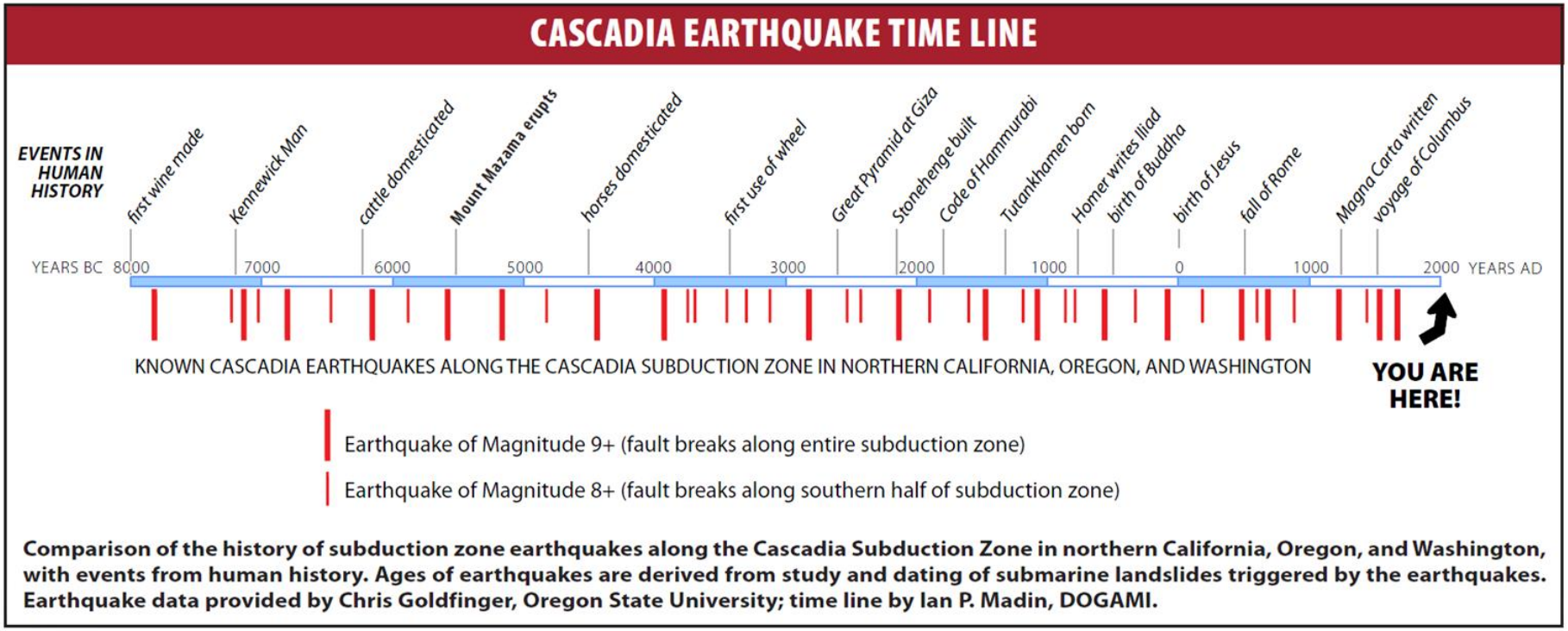
Critical Energy Infrastructure (CEI) Hub

Multnomah County Office of Emergency Management

Chris Voss
Director

The average time between Cascadia events is 230 years.

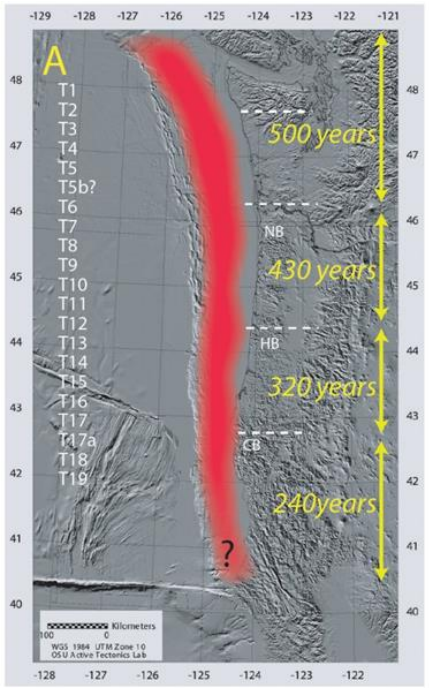
The last earthquake was 324 years ago.



