

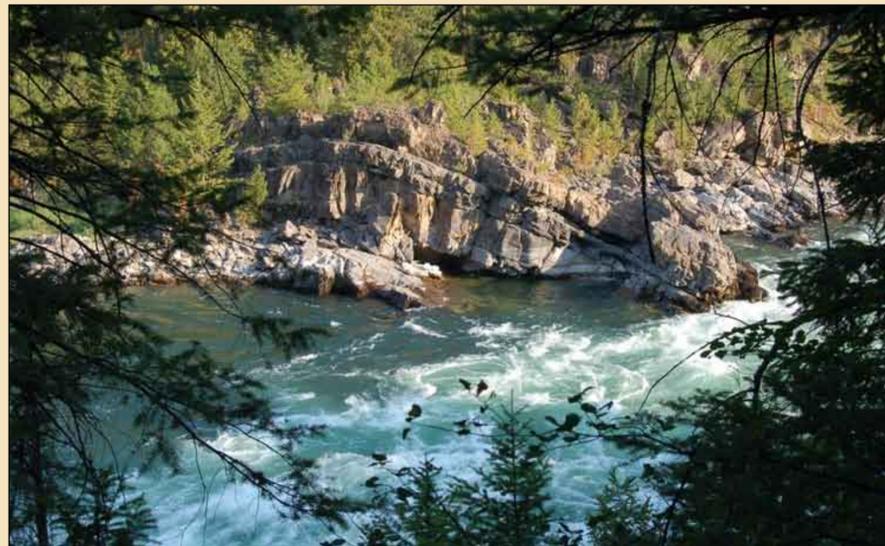
# Kootenai Falls and the Belt Supergroup



**T**he canyon along the Kootenai River exposes rocks of the Belt Supergroup, which consists of sandstones, called quartzites, and thin layers of hard mudstones or shales. These rocks form most of the outcrops along the highway from east of Libby to the Idaho border. In this area, the rocks are slightly folded so that the river cascades over the inclined hard quartzite beds in the stair-step-like falls. Individual folds may be seen in the north-facing road cut just south of Highway 2, southwest of the parking lot. Another fold may be seen north of the river. These folds resulted from east-west tectonic compression that caused north-to-south trending folds and faults throughout western Montana about 50 to 100 million years ago.

When the rocks belonging to the Belt Supergroup were deposited about 1.5 billion years ago during the Precambrian Era, much of western Montana was covered by shallow seas or lakes surrounded by very flat shores. Sediments in the water deposited thin beds of sand, mud, and calcium carbonate. The surfaces of the rocks often display mud cracks, ripple marks, and the spatter marks of raindrops. These structures can be found in outcrops along the Kootenai River, and indicate that the water covering the area was shallow, and occasionally, completely dried up. Algae mats often trapped fine particles of calcium carbonate to form rounded structures called stromatolites. Near the river below Swinging Bridge are wonderful examples of stromatolites.

Belt rocks dominate the mountains of northwestern Montana. The rocks along US Highway 2 between the Idaho border and the Continental Divide south of Glacier National Park consist almost entirely of the Belt Supergroup. The rocks next to the highway are brown, gray, red, green, purple, and yellow colors; dramatic cliffs occur where resistant, well-cemented sandstones are exposed.



*Kootenai River fold through trees. Photo by Larry Smith.*



*Ripple marks at Mount Shields Unit 3. Photo by Larry Smith.*

**Inset:** *Massive Stromatolites. Photo by Larry Smith.*

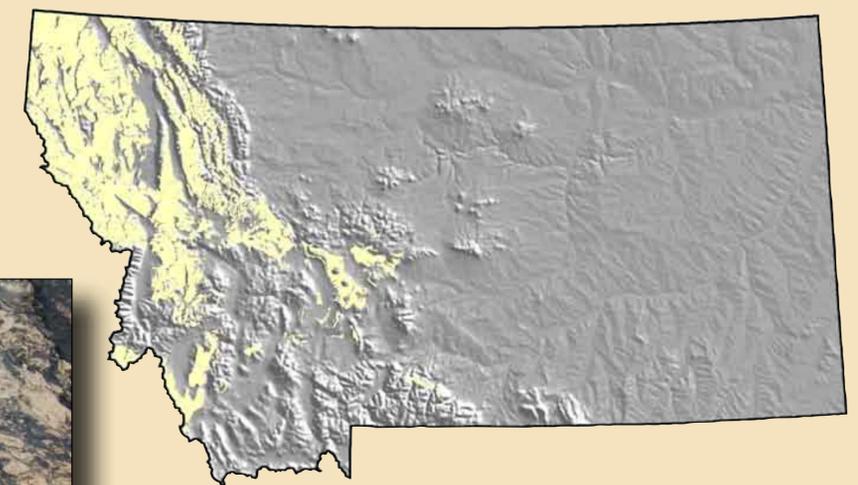


## Geo-Facts:

- The folds and small faults in the Kootenai Falls area are related to thrust faulting. Thrust faults are caused by compression, when one side slides over another.
- During the last ice age, a massive glacier dammed the Kootenai River near Bonners Ferry, Idaho. The river backed up a lake covering the valleys of northwestern Montana.
- Geologists map rocks as formations. The Belt rocks are so thick that similar formations have been combined into "groups," and the groups in turn are referred to as one very large unit called a "Supergroup."

## Geo-Activity:

- Look for something in your vehicle that you can fold such as a piece of paper or a T-shirt and see if you can fold it to mimic the way the rocks folded in a stair-step like fashion to form Kootenai Falls or the road cuts on the north side of the highway.



*Belt Supergroup indicated in yellow. Courtesy of Larry Smith*