

## **EARTHQUAKE DAM SAFETY IN THE PACIFIC NORTHWEST: TRYING TO KEEP UP WITH THE SCIENCE**

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The rate at which new information has become available on the earthquake potential of the Cascadia subduction zone (CSZ) and crustal faults in the Pacific Northwest has accelerated in the past decade more so than the previous decade which was already at a rapid pace. Because of efforts spearheaded by the U.S. Geological Survey and the Geological Survey of Canada, we are learning more about earthquake sources in the Pacific Northwest than any other region in North America. As a result, trying to keep up with the science has become a challenge with respect to evaluating existing dams for their seismic stability.

Some scientific issues that had been unresolved up to now have now gone away while others still remain uncertain. For example, the maximum magnitude of the megathrust earthquake along the CSZ has been addressed with general consensus that it is a moment magnitude (**M**) 9.0 to 9.2. However, there is still considerable uncertainty on how far inland the megathrust rupture can come, which has an obvious impact on the amplitudes, frequency content, and duration of strong ground shaking. In terms of assessing the level of ground shaking to be expected in a **M** 9 event, there still remains a global absence of strong motion data for events larger than **M** 8.5 and certainly there is no data for the CSZ. Thus without empirical data, our assessments of the strong shaking that might occur in future are simply extrapolations or modeling exercises.

Paleoseismic information on crustal faults particularly in the Puget Sound as a result of studies performed by the U.S. Geological Survey continues to change our characterization of their earthquake potential and the rate at which large events can occur. Hence, both site-specific probabilistic and deterministic assessments of the hazard for individual damsites continue to evolve resulting in some instability of our understanding of the hazard from these sources.

In this paper, I will discuss the issues that are challenging assessments of seismic hazards in the Pacific Northwest and what their implications are to dam safety.