STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
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Probability of Damaging Shaking

Probability over the next 50 years of experiencing shaking strong enough to damage weak buildings

2021

Oregon Seismic Hazard Database (OSHD) Release 1.0

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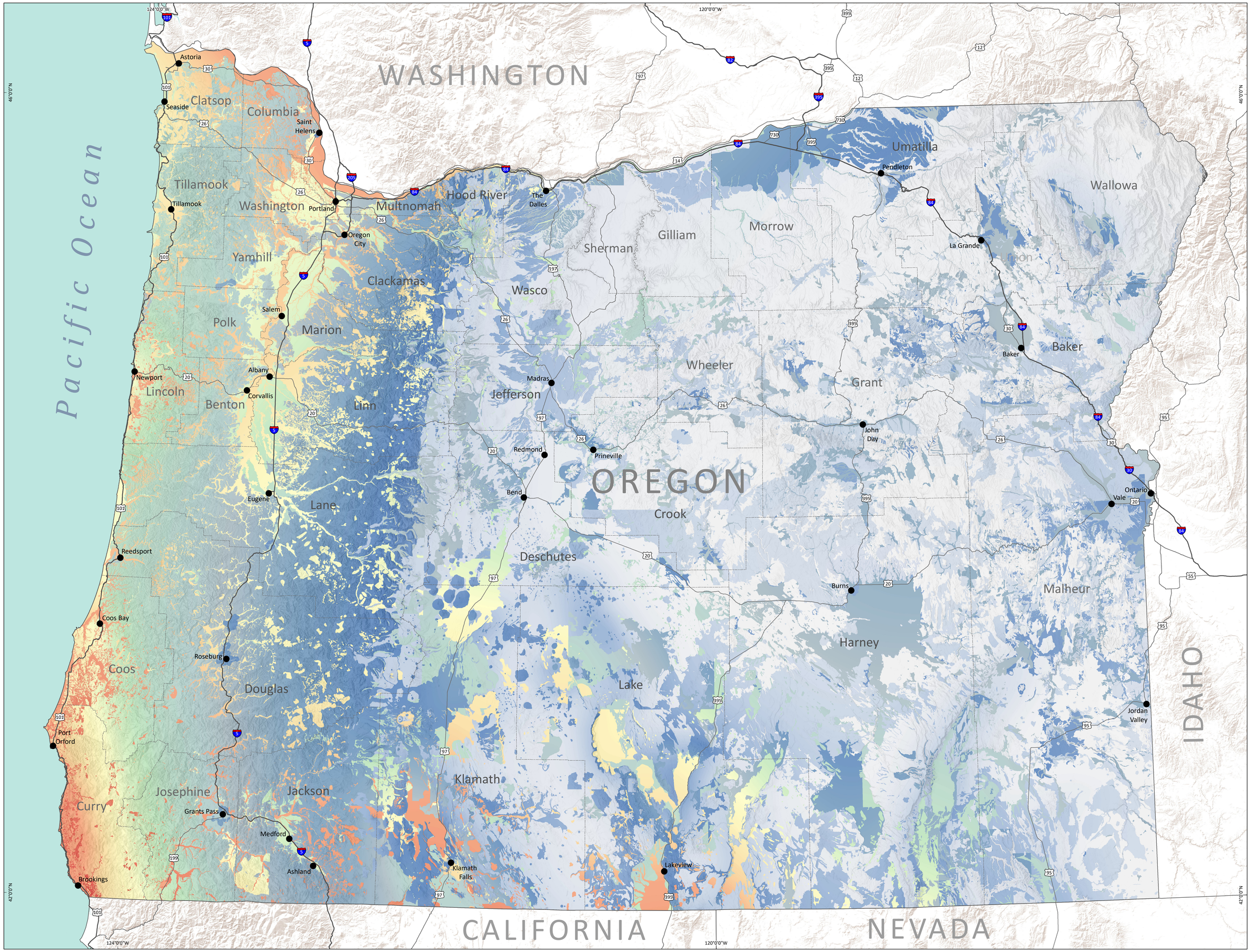
PLATE 3



Background
This map is part of a new database of seismic hazard data for Oregon published by the Oregon Department of Geology and Mineral Industries. The map shows the probability of experiencing shaking of Modified Mercalli Intensity VII, which is the nominal threshold for structural damage to buildings (USGS, 2021a, b; ABAG, 2013). The shaking probabilities are based on 2018 USGS National Seismic Hazard map data (Rukstales and Petersen, 2019), with local amplification of shaking added according to the updated National Earthquake Hazards Reduction Program (NEHRP) site class map in the accompanying report. See report for details.

