Washington Geologic Hazard Planning Map

WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGY AND EARTH RESOURCES

Washington Military Department
Emergency Management Division

Washington State is subject to numerous geologic hazards—hazards with the potential to affect thousands of people include earthquakes, tsunamis, and volcanic activity. Landslides (not shown) also significantly affect Washington's citizens on a local level.

This map was created in order to provide emergency managers, land-use planners, and other decision-makers with the ability to identify known geologic hazards in their regions. The map shows volcanic hazard areas (purple), mapped faults (red lines), tsunami hazard study areas (green), tsunami evacuation brochure areas (yellow), and tsunami and lahar warning sirens (red circles). It is a generalized, small-scale view, and is not meant to show site-specific information. For more detailed hazard data, please refer to the references given on the map.

Earthquakes

There are numerous faults in Washington that have the potential to produce damaging earthquakes. The largest fault is the Cascadia subduction zone—an M9.0 earthquake on this fault is predicted to cause damage of about $49 billion (Washington State Emergency Management Council—Seismic Safety Committee, 2012). Earthquakes directly cause damage by intense shaking and liquefaction, and create equally significant secondary effects, such as tsunamis and landslides.

Tsunamis

A Cascadia subduction zone earthquake will not only cause shaking damage, but will likely result in tsunamis that will affect coastal communities. In Japan, the 2011 Tohoku tsunami caused $300 billion in total damages and 15,891 fatalities. The Division of Geology and Earth Resources partners with other agencies to produce modeling of tsunami inundation in order to better prepare communities in planning for tsunamis along our coast. Planning for tsunamis includes producing tsunami evacuation brochures, installation of All Hazard Alert Broadcast (AHAB) tsunami sirens, and the design and construction of vertical tsunami evacuation structures in low-lying coastal communities.

Volcanoes

There are five large stratovolcanoes in Washington State, and all have the capability of producing large eruptions, volcanic mudflows, and ash fall. The 1980 eruption of Mount St Helens killed 57 people and cost at least $2.9 billion in 2016 dollars. Populous communities downstream of Mount Rainier are most vulnerable to volcanic mudflows (lahars)—lahar sirens are in place in Pierce County and evacuation planning there is ongoing.

AHAB Tsunami Sirens

RTU	Location
1	Ferndale
2	Tokeland
3	Clallam Bay
4	Port Townsend
5	Tahlolah
6	Ocean Shores
7	Ocean Shores
8	Ocean Shores
9	Ilwaco
10	Cape Disappointment State Park
11	Ocean Park
12	Ocean City
13	Port Angeles
14	Sequim
15	Hoquiam
16	Copalis Beach
17	Pacific Beach
18	Cohasset Beach
19	Ocean Park
20	Ocean Park
21	Ocean Park
22	Ocean Park
23	Bay Center
24	Seaview
25	Port Angeles
26	Westport
27	Grayland
28	Grayland
29	Long Beach
30	Long Beach
31	Port Townsend
32	Ocean Shores
33	Neah Bay
34	Westport
35	Aberdeen
36	La Push
37	Port Townsend
38	Bellingham
39	Bellingham
40	Cole Harbor
41	North Cove
42	Tatoosh Point
43	Moclips
44	Pt Roberts
45	Hoh Tribe
46	Aberdeen
47	Grayland
48	Sequim
49	Makah Tribe
50	Willapa Bay
51	Camp Murray
52	Grayland
53	Westport
54	Hoquiam
55	Long Beach
56	South Bend
57	Raymond
58	Port Angeles
59	La Push
*	Ocean Shores
*	Lummi Island
*	Ilwaco
*	Birch Bay
*	Aberdeen
*	Makah Tribe

References:

Tsunami evacuation brochures: download local tsunami evacuation brochures here: http://bit.ly/1lcwWnl

Tsunami inundation maps: download tsunami inundation publications here: http://bit.ly/1lcXPWL

Faults: *Inventory of Faults and Earthquakes in Washington State*, Washington Division of Geology and Earth Resources Open File Report 2014-05, located here: http://bit.ly/1lcLZLJ

Volcano hazard areas: available on the Washington Geologic Information Portal at http://bit.ly/1lcwWnl, or from the United States Geological Survey Cascade Volcanoes *Simplified Hazard Maps*: http://vsc.vdc.pro/1lcEdUq.

Lahar and AHAB tsunami sirens: written communication, Washington Emergency Management Division

Landslides (not shown on map): available on the Washington Geologic Information Portal at http://bit.ly/1lcwwXA

Disclaimer:

This information is meant only as a general guide to geologic hazards. It is not a substitute for a site-specific investigation to assess the level of risk for any project. It cannot be used to determine the presence or absence of geologic hazards beneath any specific locality. Such an determination requires a site-specific geotechnical investigation performed by a qualified practitioner.