When will it happen?

37% chance in the next 50 years*

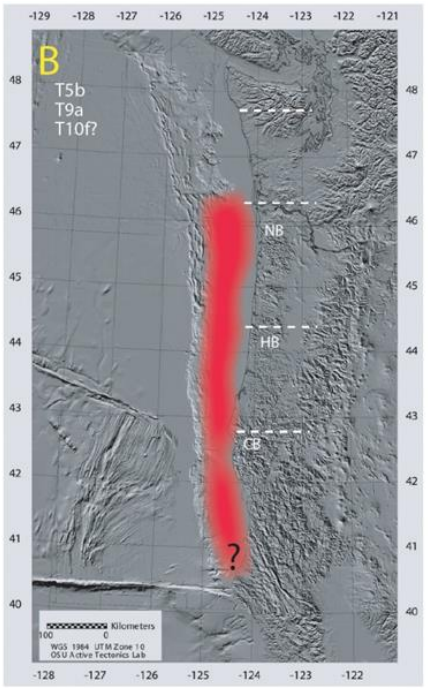
7% - 15% for a great earthquake*



21 EQ

> 9.0 Mw full rupture

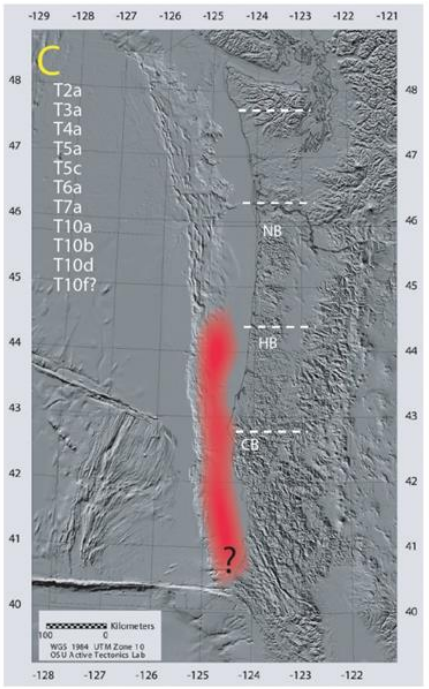
Mw ~9
500 years



3 EQ

8.5 – 8.8 Mw

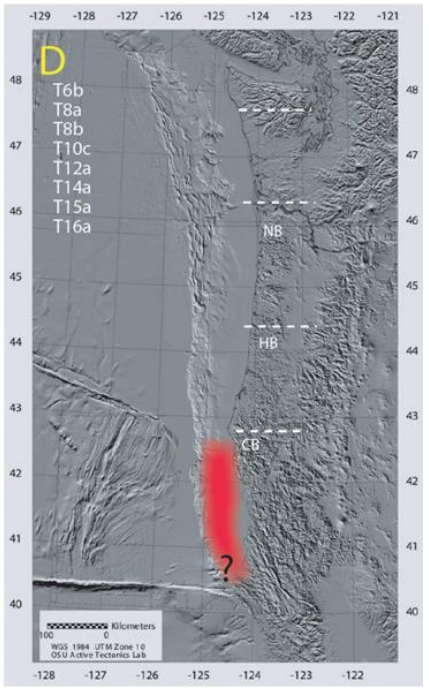
Mw 8.5 – 8.8
430 years



11 EQ

> 8.5 – 8.3 Mw

Mw 8.5 – 8.3
320 years



8 EQ

7.6 – 8.4 Mw

Mw 7.6 – 8.4
240 years

* The Oregon Resilience Plan, OSSPAC, 2013

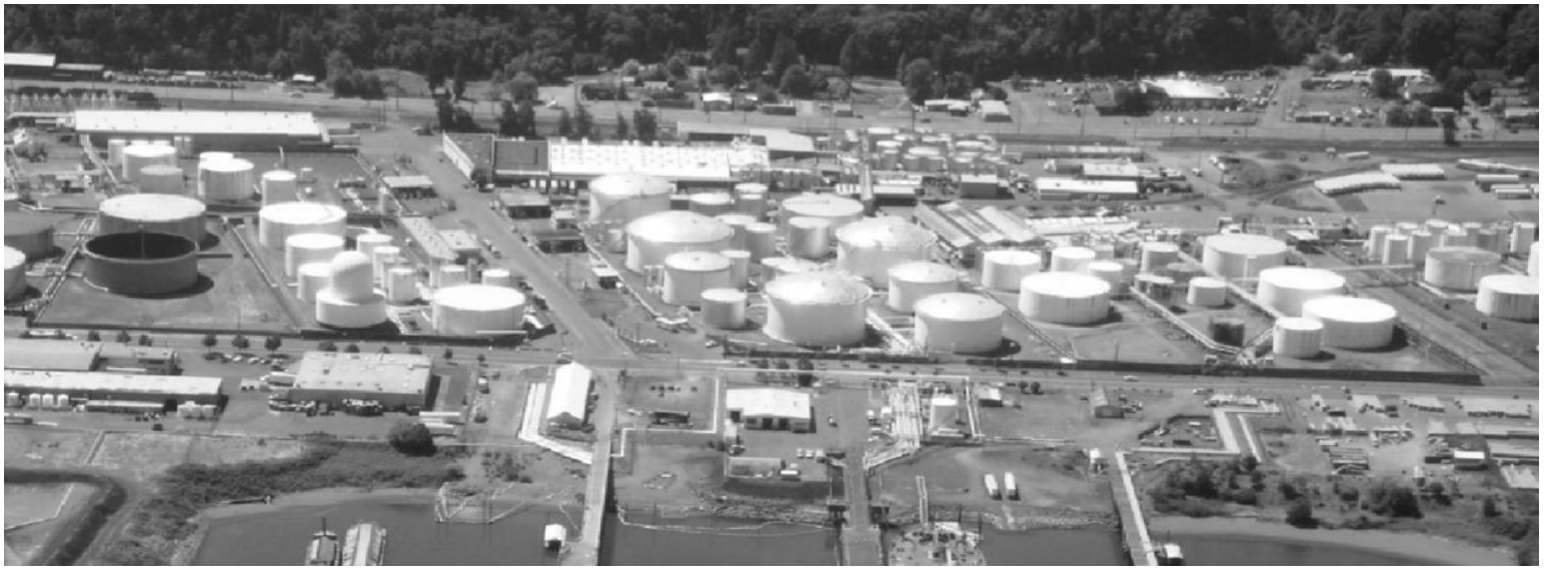
Subduction Zones in the Pacific

Critical Energy Infrastructure Hub

Critical Energy Infrastructure Hub

Lateral Spreading

Liquifaction



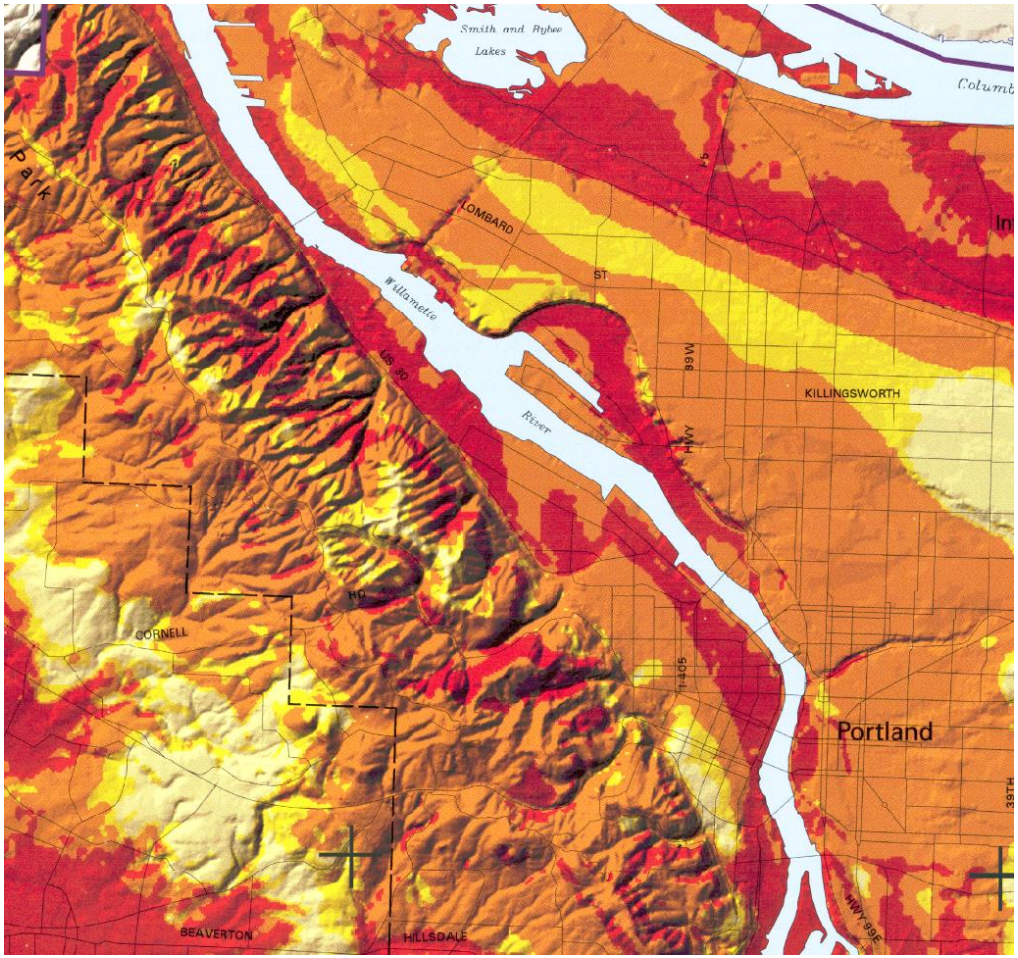
CEI Hub Known Risks

