

ISLAND COUNTY

Multi-Jurisdiction Hazard Mitigation Plan

Appendix C-1

UNINCORPORATED ISLAND COUNTY VULNERABILITY ASSESSMENT

The hazard identification and risk assessment contained in the Island County HIVA was designed to cover the entire county area. From the detailed information in the HIVA, the county is nominally made up of three incorporated towns and a large area of numerous neighborhoods. The neighborhoods in most cases are based on land on past and current developments. These "natural" groupings generally define physical areas; include structures of the same basic style, construction, use and age. These neighborhoods also include the supporting utilities, and road and street systems. Finally, they generally share the same hazards, vulnerabilities, and risks. These areas also lend themselves to analysis using census data providing a common data set and standard across all the groups.

County critical infrastructure value is hard to estimate accurately. Island County does not operate any utilities. County owned infrastructure is limited to county owned real estate, structures (exceeding \$40 million), and the county road system. Other components of critical infrastructure are provided and operated by:

- Hospital District
- Water and Sewer Districts
- Water Associations
- Fire Districts
- Dike and Drainage Districts
- School Districts
- Port Districts
- Recreation and Park Districts
- Library District
- Department of Defense (Navy) Property

The infrastructure operated and maintained by these entities is critical to all facets of the county activity and comprise a huge financial investment. A complete and detailed listing of individual critical infrastructure components is maintained by IC DEM and for security reasons is not included in this text.

HAZARD ASSESSMENT

This assessment used a more simple methodology that attempted to address the probability of a hazard occurring, the vulnerability of the area to the specific hazard, and the risk (life/injury danger and property damage) to the area from the hazard. The period over which the assessment was considered was five years which is the same as the mitigation planning cycle. Based on the types of natural hazards considered, even a longer assessment period would have produced approximately the same results.

The following terms and definitions are based on a similar assessment done by Walla Walla County and adapted to Island County geography, population, economic factors, and hazards.

PROBABILITY OF OCCURRENCE

The probability of occurrence is an adjective Description (High, Medium, Low) of the subjective probability of the specific hazard impacting a specific town or neighborhood. The determination was based on historical data, observations, and trends.

HIGH – There is a great likelihood that the hazardous event will impact the subject area in the next 5 years.

MEDIUM – There is a moderate likelihood that the hazardous event will impact the subject area in the next five years.

LOW – There is little likelihood that the hazardous even will impact the subject area in the next 5 years.

VULNERABILITY

Vulnerability is an adjective Description (High, Medium, Low) of the potential for the hazard to affect the subject area. That is an area on the beach is vulnerable to storm surge flooding while an area removed from the beach by some distance is not as vulnerable. Both areas are probably vulnerable to earthquake or windstorm damage. Vulnerability is related to geographic location, vegetation (forestation), economic activity, population density, and other factors. Vulnerability is not related to the occurrence interval of a hazard (see probability).

HIGH – The population, property, commerce, infrastructure, and services of the subject area are uniformly exposed to the effects of a hazard of potentially great magnitude with a worst-case scenario of wide spread destruction, disruption of services, injury, and loss of life.

MEDIUM - The population, property, commerce, infrastructure, and services of the subject area are uniformly exposed to the effects of a moderate severity hazard or the hazard does not affect all above named factors to the same degree. The scenario would show moderate damage, limited service disruption, and injury, possibly casualties.

LOW – A limited area or segment of the population or property is exposed to the effects of the hazard with limited damage, none or few injuries, and minor service disruption.

RISK

Risk (High, Medium, Low) describes the overall threat posed by a specific hazard impacting a specific town or neighborhood in the next five years. It is a subjective estimate of the combination of probability or occurrence and vulnerability.

HIGH – There is a strong potential for a major disaster caused by the named hazard in the next five years. The threat is significant enough to warrant major program effort to militate against, prepare for, respond to, and recover from the effects of the hazard. This hazard should be a major focus of county mitigation and emergency management efforts in this area.

MEDIUM – There is a moderate potential for a disaster in the next five years. The threat rates moderate emergency management and mitigation priority and should be included in the planning, funding and exercise program

LOW – There is little potential for disaster in the next five years. The threat is such that the specific effort devoted to mitigation or emergency planning for this hard is last after the high and moderately rated hazards.

SOME CONSIDERATIONS FOR RISK ASSIGNMENT

The various neighborhoods of the county were analyzed against the natural hazards detailed in the HIVA. Also from the HIVA we find that avalanche and volcanic eruption are very low risk hazards for the county. They were eliminated from the neighborhood analysis. Drought and wildfire were also was not actively included in the analysis – not because they don't pose problems, but because they exist in some degree all over the county all over the county with some exception for Oak Harbor. Mitigation consideration and initiatives will still be considered for drought and wildfire. The comparison between the neighborhood and the hazards was then completed and the list in Appendix 4, Areas at Risk was compiled.

