Asset Profile Total Values:				**$75-$80 MIL**			

Table 72: Asset Profile City of Poulsbo.

Appendix B: Capability Assessment

In support of the overall effort, Kitsap County Government and its independent jurisdictions inventoried and analyzed existing capabilities, ability and improve identified capabilities to achieve mitigation, 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

Participating Jurisdictions ability to expand and improve the identified capabilities to achieve mitigation

1) Each participating / adopting jurisdiction through their jurisdictional governmental policy has the ability and authority to expand on and improve any identified capability to achieve increased mitigation.

2) Upon expanding or improving on any capability the jurisdiction will notify the Kitsap County Department of Emergency Management and the other partner jurisdictions so each can evaluate the possibility of including the expanded capabilities within the whole plan or within their jurisdictional.

3) During the next 5-year review and edit phase all expansions developed will be evaluated to determine ongoing relevance for inclusion in future Kitsap County MHMP's.

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 Dunwiddie Located in the Administration Building Kitsap County Department of Administrative Services 619 Division St., Fourth Floor Port Orchard, WA 98366 (360) 337-5777 lreyes@co.kitsap.wa.us	https://www.kitsapgov.com/das/Pages/default.aspx

Agency/ Department	Role	Contact	More Information
Kitsap County Advisory Groups	Accessible Communities Advisory Committee Area Agency on Aging Advisory Council Arts Board Board of Equalization Boundary Review Board Bremerton Kitsap Access TV Citizens Advisory Committee Commission on Children and Youth Advisory Board Council for Human Rights Developmental Disabilities Advisory Board Fair Board Grant Review Committees for Block Grants Kitsap Regional Library Board of Trustees Law Enforcement Officers & Firefighters Disability Lodging Tax Advisory Committee Long-Term Care Ombudsman Advisory Council Mental Health, Chemical Dependency and Therapeutic Court Citizens Advisory Board Non-Motorized Facilities Citizen Advisory Committee Noxious Weed Control Board Olympic Workforce Development Council Parks and Recreation Advisory Board Planning Commission Public Facilities District Board of Directors Salish Behavioral Health Organization Advisory Board Sheriff's Civil Service Commission Solid Waste Advisory Committee Veterans Advisory Board Washington State Ferries Advisory Committees		https://www.kitsapgov.com/BOC_p/Pages/Advisory-Boards-.aspx

Kitsap County Department of Community Development	The Department of Community Development is responsible for coordinating the City's community development and neighborhood stabilization and revitalization efforts including financial empowerment and home retention, affordable housing, and homelessness services programs. The department also does the following: permitting, inspection, planning and environmental programs, codes, etc.	Director: David Lynam 619 Division St. Port Orchard, WA 98366 (360) 337-5777 help@kitsap1.com *Planners & Review Staff Available:	https://www.kitsapgov.com/dcd/Pages/default.aspx
Kitsap County Department of Emergency Management	Kitsap County Department of Emergency Management (KCDEM) is responsible for providing the emergency and disaster needs of the greater Kitsap County area including the cities of Bainbridge Island, Bremerton, Poulsbo, Port Orchard and the unincorporated areas of Silverdale.	Director: Jan Glarum 8900 Imperial Way SW, WA 98312 (360) 307-5871 dem@co.kitsap.wa.us	http://www.kitsapdem.org/about-us.aspx
Kitsap County Human Resources	The HR department is chiefly responsible for establishing and implementing employment policies and procedures.	Director: Denise Greer 507 Austin Avenue Port Orchard, WA 98366 (360) 337-7185 humanresources@co.kitsap.wa.us	https://www.kitsapgov.com/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 hshockle@co.kitsap.wa.us	https://www.kitsapgov.com/hs/Pages/Default%20Home%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.com/dis/Pages/default.aspx

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: Alex Wisniewski 1195 NW Fairgrounds Rd, Bremerton, WA 98311 (360) 337-5350 parks@co.kitsap.wa.us	https://www.kitsapgov.com/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.com/pw/Pages/default.aspx

More information regarding Government in Kitsap County can be found in the Kitsap County Profile section starting on page 36, and on the following link https://www.kitsap.gov/government/county-organization/county-departments-offices

Various county and city-specific agencies, departments, and officials are listed in the Participating Jurisdictions, Agencies, & Organizations table starting on page 9.

City-specific Government information can be found on the following pages:

- Bainbridge Island: 182-206
- Bremerton: 207-232
- Port Orchard: 233-254
- Poulsbo: 255-283

City-Specific City Manager information can be found on page 299 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 40, 44, 45, 46, 48, 51, 61, 93, 94, 113, 115, 121
- Maps of different hazards and their effects on the county can be found on the following pages:
    - Earthquake: 68, 69, 72, 73, 74, 79
    - Landslide & Erosion: 89, 93, 94, 105
    - Tsunami: 100,101, 104, 106
    - Wildfire & Urban Fire: 113, 115
    - Flood: 121, 123, 126, 127, 129, 130, 131, 132,
    - Severe Storm/Tornado: 139
    - Drought:

- Locations of city-specific location and hazard maps:
    - Bainbridge Island: 44, 199, 205, 206, 208, 210
    - Bremerton: 216, 220, 225, 227, 228, 229, 231
    - Port Orchard: 242, 246, 252, 254, 256
    - Poulsbo: 264, 266, 271, 272, 273, 274, 275, 276

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: 142-148
- Bainbridge Island: 190-210,
- Bremerton: 215-240,
- Port Orchard: 243-262
- Poulsbo: 267-283

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: 47-57
- Bainbridge Island: 193-197
- Bremerton: 217-240
- Port Orchard: 243-255
- Poulsbo: 266-276

Transportation

Transportation systems include airports, ports, harbor, highway, and roads.

