

# Analysis of Factors Influencing Earthquake Awareness and Preparation Levels Among Residents in the Portland Metropolitan Area, USA

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Researchers at Oregon State University have estimated a 37% chance of a magnitude 8+ earthquake occurring along the Pacific Northwest's Cascadia Subduction Zone in the next 50 years. Despite the high probability of a large earthquake and tsunami severely affecting major west coast cities such as Seattle, Portland, and Vancouver, previous studies have concluded that residents in the area are insufficiently prepared. To that end, it is imperative that local residents increase their level of disaster preparedness. This research aims to determine the level of earthquake awareness and preparation among Portland Metropolitan Area residents, as well as analyze the factors that may have a significant influence on said levels. Over the course of 30 days, a 15-question questionnaire was distributed randomly to Portland Metropolitan Area residents through hard copies and digital copies. Follow-up email interviews were carried out for respondents and state government offices. Statistical cross-sectional analysis was conducted for each factor category compared to earthquake preparation. Among 101 respondents, the ratio of those who have made preparations versus those who have not was approximately half and half. Data analysis revealed minute differences between the majority of the factor categories with respect to the proportions of have and 'have not' made preparations, suggesting an insignificant influence on earthquake awareness and preparation. Alternatively, a 'sense of urgency' and the 'reasons for no preparation' may have a stronger influence over whether or not residents choose to prepare. Among the reasons why respondents have not prepared, the 'lack of concern' for the issue was most prevalent. Research results imply that information on disaster mitigation may not be circulating or reaching residents in the most effective manner. The results from this study may be considered to tailor future efforts to increase earthquake awareness and preparation among PMA residents.

**Keywords:** Cascadia Subduction Zone, Portland Metropolitan Area, earthquake awareness, earthquake preparation, disaster management

## I Introduction

### 1. Background

#### 1) Cascadia Subduction Zone

Following the 2011 Great East Japan earthquake and tsunami, concern over the possibility of a similar-sized event occurring on the west coast of the United States heightened among researchers and residents alike (Figure 1). Located approximately 80 km offshore from the Oregon coastline, the Cascadia Subduction Zone is a 1,000 km long four-section convergent plate boundary that stretches from northern Vancouver Island to northern California (Figure 2). The shallowest depth of this seismic fault is 30 km. The fault is capable of generating megathrust earthquakes ex-

ceeding magnitude 9.0 (Pacific Northwest Seismic Network, n.d.).

Evidence of ghost forests, seaside arrowgrass, and orphan tsunamis in historical Japanese records have dated the last Cascadia event back to 319 years ago, in January 1700 (Satake, Shimazaki, Tsuji, & Ueda, 1996; Atwater et al., 2005). With a recurrence interval of roughly 243 years, this seismic fault is due for another large rupture. Other subduction zones around the globe typically have recurrence intervals of 100 to 200 years, so the overdue interval of the Cascadia fault may imply an unusually large buildup of tectonic stress.

A 2012 study analyzing carbon dating of seafloor turbidite samples indicated that 41 large earthquakes have occurred along the Cascadia