

Geologic Hazards Resources for Washington State

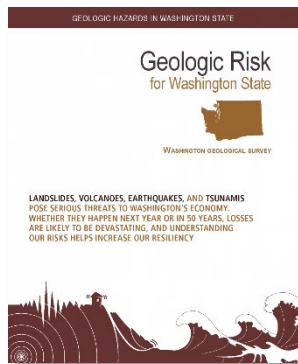
2021



WASHINGTON STATE DEPT OF
NATURAL RESOURCES
WASHINGTON
GEOLOGICAL SURVEY

General Resources

Geologic Risk Booklet



RiskMAP



Geologic Information Portal



Bare Earth Story Map



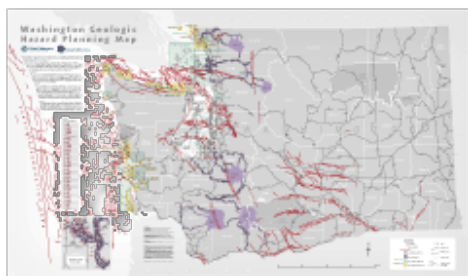
Geologic Information Portal Fact Sheet



GIS Data Webpage

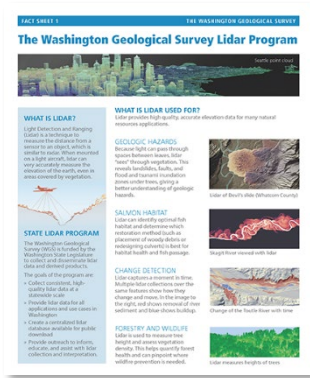


Washington Geologic Hazard Planning Map



Lidar Resources

Lidar Fact Sheet



Washington Lidar Portal



Washington State Lidar Plan

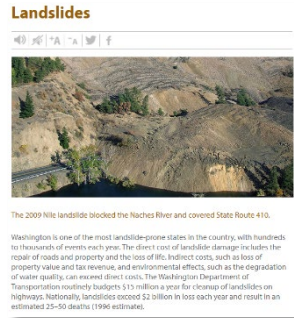


Landslide Hazard Resources

Landslide Inventory Publications



WGS Landslides Webpage



Wildfire-Associated Debris Flows



WA Dept. of Ecology Puget Sound Landslide Webpage



USGS Landslide Hazards Webpage



USDA Soils Data



Wildfire Debris Flows Fact Sheet

FLOODS AFTER FIRES

WHAT YOU SHOULD KNOW ABOUT ALLUVIAL FANS AND WILDFIRES

If you live or work on an alluvial fan you could be at risk from potentially dangerous debris flows and floods, especially if you are near a recent wildfire burn area.

What is an alluvial fan?
Alluvial fans are broad, gently sloping, fan-shaped outcrops of sediment and debris deposited where a stream emerges from steep, high-elevation terrain. Alluvial fans are made of sand and silt, gravel, and boulders. They are often found in mountainous areas, and they can be very dangerous because they can move quickly and without warning.

Wildfires and flooding
Wildfires can destroy the vegetation that holds soil in place on steep slopes. The lack of vegetation also increases the risk of landslides, which can trigger debris flows and floods.

What makes alluvial fans so dangerous?
Alluvial fans are always changing and they have several active and inactive channels. The channels that are active can move quickly and without warning. They can also be very deep and wide, and they can be very dangerous.

Washington Department of Natural Resources | Washington Geological Survey | dnr.wa.gov/geology

What are Landslides and How Do They Occur?

FACT SHEET: WHAT ARE LANDSLIDES? WASHINGTON GEOLOGICAL SURVEY

What Are Landslides And How Do They Occur?

THE ROLE OF WATER
Water is the most common trigger for landslides. It can saturate the soil, making it heavier and more likely to slide. Water can also erode the soil, creating a path for a landslide to follow.

THE ROLE OF VEGETATION
Vegetation helps hold soil in place. When trees and plants die, the soil becomes more unstable and more likely to slide.

THE ROLE OF SEISMICITY
Earthquakes can trigger landslides by shaking the ground and making it more unstable.

THE ROLE OF HUMAN ACTIVITY
Human activities like construction, mining, and deforestation can increase the risk of landslides.

SOME HISTORIC LANDSLIDES IN WASHINGTON STATE

Location	Date	Notes
Rocky Mountain	1852	Large landslide in the Cascade Range.
Seattle	1892	Major landslide in the city center.
Alaska	1964	Large landslide in the state capital.
Seattle	1992	Major landslide in the city center.
Alaska	2002	Large landslide in the state capital.

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Landslide Hazards in Washington State

FACT SHEET: LANDSLIDE HAZARDS WASHINGTON GEOLOGICAL SURVEY

Landslide Hazards in Washington State

WARNING SIGNS OF AN IMPENDING LANDSLIDE

- Cracks in the ground or in buildings.
- Changes in the shape of the ground.
- Changes in the sound of water in streams or rivers.
- Changes in the behavior of trees or plants.
- Changes in the behavior of animals.

IF YOU NOTICE THESE SIGNS OF IMPENDING A LANDSLIDE IN PROGRESS

Evacuate immediately. Do not attempt to drive or walk through a landslide. Call 911 for help.

WARNING SIGNS OF A POTENTIAL LANDSLIDE

Cracks in the ground or in buildings.

Changes in the shape of the ground.

Changes in the sound of water in streams or rivers.

Changes in the behavior of trees or plants.

Changes in the behavior of animals.

