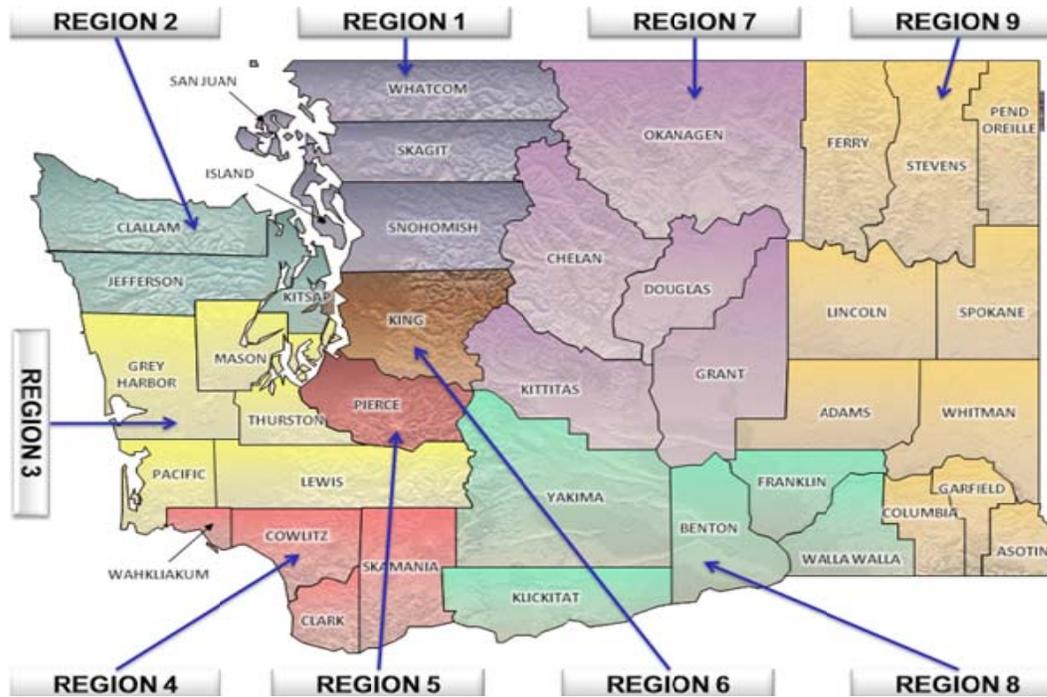


## Washington Hazard Event History (by Homeland Security Region)



## Homeland Security Region 1

Homeland Security Region 1 includes **Whatcom, Skagit, Snohomish, San Juan and Island Counties**. Each of the counties is home to a WSU County Extension office. In addition there is a Learning Center at Mt. Vernon as well as a Research and Extension Unit in **Skagit County**, also located in Mt. Vernon.

<b>Region 1 - Historical Hazardous Event Record</b>				
<b>Date</b>	<b>County</b>	<b>Injuries</b>	<b>Fatalities</b>	<b>Event</b>
2/28/2001	Clallam	n/a	n/a	Earthquake
5/1965	Snohomish	n/a	n/a	Earthquake
2/2001	Snohomish	n/a	n/a	Earthquake
1/1964 – 5/1964	Island	n/a	n/a	Drought
Spring, 1966	Island	n/a	n/a	Drought
6/1967 – 8/1967	Island	n/a	n/a	Drought
1/1973 – 8/1973	Island	n/a	n/a	Drought
10/1976 – 9/1977	Island	n/a	n/a	Drought
6/2003 – 9/2003	Island	n/a	n/a	Drought
3/10/2005	Skagit	0	0	Drought
3/10/2005	Snohomish	0	0	Drought
3/10/2005	Whatcom	0	0	Drought
5/19/2005	Snohomish	0	0	Hail
5/18/2005	Snohomish	0	0	High Wind / Tornado
4/27/2004	Whatcom	0	0	High Wind/ Tornado
5/1980	Snohomish	n/a	n/a	Volcano
10/1962	Snohomish	n/a	n/a	Flooding
12/1964	Snohomish	n/a	n/a	Flooding
12/1975	Snohomish	n/a	n/a	Flooding
12/1977	Snohomish	n/a	n/a	Flooding
12/1979	Snohomish	n/a	n/a	Flooding
11/1986	Snohomish	n/a	n/a	Flooding
11/1990	Snohomish	n/a	n/a	Flooding
12/1990	Snohomish	n/a	n/a	Flooding
11/1995–12/1995	Snohomish	n/a	n/a	Flooding
1/1996 – 2/1996	Snohomish	n/a	n/a	Flooding
3/1997	Snohomish	n/a	n/a	Flooding
11/2003	Snohomish	n/a	n/a	Flooding
12/1996 – 1/1997	Snohomish	n/a	n/a	Severe Storm

## Homeland Security Region 2

Homeland Security Region 2 includes **Clallam**, **Jefferson** and **Kitsap** counties. Each of the counties is home to a WSU County Extension office. There is also a WSU Learning Center at Port Hadlock.

<b>Region 2 - Historical Hazardous Event Record</b>				
<b>Date</b>	<b>County</b>	<b>Injuries</b>	<b>Fatalities</b>	<b>Event</b>
2/28/2001	Clallam	n/a	n/a	Earthquake
3/10/2005	Clallam	0	0	Drought
3/10/2005	Jefferson	0	0	Drought
3/10/2005	Kitsap	0	0	Drought
1986	Clallam	n/a	n/a	Flooding
1997	Clallam	n/a	n/a	Flooding
1979	Clallam	n/a	n/a	Flooding
1990	Clallam	n/a	n/a	Flooding
1995	Clallam	n/a	n/a	Flooding
1996 – 1997	Clallam	n/a	n/a	Flooding
2003	Clallam	n/a	n/a	Flooding
1986	Clallam	n/a	n/a	Severe Storm
1997	Clallam	n/a	n/a	Severe Storm
1979	Clallam	n/a	n/a	Severe Storm
1990	Clallam	n/a	n/a	Severe Storm
1995	Clallam	n/a	n/a	Severe Storm
1996 – 1997	Clallam	n/a	n/a	Severe Storm
2003	Clallam	n/a	n/a	Severe Storm
1951	Clallam	n/a	n/a	Wildland Fire
1998	Clallam	n/a	n/a	Urban Fire
1999	Clallam	n/a	n/a	Urban Fire
2000	Clallam	n/a	n/a	Urban Fire
2001	Clallam	n/a	n/a	Urban Fire
2002	Clallam	n/a	n/a	Urban Fire
2003	Clallam	n/a	n/a	Urban Fire
1994	Clallam	n/a	n/a	Landslide

### Homeland Security Region 3

Homeland Security Region 3 includes **Grays Harbor, Mason, Thurston, Pacific** and **Lewis counties**. Each of the counties has a WSU County Extension office. In addition, there is a Learning Center located in **Grays Harbor**, an Extension Energy Program facility, a branch of the Social and Economic Sciences Research Center, and a WSU government liaison office located in **Thurston County** and a small Cranberry Research and Extension Center located in **Pacific county**.

<b>Region 3 - Historical Hazardous Event Record</b>				
<b>Date</b>	<b>County</b>	<b>Injuries</b>	<b>Fatalities</b>	<b>Event</b>
2/28/2001	Thurston	0	.33	Earthquake
3/10/2005	Grays Harbor	0	0	Drought
3/10/2005	Mason	0	0	Drought
3/10/2005	Pacific	0	0	Drought
3/10/2005	Thurston	0	0	Drought
10/15/2003	Thurston	0	0	High Wind / Tornado
5/27/2004	Thurston	0	0	High Wind / Tornado
3/27/1980	Lewis	0	14.25	Volcano

## Homeland Security Region 4

Homeland Security Region 4 includes **Wahkiakum, Cowlitz, Skamania** and **Clark counties**. Each of these counties is home to a WSU County Extension office. In addition there is a Learning Center serving **Wahkiakum** and **Cowlitz counties** located in Longview and the WSU Vancouver branch campus, as well as a Research and Extension Center located in **Clark County**.

<b>Region 4 - Historical Hazardous Event Record</b>				
<b>Date</b>	<b>County</b>	<b>Injuries</b>	<b>Fatalities</b>	<b>Event</b>
5/18/1980	Skamania	0	32	Earthquake
3/10/2005	Cowlitz	0	0	Drought
3/10/2005	Wahkiakum	0	0	Drought
4/13/2003	Cowlitz	1	0	Hail
4/21/2004	Clark	0	0	Hail
4/5/1972	Clark	300	6	High Wind / Tornado
5/31/1997	Clark	0	0	High Wind / Tornado
5/11/2000	Clark	0	0	High Wind / Tornado
6/6/2004	Cowlitz	0	0	High Wind / Tornado
3/27/1980	Clark	0	14.25	Volcano
3/27/1980	Cowlitz	0	14.25	Volcano
3/27/1980	Skamania	0	14.25	Volcano

## Homeland Security Region 5

Homeland Security Region 5 consists solely of **Pierce County**. **Pierce County** is home to a county Extension office, a Learning Center and a Research and Extension Center.