DROUGHT

It can be said that drought conditions are frequently found in Island County and so overall the probability of drought for any given area is high. The last three years have seen higher temperatures and lower than expected rainfall. The risk to the county caused by drought is low except for those areas where agriculture predominates. An extended drought would lower aquifer recharge rates and raise the risk of saltwater intrusion into some water systems. Saltwater intrusion an also occur because of improper use or uncontrolled growth attached to a specific water system. These are controllable factors.

EARTHQUAKE

Probability of a quake being felt in Island County is high. The probability that it would be caused by either the South Whidbey fault or the North Whidbey fault is considered moderate. An earthquake affecting Camano Island from either of these faults or others in the area is also a moderate probability.

The vulnerability of Island County Communities to an earthquake is more variable and dependent on the magnitude of the quake. Projections from the HAZUS computer program indicate that for a South Whidbey Fault quake all areas south of Greenbank would be moderately vulnerable. This includes the Southern half of Camano Island.

Those areas on a line roughly from Langley to Useless Bay would be highly vulnerable to an earthquake. Those areas of Whidbey Island north of Greenbank and the north portion of Camano Island would be considered as having a lower vulnerability. For those earthquakes on the North Whidbey fault complex, the vulnerabilities are basically reversed with Oak Harbor, North Whidbey, and North Camano Island having a high vulnerability.

Earthquake risk closely follows earthquake vulnerability. The more concentrated the population is on or near a fault the higher the risk. For this reason a quake on the South Whidbey Fault places the area of Langley, Freeland, and Clinton south to Scatchet Head, in the high-risk category. The village of Clinton and associated beach communities with the high unstable bluffs would probably be at high risk. For an earthquake on the North Whidbey Fault, Oak Harbor and communities on a line to Mariner’s Cove and the Naval Air Station Whidbey Island are in the high-risk area with Coupeville being in a moderate risk position.

FLOOD

As discussed in the HIVA most flooding in Island County is caused by wind-driven tidal surge coupled with high seasonal tides. There is also a history of local flooding after heavy rains but this is limited in occurrence.

In spite of the number of beach level communities in Island County the occurrence of wide area flooding is low. The probability that any one community will be flooded from a combination of factors cannot be rated at less than medium. The following communities are at beach level and have a medium to high probability of localized flooding or wave damage:

Whidbey Island

West Beach
 Patton’s Hide-away
 Admiral’s Cove
 Ledgewood Beach
 Lagoon Point
 Bush Point
 Mutiny sands
 Useless Bay Beach

Sunlight Beach
 Sandy Hook
 Scatchet Head
 Possession Beach
 Hidden Beach
 Harrington Lagoon
 Snaklum Point
 Long Point Manor

Columbia Beach
 Brighton Beach
 Sandy Point
 Bell’s Beach

Camano Island

Rocky Point
 Madrona Beach
 Woodland Beach
 Onamac Point
 Indian Beach
 Mabana Shores
 Summerland Beach

Saratoga View Walk
 Pebble Beach
 Wilkes Gary Hts.
 Tyee Beach
 Tillicum Beach
 Camano C.C
 Driftwood Shores

Long Beach
 Juniper Beach

There are other communities on or near the beach but due to their location on beaches not subject to high winds; the probability of them facing the combined conditions for tidal surge flooding is low.

LANDSLIDE

There are many areas in Island County, primarily coastal bluffs that are prone to slide or slump. The probability of a landslide occurrence should be rated as high for nearly all these areas. The probability of a slide increases if there is a prolonged period of steady rain. The mechanics of local slides are described in the HIVA, but essentially increased ground water acts as a lubricant between impervious soil layers so the vulnerability to landslides varies with ground water content, the types of soil material involved, the angle of the slope face, and the amount of vegetation covering the slope or bluff.

Several areas in Island County are actively moving at this time or have subsided in recent years. The risk in these areas is high:

- Driftwood Lane in Ledgewood Beach
- Slope above Hidden Beach Drive, Beachcombers Hidden Beach
- Slope above Whidbey Shores at East Point
- Scatchet Head
- Area above Columbia Beach
- Area in the vicinity of Useless Bay
- Bluff below Scenic Heights Road, Oak Harbor
- Camano Head
- Tyee Beach
- Vicinity Pebble Beach

Some areas of high bluff that should be rated as having a medium vulnerability to landslide are:

- West Beach of Whidbey Island vicinity of Evendown
- Bluff above Lagoon Point Shores
- Bluff above Bush Point
- Double Bluff
- Bluff above Bell's Beach
- Bluff above Possession Beach
- Bluff above Tillicum Beach

There are other areas in the county that are vulnerable to slide but may be on undeveloped inaccessible land or state park land.

