

## **Executive Summary**

In 1700 the Pacific Northwest experienced an earthquake and tsunami that rivals the recent incident off the coast of Japan. A catastrophic earthquake of this magnitude along the Cascadia fault off the coast of Oregon and Washington is estimated to occur every 500 years. This report analyzes the possible direct impacts from a 9.0-magnitude earthquake and ensuing tsunami on population and infrastructure.

Key points from the analysis include:

- The 9.0-magnitude earthquake along the Cascadia fault line off the coast of northern California, Oregon, and Washington, along with a resulting tsunami, causes significant damage and loss of life along coastal regions of California, Oregon, and Washington.
- Almost two thousand lives could be lost and another 2,300 or more injured due to tsunami inundation along the Pacific coast, with the communities of Crescent City and Grays Harbor particularly hard hit.
- An additional 1,100 fatalities could be expected to result from ground shaking, primarily due to the collapse of structures, with approximately 25,000 injured.
- Extensive electric power outages would be experienced throughout the region, with medium-term outages forecast for the coastal areas. Restoration is expected to occur on a prioritized basis within one to eight days.
- Natural Gas
  - Segments of the backbone natural gas transmission pipeline serving western Washington and Oregon are at risk of being damaged.
  - Both the transmission pipeline and the networks of distribution pipelines are likely to suffer enough damage that the majority of customers in western Washington and western Oregon will lose natural gas service.
  - Combined with electrical outages, many homes may lose all sources of heating.
- Telecommunications
  - Regional communication disruptions are expected in wireline, wireless, and the Internet.
  - Major undersea transpacific cables are likely severed, disrupting communication service to East Asia. A two- to three-month restoration time is expected.
  - Undersea cables serving Alaska are likely severed, disrupting communication between Alaska and the contiguous United States.
- Transportation Fuels
  - A significant number of pump stations along the Olympic and Oregon Line refined-product pipeline system will sustain damage. As a result, the ability to move refined product by pipeline will be disrupted.
  - A substantial number of refined product terminals in the region will sustain significant damage. The inability to store and distribute fuels locally will have a major impact on regional fuel supplies.

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- **Transportation**
  - Significant damage to roads can be expected, particularly those along the coast and connecting the coast to the I-5 corridor. U.S. 101 is expected to suffer substantial damage due to both shaking and tsunami, resulting in limited capacity for several months. Nearby coastal areas may be isolated for the short term.
  - Tsunami damage at the mouth of the Columbia River will impact navigation and the ability to export agricultural commodities.
  - Road and bridge damage will likely impact accessibility of emergency services as well as essential repair crews for other sectors.
  - Long-term rail traffic disruptions can be expected along the I-5 corridor. A complete loss of key rail bridges in the Olympia and Seattle area and downtown Portland can be expected.
- **Emergency Services**
  - Widespread damage to police stations, fire stations, and hospitals along the coast is expected.
  - Bridge and road outages will inhibit/limit emergency response capabilities.
  - Communications challenges will affect all coastal emergency operations.
  - Supplying transportation fuels to key emergency operations centers may become an issue until road access is restored.
- **Banking and Finance**
  - Loss of the Alaska telecommunications link would significantly impact the ability of Alaskan banks to process payments/ settlements. Satellite uplinks might not be an available option due to scarcity of bandwidth and contractual agreements.
  - Loss of major transpacific undersea cable capacity would affect transoceanic commerce, settlement, and transpacific financial market exchanges. With the loss of approximately half the undersea cable capacity, communications systems could face abnormally high congestion.
- **Health Care**
  - The potential of 15,000 to 30,000 casualties combined with the expected loss due to damage of 15-27 hospitals comprising 524-1708 regular beds and 60-228 critical bed facilities concentrated near the coast would be sufficient to saturate the excess capacity of other hospitals within a 250-mile range of the worst damage.
- **Water & Wastewater**
  - Disruptions to potable water supply are expected with restoration times of 3 weeks to 7 months with greatest damage and restoration times near the coastline.
  - There is some risk of release of untreated wastewater. The region may experience an increase in waterborne diseases due to contamination of drinking water.
  - Availability of water supply and wastewater systems can delay economic recovery particularly along the coastline.