<b>Region 5 - Historical Hazardous Event Record</b>				
<b>Date</b>	<b>County</b>	<b>Injuries</b>	<b>Fatalities</b>	<b>Event</b>
2/28/2001	Pierce	0	.33	Earthquake
3/10/05	Pierce	0	0	Drought
5/17/2005	Pierce	0	0	Hail
6/23/1996	Pierce	0	0	High Wind / Tornado
5/31/1997	Pierce	0	0	High Wind / Tornado
6/27/2001	Pierce	0	0	High Wind / Tornado

## Homeland Security Region 6

Homeland Security Region 6 is synonymous with **King county**. **King County** is home to a WSU County Extension office and the WSU West facility in downtown Seattle.

<b>Region 6 - Historical Hazardous Event Record</b>				
<b>Date</b>	<b>County</b>	<b>Injuries</b>	<b>Fatalities</b>	<b>Event</b>
4/29/1965	King	0	7	Earthquake
2/28/2001	King	0	.33	Earthquake
2001	King	0	0	Drought
3/10/05	King	0	0	Drought
9/28/1962	King	0	0	High Wind / Tornado
12/12/1969	King	1	0	High Wind / Tornado
1972	King	n/a	n/a	Flooding
1975	King	n/a	n/a	Flooding
1977 –1979	King	n/a	n/a	Flooding
1986	King	n/a	n/a	Flooding
1986	King	n/a	n/a	Flooding
1/1990	King	n/a	n/a	Flooding
11/1990	King	n/a	n/a	Flooding
12/1990	King	n/a	n/a	Flooding
2/1996	King	n/a	n/a	Flooding
4/1997	King	n/a	n/a	Flooding
1/1993	King	n/a	n/a	Severe Storm
1/1996	King	n/a	n/a	Severe Storm
1/1997	King	n/a	n/a	Severe Storm
11/1999	King	n/a	n/a	Civil Disturbance
2/28/2002	King	n/a	n/a	Civil Disturbance
04/2002	King	n/a	n/a	Civil Disturbance
10/2003	King	n/a	n/a	Civil Disturbance
1993	King	n/a	n/a	Terrorism; Explosive / Skinheads
1995	King	n/a	n/a	Terrorism; Explosive / Unknown
12/14/1999	King	n/a	n/a	Terrorism; Explosive / Ahmed Ressay
05/2001				Terrorism; Incendiary / ALF
1/2000 – 12/2002	King	n/a	n/a	Terrorism; Biological White Powder / Misc Individuals
10/2002	King	3	10	Terrorism; Fire Arms / John Allen, Muhammad & John Lee Malvo

## Homeland Security Region 7

Homeland Security Region 7 includes **Okanogan, Chelan, Douglas, Grant** and **Kittitas counties**. Each of the counties is home to a WSU County Extension office. In addition there is a Learning Center and a Tree Fruit Research and Extension Center in **Chelan County**.

<b>Region 7 - Historical Hazardous Event Record</b>				
<b>Date</b>	<b>County</b>	<b>Injuries</b>	<b>Fatalities</b>	<b>Event</b>
2/28/2001	King	0	.33	Earthquake
1977	Douglas	n/a	n/a	Drought
1977	Grant	n/a	n/a	Drought
2001	Grant	n/a	n/a	Drought
2003 – 2004	Douglas	n/a	n/a	Drought
8/1/1984	Chelan	0	0	Hail
8/6/1991	Chelan	0	0	Hail
7/8/1993	Chelan	0	0	Hail
7/11/1993	Chelan	0	0	Hail
5/16/1994	Chelan	0	0	Hail
6/21/1997	Chelan	0	0	Hail
5/4/2005	Grant	0	0	Hail
6/26/1982	Okanogan	0	0	Hail
7/9/1995	Okanogan	0	0	Hail
7/5/1997	Okanogan	0	0	Hail
7/22/2000	Okanogan	0	0	Hail
7/21/1997	Okanogan	0	0	High Wind / Tornado
1980	Douglas	n/a	n/a	Volcano
1925	Chelan	0	14	Flooding
1942	Chelan	0	8	Flooding
5/1948 – 06/1948	Chelan	0	1	Flooding
1957	Grant	n/a	n/a	Flooding
3/1957	Douglas	n/a	n/a	Flooding
1972	Douglas	n/a	n/a	Flooding
5/1972 – 06/1972	Chelan	0	4	Flooding
3/1989	Douglas	n/a	n/a	Flooding
11/1990	Chelan	0	0	Flooding
1993	Douglas	n/a	n/a	Flooding
1995	Douglas	n/a	n/a	Flooding
11/1995 - 12/1995	Chelan	0	0	Flooding
1996	Douglas	n/a	n/a	Flooding
12/1996	Chelan	0	0	Flooding
1996-1997	Grant	n/a	n/a	Flooding

<b>Region 7 - Historical Hazardous Event Record</b>				
<b>Date</b>	<b>County</b>	<b>Injuries</b>	<b>Fatalities</b>	<b>Event</b>
1997	Douglas	n/a	n/a	Flooding
1/1949	Grant	n/a	n/a	Severe Storm
1/1950	Chelan	n/a	n/a	Severe Storm
1/13/1950	Grant	n/a	Several dozen(?)	Severe Storm
10/1950	Chelan	n/a	n/a	Severe Storm
3/1956	Chelan	n/a	n/a	Severe Storm
12/1968	Chelan	n/a	n/a	Severe Storm
3/1972	Chelan	n/a	n/a	Severe Storm
6/1972	Chelan	n/a	n/a	Severe Storm
8/1979	Chelan	n/a	n/a	Severe Storm
1/1983	Chelan	n/a	n/a	Severe Storm
3/1988	Chelan	n/a	n/a	Severe Storm
1/1996	Chelan	n/a	n/a	Severe Storm
12/1996 – 1/1997	Grant	n/a	n/a	Severe Storm
1/1997	Chelan	n/a	n/a	Severe Storm
1970	Chelan	0	0	Wildland Fire
July 14, 1987	Grant	n/a	n/a	Wildland Fire
1988	Chelan	0	1	Wildland Fire
1992	Chelan	n/a	n/a	Wildland Fire
1994	Chelan	n/a	n/a	Wildland Fire
8/2-3/1996	Grant	n/a	n/a	Wildland Fire
1998	Douglas	n/a	n/a	Wildland Fire
2001	Chelan	n/a	n/a	Wildland Fire
2001	Okanogan	n/a	n/a	Wildland Fire
August 1967	Chelan	0	n/a	Hazardous Materials
August 6, 1974	Chelan	2	n/a	Hazardous Materials
May 1992	Chelan	2	n/a	Hazardous Materials
November 18, 1993	Chelan	0	n/a	Hazardous Materials
January 27, 1994	Chelan	3	n/a	Hazardous Materials
July 1996	Chelan	3	n/a	Hazardous Materials
1998	Grant	n/a	2	Hazardous Materials
August 1999	Chelan	0	n/a	Hazardous Materials
February 2000	Chelan	0	n/a	Hazardous Materials

## Homeland Security Region 8

Homeland Security Region 8 includes **Yakima, Klickitat, Benton, Franklin** and **Walla Walla Counties**. Each of the counties is home to a WSU County Extension office. In addition there are Learning Centers located in **Yakima, Klickitat, and Walla Walla Counties** as well as the WSU Tri-Cities branch campus and a Research and Extension Center located at Prosser in **Benton County**.

<b>Region 8 – Historical Hazardous Event Record</b>				
<b>Date</b>	<b>County</b>	<b>Injuries</b>	<b>Fatalities</b>	<b>Event</b>
10/1976 – 9/1977	Franklin	n/a	n/a	Drought
2001	Franklin	n/a	n/a	Drought
8/6/1991	Walla Walla	0	0	Hail
6/27/2001	Walla Walla	0	0	Hail
6/27/2001	Yakima	0	0	Hail
2/1956	Franklin	n/a	n/a	Flooding
3/1979	Franklin	n/a	n/a	Flooding
12/1976 – 2/1997	Franklin	n/a	n/a	Flooding
1/1949	Franklin	n/a	n/a	Severe Storm
1/1950	Franklin	n/a	n/a	Severe Storm
12/1996 – 1/1997	Franklin	n/a	n/a	Severe Storm

## Homeland Security Region 9

Homeland Security Region 9 encompasses **Ferry, Stevens, Pend Oreille, Lincoln, Spokane, Adams, Whitman, Garfield, Columbia** and **Asotin Counties**, essentially the eastern region of Washington State. Each of the counties is home to a WSU County Extension office. Additionally, the main WSU campus, as well as a Research and Extension Center, are located in **Whitman County**, a Learning Center is located in Stevens County.