- The CEI Hub is adjacent to the Willamette River and has extensive deposits of soils highly susceptible to lateral spreads (Earthquake Risk Study for Oregon's Critical Energy Infrastructure Hub, Yumei Wang et al, 2012)
- The CEI Hub has extensive deposits of highly liquefiable soils (Mabey et al, 1993)
- Some of the facilities in the CEI Hub have been mapped as artificial fill or modified ground and which are potentially unstable. (Madin et al, 2008)
- Loose fills such as those placed without compaction are very likely to be susceptible to liquefaction (Kramer, 1996)

CEI Hub Statistics

- Over 90 percent of the state's liquid fuel supply is transported through CEI Hub facilities
- CEI Hub has 10 companies on 31 properties total 219.85 acres.
- There are over 150 different types of materials stored at the CEI Hub, most of which are petroleum-based.
- There are 630 tanks of varying sizes throughout the CEI Hub holding with a tank capacity of at least 350.6 million gallons. (Impacts of a Cascadia Subduction Zone Earthquake on the CEI Hub, 2022)

Portland Metropolitan Relative Earthquake Hazard



Zone A
Zone C
Zone B
Zone D

Relative Earthquake Hazards Explanation

(see accompanying text for complete explanation)

The relative earthquake hazard zones shown above range from zone A, which shows areas of greatest hazard, to zone D, which shows areas of least hazard. The degree of relative hazard was based on the factors of ground motion amplification, liquefaction, and slope instability, shown on smaller scale maps on the right margin of this map.