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Homeowners Guide to Landslides

Protect Your Home and Property

A Homeowner's Guide to Landslides
for Washington and Oregon

Washington Geological Survey
Oregon Department of Geology and Mineral Industries

LANDSLIDES ARE ONE OF THE MOST COMMON AND DEVASTATING NATURAL HAZARDS IN THE PACIFIC NORTHWEST. THE DAMAGE THEY CAUSE IS ALMOST NEVER COVERED BY INSURANCE.

Oregon Land Use Guide

PREPARING FOR LANDSLIDE HAZARDS
A LAND USE GUIDE FOR OREGON COMMUNITIES

October 2016

Seismic Hazards Resources

WGS Earthquakes & Faults Webpage

Earthquakes and Faults

This map shows areas of seismic risk from high (red) to low (gray-green). The map is from a 2007 report (click here to download) on seismic design categories in Washington. The map also shows potentially active faults from a separate 2014 report (click here to download).

Earthquakes occur nearly every day in Washington. Most are too small to be felt or cause damage. Large earthquakes are less common but can cause significant damage to the things we count on in everyday life, such as buildings, roads, bridges, dams, and utilities.

Washington has the second highest risk in the U.S. of these large and damaging earthquakes because of its geologic setting. Read more below to learn about how and where earthquakes occur, what to do before, during, and after an earthquake, and what scientists are doing to learn more about them.

Faults & Earthquakes in Washington

Faults and Earthquakes in Washington State

This map shows the locations of faults and earthquakes in Washington State. It includes a legend for fault types and earthquake magnitudes. The map also includes a scale bar and a north arrow.

Homeowner's Guide to Earthquakes in Washington

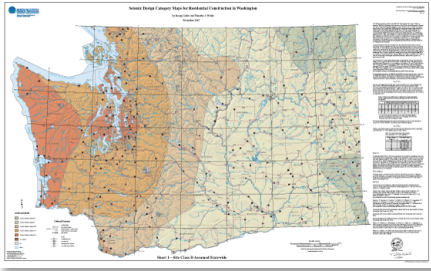
Protect Your Home and Property

A Homeowner's Guide to Earthquakes
in Washington State

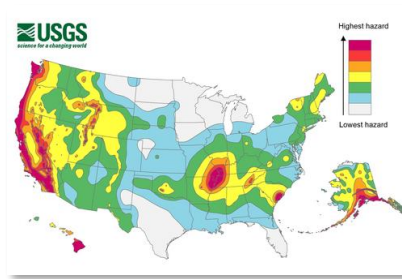
Washington Geological Survey

WASHINGTON STATE HAS ONE OF THE HIGHEST EARTHQUAKE RISKS IN THE COUNTRY. REPAIRING BEFORE A MAJOR EARTHQUAKE MAY SAVE YOUR LIFE AND MAY ALSO SAVE YOU MONEY.

WA Seismic Design Category Maps



U.S National Seismic Hazard Maps



Seismic Scenario Catalog



Tsunami Hazards Resources

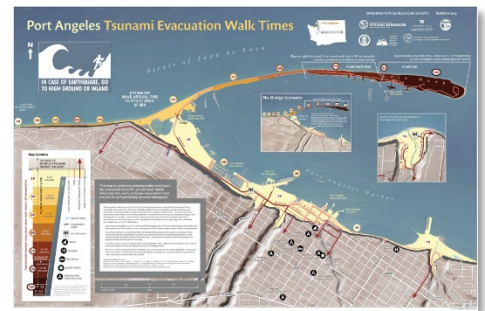
WGS Tsunami Webpage



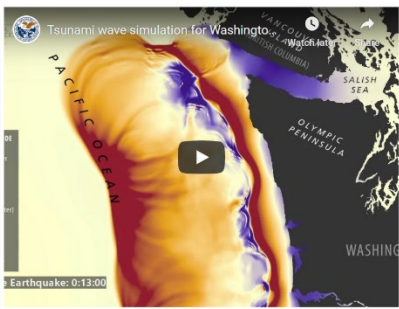
Tsunami Hazard Maps



Tsunami Evacuation Maps



Tsunami Simulations



Volcanic Hazards Resources

WGS Volcano Webpage

Volcanoes and Lahars



Washington has five major volcanoes: Mount Baker, Glacier Peak, Mount Rainier, Mount St. Helens, and Mount Adams. These volcanoes are part of the Cascade Range, a 1,200 mile line of volcanoes from British Columbia to northern California.

Many volcanoes in Washington are active and have had recent eruptions. Volcanoes do not erupt at regular intervals, so it is difficult to know exactly when or where the next eruption will happen.

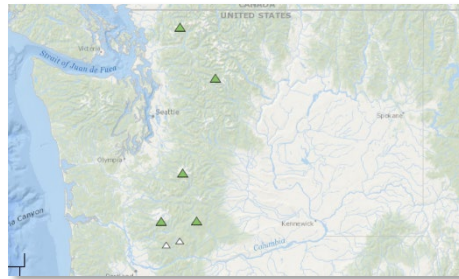
Many hazards come with living near volcanoes. Volcanic eruptions can send ash and volcanic debris into the air. Hot lava flows can melt snow or ice and cause dangerous mudflows and debris flows called lahars. Magma rock called lava can erupt and flow downhill, destroying everything in its path.



How dangerous are the Northwest's volcanoes? Video by Oregon Public Broadcasting.

Volcanoes are also beautiful mountains that many people visit each year for recreation. Volcanoes are the most visible result of plate tectonics and are one of the few places on Earth where molten rock can reach the surface. There are even old volcanoes on other planets, such as Venus and Mars.

USGS Cascades Volcano Observatory Webpage



Volcanic Hazards Brochure