<b>Region 9 – Historical Hazardous Event Record</b>				
<b>Date</b>	<b>County</b>	<b>Injuries</b>	<b>Fatalities</b>	<b>Event</b>
3/10/2005	Lewis	0	0	Drought
6/27/2001	Adams	0	0	Hail
6/15/1999	Garfield	0	0	Hail
7/16/2005	Pend Oreille	0	0	Hail
7/24/1991	Spokane	0	0	Hail
5/31/1997	Spokane	0	0	Hail
4/27/2000	Spokane	0	0	Hail
9/16/2003	Spokane	10	0	Hail
7/16/2005	Spokane	0	0	Hail
8/12/2005	Spokane	0	0	Hail
4/27/2001	Whitman	0	0	Hail
8/4/2004	Whitman	0	0	Hail
1/16/2000	Columbia	0	0	High Wind / Tornado
4/5/1972	Lincoln	1	0	High Wind / Tornado
5/31/1997	Lincoln	0	0	High Wind / Tornado
5/31/1997	Spokane	0	0	High Wind / Tornado
8/14/1980	Stevens	0	0	High Wind / Tornado
7/21/1997	Stevens	0	0	High Wind / Tornado
2001	Ferry	n/a	n/a	Wildland fire

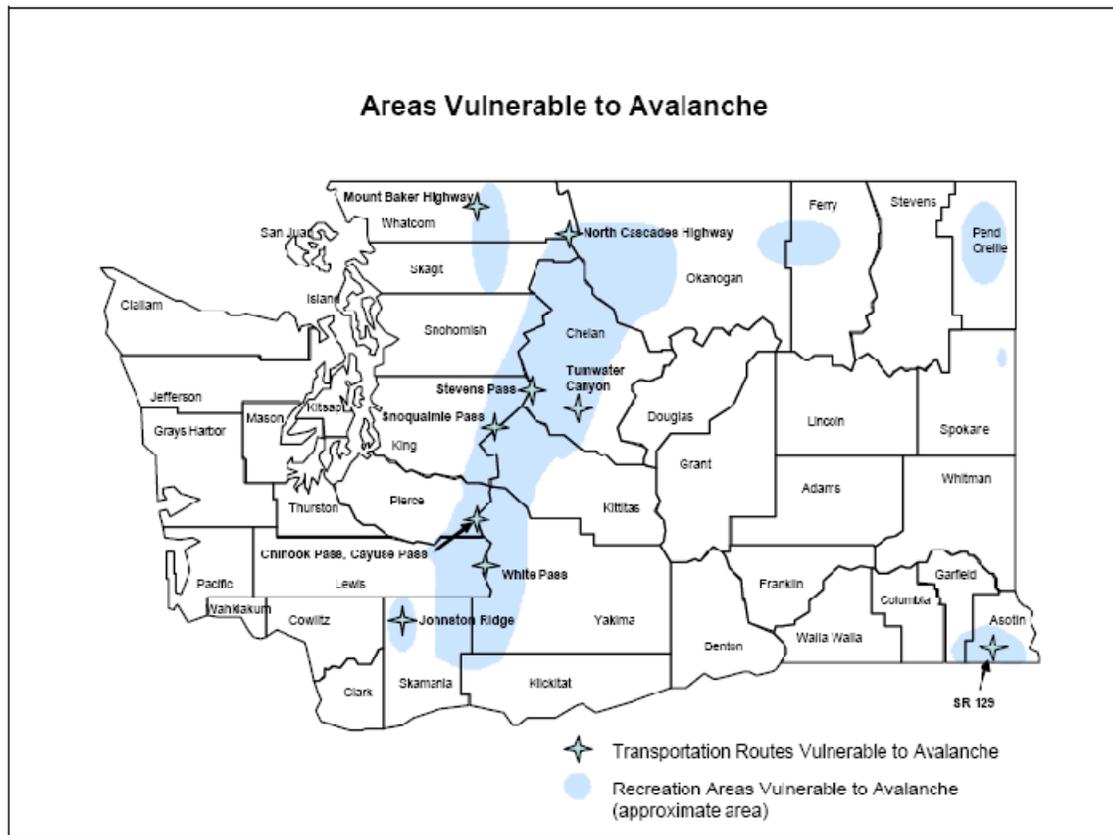
## Hazards in Washington State

### Avalanche

An avalanche occurs when a layer of snow loosens and slides down hill at high velocity. It is estimated that in the past century, avalanches have killed more than 190 people in Washington. One infamous example occurred in 1910, when enormous avalanches hit two trains trapped high on Stevens Pass, killing 96 people. Currently, it is estimated that avalanches kill 1 to 2 individuals each year in Washington State.

The following 13 counties are most vulnerable to avalanches:

- Region 1: Skagit County, Whatcom County;
- Region 3: Lewis County;
- Region 4: Skamania County;
- Region 7: Chelan County, Kittitas County, Okanogan County;
- Region 8: Yakima County;
- Region 9: Asotin County, Ferry County, Garfield County, Stevens County, Pend Oreille County



Map 3.7.2a

Source: Washington Military Department – Emergency Management Division 2004.

## Drought

Drought is defined as a prolonged period of dryness severe enough to reduce soil moisture, water and snow levels below the minimums necessary for sustaining plant and animal, environmental, and economic systems. Droughts are a natural part of the climate cycle. In the past century, the state of Washington has experienced a number of significant drought episodes, including several that lasted for more than a single season; 1928 to 1932, 1992 to 1994, and 1996 to 1997.

Unlike most states, Washington has a statutory definition of drought (Revised Code of Washington Chapter 43.83B.400). According to state law, an area is in a drought condition when: *The water supply for the area is below 75 percent of normal and, water uses and users in the area will likely incur undue hardships because of the water shortage.*

The National Drought Mitigation Center at the University of Nebraska-Lincoln uses three categories to describe likely drought impacts:

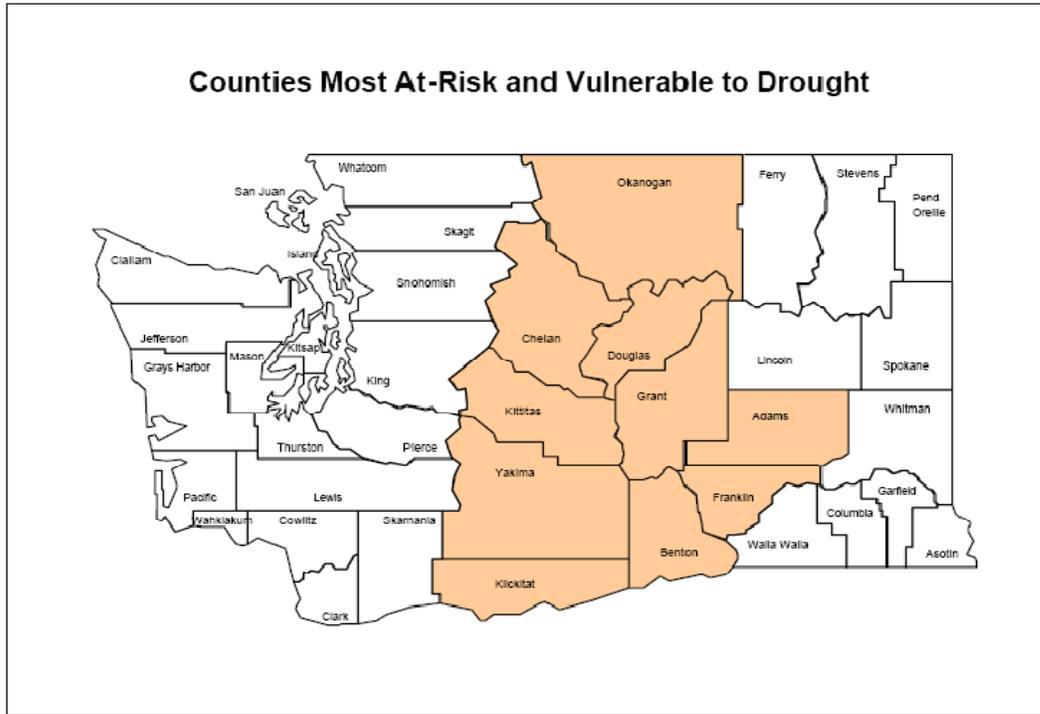
- Agricultural – Drought threatens crops that rely on natural precipitation;
- Water supply – Drought threatens supplies of water for irrigated crops and for communities; and
- Fire hazard – Drought increases the threat of wildfires from dry conditions in forests and rangelands.

10 counties are most vulnerable to prolonged drought activity. The central geographic region of the state is the area most susceptible to prolonged drought occurrences:

Region 7: Chelan County, Douglas County, Grant County, Kittitas County, Okanogan County;

Region 8: Benton County, Franklin County, Klickitat County, Yakima County; and

Region 9: Adam County.