Landslide risk is obviously high in those areas that are currently observed to be moving. Several of these are in residential areas with structures both above and below the slope. The areas of medium vulnerability also have structures above or below the potential slide increasing the likely loss if a slide does occur.

SEVERE STORM

Of the eight natural hazards to which the majority of Island County is vulnerable, a severe wind and rainstorm is the most common hazard with some wind damage

occurring on a yearly basis. The predominant north-south orientation of Whidbey and Camano Islands and the normal west to east wind pattern makes the impact of wind on the island asymmetric – strong winds on the west and south coasts, lighter wind on the east and north coasts. Therefore the risk of windstorm damage is higher for communities and property on the west and south coasts. This was the case in February of 2006 when the region was hit by extreme winds out of the southwest.

A second aspect of the geographical setting is that most of the county is tree covered. Residences and businesses are located in close proximity to large tree stands, except in some areas of the incorporated towns and Freeland. The result is that most county residential structures and roads have a large exposure to damage; utility interruption and blockage from tree blow down. When heavy rain has saturated the soil, risk of tree blow down rises along with landslides and local flooding from rain ponding. Finally, as discussed previously, high wind often can push high tides and floating debris over bulkheads into beach communities.

TSUNAMI

There is no first-hand tsunami experience for the area of Island County. There is a fair amount of scientific data for prehistoric tsunami exposure. The probability of a tsunami impacting Island County is rated medium only because there hasn't been one in the historical period. However, there have been tsunamis in other parts of Puget Sound.

Vulnerability to a tsunami caused by Subduction on the Cascadia Plate is rated as high for those areas of northwest Whidbey Island that face the Strait of San de Fuca. Those county areas rated as having a high or medium vulnerability to tidal flooding also face a high risk of tsunami damage after a severe earthquake within Puget Sound. Some high bluff areas are also vulnerable to landslides caused by a tsunami eroding the base of the bluff.

VOLCANO

The probability of Island County receiving any impact from an erupting Cascade volcano, especially Mount Baker, is low. The Cascade volcanoes are not dead either technically or historically and so an eruption is a remote but possible event.

Island County vulnerability to such an eruption is low. The predominant wind direction from west to east means that most ash, smoke, and toxic gases would be blown away from the county. A USGS Cascades Volcano Observatory technical study of the potential volcanic hazards from Mount Baker indicates that blast and other explosive products of an eruption would not reach Island County. However other aspects of a local eruption might - these aspects include eruption-connected earthquakes, sieches, and potable water source impacts if upriver slides and eruption products foul the Skagit River. These would impact the county in the form power and water utility disruptions, transportation disruptions, and other supporting service impacts. The overall risk to the county from a Mount Baker volcanic eruption or other Cascade volcano eruption is considered low.

INTERFACE FIRE

As mentioned earlier, Island County is largely forest covered with communities and residences dispersed in these woods. Given these factors, all of the county except for the urban portions of the three towns and Naval Air Station Whidbey Island (NASWI) are highly vulnerable or at risk to wildland fire or interface fire.

While there hasn't been a serious or large wildland or interface fire in some years, risk factors increase with residential growth, dry hot summers, and increased fuel accumulation. Additionally, wildland firefighting resources on either island are limited. If additional firefighting equipment is required, the limited access on and off Whidbey and Camano Islands adds to risk by extending response times. Also, other than seawater, firefighting water availability and distribution in many areas of the two islands is severely limited.

NEIGHBORHOOD PROFILE AND VULNERABILITY INFORMATION

Information about many of the county neighborhoods and the hazards they face are contained in the next two appendices. Appendix B-3, Neighborhood Characteristics was derived from information accumulated in Mitigation 20/20 databases. The data was derived from census data and DEM area on-site surveys. The information is intended to be descriptive and generalized for the area.

Appendix B-4, At Risk Areas, lists many of the neighborhoods mentioned in the previous hazard analysis and lists the most significant or hazards with the most risk that they face. Again, this is a generalized view and all areas may have other hazards based on local factors.

Multi-Hazard Mitigation Initiatives

Multi-Hazard Initiative #1

Continue implementation of the public education program within Island County to educate citizens about the hazards faced in Island County and the appropriate preparedness and response measures.