Information regarding transportation systems can be found on the following pages:

- Kitsap County: 49-50

- Bainbridge Island: 194
- Bremerton: 218
- Port Orchard: 244
- Poulsbo: 267

Vulnerable Populations

Information on vulnerable populations can be found on the following pages:

- Kitsap County: 46
- Bainbridge Island: 191
- Bremerton: 216
- Port Orchard: 242
- Poulsbo: 264

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: 454-58
- Bainbridge Island: 1203-204, 214
- Bremerton: 240
- Port Orchard: 243
- Poulsbo: 283

Legal and Regulatory Capability				
	Local Authority	Other Jurisdiction Authority	State Mandated	Integration Opportunity?
Codes, Ordinances, & Requirements				
Building Code *Comment: Kitsap County Code Title 14*	Yes	Yes	Yes	Yes
Zoning Code *Comment: Kitsap 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

Comment: WA State Dept of Ecology				
Other: Comprehensive Plan *Comment: Kitsap County Comprehensive Plan (2016-2036)*	Yes	Yes	Yes	Yes
Planning Documents				
Comprehensive Plan *Comment: Kitsap County Comprehensive Plan (2016-2036)*	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
Comment: Kitsap County Comprehensive Emergency Management Plan 2015				
Continuity of Operations Plan *Comment: Continuity of Operations (COOP) Plan (under development)*	Yes	Yes	Yes	Yes
Public Health Plan Comment: *Kitsap County Health District Emergency Response Plan*	Yes	Yes	Yes	Yes

Planning/ Regulatory Tool	Kitsap County	Bainbridge Island	Bremerton	Port Orchard	Poulsbo
Emergency Operations/Emergency Management Plan	√	√	√	√	√
Hazard Mitigation Plan	√				
Comprehensive Land Use Plan	√	√	√	√	√
Open Space Management Plan (Parks & Rec/Greenway Plan	√	√	√	√	√
Stormwater Management Plan/Ordinance	√	√	√	√	√
Natural Resource Protection Plan Flood Response Plan					
Continuity of Operations Plan	√				
Disaster Recovery Plan	√				
Economic Development Plan	√	√	√	√	√
Flood Damage Prevention Ordinance	√	√	√	√	√
Zoning Ordinance	√	√	√	√	√
Subdivision Ordinance	√	√	√	√	√
Unified Development Ordinance	√	√	√	√	√
Post-Disaster Redevelopment Ordinance					
Building Code	√	√	√	√	√
Fire Code	√	√	√	√	√
National Flood Insurance Program (NFIP)	√	√	√	√	√
NFIP 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
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 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?	Meets
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
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 NFIP 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 Grading Schedule	Yes	N/A	N/A
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

Washington State 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)).

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.

Activities	HMGP	PDM	FMA
Mitigation Projects	√	√	√
Property Acquisition and Structure Demolition	√	√	√
Property Acquisition and Structure Relocation	√	√	√
Structure Elevation	√	√	√
Mitigation Reconstruction			
Dry Floodproofing of Historic Residential Structures	√	√	√
Dry Floodproofing of Non-residential Structures	√	√	√
Minor Localized Flood Reduction Projects	√	√	√
Structural Retrofitting of Existing Buildings	√	√	
Non-Structural Retrofitting of Existing Buildings and Facilities	√	√	
Safe Room Construction	√	√	
Infrastructure Retrofit	√	√	
Soil Stabilization	√	√	
Wildfire Mitigation	√	√	
Post-disaster Code Enforcement	√		
5% Initiative Projects	√		
Hazard Mitigation Planning	√	√	√
Management Costs	√	√	√

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
  - 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
  - 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: https://mil.wa.gov/disaster-assistance-overview
- FEMA Hazard Mitigation Assistance: https://www.fema.gov/hazard-mitigation-assistance
- FEMA Hazard Mitigation Grant Program: https://www.fema.gov/hazard-mitigation-grant-program
- 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 during public decision-making processes	Moderate
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 strategies	Moderate
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
    - 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 cross-section 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.
- Collaborate with other functional organizations on mitigation strategies

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

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: Stakeholders 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

Local Emergency Planning Committee
Meeting Minutes
April 11, 2023

Members present:
Chief Joe Clark, Bainbridge Police Department
Chief Pat McGanney, Bremerton Fire Department
Assistant Chief Ryan Madison, Central Kitsap Fire & Rescue
George Nixon, Commander Navy Region Northwest Emergency Management
Deputy Fire Chief David Michaelsen, Commander Navy Region Northwest Fire
Jan Glarum, Kitsap County Department of Emergency Management
Michele Moen, Kitsap County Department of Emergency Management
Doug Washburn, Director, Kitsap County Human Services
Brian Hauschel, Kitsap County Parks Department
Dustin Rodrigues, Kitsap Transit
Robert Kleinpaste, Kitsap Transit
Assistant Chief Jake Gillanders, Poulsbo Fire Department
Chief Ron Harding, Poulsbo Police Department
Captain Lance Walters, Salvation Army Bremerton
Carl Borg, United Way of Kitsap County
Diane Fowler, Washington State Department of Ecology
Susan Forsythe, Washington State Emergency Management Division
Captain James Mjor, Washington State Patrol

Support Staff present:

Dave Rasmussen, Kitsap County Department of Emergency Management
Sarah Peterson, Kitsap County Department of Emergency Management
Katlyn Colflodt, Kitsap County Department of Emergency Management

Call to Order: The Local Emergency Planning Committee meeting was called to order at 12:33pm by Kitsap County Department of Emergency Management Acting Director Jan Glarum.