**Map 3.7.3a**

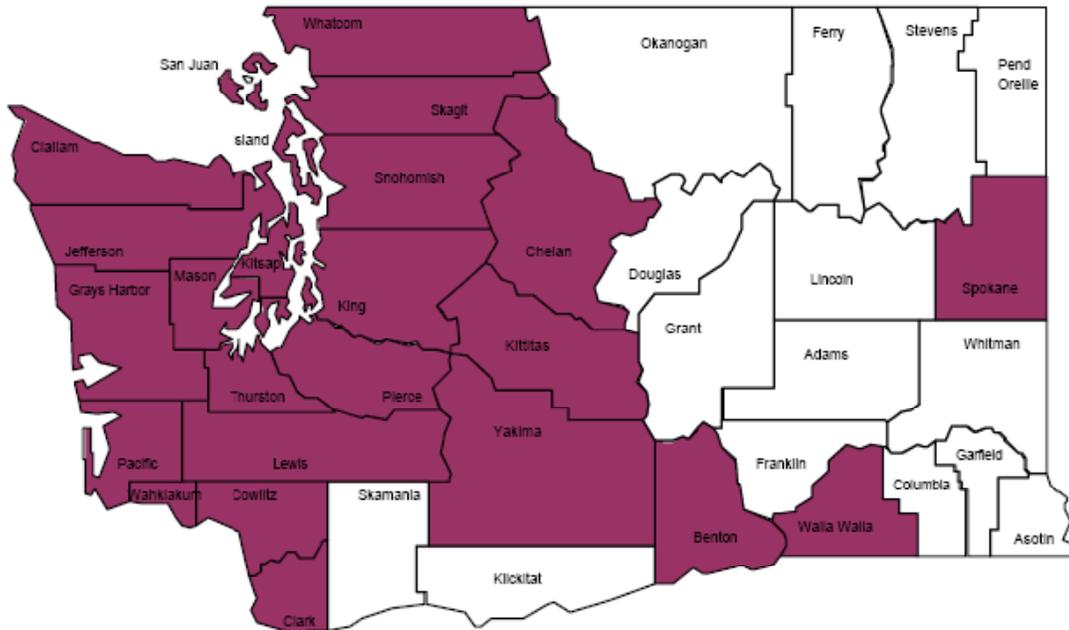
*Source: Washington Military Department – Emergency Management Division 2004.*

## Earthquake

An earthquake is the sudden release of stored energy by an abrupt movement of the earth, usually along a fracture within the earth, called a fault. Occasionally large earthquakes produce very strong ground-shaking. It is this strong shaking and its consequences – ground failure, landslides, liquefaction – that damages buildings and structures, upsetting the regional economy.

Washington, especially the Puget Sound basin, has a history of frequent earthquakes. More than 1,000 earthquakes occur in the state each year. Annually, a dozen or more are strong enough that people feel the ground shaking; occasionally, earthquakes cause damage. Large earthquakes in 1946 (magnitude 5.8), 1949 (magnitude 7.1), and 1965 (magnitude 6.5) have killed 15 people and caused more than \$200 million (1984 dollars) in damage throughout several counties. The state has experienced at least 20 damaging events in the last 125 years. The Nisqually quake of 2001 is the most recent example of the type of impact which might occur from an earthquake in this Cascadia Zone.

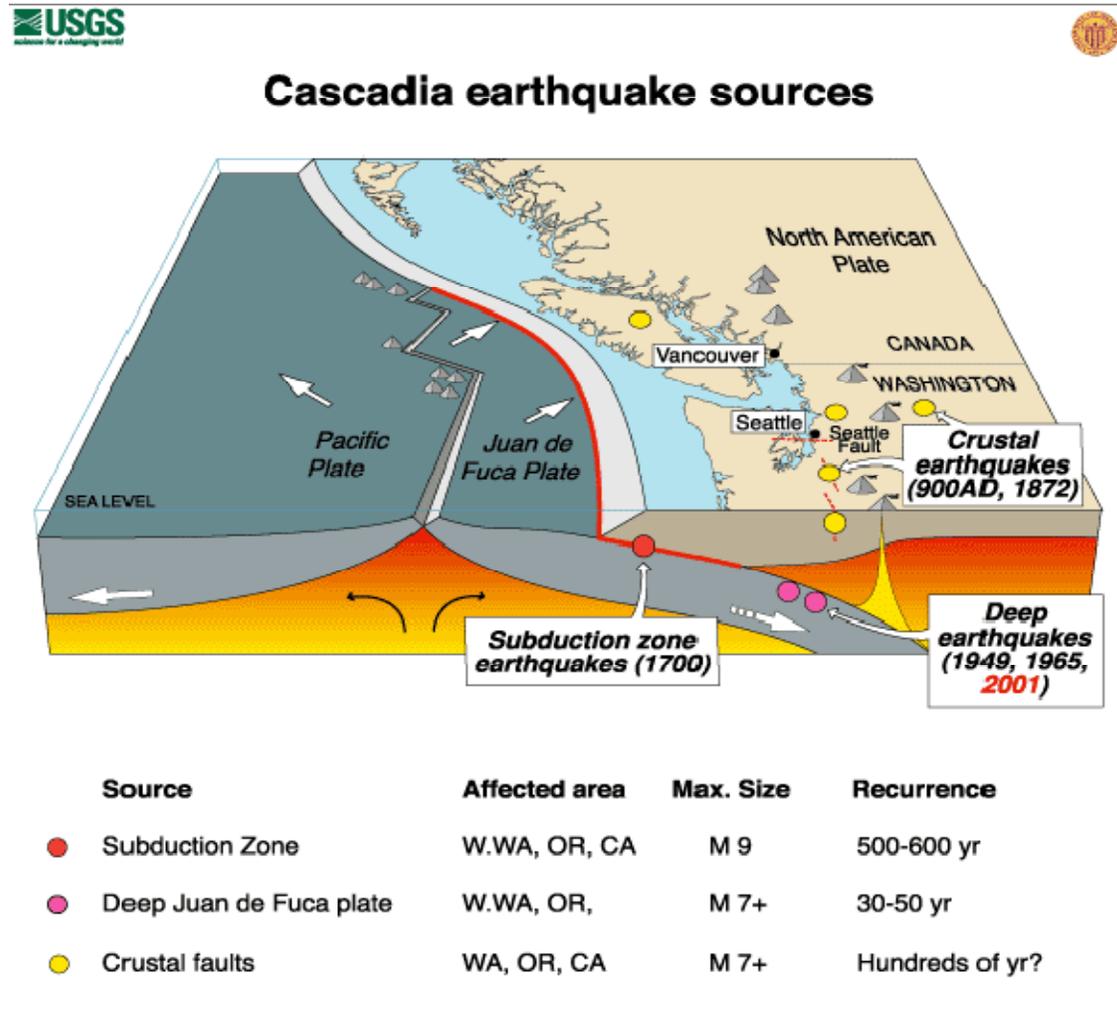
### Counties Most At-Risk and Vulnerable to Earthquake



Map 3.7.4a

Source: Washington Military Department – Emergency Management Division.

Figure 3.7.4b (below) provides a graphical representation of major fault zones off the coast of Washington, as well as the major subduction zone in the Pacific Ocean that is a catalyst to major earthquake activity, potentially affecting many WSU locations.



Map 3.7.4b

Source: United States Geological Survey 2002.

## **Flooding**

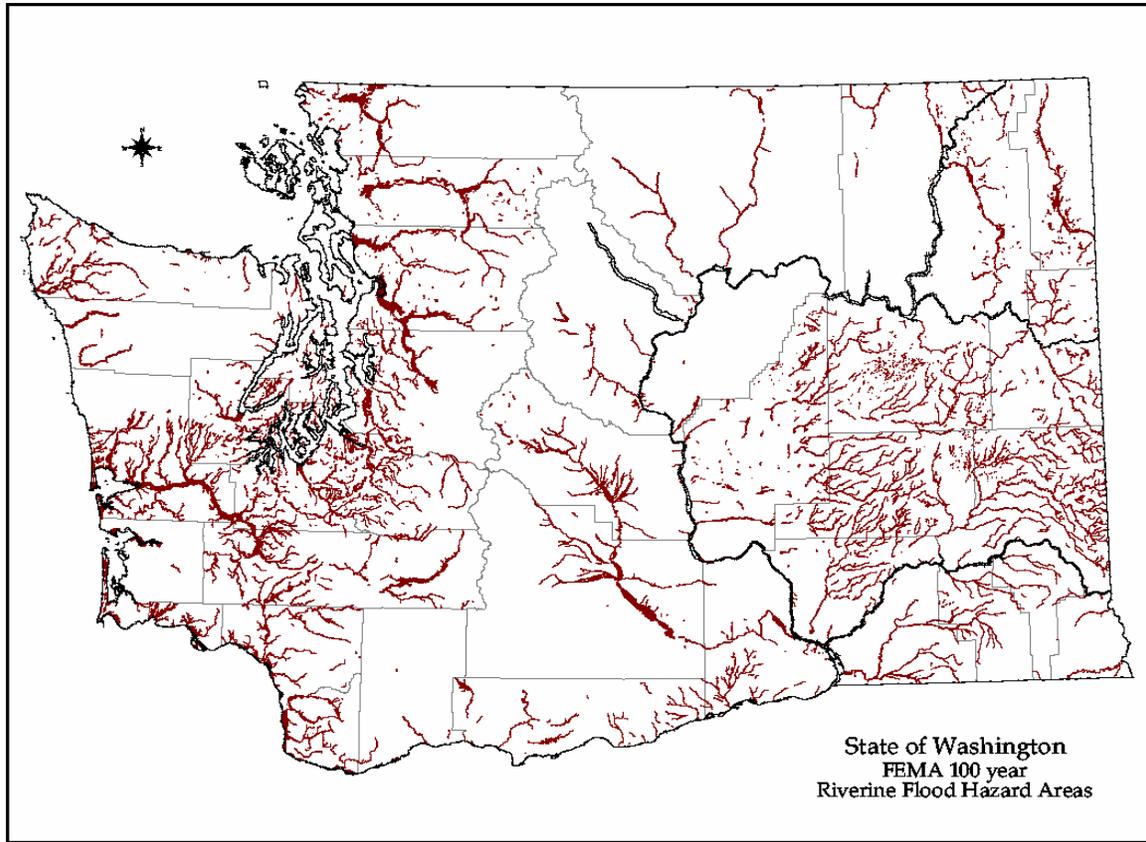
Floods cause loss of life and damage to structures, crops, land, flood control structures, roads, and utilities. Floods also cause erosion and landslides, and can transport debris and toxic products that cause secondary damage. Flood damage in Washington State exceeds damage by all other natural hazards; hence it could potentially be very costly to WSU locations statewide.