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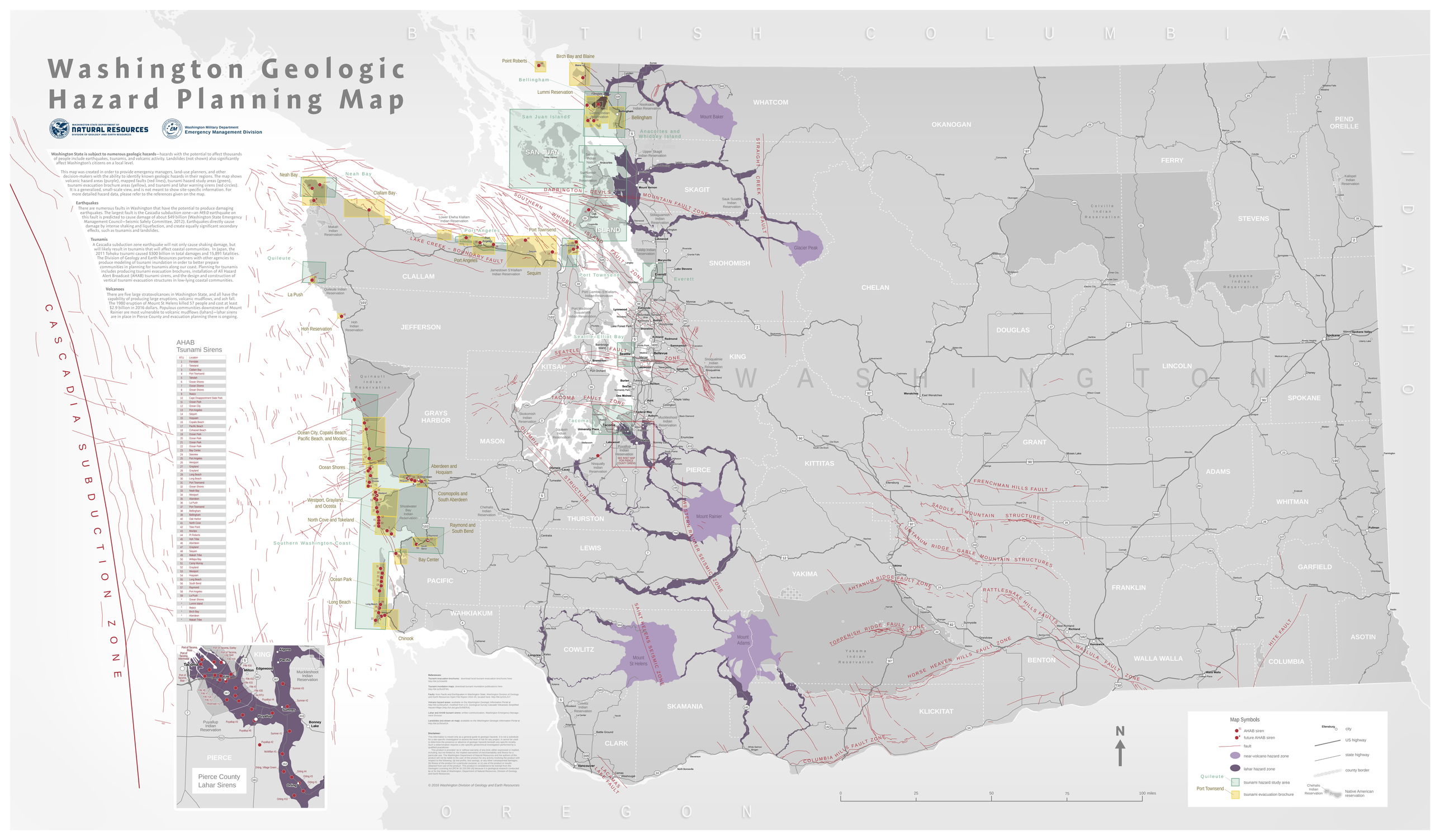
B R I T I S H C O L U M B I A
I D A H O
W A S H I N G T O N
O R E G O N
C A S C A D I A S U B D U C T I O N Z O N E
WHATCOM
OKANOGAN
FERRY
PEND OREILLE
STEVENS
SKAGIT
SNOHOMISH
CHELAN
DOUGLAS
LINCOLN
SPOKANE
KING
KITSAP
JEFFERSON
CLALLAM
GRAYS HARBOR
MASON
THURSTON
PIERCE
PACIFIC
LEWIS
WAHKIAKUM
COWLITZ
CLARK
SKAMANIA
KLICKITAT
YAKIMA
KITTITAS
GRANT
ADAMS
WHITMAN
GARFIELD
FRANKLIN
BENTON
WALLA WALLA
COLUMBIA
ASOTIN
Mount Baker
Glacier Peak
Mount Rainier
Mount St Helens
Mount Adams
SAN JUAN
San Juan Islands
Anacortes and Whidbey Island
Bellingham
Birch Bay and Blaine
Point Roberts
Lummi Reservation
Neah Bay
Clallam Bay
Port Angeles
Port Townsend
Sequim
Port Gamble S'Klallam Indian Reservation
Seattle–Elliot Bay
Ocean City, Copalis Beach, Pacific Beach, and Moclips
Ocean Shores
Westport, Grayland, and Ocosta
North Cove and Tokeland
Southern Washington Coast
Aberdeen and Hoquiam
Cosmopolis and South Aberdeen
Raymond and South Bend
Bay Center
Ocean Park
Long Beach
Chinook
Quileute
La Push
Hoh Reservation
Quinault Indian Reservation
Shoalwater Bay Indian Reservation
Chehalis Indian Reservation
Squaxin Indian Reservation
Nisqually Indian Reservation
Puyallup Indian Reservation
SEE INSET MAP FOR PIERCE COUNTY SIRENS
Muckleshoot Indian Reservation
Yakama Indian Reservation
Colville Indian Reservation
Spokane Indian Reservation
Kalispel Indian Reservation
Cowlitz Indian Reservation
Lower Elwha Klallam Indian Reservation
Jamestown S'Klallam Indian Reservation
Tulalip Indian Reservation
Sauk Suiattle Indian Reservation
Stillaguamish Indian Reservation
Nooksack Indian Reservation
Lummi Indian Reservation
Swinomish Indian Reservation
Upper Skagit Indian Reservation
Makah Indian Reservation
Quileute Indian Reservation
Hoh Indian Reservation
Skokomish Indian Reservation
Snoqualmie Indian Reservation
Muckleshoot Indian Reservation
DARRINGTON – DEVILS MOUNTAIN FAULT ZONE
