

Geology

RESOURCE BRIEF

Importance

Bighorn Canyon exposes a record of geological processes, climates, and depositional environments going back millions of years. Bygone seas deposited layers of sediments in which are entombed fossils of the plants and animals that lived in those waters. Other sediments were deposited when the land was above sea level, including times when dinosaurs were present. The Laramide Orogeny, which began about 75 million years ago, uplifted the Bighorn and Pryor mountains. The Bighorn River gradually carved out the drainage now known as Bighorn Canyon, about 50 miles long, with walls that rise up 1,000 feet at Devil Canyon Overlook and over 2,000 feet where it crosses the north end of the Bighorn Mountains.

Changes in the Topography

The depositional environments of Bighorn Canyon date back to the Cambrian at the start of the Paleozoic Era (570 million years ago), and are nearly continuous through the Cretaceous at the end of the Mesozoic Era (65 million years ago). These include near shore sandstones, shallow marine deposits of mud and silt that formed shale, flat pebble conglomerates, marine carbonate shelves, beaches, arid coastal plains, coastal plains lush with vegetation, and deep marine environments that produced limestone and dolomite. The layers 5,800 to 7,500 feet thick that formed atop the Madison Limestone from the late Paleozoic Era to the early Cenozoic Era have largely eroded away where they were most uplifted, but they are exposed in the canyon walls at its north and south ends (Fort Smith and Horseshoe Bend). The Madison Limestone layer, which is up to 750 feet thick and the most resistant to erosion, forms the rim for the length of the canyon, where it is often reddened by minerals washed out of the overlying Amsden Formation.

Discussion

The 1966 completion of the Yellowtail Dam altered the canyon's geology by transforming the Bighorn River into a slowly moving lake. This ended the down cutting erosion of the river, although the canyon continues to widen as a result of rock falls. No longer carried through the canyon by a rapidly flowing river, sediments from upstream are forming a delta that is gradually extending further down the lake. This ongoing human-caused change to the lake bottom will affect future management of the dam, the lake ecology, and recreational use.



SHARON GENAUX

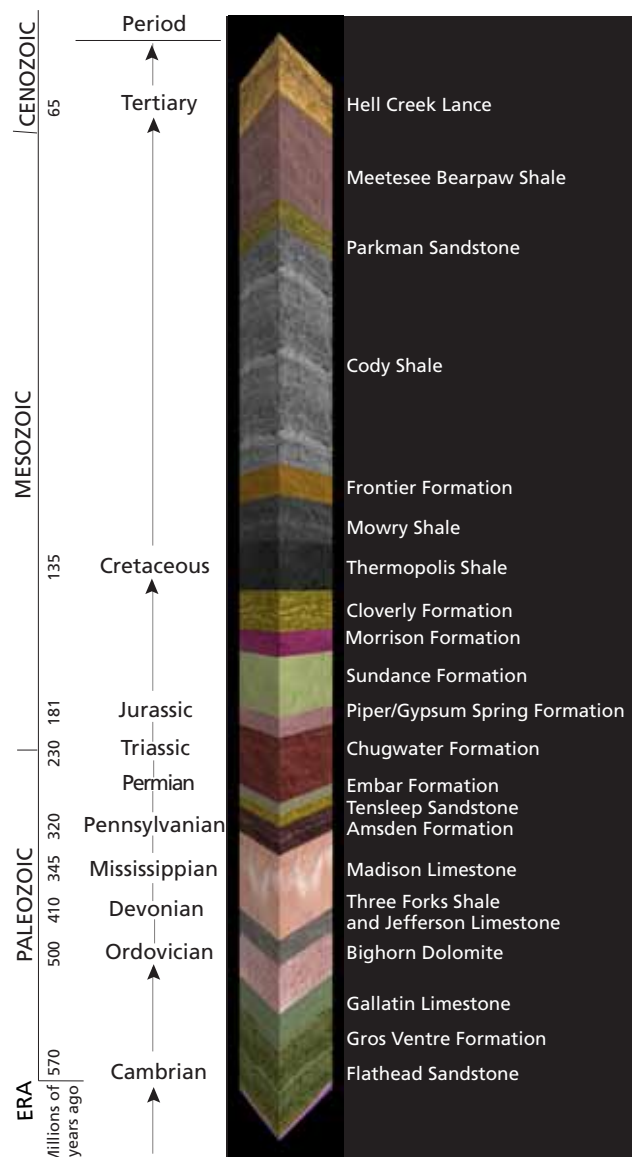


Figure 1. Stratigraphy of Bighorn Canyon.