There have been 28 Presidential Major Disaster Declarations for floods in Washington State, from 1956 through October of 2003. Every county has received a at least one Presidential Disaster Declaration for flooding since 1970. While not every flood creates enough damage to merit such a declaration, many which do not qualify for formal declaration are nonetheless sufficiently severe to warrant intervention by local, state or federal authorities. December 2007 saw yet another series of severe storms and accompanying flooding hit the counties in Homeland Security Regions 3 and 4.

The magnitude of most floods in Washington depends upon particular combinations of intensity and duration of rainfall, pre-existing soil conditions, area of a basin, elevation of the rain or snow level, and amount of snow-pack. Man-made changes to a basin also can affect the size of floods.

Although floods can happen at any time during the year, there are typical seasonal patterns for flooding in Washington State, based on the variety of natural processes that cause floods:

- Heavy rainfall on wet or frozen ground, before a snow pack has accumulated, typically causing fall and early winter floods;
- Rainfall combined with melting of the low-elevation snowpack, typically causing winter and early spring floods;
- Late spring floods in Eastern Washington primarily resulting from melting of the snowpack; and
- Thunderstorms typically causing flash floods during the summer in Eastern Washington. On rare occasions, thunderstorms embedded in winter-like rainstorms cause flash floods in Western Washington.



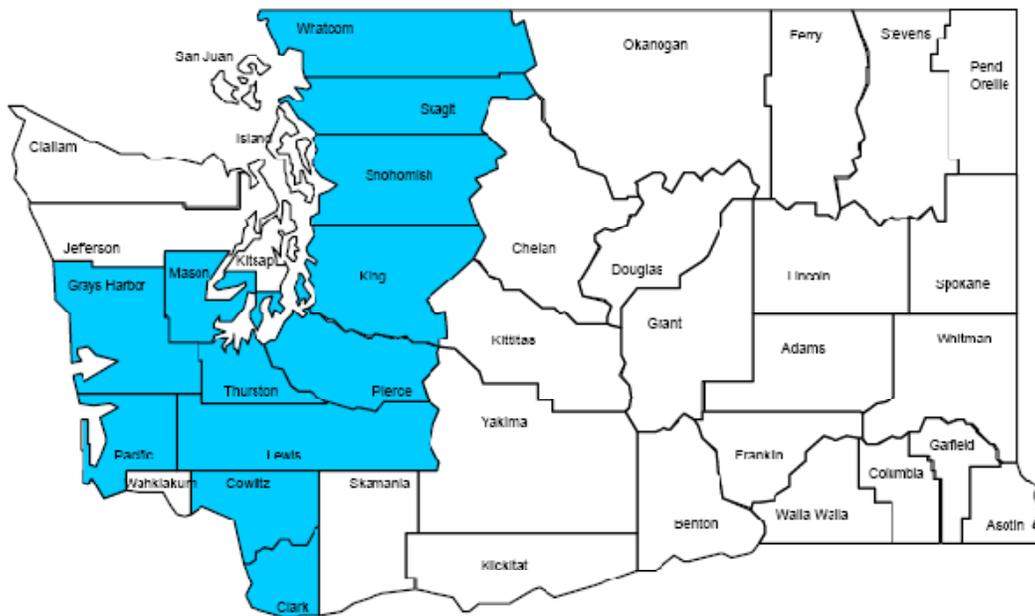
**Map 3.7.5a**

*Source: Department of Interior – United States Geological Survey 1998.*

Twelve 12 of the 39 counties are vulnerable to flooding occurrences:

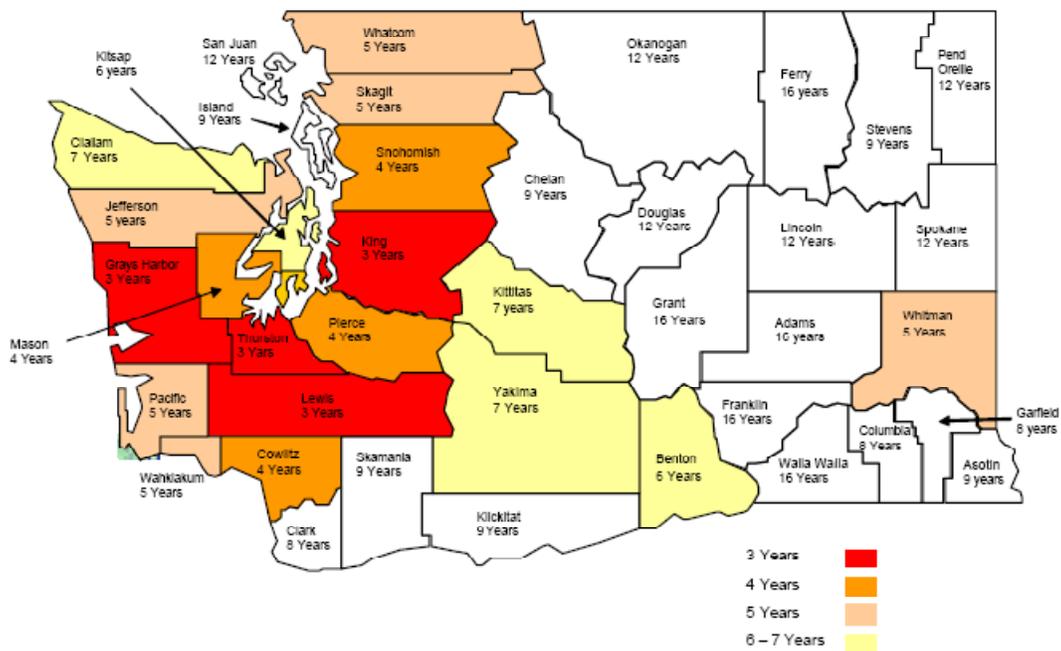
- Region 1: Skagit County, Snohomish County, Whatcom County;
- Region 3: Gray Harbor County, Lewis County, Mason County,  
Pacific  
County, Thurston County;
- Region 4: Clark County, Cowlitz County;
- Region 5: Pierce County; and
- Region 6: King County.

## Counties Most At-Risk and Vulnerable to Flood



**Map 3.7.5b:** A geographical visual description of the WSU locations that are susceptible to flooding  
*Source: Washington Military Department – Emergency Management Division 2004.*

Map 3.7.5c (below) shows the frequency of major flooding occurrences, from 1956 to the present year, which have affected counties containing WSU locations.



**Map 3.7.5c**

*Source: Washington Military Department – Emergency Management Division 2004.*

## Landslide

Landslide is the movement of rock, soil and debris down a hillside or slope. Landslides take lives; destroy homes, businesses, and public buildings; interrupt transportation; undermine bridges; derail train cars; cover marine habitat; and, damage utilities.

Landslide includes a wide range of ground movement, such as falling rocks, deep failure of slopes, and shallow debris flows. Ground failures that result in landslides occur when gravity overcomes the strength of a slope. While gravity is the primary reason for a landslide, there can be other contributing factors, including:

- Saturation, Erosion; Stress from earthquake, or Volcanic eruptions
- Topography of a slope – its shape, size, degree of slope and drainage;
- Excess weight: from accumulation of rain or snow, from stockpiling of rock or ore, from waste piles, or from man-made structures; and
- Human action, such as construction, logging or road building that disturbs soils and slopes.

