ABSTRACT


Title: Potential for Coastal Flooding due to Coseismic Subsidence in the Central Cascadia Margin.

Interpretations made from compilation of existing core and cutbank data for Oregon and Washington are used to evaluate the potential flooding impact from regional coseismic subsidence.

Estimates of regional subsidence are based on tidal level indicators including plant macrofossils, peat development, and diatoms. A compilation of existing late Holocene stratigraphic records shows multiple burial events in all bays of Oregon, however some coastal sites in central Oregon show continuous submergence. Tests of tidal level indicators using modern Cascadia wetlands indicate that paleosubsidence can be estimated to 0.0 ± 0.5m, 1.0 ± 0.5m, and 2 m ± 0.5m. An AMS date from a cone atop a buried wetland deposit (250 ± 40 RCYBP) in Tillamook Bay, Oregon is consistent with the interpretation of the most recent buried wetland deposit correlated to a regional coseismic subsidence event occurring at ~1700 AD. Estimates of paleosubsidence produced by the most recent regional
seismic event are 1 to 2 m ± 0.5m for Grays Harbor, 1 m ± 0.5 m Necanicum Estuary, 1 m ± 0.5 m Tillamook Bay, and 0 to 1 m ± 0.5 m Siletz Bay. A database using the most recently buried wetland is produced from published and unpublished core and cutbank data collected throughout the central Cascadia margin. A regional trend of decreasing subsidence is found from north to south and locally from east to west. These trends yield an apparent correlation between the amount of subsidence and distance (east-west) from the subsidence site to the Cascadia trench.

Paleosubsidence estimates for sites at Elliot Slough (2.0 m) and Neawanna Creek (1.0 m) are used for analysis of flooding in Aberdeen, Washington and Seaside, Oregon, respectively. Paleosubsidence estimates added to the 10 and 100 yr. flood elevations are compared to current 10, 100, and 500 yr. flood elevations (pre-subsidence). Emergency access roads, dikes, tidegates, and city drainage outfalls are susceptible to seasonal flooding at 1-10 yr. flooding frequencies following coseismic subsidence of 1-2 m.