Election of Officers: Kitsap County Department of Emergency Management Acting Director Jan Glarum made a motion for approval of CKFR Assistant Chief Ryan Madison as Chair, Kitsap Transit Safety & Security Training Administrator Dustin Rodrigues as Vice Chair and Washington State Patrol Captain James Mjor as Secretary/Treasurer; Motion was approved unanimously.

Public Comments: None.

Kitsap LEPC Meeting Minutes April 11, 2023 1 | Page

Local Emergency Planning Committee
Meeting Minutes
July 12, 2023

Members present:
Anne LeSage, Bainbridge Island Emergency Management
Chief Pat McGanney, Bremerton Fire Department
Assistant Chief Ryan Madison, Central Kitsap Fire & Rescue
Shawn Olivas, Emergency Management Specialist Navy
Erina Kong, Kitsap County Communications Department
Jan Glarum, Kitsap County Department of Emergency Management
Michele Moen, Kitsap County Department of Emergency Management
Doug Washburn, Director, Kitsap County Human Services
Brian Hauschel, Kitsap County Parks Department
Gabrielle Hadley, Kitsap Public Health Department
Dr. Gib Morrow, Kitsap Public Health Department
Andrew Nelson, Kitsap Public Works
Robert Kleinpaste, Kitsap Transit
Brent Bower, NOAA Federal
Ryan Buchanan, North Kitsap Fire and Rescue
Erik Peffer, Poulsbo Police Department
Captain Lance Walters, Salvation Army Bremerton
Bradley Martin, United States Environmental Protection Agency
Pamela Parris, United States Navy
Laura Hayes, Washington State Department of Ecology
Deanna Brewer, Washington State Department of Transportation
Shane Inman, Washington State Department of Transportation
Chris Caprio, Washington State Emergency Management Division

Members missing:
Chief Joe Clark, Bainbridge Police Department
George Nixon, Commander Navy Region Northwest Emergency Management
Deputy Fire Chief David Michaelsen, Commander Navy Region Northwest Fire
Dustin Rodrigues, Kitsap Transit
Assistant Chief Jake Gillanders, Poulsbo Fire Department
Chief Ron Harding, Poulsbo Police Department
Carl Borg, United Way of Kitsap County
Diane Fowler, Washington State Department of Ecology
Susan Forsythe, Washington State Emergency Management Division
Captain James Mjor, Washington State Patrol

Local Emergency Planning Committee Meeting Minutes
November 2, 2023

Members present:
Jan Glarum, Kitsap County Department of Emergency Management
Michele Moen, Kitsap County Department of Emergency Management
Doug Washburn, Kitsap County Human Services
Dr. Gib Morrow, Kitsap Public Health Department
Andrew Nelson, Kitsap Public Works
Robert Kleinpaste, Kitsap Transit
Ryan Buchanan, North Kitsap Fire and Rescue
Captain Lance Walters, Salvation Army Bremerton
Chris Caprio, Washington State Emergency Management Division
Dustin Rodrigues, Kitsap Transit
Jake Gillanders, Poulsbo Fire Department
Eric Quitslund, Suquamish Tribe Emergency Management
John Gundermann, Washington State Patrol
Jared Moravec, Bainbridge Island Fire Department
Sara Benovic, Oil & Hazardous Substances Spill Response/Deputy Navy On-Scene Coordinator
Heather Parter, Regional Program Manager/Navy On-Scene Coordinator
Lit Dudley, Washington State Department of Transportation
Quynh Sample, Kitsap County Public Health Department
Erina Kong, Kitsap County Communications Department

Members missing:
Joe Clark, Bainbridge Police Department
George Nixon, Commander Navy Region Northwest Emergency Management
David Michaelsen, Commander Navy Region Northwest Fire
Ron Harding, Poulsbo Police Department
Carl Borg, Kitsap County Housing and Homelessness Division Program Manager
Diane Fowler, Washington State Department of Ecology
Susan Forsythe, Washington State Emergency Management Division
Anne LeSage, Bainbridge Island Emergency Management
Pat McGanney, Bremerton Fire Department
Ryan Madison, Central Kitsap Fire & Rescue
Shawn Olivas, Emergency Management Specialist Navy
Brian Hauschel, Kitsap County Parks Department
Erik Peffer, Poulsbo Police Department
Bradley Martin, United States Environmental Protection Agency
Pamela Parris, United States Navy
Laura Hayes, Washington State Department of Ecology
Deanna Brewer, Washington State Department of Transportation
Shane Inman, Washington State Department of Transportation
Matt Brown, City of Port Orchard Police Department

Local Emergency Planning Committee Meeting Minutes
February 1, 2024

Members present:
Ryan Madison, Central Kitsap Fire & Rescue
Jan Glarum, Kitsap County Department of Emergency Management
Michele Moen, Kitsap County Department of Emergency Management
Dr. Gib Morrow, Kitsap Public Health Department
Andrew Nelson, Kitsap Public Works
Robert Kleinpaste, Kitsap Transit
Chris Caprio, Washington State Emergency Management Division
Dustin Rodrigues, Kitsap Transit
Eric Quitslund, Suquamish Tribe Emergency Management
Heather Parker, Regional Program Manager/Navy On-Scene Coordinator
Dave Rasmussen, Kitsap County Department of Emergency Management
Jeff Crippen, Poulsbo Police Department
Justin Gillen, Poulsbo Police Department
Kimberly Pleger, Kitsap County Public Works
Sarah Peterson, Kitsap County Department of Emergency Management