30 of the 39 Washington counties are vulnerable to landslide activity. The following jurisdictions have the greatest vulnerability to landslides, based on descriptions of events and damages described above, as well as information from landslide experts from the Washington Department of Natural Resources and the U.S. Geologic Survey.

Region 1: Island County, San Juan County, Skagit County, Snohomish County, Whatcom County;

Region 2: Clallam County, Jefferson County, Kitsap County;

Region 3: Gray Harbor County, Lewis County, Mason County, Pacific County, Thurston County;

Region 4: Clark County, Cowlitz County, Skamania County;

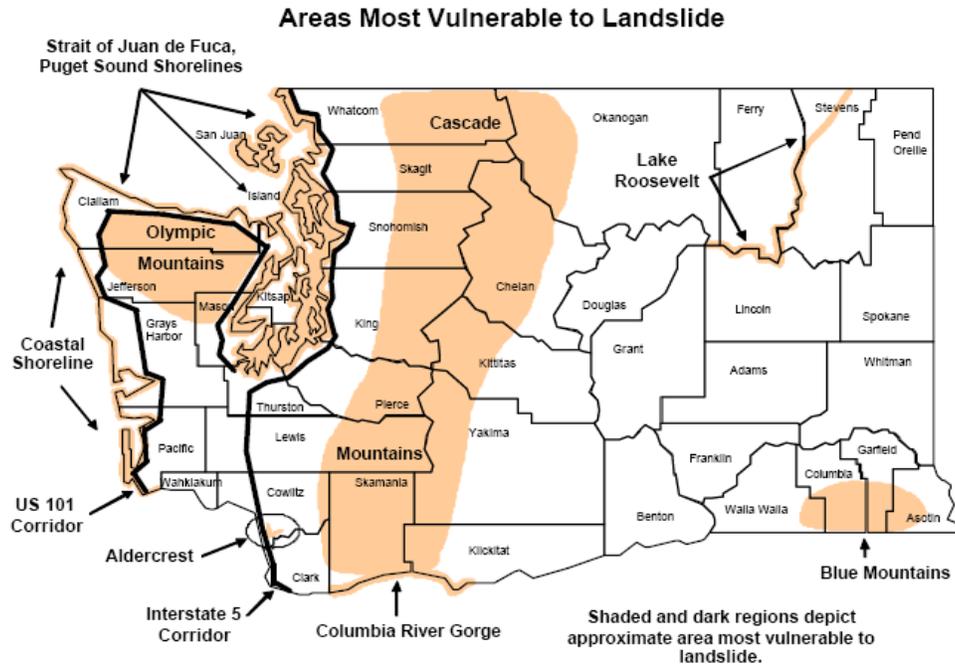
Region 5: Pierce County;

Region 6: King County;

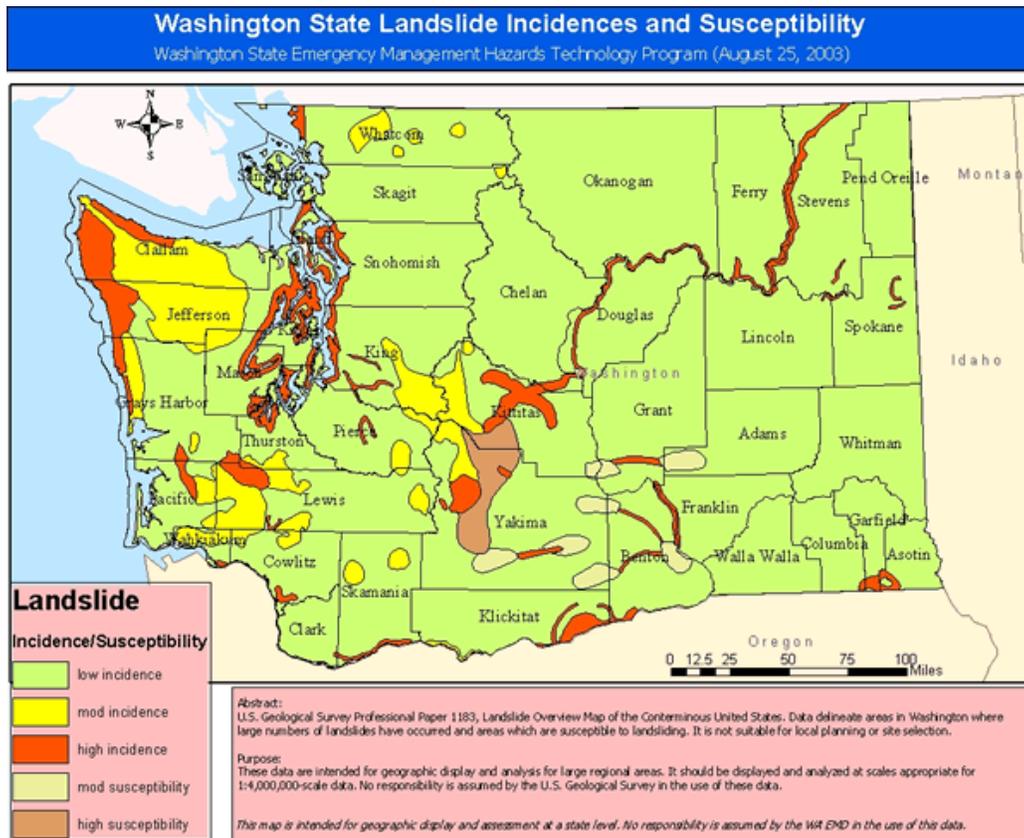
Region 7: Chelan County, Kittitas County, Okanogan County;

Region 8: Klickitat County, Walla Walla County, Yakima County; and

Region 9: Asotin County, Columbia County, Ferry County, Garfield County, Lincoln County, Stevens County.



**Map 3.7.6a:** An extensive number of WSU locations on the western side of the state are vulnerable to landslide activity. *Source: Washington Military Department – Emergency Management Division 2004.*



**Map 3.7.6b**

*Source: Washington State Emergency Management Hazards technology Program 2003.*

## Wild Fire

The season for wildland fire in Washington State usually begins in early May and generally ends in late September, although fires have occurred in every month of the year. The length of the fire season can be expanded due to drought, snowpack, and local weather conditions. The early and late occurrence of the fire season is generally linked to human activities, although lightning causes most of the fires during the peak period of July to early September.

Loss caused by a wildland fire can include the destruction of timber, damage to wildlife habitat, scenic vistas, and watersheds; and increased vulnerability to flooding due to the destruction of watersheds. Consequently, wildland fire can affect an extensive number of WSU facilities and personnel located across the state associated with research and educational development.

The Washington agencies respond to more than 1,000 wildland fires per year across the state and about 70 percent occur in Eastern Washington, making WSU facilities and personnel in that area particularly vulnerable. Wildland fires can spread to more than 100,000 acres and larger, lasting up to several months depending on a variety of factors.

34 counties within the 9 regions are susceptible to severe wildfire occurrences:

Region 1: San Juan County, Skagit County, Snohomish County  
Whatcom County;

Region 2: Clallam County, Jefferson County, Kitsap County;

Region 3: Lewis County, Mason County, Pacific County  
Thurston County;

Region 4: Clark County, Cowlitz County, Skamania County,  
Wahkiakum County;

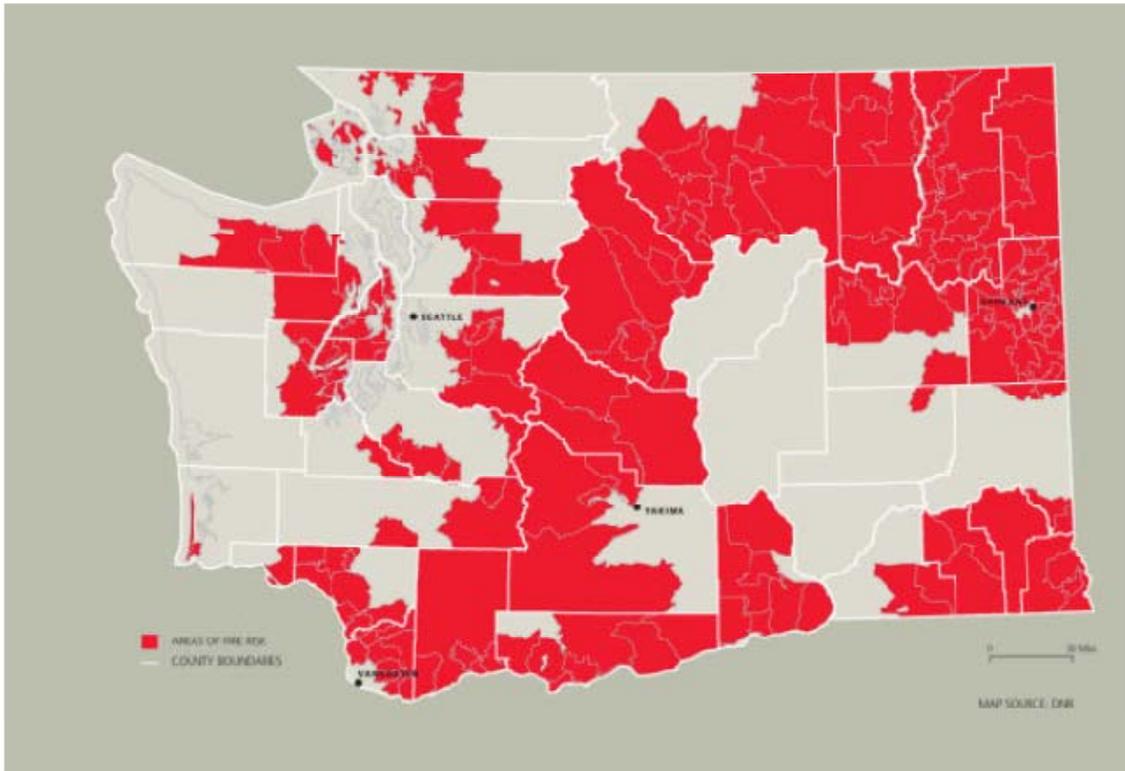
Region 5: Pierce County;

