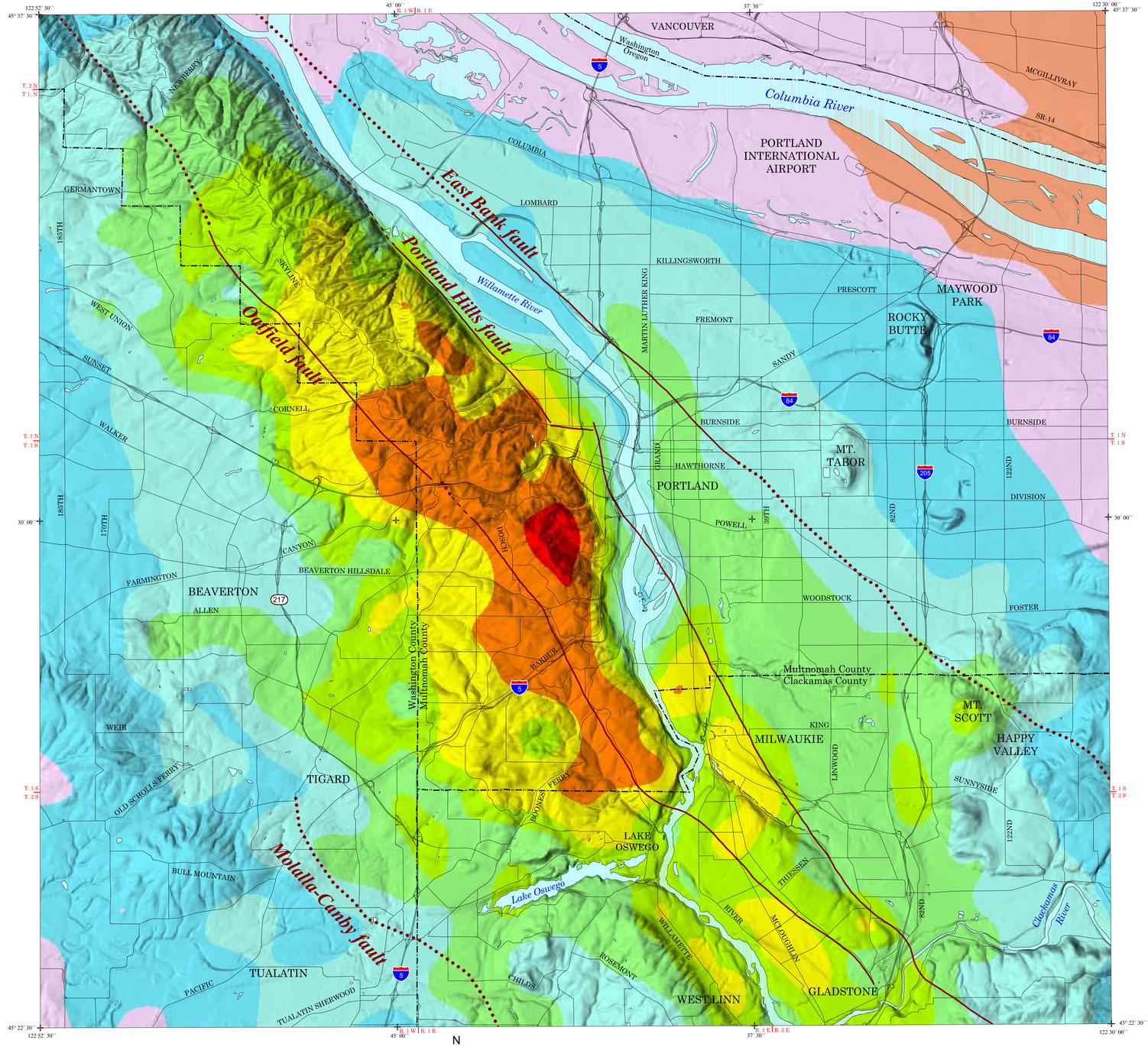
Earthquake Scenario Ground Shaking Map for the Portland, Oregon, Metropolitan Area

Portland Hills Fault M 6.8 Earthquake
Peak Horizontal Acceleration (g) at the Ground Surface

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
JOHN D. BEAULIEU, STATE GEOLOGIST



Base Map Data from REGIONAL LAND INFORMATION SYSTEM,
Metro Data Resource Center. Relief Shading Derived From
USGS 7.5 Minute Quadrangle Digital Elevation Model Data.