Members missing:
Joe Clark, Bainbridge Police Department
George Nixon, Commander Navy Region Northwest Emergency Management
David Michaelsen, Commander Navy Region Northwest Fire
Ron Harding, Poulsbo Police Department
Carl Borg, Kitsap County Housing and Homelessness Division Program Manager
Diane Fowler, Washington State Department of Ecology
Susan Forsythe, Washington State Emergency Management Division
Anne LeSage, Bainbridge Island Emergency Management
Pat McGanney, Bremerton Fire Department
Shawn Olivas, Emergency Management Specialist Navy
Brian Hauschel, Kitsap County Parks Department
Bradley Martin, United States Environmental Protection Agency
Pamela Parris, United States Navy
Deanna Brewer, Washington State Department of Transportation
Shane Inman, Washington State Department of Transportation
Matt Brown, City of Port Orchard Police Department
Doug Washburn, Kitsap County Human Services
Ryan Buchanan, North Kitsap Fire and Rescue
Captain Lance Walters, Salvation Army Bremerton
Jake Gillanders, Poulsbo Fire Department
John Gundermann, Washington State Patrol
Jared Moravec, Bainbridge Island Fire Department
Sara Benovic, Oil & Hazardous Substances Spill Response/Deputy Navy On-Scene Coordinator
Lit Dudley, Washington State Department of Transportation

Local Emergency Planning Committee Meeting Minutes
February 1, 2024

Members present:
Jan Glarum, Kitsap County Department of Emergency Management
Chris Caprio, Washington State Emergency Management Division
Dustin Rodrigues, Kitsap Transit
Eric Quitslund, Suquamish Tribe Emergency Management
Jeff Crippen, Poulsbo Police Department
Anne LeSage, Bainbridge Island Emergency Management
Doug Washburn, Kitsap County Human Services
Ryan Buchanan, North Kitsap Fire and Rescue
Sara Benovic, Oil & Hazardous Substances Spill Response/Deputy Navy On-Scene Coordinator
Lit Dudley, Washington State Department of Transportation
April Allen, Poulsbo Police Department
Nessa McMillen, WSP
Brian Nielson, Kitsap County Public Health
Sean Horan, U.S. Navy Emergency Management
Cole Barnes, Port of Bremerton
Dani Wood, Navy Region NW
Chris Cooper, WSP
Timothy Lupher, USCG
Jason Boddy, Kitsap County Police Department
Michael Robinson, Kitsap County Department of Emergency Management
Dave Rasmussen, Kitsap County Department of Emergency Management

Members virtually present:
Michele Moen, Kitsap County Department of Emergency Management
Arne Bakker, Port of Bremerton
Carl Borg, Kitsap County Housing and Homelessness Division Program Manager
Jake Gillanders, Poulsbo Fire Department
James Weaver, Port of Bremerton
Kimberly Pleger, Kitsap County Public Works
Erina Kong, Kitsap County Communications Department
Nickolas Miller, Port Gamble S'Klallam Tribe
Robert Kleinpaste, Kitsap Transit

Members missing:
Ryan Madison, Central Kitsap Fire & Rescue
Joe Clark, Bainbridge Police Department
Dr. Gib Morrow, Kitsap Public Health Department
Heather Parker, Regional Program Manager/Navy On-Scene Coordinator
Justin Gillen, Poulsbo Police Department
Sarah Peterson, Kitsap County Department of Emergency Management
George Nixon, Commander Navy Region Northwest Emergency Management

Local Emergency Planning Committee Meeting Minutes
August 1, 2024

Members present:
Jan Glarum, Kitsap County Department of Emergency Management
Chris Caprio, Washington State Emergency Management Division
Dustin Rodrigues, Kitsap Transit
Eric Quitslund, Suquamish Tribe Emergency Management
Jeff Crippen, Poulsbo Police Department
Doug Washburn, Kitsap County Human Services
Ryan Buchanan, North Kitsap Fire and Rescue
Lit Dudley, Washington State Department of Transportation
April Allen, Poulsbo Police Department
Brian Nielson, Kitsap County Public Health
Michael Robinson, Kitsap County Department of Emergency Management
Dave Rasmussen, Kitsap County Department of Emergency Management
Michele Moen, Kitsap County Department of Emergency Management
Arne Bakker, Port of Bremerton
Nickolas Miller, Port Gamble S'Klallam Tribe
Robert Kleinpaste, Kitsap Transit
Susan Forsythe, Washington State Emergency Management Division
Matt Brown, City of Port Orchard Police Department
Josh Miller, Kitsap County Sheriff
Cherrie May, Suquamish O&M
Alex Wisniewski, Kitsap County Parks
Linda Gonzalez, PSNS
Jeff Menge, Kitsap County Sheriff
Carlos Soto, PSNS
Pylo Lopez, Kitsap Mental Health Services
Victor Vaona, Salvation Army
Bre Ganne, Kitsap County Parks

Members missing:
Anne LeSage, Bainbridge Island Emergency Management
Ryan Madison, Central Kitsap Fire & Rescue
Joe Clark, Bainbridge Police Department
Dr. Gib Morrow, Kitsap Public Health Department
Heather Parker, Regional Program Manager/Navy On-Scene Coordinator
Justin Gillen, Poulsbo Police Department
Sarah Peterson, Kitsap County Department of Emergency Management
George Nixon, Commander Navy Region Northwest Emergency Management
Sara Benovic, Oil & Hazardous Substances Spill Response/Deputy Navy On-Scene Coordinator
Nessa McMillen, WSP
Sean Horan, U.S. Navy Emergency Management
Cole Barnes, Port of Bremerton