Region 6: King County;

Region 7: Chelan County, Kittitas County; Okanogan County,

Region 8: Benton County, Klickitat County, Walla Walla  
County, Yakima County; and

Region 9: Adams County, Asotin County, Columbia County,  
Ferry County, Garfield County, Lincoln County, Pend Oreille  
County, Spokane County; Stevens County, Whitman County.



## Severe Storms

Washington State University statewide is vulnerable to severe weather. A severe storm is an atmospheric disturbance that results in one or more of the following phenomena: strong winds and large hail, thunderstorms, tornados, rain, snow, and/or other mixed precipitation. Loss of utilities such as electrical power and other infrastructure, including transportation, are usually impacted by a severe storm. Consequently, many of these interruptions in association with extreme weather can create a domino effect. Generally, severe storms move into the state of Washington from the Pacific Ocean and usually advance eastward.

Based on the National Weather Service definitions, the following are considered at the top of the list for major severe storms affecting Washington.

## High Winds

Conditions of high winds are associated with storms having perpetual winds between 40 and 58 mph or greater, lasting in excess of one hour; not caused directly by thunderstorms.

The following counties are most vulnerable to *high wind* incidents:

Region 1: Island County, San Juan County, Skagit County, Snohomish County, Whatcom County;

Region 2: Clallam County; Jefferson County, Kitsap County;

Region 3: Gray Harbor County, Lewis County, Mason County, Pacific County, Thurston County;

Region 4: Clark County, Cowlitz County, Skamania County;

Region 5: Pierce County;

Region 6: King County;

Region 7: Kittitas County;

Region 8: Benton County, Walla Walla County; and

Region 9: Columbia County.



	Vulnerable to Meteorological Conditions	Recurrence Rate (>100% – At least 1 occurrence per year)
Adams	YES	70%
Asotin	NO	70%
Benton	YES	140%
Chelan	YES, East Slopes of Cascades	63%
Clallam	YES, Pacific Coast	118%
Clark	YES	130%
Columbia	YES	120%
Cowlitz	YES	113%
Douglas	NO	80%
Ferry	YES, Higher Elevations	65%
Franklin	NO	80%
Garfield	YES	70%
Grant	YES	93%
Grays Harbor	YES	170%
Island	YES	148%
Jefferson	YES, Pacific Coast	125%
King	YES	133%
Kitsap	YES	125%
Kittitas	YES	110%
Klickitat	YES	73%
Lewis	YES	123%
Lincoln	YES	75%
Mason	YES	165%
Okanogan	YES	83%
Pacific	YES, Pacific Coast	213%
Pend Oreille	YES	73%
Pierce	YES	165%
San Juan	YES, Western Half	173%
Skagit	YES	188%
Skamania	YES	95%
Snohomish	YES, Western Half	175%
Spokane	NO	105%
Stevens	YES, Higher Elevations	83%
Thurston	YES	175%
Wahkiakum	YES	118%
Walla Walla	YES	90%
Whatcom	YES, Western Half	190%
Whitman	YES	93%
Yakima	YES	103%

Source: Washington State Hazardous Mitigation Plan 2004

## Severe Thunderstorm

A severe thunderstorm is a storm that produces winds of 58 mph or greater or three-quarter inch or larger hail.

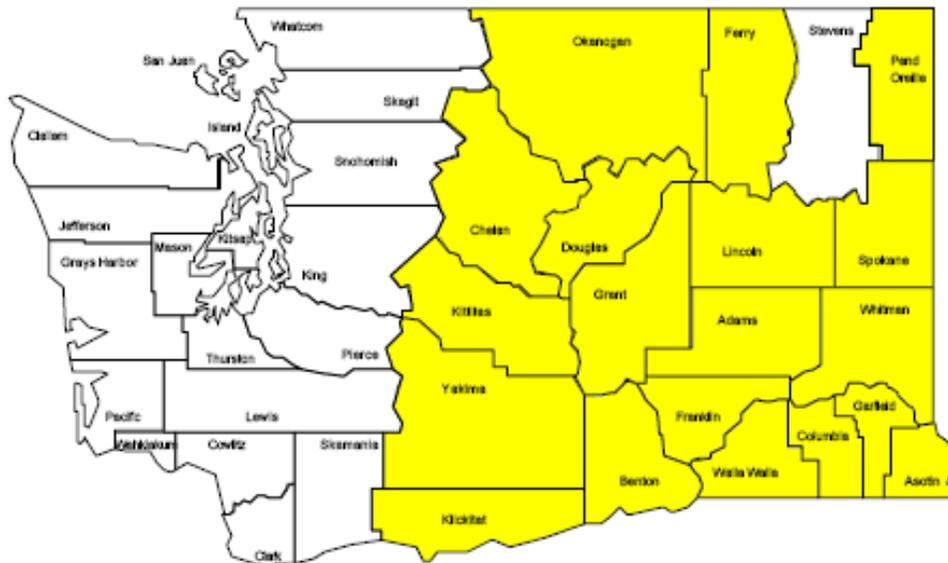
The following counties are most vulnerable to *severe thunderstorm* occurrences:

Region 7: Chelan County, Douglas County, Grant County Kittitas County, Okanogan County;

Region 8: Benton County, Franklin County, Klickitat County, Walla Walla County Yakima County; and

Region 9: Adams County, Asotin County, Columbia County, Ferry County, Garfield County, Lincoln County, Pend Oreille County, Spokane County, Whitman County.

**Counties Most Vulnerable to Severe Thunderstorm**



**Map 3.7.10a**

*Source: Washington Military Department – Emergency Management Division 2004.*

**Table 3.7.10b: Counties/WSU locations vulnerable to severe thunder storms (shaded = most vulnerable).**

*Source: Washington State Hazardous Mitigation Plan 2004*

## Winter Storm

A Winter Storm is a storm with significant snowfall, ice, and/or freezing rain. Heavy snowfall is defined as 4 inches or more in a 12-hour period, or 6 or more inches in a 24-hour period in non-mountainous areas; 12 inches or more in a 12-hour period or 18 inches or more in a 24-hour period in mountainous areas.

The following counties are most vulnerable to *winter storm* activity:

Region 1: Skagit County, Snohomish County;

Region 3: Mason County, Thurston County;

Region 4: Clark County, Cowlitz County, Skamania County;

Region 5: Pierce County;

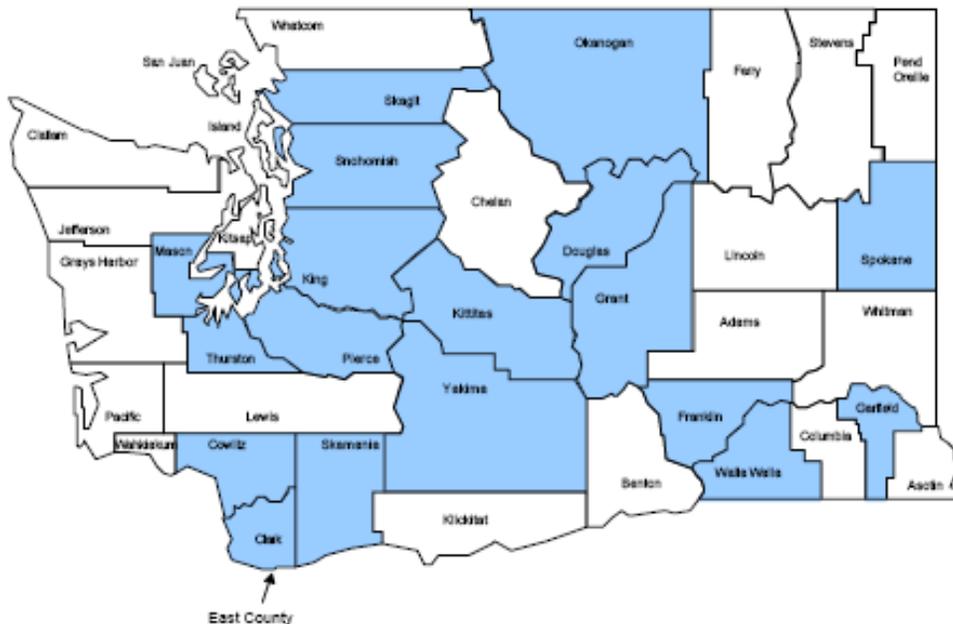
Region 6: King County;

Region 7: Chelan County, Douglas County, Grant County, Kittitas County; Okanogan County;

Region 8: Franklin County, Walla Walla County, Yakima County; and

Region 9: Garfield County, Spokane County.

