

Rapids and Waterfalls Encyclopedia Article

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Rapids and Waterfalls

Rapids are stream sections with extremely strong currents, numerous obstacles, and steps in their streambeds. A waterfall is a vertical drop in a streambed. Both are sites of vigorous **erosion**. Rapids often form where resistant **bedrock** confines a stream to a narrow channel, and forces an increase in **water** velocity. Fast-moving water, laden with abrasive **sand** and gravel, cuts into the bedrock, forming cliffs on either side of the cataract. Large boulders fall from the cliffs, creating obstacles in the streambed, and increasing water turbulence. Rapids are navigational hazards that have hampered exploration, travel, and trade on the world's **rivers** throughout human history. Today, adventurers explore remote natural areas, and test their athletic abilities, by kayaking, canoeing, and rafting along these treacherous stretches of rivers.

Waterfalls form where fast-flowing water traverses a geologic contact between more resistant and less resistant **rock** layers, or across a fault that has juxtaposed different rock types. In other words, waterfalls often form at the end of a

Victoria Falls, bordering with Zimbabwe and Zambia. Cynthia Bassett. *Reproduced by permission.*

series of rapids. (The classic movie scene in which the protagonists survive a trip through rapids only to be carried over a waterfall contains an element of reality.) Turbulent, sediment-laden water quickly erodes the less-resistant rocks, creating a vertical step in the streambed. Falling water erodes the soft rock even more quickly, and the waterfall grows taller. Turbulence at the base of the waterfall undercuts the newlyformed cliff, and it moves upstream. Niagara Falls, for example, retreats upstream about 3.3 ft (1 m) each year. Waterfalls also form where streams flow across pre-existing cliffs. They are common where streams reach the ocean along eroding or tectonically uplifting coastlines. For example, many streams end at spectacular waterfalls along the Scandinavian **fjords**. Yosemite Valley's famous waterfalls occur where small streams flow over the rim of the valley. Angel Falls, in Venezuela, is Earth's tallest waterfall at 3212 ft (979 m). Victoria Falls, on the Zambizi River along the border of Zambia and Zimbabwe, is one of the natural wonders of world; its beauty and mythical history are legendary.

See Also

Bed or Traction Load; Stream Valleys, Channels and Floodplains