United States Department of Agriculture | Forest Service | Intermountain Region | Salmon-Challis National Forest

The Day The Earth SHOOK

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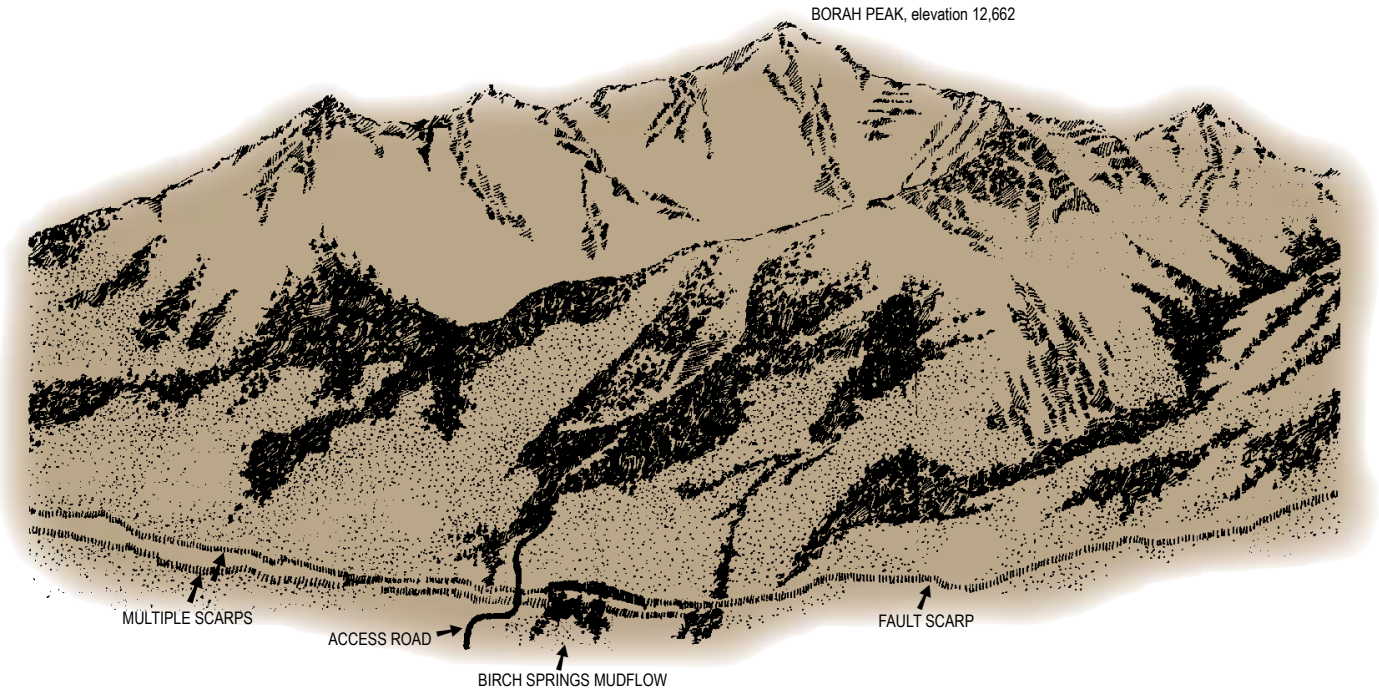

1983 EARTHQUAKE!!!
Borah Peak 7.3

At 8:06 a.m., Friday, October 28, 1983, an earthquake measuring 7.3 on the Richter scale rocked the West. It was the worst earthquake to hit Idaho in a century and the most severe in the Mountain West since 1959. Tragically, two children were killed in Challis, Idaho.

With the epicenter near Challis, Idaho, the earthquake toppled buildings, sent boulders crashing into homes, released new springs and geysers, and caused an estimated $12.5 million in damage in sparsely-populated Custer and Butte Counties. A scarp 21 miles long and up to 14 feet high near the base of Borah Peak is a haunting reminder of that day.

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The Making of a Mountain (Borah Peak)

There is a great deformation called the Western Cordillera (principal mountain range of a continent) that runs from the southern tip of Chile to Alaska. The Lost River Range in Idaho, rising over 6,000 feet above the valley floor, is in the central portion of the Cordillera. The Idaho Batholith lies to the west and the Overthrust Belt to the east.

The Lost River Range is a triple-ridge range. Borah Peak (12,662 feet) is in the central ridge and is the highest point in Idaho. Most of the rocks that outcrop in the range consist of lithified ocean sediments, even to the top of Borah Peak. It is possible to collect bivalve shells and corals from many locations in the Lost River Range, including peaks more than 12,000 feet above sea level.

The Lost River Range is composed of Paleozoic and Precambrian sedimentary rocks, complexly folded and thrust faulted during the Mesozoic Era. Much of the present topography of the Lost River Range is probably from displacement from the late Pliocene and Pleistocene Epochs. Over the last 5 million years there has been over 8,000 feet of displacement on the Lost River Fault, forming the Lost River Range and spectacular Borah Peak.

In the 1930's, Dr. Richter developed a system that was useful in the State of California to recognize variations in the energy released during an earthquake. The system has been used in the United States ever since. Each whole number is 10 times the energy release of the next smaller number; hence a Richter 5 earthquake has 10 times more energy than a Richter 4 earthquake. A Richter 7 earthquake has 1,000 times more energy than a Richter 4 earthquake.

In 1983, a 7.3 earthquake formed a new rupture which followed an ancient scarp near the base of Borah Peak. The principal movement of the new rupture was up and down. The angle at the break is 60º to 80º and is called a "high angle dip slip fault." Most of the active faults in the Intermountain Region are "high angle dip slip faults" that have moved one or more times during the past 10,000 years.

The 1983 earthquake also caused new springs and sand cones to develop north and east of Chilly Buttes (west of Highway 93 in Thousand Springs Valley). Sand cones are groundwater eruptions that develop a cone or tubular orifice. The geyser brings sand from the subsurface to form a low cone. Some of the new springs will be active for several years.

In the 1970's, geologists recognized that the existing scarp at the foot of Borah Peak was as high and fresh as any other along the 100-mile-long Lost River fault and might be the site of a future earthquake. Not only did that earthquake occur, but the new scarp created by the 1983 Borah Peak earthquake is identical to its predecessor. The scarp is now twice its former height and 21 miles long.

The Lost River fault thus created two nearly identical earthquakes during the past two ruptures at Thousand Springs Valley. But are all ruptures of the fault at the Valley similar to the 1983 event? Borah Peak now stands one and one-half mile above the deepest deposits in the valley, although they are composed of the same rock and once stood at the same level. If each earthquake increased the separation between Borah Peak and the Valley by six feet, then a Borah Peak earthquake must have struck 1,500 times since the birth of the fault about five million years ago.