**Counties Most Vulnerable to Winter Storm**



**Map 3.7.11a**

Source: Washington Military Department – Emergency Management Division 2004.

## Blizzards

A blizzard is a storm with considerable falling and/or blowing snow combined with sustained winds or frequent gusts of 35 mph or greater that frequently reduces visibility to less than one-quarter mile

The following counties are most vulnerable to *blizzard* incidents:

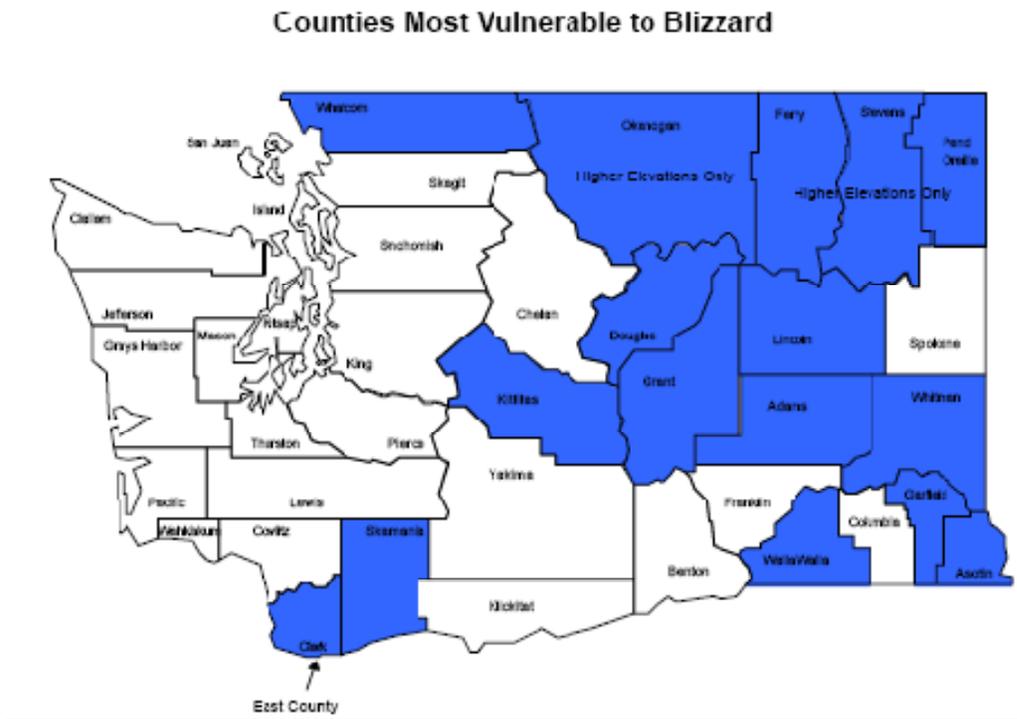
Region 1: Whatcom County;

Region 4: Clark County, Skamania County;

Region 7: Douglas County, Grant County, Kittitas County, Okanogan County;

Region 8: Walla Walla County; and

Region 9: Adams County, Asotin County, Ferry County, Garfield County, Lincoln County, Pend Oreille County, Stevens County, Whitman County.



**Map 3.7.12a**

*Source: Washington Military Department – Emergency Management Division 2004.*

**Table 3.7.12b: Counties/WSU locations vulnerable to blizzards (shaded counties = most vulnerable).**

*Source: Washington State Hazardous Mitigation Plan 2004*



## Coastal Flooding

Flooding in coastal areas may be caused by storm surges, astronomical high tides, or a combination of both.

The following counties are vulnerable to *coastal flooding* incidents:

Region 1: Island County, San Juan County, Skagit County, Snohomish County, Whatcom County;

Region 2: Clallam County; Jefferson County, Kitsap County;

Region 3: Gray Harbor County, Pacific County, Thurston County;

Region 5: Pierce County; and

Region 6: King County.



**Map 3.7.14a**

Source: Washington Military Department – Emergency Management Division 2004.

**Table 3.7.14b:** Counties/WSU locations vulnerable to coastal flooding (shaded counties = most vulnerable).

Source: Washington State Hazardous Mitigation Plan 2004

## Tornado

The tornado is defined as violent rotating columns of air that are in contact with the ground, and usually develop from severe thunderstorms. The WSU locations in counties with severe thunderstorms are most vulnerable to experiencing a tornado.

The following counties are vulnerable to a *tornado* occurrence.

Region 1: Snohomish County;

Region 3: Gray Harbor County, Pacific County;

Region 4: Clark County, Cowlitz County;

Region 5: Pierce County;

Region 6: King County;

Region 7: Grant County, Okanogan County;

Region 8: Benton County, Franklin County, Klickitat County, Walla Walla County, Yakima County; and

Region 9: Adams County, Asotin County, Columbia County, Garfield County, Lincoln County, Pend Oreille County, Spokane County, Stevens County, Whitman County.

Counties Most Vulnerable to Tornado



Map 3.7.15a

Source: Washington Military Department – Emergency Management Division 2004.

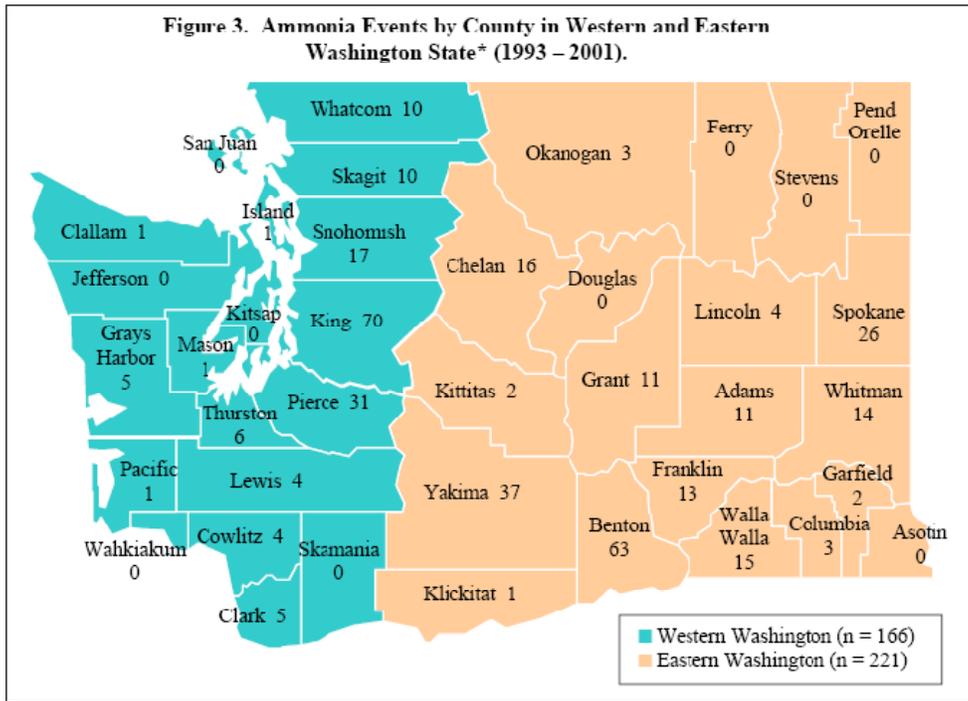
Table 3.7.15b: Counties/WSU locations vulnerable to tornadoes (shaded = most vulnerable).

Source: Washington State Hazardous Mitigation Plan 2004

### Hazardous Materials

Hazardous materials are those, which, because of their chemical, physical, or biological nature, pose a potential risk to life, health, or property when released. A release may occur by spilling, leaking, emitting toxic vapors, or any other process that enables the material to escape its container, enter the environment, and create a potential hazard. The hazard can be explosive, flammable, combustible, corrosive, reactive, poisonous, toxic, biological agent, and radioactive.

The Washington State Department of Ecology reported 3,988 confirmed hazardous material spills in 1999, in counties where WSU personnel and facilities are located. The continuing increase in responses to clandestine methamphetamine labs is of particular concern. Hazardous materials include chemical hazards found in every county across Washington State.



**Map 3.7.25a** Source: Hazardous Substances Emergency Events Surveillance Program Office of Environmental Health and Safety Washington State Department of Health.