

Earthquakes

Earthquakes are caused by the bending and breaking of rocks along faults, which are most abundant in boundary zones between tectonic plates (see page 136). Two of the world's largest plates, the North American and Pacific Plates, are involved in a slow, glancing collision along the western margin of the U.S. This process accounts for the numerous earthquakes shown here on both the West Coast and Oregon maps. While most of the movement between these plates is localized to California and the Gulf of California, where the earthquakes are most frequent, deformation and earthquakes due to these plate movements extend as far east as Colorado and north into Canada and Alaska. Trapped between these two large plates are smaller plates, including the Juan de Fuca Plate that lies between the coast of the Pacific Northwest (see page 136) and the offshore zone of earthquakes that form the boundary of the Pacific Plate. The Juan de Fuca Plate is being forced under the North American Plate, rather than sliding past it. This "subduction" results in volcanic activity; it also causes earthquakes, which are not numerous but can be extremely violent.

Earthquakes are located and measured by seismometers which record ground movement. The size and location of past earthquakes can be a powerful tool for predicting where future earthquakes will occur. However, because very large earthquakes occur infrequently, the short instrumental record of seismometer readings now available can be misleading. The largest known earthquake in the Western U.S. occurred in 1700 AD just off the Oregon Coast, but there have been no major earthquakes (and very few of any size) in that area since seismometers have been installed. Historical records and geologic evidence are relied on to create longer records of earthquakes for hazard maps like those shown on the next page.

In addition to the plate boundary zones offshore, Oregon has many faults that produce earthquakes during infrequent bursts of activity