Local Emergency Planning Committee Meeting Minutes
August 1, 2024

Members present:
Jan Glarum, Kitsap County Department of Emergency Management
Chris Caprio, Washington State Emergency Management Division
Dustin Rodrigues, Kitsap Transit
Eric Quitslund, Suquamish Tribe Emergency Management
Jeff Crippen, Poulsbo Police Department
Doug Washburn, Kitsap County Human Services
Ryan Buchanan, North Kitsap Fire and Rescue
Lit Dudley, Washington State Department of Transportation
April Allen, Poulsbo Police Department
Brian Nielson, Kitsap County Public Health
Michael Robinson, Kitsap County Department of Emergency Management
Dave Rasmussen, Kitsap County Department of Emergency Management
Michele Moen, Kitsap County Department of Emergency Management
Arne Bakker, Port of Bremerton
Nickolas Miller, Port Gamble S'Klallam Tribe
Robert Kleinpaste, Kitsap Transit
Susan Forsythe, Washington State Emergency Management Division
Matt Brown, City of Port Orchard Police Department
Josh Miller, Kitsap County Sheriff
Cherrie May, Suquamish O&M
Alex Wisniewski, Kitsap County Parks
Linda Gonzalez, PSNS
Jeff Menge, Kitsap County Sheriff
Carlos Soto, PSNS
Pylo Lopez, Kitsap Mental Health Services
Victor Vaona, Salvation Army
Bre Ganne, Kitsap County Parks

Members missing:
Anne LeSage, Bainbridge Island Emergency Management
Ryan Madison, Central Kitsap Fire & Rescue
Joe Clark, Bainbridge Police Department
Dr. Gib Morrow, Kitsap Public Health Department
Heather Parker, Regional Program Manager/Navy On-Scene Coordinator
Justin Gillen, Poulsbo Police Department
Sarah Peterson, Kitsap County Department of Emergency Management
George Nixon, Commander Navy Region Northwest Emergency Management
Sara Benovic, Oil & Hazardous Substances Spill Response/Deputy Navy On-Scene Coordinator
Nessa McMillen, WSP
Sean Horan, U.S. Navy Emergency Management
Cole Barnes, Port of Bremerton

Carl Borg, Kitsap County Housing and Homelessness Division Program Manager
Jake Gillanders, Poulsbo Fire Department
James Weaver, Port of Bremerton
Nickolas Miller, Port Gamble S'Klallam Tribe
Robert Kleinpaste, Kitsap Transit
Ryan Madison, Central Kitsap Fire & Rescue
Joe Clark, Bainbridge Police Department
Heather Parker, Regional Program Manager/Navy On-Scene Coordinator
Justin Gillen, Poulsbo Police Department
Sarah Peterson, Kitsap County Department of Emergency Management
George Nixon, Commander Navy Region Northwest Emergency Management
David Michaelsen, Commander Navy Region Northwest Fire
Ron Harding, Poulsbo Police Department
Diane Fowler, Washington State Department of Ecology
Susan Forsythe, Washington State Emergency Management Division
Pat McGanney, Bremerton Fire Department
Brian Hauschel, Kitsap County Parks Department
Bradley Martin, United States Environmental Protection Agency
Pamela Parris, United States Navy
Deanna Brewer, Washington State Department of Transportation
Shane Inman, Washington State Department of Transportation
Matt Brown, City of Port Orchard Police Department
John Gundermann, Washington State Patrol
Jared Moravec, Bainbridge Island Fire Department
Brian Bartles, Navy Region Northwest Fire and Emergency Services
Andrew Nelson, Kitsap Public Works

Guests:
Joel Davis, Sazan Group
Tom Bowen, Sazan Group
Jack Newman, Sazan Group

Support Staff present:

Katlyn Colflodt, Kitsap County Department of Emergency Management

Call to Order: The Local Emergency Planning Committee meeting was called to order at 1310 by Vice-Chair Dustin Rodrigues.

Old Business: A motion was made by Vice-Chair Dustin Rodrigues that the agenda for the meeting be accepted as presented. The motion passed unanimously.

Due to Chair Ryan Madison absence, a motion was made by Vice-Chair Dustin Rodrigues to table approval of new membership. The motion was passed unanimously.

Public Comments: None

Discussion:

This page intentionally left blank.

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 Districts by WA State (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)

This page intentionally left blank.

