Ice Age Floods

Glacial Lake Missoula

Remember Manny the Mastodon, Syd the Sloth, and the humongous ice dam that broke, saving their “herd” in the Ice Age movie. Well, almost of southeastern Washington was impacted by several massive real-life floods caused by the breakups of colossal ice dams in northern Idaho. In the 1920s, a geologist named J Harlen Bretz spent years studying massive landforms in eastern Washington, collectively known as the "Channeled Scablands". Bretz noted that streams in many of the canyons were far too small to have eroded such large gorges. The presence of "dry falls", huge boulders out of place geologically, and out of scale “fossil” ripples in gravel bars led Bretz to conclude that these oversized features were created by some sort of massive flood.

But where could such a massive flood originate? Would you believe Western Montana? During the last ice age, between 15,000 and 13,000 years ago, the Purcell Trench Lobe of the Cordilleran Ice Sheet formed an ice dam blocking the Clark Fork River at about Sandpoint, Idaho and creating Glacial Lake Missoula. The site of Missoula itself was under 900 feet of water.

Over the course of 2,000 years, the ice dam of Glacial Lake Missoula failed repeatedly, rapidly emptying the contents of the lake. After overflowing the shores of Glacial Lake Columbia, the floods spread out across the landscape and tore a myriad of channels across much of eastern Washington, creating the Channeled Scablands.
The floodwaters then flowed across the Quincy and Pasco basins before damming up temporarily behind Wallula Gap, a topographic constriction at the border of modern-day Washington and Oregon. The dammed water formed Lake Lewis, which stretched from present-day Yakima to Walla Walla.
If you’re looking for something to do with your kids or grandkids that will blow their minds, take them on virtual and real-life tours on the trail of ice age floods. One place to start is “Washington's Ice Age Floods”, an interactive slide show by the Washington State Department of Natural Resources.

https://wadnr.maps.arcgis.com/apps/Cascade/index.html?appid=84ea4016ce124bd9a546c5cbe58f9e29

The preceding maps are from that slide show. Additional links are below.

- Washington Geological Survey
- Ice Age Floods Institute
- Nick on the Rocks
- 2 Minute Geology
- United States Geological Survey
- Ice Age Floods National Geologic Trail
- Bruce Bjornstad
- HUGEfloods.com
- Montana Natural History Center
- NOVA

Two books that should be on your ice age flood bookshelf are:

- On the Trail of the Ice Age Floods: A Geological Field to the Mid-Columbia Basin, by Bruce Bjornstad, 2006
- Glacial Lake Missoula and Its Humongous Floods, by David Alt, 2001

Grand Coulee and the Dry Falls

One of the most striking pieces of evidence for ice age floods are the Upper and Lower Grand Coulees between Soap lake and Grand Coulee Dam. Over 900 feet of basalt rock layers were eroded by the flood from Glacial Lake Missoula as they surged through Glacial Lake Columba. A 1947 book by Fred O. Jones entitled Grand Coulee from Hell to Breakfast has several plates that depict the geologic history of the Grand Coulee.
Note the location of the Grand Coulee (Upper and Lower segments). The following plates are along a cross-section down the center of the Grand Coulee.

The Columbia Plateau basalts were easily erodible due to fractures inherent in the cooling lava.
The last plate in the series shows the extent to which the ice floods eroded the basalt into the coulees we see today.

Note these pictures of the Dry Falls.
THE UPPER GRAND COULEE
The Upper Coulee as seen from the Plateau north of Coulee City looking toward Steamboat Rock and Coulee Dam. It has been estimated that more than 20 cubic miles of rock were carved from the Grand Coulee. As many as 12 lava flows can be counted along the westwall.