LEAD AGENCY: Island County Department of Emergency Management
 FUNDING SOURCE: Pre-Disaster Mitigation Program
 Emergency Management Program Grant
 TIME-LINE: Short Term within three years of funding

Multi-Hazard Initiative #2

Continue and expand Community Emergency Response Team (CERT) Training. Involve CERT teams in local exercises and training with first responders.

LEAD AGENCY: Island County Department of Emergency Management
 FUNDING SOURCE: Pre-Disaster Mitigation Program
 Homeland Security Grant Program
 TIME-LINE: Short Term, within three years of funding

Multi-Hazard Initiative #3

Implement a program to provide emergency power for all critical facilities and infrastructure to include telecommunications systems, water utilities, and designated emergency shelters.

LEAD AGENCY: Island County Department of Emergency Management
 FUNDING SOURCE: Pre-Disaster Mitigation Program
 TIME-LINE: Short Term, within three years of funding

Multi-Hazard Initiative #4

Prepare a coordinated plan for the emergency control and distribution of fuels both automotive and heating fuels in case of the prolonged interruption of normal distribution to Island County locations.

LEAD AGENCY: Island County Department of Emergency Management
 FUNDING SOURCE: Pre-Disaster Mitigation Program
 TIME-LINE: Long Term, with in three years of funding

Multi-Hazard Initiative #5

Plan for and implement an expanded solid waste facility on Camano Island to accommodate debris. The current facility cannot accommodate the collection and storage of storm debris in any above normal quantity.

LEAD AGENCY: Island County Department of Emergency Management
 FUNDING SOURCE: Pre-Disaster Mitigation Program
 TIME-LINE: Long Term, more than three years from funding

Multi-Hazard Initiative #6

Evaluate current coverage and equipment and provide a strategic emergency communications plan that provides better coverage to all areas of Island County for first responders and emergency amateur radio communications.

LEAD AGENCY: Island County Department of Emergency Management
 Island Communications (ICOM 911)
 FUNDING SOURCE: Pre-Disaster Mitigation Program
 TIME-LINE: Long Term, more than three years from funding

Earthquake

- Implement a review of designated emergency shelter structural and utility readiness for occupancy after a significant earthquake.

Lead Agency: Island County Department of Emergency Management
 Funding Source: Pre-Disaster Mitigation Program
 Time-Line: Short Term, within three years of funding

- Study and retrofit county owned facilities to better withstand damage from a major earthquake.

Lead Agency: Island County Facilities Maintenance Department
 Funding Source: Pre-Disaster Mitigation Program
 Hazard Mitigation Grant Program
 Time-Line: Long Term, more than three years from funding

- Analyze options and acquire resources for alternate forms of transportation access to Camano Island should SR 532 or either of the two highway bridges becomes unserviceable.

Lead Agency: Island County Public Works Department
 Funding Source: Pre-Disaster Mitigation Program
 Hazard Mitigation Grant Program
 Time-Line: Long Term, more than three years from funding

Flood

Evaluate and enhance the current capital improvements program (CIP) for county roads and drainage projects to provide better flood control in known tidal flood problem areas.

Lead Agency: Island County Public Works Department
 Funding Source: Pre-Disaster Mitigation Program
 Hazard Mitigation Grant Program
 Time-Line: Long Term, more than three years from funding

Landslide

- Provide steep slope stability project funding or relocation funding for county roads with histories of instability.

Lead Agency: Island County Public Works Department
 Funding Source: Pre-Disaster Mitigation Program
 Hazard Mitigation Grant Program
 Time-Line: Long Term, more than three years from funding

- Provide steep slope stability advice and education to owners of structures above steep bluffs or below steep bluffs. Increase monitoring of county bluffs involving beach communities or access to beach communities.

Lead Agency: Island County Public Works Department
 Funding Source: Pre-Disaster Mitigation Program
 Hazard Mitigation Grant Program
 Time-Line: Long Term, more than three years from funding

Tsunami

Obtain funding to provide tsunami evacuation maps, information, publications, and road signage for both Whidbey and Camano Islands. Obtain all hazard alert broadcast (AHAB) towers for areas of North Whidbey Island.

Lead Agency: Island County Department of Emergency Management
Funding Source: Pre-Disaster Mitigation Program
Hazard Mitigation Grant Program
Time-Line: Long Term, more than three years from funding

Interface Fire

Promote a "Firewise" program in Island County to increase fire safety zones around businesses and residences. Encourage owners to reduce woodland fuel loads on their property.

Lead Agency: Island County Department of Emergency Management
Funding Source: Pre-Disaster Mitigation Program
Time-Line: Long Term, more than three years from funding