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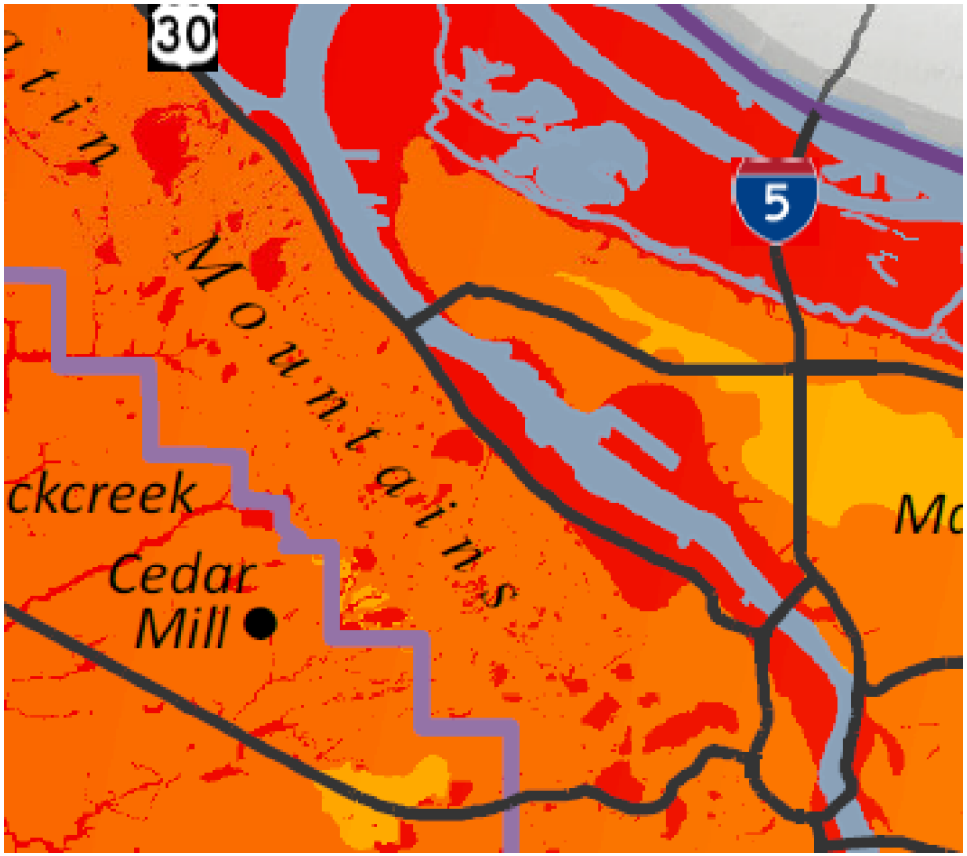
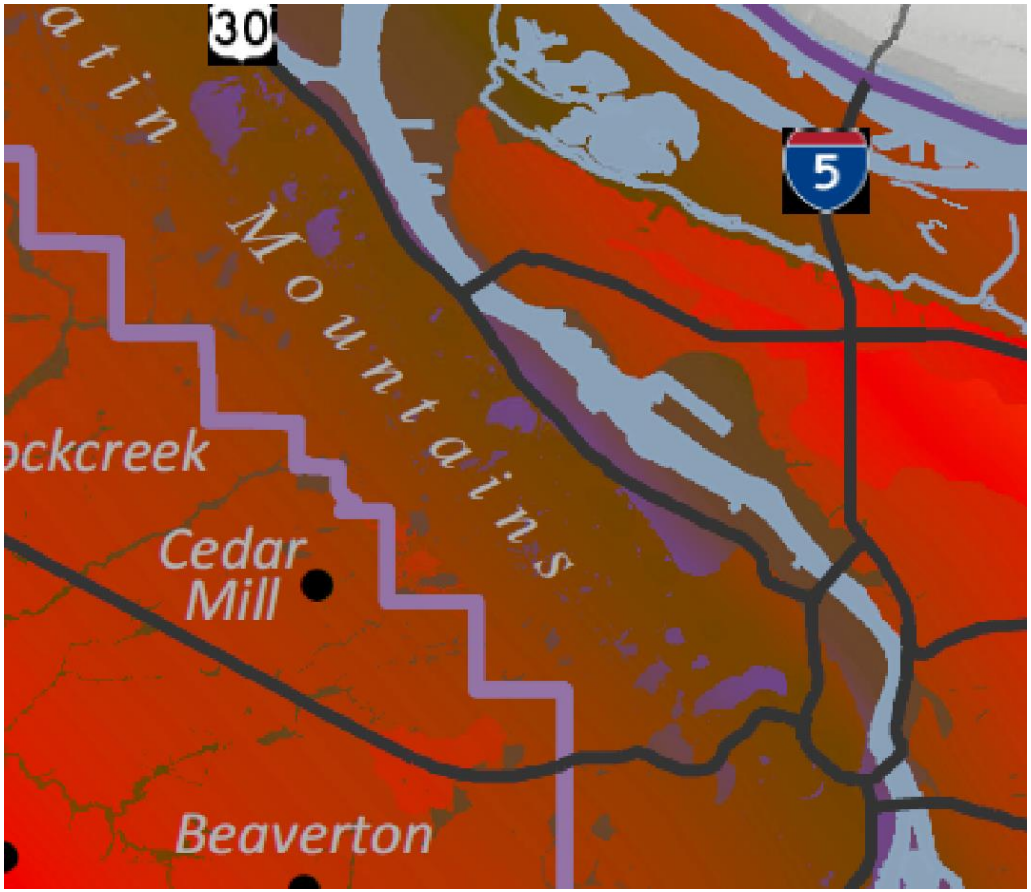
Perceived Shaking
Cascadia 9.0 Earthquake