Universal Transverse Mercator Projection, Zone 10
1927 North American Datum.

N

1:62,500

5000 0 5000 10000 FEET

1 0 1 2 KILOMETERS

1 0 1 MILES

IMS - 15

Earthquake Scenario and Probabilistic Ground Shaking Maps
for the Portland, Oregon, Metropolitan Area

by

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Portland Hills Fault M 6.8 Earthquake
Peak Horizontal Acceleration (g) at the Ground Surface

Peak Horizontal Acceleration (g)	Modified Mercalli Intensity (from Wald et al., 1999)
0.2 - 0.3	VII — Very strong shaking. Negligable damage in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or designed structures.
0.3 - 0.4	
0.4 - 0.5	VIII — Severe shaking. Slight damage in specially designed structures; considerable in ordinary substantial buildings with partial collapse; great in poorly built structures.
0.5 - 0.6	
0.6 - 0.7	
0.7 - 0.8	IX — Violent shaking. Considerable damage in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse.
0.8 - 0.9	
0.9 - 1.0	
1.0 - 1.1	

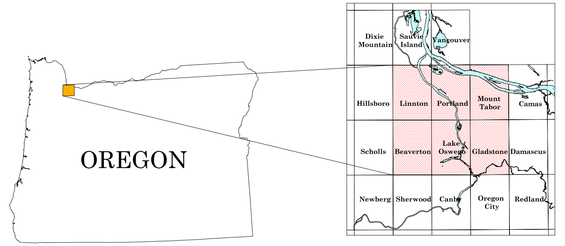
Note: The values associated with color keys vary on individual maps.

POTENTIALLY SEISMOGENIC FAULTS

- Mapped
- Inferred in this study
- Interpreted from aeromagnetic data

Data Sources: Madin, 1990, Beeson et al., 1991, and Blakely et al., 1995

Note: The locations of faults as depicted on these maps may have errors of up to 500 meters or more, particularly if they are concealed or based on aeromagnetic data.



MAP AREA LOCATION

USGS 7½ Minute Quadrangles

Explanation

This map shows the predicted ground shaking from a hypothetical earthquake of moment magnitude (M_W) 6.8 occurring on the Portland Hills fault. The fault traverses through Portland and generally defines the base of the Portland Hills along its central section. If this earthquake were to occur, the actual ground motions are expected to be similar to the values shown on this map; however, the uncertainties in the depicted values are large, and differences are to be expected.

A report and an additional 11 maps depicting ground motions expressed in terms of peak horizontal ground acceleration and spectral accelerations at periods of 0.2 and 1.0 seconds, can be found in IMS-## "Earthquake Scenario and Probabilistic Ground Shaking Maps for the Portland, Oregon, Metropolitan Area" (Wong et al., 1999). The maps display ground motion estimates for (1) a Portland Hills fault M_W 6.8 scenario earthquake; (2) a Cascadia subduction zone M_W 9.0 megathrust scenario earthquake; (3) a 500-year return period; and (4) a 2,500-year return period. The latter two maps are probabilistic in nature.

Limitations

There are large uncertainties associated with ground motion prediction in the Pacific Northwest due to a limited amount of region-specific information and data on the characteristics of seismic sources and ground motions. Additional uncertainty stems from the characterization of the subsurface geology beneath Portland and the estimation of the associated site response effects on ground motions. Thus the maps should not be used for site-specific design or in place of site-specific hazard evaluations.

This project was a cooperative effort between URS Greiner Woodward Clyde Federal Services and the Oregon Department of Geology and Mineral Industries. The project is supported by the U.S. Geological Survey under the National Earthquake Hazards Reduction Program Award 1434-HQ-96-GR-02727. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

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