Appendix F: References & Authorities

References

1. Census Reporter, Kitsap County Demographic Overview, 2023. https://censusreporter.org/profiles/05000US53035-kitsap-county-wa/
2. Climate Change Impacts in the United States, Chapter 21, Northwest. U.S. Global Change Research Program, 2024. www.globalchange.gov
3. Closed and Abandoned Landfills in Kitsap County, Kitsap County Public Health District, 2014. https://www.bremertonwa.gov/DocumentCenter/View/7674/Item-7-PDF; verified current 11/2024
4. Inventory of Dams report 2019; WA State Department of Ecology, https://www.utc.wa.gov/sites/default/files/2021-02/Inventory%20of%20Dams%20Report.pdf
5. Earthquake and Landslide Hazards, Washington State Department of Natural Resources, www.dnr.wa.gov; last updated 2024
6. Hazardous Sites List, Site Register, Washington State Department of Ecology,2022, https://apps.ecology.wa.gov/publications/documents/2209042a.pdf; last updated 2022
7. Internet Crime Report, Federal Bureau of Investigation, 2023; https://www.ic3.gov/annualreport/reports/2023_ic3report.pdf; last updated 2023.
8. Kitsap County Department of Emergency Management, Map Library,2024; https://www.kitsap.gov/dis/Pages/old_maplibrary.aspx; last accessed 11/2024
9. Kitsap County Profile, Washington State Office of Financial Management, 2024; https://ofm.wa.gov/washington-data-research/county-and-city-data/kitsap-county; last accessed 11/2024.
10. Kitsap County GIS and Community Development Websites and Mapping Data, Kitsap County WA, 2018; https://www.kitsap.gov/dcd/Pages/Community_Development_Maps.aspx; last accessed 11/2024.
11. Landslides Mapped from LiDAR Imagery, Kitsap County, Washington; 2008; https://pubs.usgs.gov/publication/ofr20081292; Verified current 10/2024
12. McKenna, David J. Lidke, and Jeffrey A. Coe, U. S. Department of the Interior and USGS Landslides Triggered by the Winter 1996-97 Storms in the Puget Lowland, Washington. Verified current 10/2024
13. National Oceanic and Atmospheric Administration (NOAA) statistics, 2024; https://www.ncei.noaa.gov/access/monitoring/monthly-report/; last accessed 11/204
14. National Oceanic and Atmospheric Administration (NOAA) climate mapping, 2024; https://www.climate.gov/maps-data; last accessed 11/2024.
15. OpenStreetMap® maps. https://www.openstreetmap.org/copyright.
16. Pacific Northwest Seismograph Network, University of Washington, Department of Earth and Space Sciences, 2024; https://ess.uw.edu/; last updated 12/2024.
17. Baum, R. L., Chleboard, A. F., , and Schuster,R. L., 1998 Landslides Triggered by the Winter 1996-97 Storms in the Puget Lowland, Washington U.S. Department of the Interior and USGS; https://pubs.usgs.gov/of/1998/0239/report.pdf
18. SARA Title II Tier Reports for Kitsap County filed with Washington State Department of Ecology, 2023; https://ecology.wa.gov/regulations-permits/reporting-requirements/emergency-planning-community-right-to-know-act/tier-two-reporting; last updated 2023
19. US Department of Homeland Security National Preparedness Goal, U.S. Department of Homeland Security, 2022; https://www.dhs.gov/national-preparedness-goal; last accessed 10/2024
20. Washington Department of Health Outbreak Information,2024; https://doh.wa.gov/public-health-provider-resources/notifiable-conditions/outbreak-reporting; last updated 11/2024
21. Washington State Department of Natural Resources, Geologic Information Portal, 2024. https://www.dnr.wa.gov/geologyportal.
22. Washington State Enhanced Mitigation Plan 2023; https://mil.wa.gov/asset/651ec296d76a9/2023_WA_SEHMP_final_20231004.pdf.
23. Washington State Preparedness Report (SPR): SPR Capabilities Assessment 2023; https://mil.wa.gov/asset/64a6db53807c2/Final%20-%202024-2026%20IPP_C1.pdf
24. Sovacool,, B. K., 2011 Hard and soft paths for climate change adaptation, *Climate Policy*, doi:10.1080/14693062.2011.579315 https://www.globalsupportprogramme.org/sites/default/files/downloads/sovacool-cp-hardsoft.pdf
25. FEMA 2022; Local Mitigation Planning Policy Guide; https://www.fema.gov/sites/default/files/documents/fema_local-mitigation-planning-policy-guide_042022.pdf Last Updated 4/2023
26. FEMA, 2023 ; National Risk and Capability Assessmment; https://www.fema.gov/emergency-managers/national-preparedness/goal/risk-capability-assessment) last updated 6/2023
27. FEMA 2024; Cost Benefit Analysis; https://www.fema.gov/benefit-cost-analysis; last updated 11/2024
28. FEMA 2023; Hazard Mitigation Planning; https://www.fema.gov/emergency-managers/risk-management/hazard-mitigation-planning last updated 11/2023
29. FEMA 2013; Mitigation Ideas; https://www.fema.gov/sites/default/files/2020-06/fema-mitigation-ideas_02-13-2013.pdf#:~:text=The%20suggested%20mitigation%20actions%20are%20summarized%20into%20four,Systems%20Protection%2C%20and%20%284%29%20Education%20and%20Awareness%20Programs
30. United States Census Bureau 2023; Kitsap County Population demographics; https://www.census.gov/quickfacts/kitsapcountywashington Last updated 7/2023

