Distant Source (Alaska-Aleutian Subduction Zone) Tsunami Inundation Map
Nestucca Bay, Oregon

Introduction

Tsunami inundation maps are maps that show the extent of a tsunami inundation, which is the area that has been flooded by the tsunami waves. These maps are used by emergency management agencies to plan for evacuation, rehabilitation, and recovery from a tsunami event. DOGAMI has produced tsunami inundation maps using computer models and elevation data. These maps are based on scenarios of tsunami events that could occur in the Pacific Ocean and arrive onshore in Oregon.

Map Explanation

This tsunami inundation map displays the output of computer models representing the two selected tsunami scenarios: Alaska M9.2 (1964) and Cascadia (C) M9.0. The map shows the inundation extent for the two scenarios at the profile locations shown in Figure 2.

The computer simulation model output is provided to DOGAMI as millions of points with values that indicate whether the location of each point is inundated. The computer model output is created from fault geometries, subsidence, and computer models, and the methodology used to create the scenario for Oregon. Detailed information on fault geometries, subsidence, computer models, and the methodology used to create the scenario for Oregon is available in Witter and others (2011).

 tsunami waves. The maximum inundation for the each scenario is shown in Table 1.

Marine inundation maps are useful for visualizing tsunami extent but do not necessarily be the largest as waves interfere and reflect off local topography and bathymetry.

Earthquake/Tsunami Events

Distant earthquake/tsunami events have affected the Oregon coast: the 1964 M9.2 Prince William Sound earthquake in Alaska, and the 2011 M9.2 Tohoku earthquake in Japan. Oregon was on the edges of the Pacific Plate and other major tectonic plates. The Pacific Ring of Fire is located at the borders of the Pacific Plate and other major tectonic plates. The Ring of Fire stretching from New Zealand, along the eastern edge of Asia, north to Alaska, and south to Puerto Rico.

Revised Statutes 455.446 and 455.447, commonly known as the National Tsunami Hazard Mitigation Program, which has been funded by the National Oceanic and Atmospheric Administration (NOAA) since 1995. DOGAMI's work is designed to help cities, counties, and other sites in coastal areas reduce the tsunami-related effects on people and property. The Oregon Department of Geology and Mineral Industries (DOGAMI) has been identifying and mapping the tsunami inundation hazard since 1994. In Oregon, DOGAMI manages the tsunami inundation extent for the two scenarios at the profile locations shown in Figure 2.

Summary of Tsunami Inundation Maps

The tsunami inundation maps are based on the simulated tsunami runup (maximum water elevation) at a simulated gauge station. The tsunami waves are shown as they arrive at a selected reference point (simulated gauge station). It shows the change in water elevation over time.

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Figure 1: The “Ring of Fire” is the zone of volcanic and seismic activity that is located around the Pacific Ocean. It is the area where the Pacific Plate and other major tectonic plates collide and subduct.

Figure 2: This map shows the tsunami inundation extent for the two scenarios at the profile locations shown in Figure 2. The Alaska M9.2 (1964) tsunami is the largest recorded tsunami in the United States, and was originated near the Gulf of Alaska. It devastated many towns along the Pacific Coast, killed 106 people in Alaska, and caused $200 million in damage. The Cascadia (C) M9.0 tsunami is a hypothetical scenario for Oregon.

Table 1: This table shows the tsunami inundation extent for the two scenarios at the profile locations shown in Figure 2. The Alaska M9.2 (1964) tsunami is the largest recorded tsunami in the United States, and was originated near the Gulf of Alaska. It devastated many towns along the Pacific Coast, killed 106 people in Alaska, and caused $200 million in damage. The Cascadia (C) M9.0 tsunami is a hypothetical scenario for Oregon.