SOUTHERN WHIDBEY ISLAND FAULT ZONE
LAKE CREEK – BOUNDARY FAULT
SEATTLE FAULT ZONE
TACOMA FAULT ZONE
OLYMPIA STRUCTURE
STRAIGHT CREEK FAULT
WENATCHEE – RAINIER SEISMIC ZONE
SAINT HELENS SEISMIC ZONE
LACAMAS LAKE FAULT
FRENCHMAN HILLS FAULT
SADDLE MOUNTAIN STRUCTURES
ANTANUM RIDGE – GABLE MOUNTAIN STRUCTURES
AHTANUM RIDGE FAULT ZONE
RATTLESNAKE HILLS FAULTS
TOPPENISH RIDGE FAULT ZONE
HORSE HEAVEN HILLS FAULT ZONE
WALLULA FAULT ZONE
COLUMBIA HILLS FAULT ZONE
HITE FAULT
Seattle
Tacoma
Olympia
Bellingham
Everett
Spokane
Yakima
Kennewick
Pasco
Richland
Wenatchee
Moses Lake
Ellensburg
Vancouver
Longview
Aberdeen
Port Angeles
Sequim
Walla Walla
Pullman
Cheney
Ephrata
Chelan
Omak
Colville
Newport
Kettle Falls
Republic
Oroville
Tonasket
Okanogan
Winthrop
Twisp
Coupeville
Port Orchard
Bremerton
Kent
Auburn
Renton
Bellevue
Redmond
Issaquah
Snoqualmie
North Bend
Maple Valley
Covington
Enumclaw
Black Diamond
Buckley
Sumner
Puyallup
Tenino
Centralia
Chehalis
Toledo
Castle Rock
Kalama
Cathlamet
Ocean Park
Long Beach
Raymond
Aberdeen
Hoquiam
Montesano
Elma
Shelton
Belfair
Port Townsend
Port Angeles
Forks
Neah Bay
Clallam Bay
Sekiu
Quilcene
Brinnon
Ilwaco
Chinook
Naselle
Pe Ell
Winlock
Toutle
Randle
Packwood
Ashford
Elbe
Eatonville
Orting
Carbonado
Wilkeson
Buckley
Enumclaw
Black Diamond
Ravensdale
Maple Valley
Vashon
Manchester
Gig Harbor
Fox Island
Steilacoom
Dupont
Roy
Yelm
Rainier
Tenino
Bucoda
Oakville
Montesano
Ocean Shores
Westport
Cosmopolis
Hoquiam
Aberdeen
Raymond
South Bend
Bay Center
Ilwaco
Long Beach
Ocean Park
Seaview
Chinook
Naselle
Cathlamet
Longview
Kelso
Castle Rock
Toledo
Winlock
Vader
Morton
Packwood
Randle
Glenoma
Kalama
Woodland
Ridgefield
La Center
Yacolt
Battle Ground
Camas
Washougal
Stevenson
North Bonneville
White Salmon
Bingen
Goldendale
Klickitat
Lyle
Dallesport
Bingen
Trout Lake
Glenwood
Goldendale
Bickleton
Roosevelt
Wishram
Lyle
Stevenson
Carson
Cougar
Yacolt
Amboy
Ariel
Woodland
Kalama
Longview
Cathlamet
Skamania