Source Data
Shaking and damage potential data from this report is based on a 2018 USGS 2% in 50-year probabilistic shaking model (Rukstales and Petersen, 2019). State and county boundaries and city locations are from the U.S. Census and U.S. Geological Survey (USGS). Base map imagery is from the Environmental Systems Research Institute (Esri), USGS, and National Oceanic and Atmospheric Administration (NOAA).

References
Association of Bay Area Governments (ABAG), 2013, Making sense of the Modified Mercalli Intensity scale – a measure of shaking, https://abag.ca.gov/sites/default/files/making_sense_of_the_modified_mercalli_intensity_scale.pdf, accessed 1/21/21.

Rukstales, K.S., and Petersen, M.D., 2019, Data release for 2018 update of the U.S. National Seismic Hazard Model: U.S. Geological Survey data release, https://doi.org/10.5066/P9WT5OVB.

U.S. Geological Survey (USGS), 2021a, Modified Mercalli Scale, https://www.usgs.gov/media/images/modified-mercalli-intensity-mmi-scale-assigns-intensities, accessed 1/21/21.

U.S. Geological Survey (USGS), 2021b, Modified Mercalli Intensity Scale ... [web page], https://www.usgs.gov/media/images/modified-mercalli-intensity-scale, accessed 5/28/21.

Location Map

Projection: Oregon Statewide Lambert Conformal Conic, Unit: International Feet, Horizontal Datum: NAD 1983; 2011.

Software: Esri ArcGIS® 10.7.1 and Adobe® Illustrator® 2021.

Cartography: Jon J. Franczyk

SCALE 1:825,000

0 25 50 100 Miles

0 25 50 100 Km

Probability of Damaging Shaking

- Very Low (< 5 %)
- Low (6 - 10 %)
- Moderate (11 - 20 %)
- High (21 - 30 %)
- Very High (> 30 %)

- City
- US Interstate
- US Highway
- State Boundary

APPROXIMATE MEAN DECLINATION, 2021

DISCLAIMER: This publication cannot substitute for site-specific investigations by qualified practitioners. Site-specific data may give results that differ from the results shown in the publication. See the accompanying text report for more details on the limitations of the methods and data used to prepare this publication. This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

Relationship between Mercalli Intensity and Building Damage (ABAG, 2013)

Intensity Scale	Building Contents	Masonry Buildings	Multi-Family Wood-Frame Buildings	1- and 2-Story Wood-Frame Buildings
VI	Some items thrown from shelves, pictures shifted, water thrown from pools.	Some walls and parapets of poorly constructed buildings crack.	Some drywall cracks.	Some chimneys are damaged, some drywall cracks. Some slab foundations, patios, and garage floors slightly crack.
VII	Many items are thrown from walls and shelves. Furniture shifts.	Poorly constructed buildings are damaged and some well-constructed buildings crack. Cornices and unbraced parapets fall.	Plaster cracks, particularly at inside corners of buildings. Some soft-story buildings strain at the first floor level. Some partitions deform.	Many chimneys are broken and some collapse, damaging roofs, interiors, and porches. Weak foundations can be damaged.
VIII	Nearly everything is thrown down from shelves, cabinets, and walls. Furniture overturned.	Poorly constructed buildings suffer partial or full collapse. Some well constructed buildings are damaged. Unreinforced walls fall.	Soft-story buildings are displaced out of plumb and partially collapse. Loose partition walls are damaged and may fail. Some pipes break.	Unbolted houses shift off the foundation, or partially collapse if cripple walls are not braced. Structural elements (e.g. beams, joists, and foundations) are damaged. Some pipes break.
IX	Only very well anchored contents remain in place.	Poorly constructed buildings collapse. Well constructed buildings are heavily damaged. Retrofitted buildings damaged.	Soft-story buildings partially or completely collapse. Some well-constructed buildings are damaged.	Poorly constructed buildings are heavily damaged, some partially collapse. Some well constructed buildings are damaged.
X	Only very well anchored contents remain in place.	Retrofitted buildings are heavily damaged, and some partially collapse.	Many well constructed buildings are damaged.	Well constructed buildings are damaged.