Modified Mercalli Intensity Scale	Perceived Shaking	Damage Potential
IV	Light	None
V	Moderate	Very light
VI	Strong	Light
VII	Very Strong	Moderate
VIII	Severe	Moderate/ Heavy
IX	Violent	Heavy

Perceived Shaking
Portland Hills Fault 6.8 Earthquake



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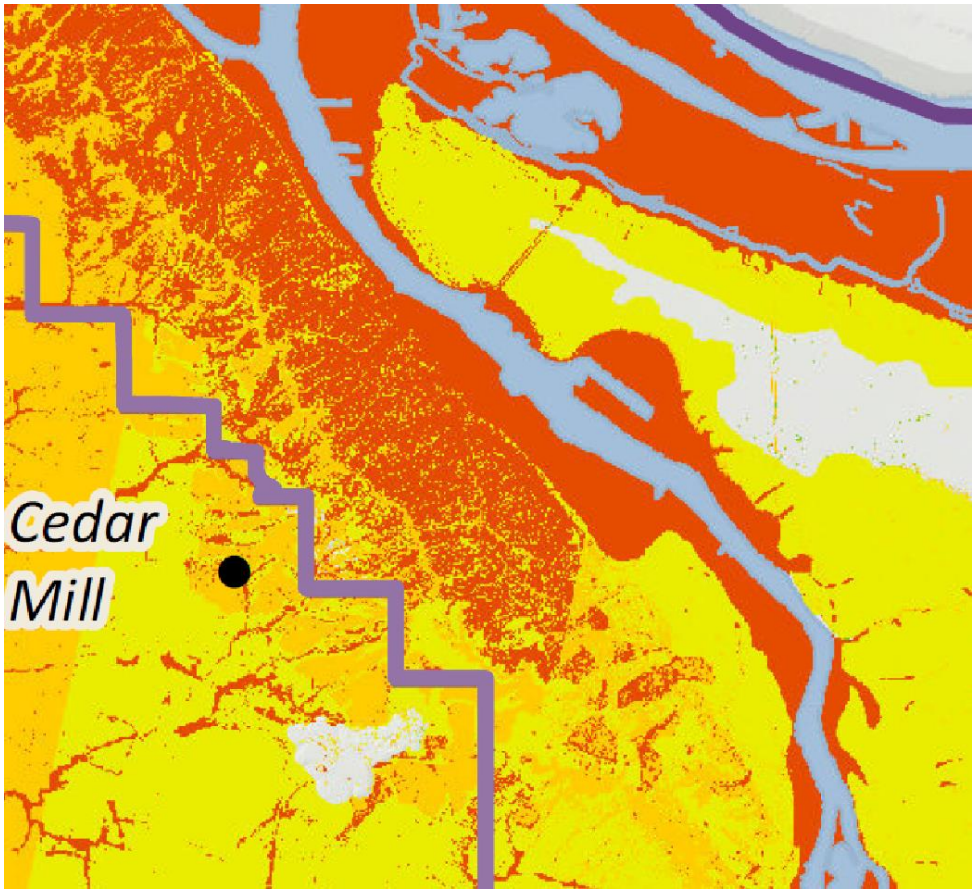
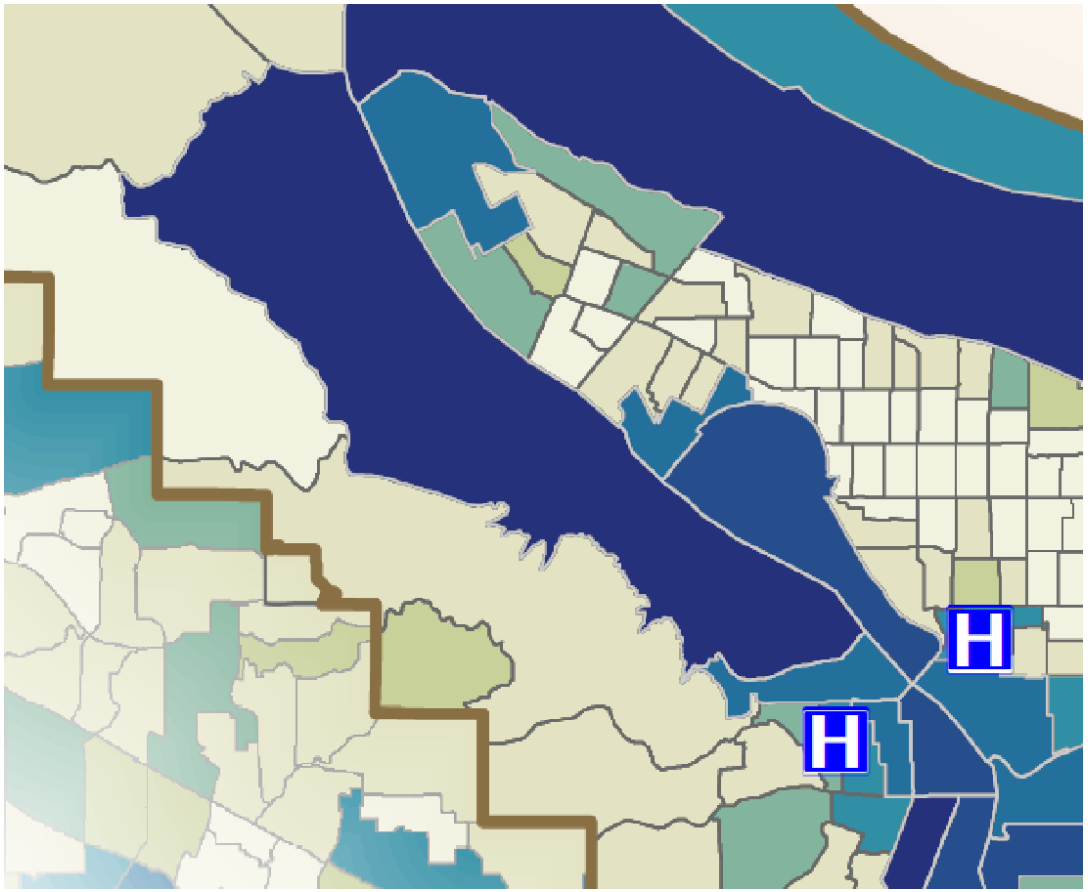
Potential Permanent Ground Deformation Due to Earthquake-Induced Landslides and Liquefaction Lateral Spreading



