The "Ring of Fire", also called the Circum-Pacific belt, is the zone of subduction that rings much of the Pacific Ocean. Earthquakes can occur at the edges of tectonic plates. One type of movement is called subduction, where one plate slides underneath another creating subduction zones that can trigger tsunamis. Tectonic plates move in the Earth's crust, occasionally colliding or sliding past one another with and sliding underneath other plates creating subduction zones that can trigger tsunamis.

The National Oceanic and Atmospheric Administration (NOAA) manages the National Tsunami Warning Center (NTWC) along the Oregon coast since 1994. In Oregon, DOGAMI manages the National Tsunami Inundation Zones to prevent new buildings from being built in these zones. Buildings placed in these zones can result in insurance issues and increased cost for existing properties. Time Series Graphs and Wave Elevation Profiles from the tsunami simulations can be obtained from DOGAMI for potential building locations.

Tsunami inundation maps can be found in DOGAMI Special Paper 43 (Witter and others, 1999). Extreme fault model parameters that result in maximum seafloor uplift is represented by a hypothetical maximum event. This maximum event is the inundation that occurred at Depoe Bay—11.5 feet at Newport, 10 to 11 feet at Florence, and 11 feet at Lincoln City North, Oregon. Tides were not taken into account as the inundation maps are static and represent the two selected tsunami scenarios: Alaska M9.2 (1964) and Japan M9.0 (2011).

The computer simulation model output is provided to DOGAMI as a series of wet and dry contour lines; this is termed the Wet/Dry Zone, which equates to a particular inundation level. Each assigned value ranging from 0 to 10 feet to estimate. This map is based on hydrodynamic tsunami modeling by the Oregon Department of Geology and Mineral Industries (DOGAMI), with foundation data from the U.S. Geological Survey and Federal Emergency Management Agency (FEMA) flood hazard maps. The model results were redigitized by Rachel L. Smith and Sean G. Pickner, Oregon Health and Science University.

Figure 1 shows the tsunami wave height through time for selected coastal gauge stations. Figure 2 shows tsunami water elevation profiles along the Oregon coast. Figure 3 shows a time series graph of tsunami wave height. DOGAMI manages the National Tsunami Warning Center (NTWC) along the Oregon coast since 1994. In Oregon, DOGAMI manages the National Tsunami Inundation Zones to prevent new buildings from being built in these zones to prevent insurance issues and increased cost for existing properties. Buildings placed in these zones can result in insurance issues and increased cost for existing properties.

Tsunamis were generated along the Gulf of Alaska, left serious damage in Japan, and were created by earthquakes. Tsunamis can inundate land along the ocean front as one might expect, but in the estuary channels less damage results because of the large volume of water and the lower velocity of the tsunami wave.

Figure 4: This map was funded under award number 09-MIP-006 from the USGS Pacific Coastal and Marine Science Division, U.S. Geological Survey. This project was supported in part by the Oregon Natural Resources Research Institute (ONRRI). Data preparation was funded through research grants from NOAA and the Oregon Department of Geology and Mineral Industries (DOGAMI). The computer simulation model output is provided to DOGAMI as a series of wet and dry contour lines; this is termed the Wet/Dry Zone, which equates to a particular inundation level. Each assigned value ranging from 0 to 10 feet to estimate. This map is based on hydrodynamic tsunami modeling by the Oregon Department of Geology and Mineral Industries (DOGAMI), with foundation data from the U.S. Geological Survey and Federal Emergency Management Agency (FEMA) flood hazard maps. The model results were redigitized by Rachel L. Smith and Sean G. Pickner, Oregon Health and Science University.


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