31. Municipal Research and Services Center (MRSC) 2024 http://mrsc.org/Home/About-MRSC.aspx; last updated 2024
32. Kitsap County Department of Community Development, 2018; https://www.kitsap.gov/dcd; verified current 10/2024
33. Esri Demographics (July 2024) https://washington.hometownlocator.com/wa/kitsap/
34. Kitsap population and Vulnerability Starburst 2024; https://public.tableau.com/app/profile/kitsap.public.health.district.assessment.and.epi.team/viz/KitsapStarburst_16886600415440/KitsapStarburst; Last updated 7/2024
35. United States Census Bureau (2017-2020) and Esri Demographics (July 2024) https://washington.hometownlocator.com/wa/kitsap/
36. Washington Employment Security Department 2022, https://esd.wa.gov/labormarketinfo/county-profiles/kitsap; last updated 5/2022
37. FEMA Flood Mapping Kitsap County 2024; https://www.fema.gov/flood-maps; last updated 1/2024
38. FEMA Risk Report for Kitsap County (2015)
39. FEMA Risk Management 2024; https://www.fema.gov/emergency-managers/risk-management; last updated 11/2024
40. Bainbridge Island Community Wildfire Protection Plan 2022; https://www.bifd.org/pdfs/wildfire_related_2022/FINAL_CWPP_UPDATE_101322.pdf; last updated 2022
41. City of Bainbridge Island - Planning Department (2019)
42. City of Bainbridge Island Sea Level Rise 2023; https://storymaps.arcgis.com/stories/1f22ceaa04bb48c7b0d26175a028295c; last updated 2023
43. City of Bainbridge Island 2024; Comprehensive Emergency Management Plan; https://www.bainbridgewa.gov/DocumentCenter/View/18907/2024-Comprehensive-Emergency-Management-Plan-CEMP?bidId=; last updated 2024
44. Kitsap County Profile 2024; https://www.kitsapeda.org/; last updated 2024
45. Washington State Enhanced Hazard Mitigation Plan 2023; https://mil.wa.gov/asset/651ec296d76a9/2023_WA_SEHMP_final_20231004.pdf; last updated 10/2023
46. Washington Department of Natural Resources / GIS services 2024; https://www.dnr.wa.gov/programs-and-services/geology/publications-and-data/gis-data-and-databases; last updated 2024
47. FEMA Risk Maps, Kitsap County, and partner cities 2015; https://www.bainbridgewa.gov/DocumentCenter/View/6701/Final_Kitsap_Risk_Report_UpdateStrategies?; last updated 2015
48. FEMA GIS Hazard Risk Map 2024; https://hazards.fema.gov/nri/map; last accessed 10/2024
49. USGS- Kitsap County reports, 2024; https://www.usgs.gov/search?keywords=Kitsap%20County&page=0; last updated 2024
50. USGS 2017, revisiting the OSO Landslide; https://www.usgs.gov/news/revisiting-oso-landslide; last updated 11/2017
51. Kitsap County GIS figures 2024; https://www.kitsap.gov/services/Pages/Map-Library.aspx; last updated; 4/2024
52. Kitsap Flood Risk Report 2024; https://firststreet.org/county/kitsap-county-wa/53035_fsid/flood; last updated 9/2024
53. Kitsap Fire Risk Report 2024; https://firststreet.org/county/kitsap-county-wa/53035_fsid/fire; last updated 7/2024
54. Climate Impacts Group, Collect of the Environment, University of Washington 2015; https://cig.uw.edu/wp- content/uploads/sites/2/2014/11/ps-sok_sec05_sediment_2015.pdf; last updated 2015
55. City of Poulsbo Critical Areas 2025; https://cityofpoulsbo.com/criticalareasupdate/ last updated 12/2024
56. City of Port Orchard Critical Area Ordinance 2024; https://www.codepublishing.com/WA/PortOrchard/html/PortOrchard20/PortOrchard20162.html; last updated 7/2024
57. City of Bremerton Critical Area Ordinance 2024; https://www.codepublishing.com/WA/Bremerton/html/Bremerton20/Bremerton2014.html#:~:text=The%20purpose%20of%20this%20chapter%20is%20to%20protect,standards%20for%20development%20in%20association%20with%20these%20area; Last updated 9/2024
58. Washington State Department of Natural Recourses, Tsunami, 2024https://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards/Tsunamis#tsunamis-in-; last updated 2024
59. Maria Arcos 2012, *Bulletin of the Seismological Society of America*, The A.D. 900–930 Seattle-Fault-Zone Earthquake with a Wider Coseismic Rupture Patch and Postseismic Submergence: Inferences from New Sedimentary Evidence,. http://faculty.washington.edu/cpetroff/wordpress/wp-content/uploads/2012/10/Arcos_2012_Seattle_fault.pdf; Vol. 102, No. 3, pp. –, June 2012, doi: 10.1785/0120110123
60. Kitsap County Hazard Identification & Vulnerability Assessment 2015; https://www.kitsapdem.com/disasters/
61. National Research Council Sea level Rise for the Coast of California, Oregon, and Washinton 2012; http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=13389 ; last accessed 11/2024
62. Balch, J. K.; Bradley, B. A; Abatzoglou, J. T., NagyR. C; Fusco. E. J., Mahood, A. L., (2017) Human-started wildfires expand the fire niche across the United States; Proc Natl Acad Sci U S A. Mar 14;114(11):2946-2951; 10.1073/pnas.1617394114; https://pubmed.ncbi.nlm.nih.gov/28242690/
63. National Wildfire Coordinating Group Glossary of Wildland fires, PMS 205; https://www.nwcg.gov/term/glossary/flash-fuels; last accessed 10/2024
64. Kitsap County Hazard Identification Risk Assessment (2015)
65. Washington State Drought legislation, https://app.leg.wa.gov/RCW/default.aspx?cite=43.83B.400
66. Kitsap Economic Development Alliance 2024; https://www.kitsapeda.org/; last updated 2024
67. US Drought Monitor Drought Severity Classification System: https://droughtmonitor.unl.edu/AboutUSDM/AbouttheData/DroughtClassification.aspx; last updated 12/2024
68. National Integrated Drought Information System (2024), https://www.drought.gov/drought/states/washington; Last Accessed 11/2024
69. US Environmental Protection Agency; What Climate Change means for Washington; https://www.epa.gov/wa; last updated 11/2024
70. City of Bainbridge Island (COBI) Finance Department, Bainbridge Island (2024)
71. City of Bremerton - Planning Commission, 2024; https://www.bremertonwa.gov/230/Planning-Commission; last updated 12/2024
72. National Registry of Historic Places, Washington, 2024; https://catalog.archives.gov/id/74615694; last accessed 11/2024
73. Port Orchard, Sidney Museum and the Arts http://www.sidneymuseumandarts.com; Last accessed 11/2024