Permanent Ground Deformation

- None
- Low (0–10 cm; 0–4 inches)
- Moderate (10–30 cm; 4–12 inches)
- High (30–100 cm; 12–39 inches)
- Very High (100–1180 cm; 39–173 inches)

Injuries Requiring Hospitalization (Cascadia Earthquake 9.0)



Injuries Requiring Hositalization per Neighborhood Unit

- 0 – 1
- 2 – 5
- 6 – 10
- 11 – 20
- 21 – 50
- 51 – 100
- 101 – 200
- 201 – 400

H Hospital

CEI Hub Statistics

- The total potential releases from the materials stored in tanks at the CEI Hub range from 94.6 million to 193.7 million gallons.
- Approximately 57 percent of the total potential releases would be released onto ground and 43 percent have potential to flow into the Willamette River. (Impacts of a Cascadia Subduction Zone Earthquake on the CEI Hub, 2022)
- Exxon Valdez released 11 million gallons, was estimated to cost 7 billion (including fines and settlements), killed 250,000 birds and 2,800 sea otters and efforts recovered between 10-15% of the release. (NOAA, The Exxon Valdez, 25 Years Later)

The Risks Posed by the CEI Hub

- The soils the CEI Hub are build on are susceptible to liquefaction, lateral spreading and permanent deformation
- The chemicals on-site and the immediate harm they can pose to workers, responders and nearby residents
- The Risk to the community due to a slowed response in an area predicted to have greater injuries
- The risk to the county and state due to an interrupted fuel supply chain
- The potential financial risk to the county in dealing with a large scale response, cleanup and business interruption due to fuel supply shortages