74. Western Washington Center for the Arts; https://www.wwca.us ; Last accessed 11/2024
75. Port Orchard Fathoms of Fun; https://www.fathomsofun.org; last accessed 11/2024
76. FEMA mitigation for homeowners 2023; https://www.fema.gov/fact-sheet/mitigation-homeowners, Last updated 9/2023
77. https://uscode.house.gov/statutes/pl/96/342.pdf
78. PUBLIC LAW 91-606- https://www.govinfo.gov/content/pkg/STATUTE-84/pdf/STATUTE-84-Pg1744.pdf#page=14
79. Stafford Act; https://www.fema.gov/media-library/assets/documents/15271
80. Washington State Administrative Procedure Act WAC; https://app.leg.wa.gov/RCW/default.aspx?cite=34.05&full=true
81. Washington State Emergency Management WAC; https://apps.leg.wa.gov/RCW/default.aspx?cite=38.52
82. Washington States **Growth Management—Planning by Selected Counties and Cities** WAC; https://apps.leg.wa.gov/RCW/default.aspx?cite=36.70A
83. Washington State Public Water Supplies WAC; https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-010.pdf
84. Kitsap County Code; https://www.codepublishing.com/WA/KitsapCounty/html/KitsapOT.html
85. Kitsap County Ordinance Disposition Table; https://www.codepublishing.com/WA/KitsapCounty/html/KitsapOT.html
86. Introduction and Approval Procedures; https://www.codepublishing.com/WA/KitsapCounty/#!/Kitsap19/Kitsap19100.html#19.100
87. FEMA 2024; Hazard Mitigation Planning; https://www.fema.gov/hazard-mitigation-planning; last updated 11/2024
88. Kitsap County Department of Emergency Management, ,2024; https://www.kitsapdem.com/; last updated 11/2024
89. Municipal Research and Services Center of Washington , 2024; https://mrsc.org/explore-topics/government-organization/special-districts/special-purpose-district-contents, Last updated 2024.
90. City of Port Orchard Community Planning Commission, 2024; https://portorchardwa.gov/departments/planning-commission/ ; last updated 12/2024
91. City of Poulsbo Planning Commission, 2024; https://cityofpoulsbo.com/planning-commission/; last updated 12/2024
92. Suquamish Tribal Council 2024; https://suquamish.nsn.us/home/government/; last updated 2024
93. Port Gamble S'Klallam, Tribal Council 2024; https://pgst.nsn.us/tribal-council/; last updated 2024
94. FEMA 2024, Declared Disasters by Region and State; https://www.fema.gov/locations/washington, Last updated 2024
95. FEMA 2024, Declared Disaster by State and County, Kitsap County; https://www.fema.gov/data-visualization/disaster-declarations-states-and-counties; last updated 2024
96. Northwest Geological Society (NWGS), 2024; https://nwgs.org/, last updated 11/2024
97. The Geological Society of Washington, 2024; https://www.gswweb.org/; last updated 12/2024
98. Satake, K. (2014). Chapter 24, The 2011 Tohoku, Japan, Earthquake and Tsunami. Extreme Natural Hazards, Disaster Risks and Societal Implications, Cambridge University Press, p. 340-351.
99. UNESCO/IOC (2012). Summary Statement from the Japan - UNESCO - UNU Symposium on The Great East Japan Tsunami on 11 March 2011 and Tsunami Warning Systems: Policy Perspectives 16 - 17 February 2012
100. Washington State Office of Financial Management, 2024l; https://ofm.wa.gov/washington-data-research/county-and-city-data/kitsap-county; Last updated 2024
101. First Street Technologies Inc, The Standard for Climate Risk Financial Modeling; 2024; https://firststreet.org/; last updated 2024
102. US Department of Agriculture, *Wildland Fire & Natural Resource Management, 2024; https://www.landfire.gov/; Last updated 2024*
103. USGS, Foundational data for interagency fire and land management; https://www.usgs.gov/special-topics/wildland-fire-science/landfire-foundational-data-interagency-fire-and-land; Last updated 2024
104. FEMA National Flood Insurance Program (NFIP), 2024; https://www.floodsmart.gov/flood-zones-and-maps; last updated 2024
105. FEMA Community Rating system, 2024; https://www.fema.gov/floodplain-management/community-rating-system; Last updated 2024
106. Kitsap County DEM, 2018; Port orchard Tornado; https://www.kitsap.gov/Documents/Tornado%20Response%2012-19-2018.pdf; verified 10/2024
107. Tornado Project Online, Washington Tornadoes 1950-2012; https://tornadoproject.com/alltorns/watorn.htm, Verified 10/2024
108. The Weather Channel, 2024; Rare Tornado Warning in Western Washington; https://weather.com/storms/severe/video/rare-tornado-warnings-issued-in-olympic-peninsula; Verified 10/2024
109. Weather.com, 2018; Port Orchard Tornado; https://weather.com/news/news/2018-12-18-severe-storms-tornado-damage-port-orchard-washington; verified 11/2024
110. Kitsap Public Utilities District (KPUD), 2024, Rain volume; http://kpudhydrodata.kpud.org/APSFED_RAIN.aspx; Verified 11/2024
111. NOAA Weather, Historic view, 2024; https://www.weather.gov/wrh/Climate?wfo=sew; verified 10/2024
112. Department of Homeland Security, 2024, All Hazards Approach to Hazard Planning; https://www.dhs.gov/archive/plan-and-prepare-disasters, verified 11/2024
113. Waugh, W.I., 2004, Terrorism and the All Hazards Model, https://training.fema.gov/emiweb/downloads/waugh%20-%20terrorism%20and%20planning.doc, Verified 11/2024

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.

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''.

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) 38.52[9]**
   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 Plans[10]**
   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

2. **Kitsap County, 1980. Ordinance No. 80 - Flood Damage Prevention Regulations[12]** 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.

3. **Kitsap County Ordinance No. 109, March 24, 1986[13]**
   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.

4. **Kitsap County Critical Areas Ordinance, December 2017[14]**

City of Bainbridge Island Critical Area Ordinance, January 2019[15] City of

Poulsbo Chapter 16.20 Critical Area Ordinances, July 2007[16] Port Orchard

Critical Ordinance, December 2009[17]

5. **City of Bremerton Critical Lands Ordinance, June 2016[18]**

   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.

6. **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

7. **Kitsap County Comprehensive Emergency Management Plan, 2015[19]**
   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.

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 Urban Interface	Wildland vegetation and forest areas adjacent to or intermingled with residential developments.

This page intentionally left blank.