



How The Gap Was Formed



The Delaware Water Gap is the best known feature of the park, a distinct notch cut into the Kittatinny Ridge by the Delaware River. Once touted as a scenic Wonder of the World, it is about a quarter mile wide at river level and nearly a mile wide from the top of one mountain to the top of the other.

What Is A Water Gap?

Several words in the English language denote a *break* or *cleft* in the mountains. Chasm and notch are popular in New England; pass and gorge in the South and West of the United States. Gap is especially common in this

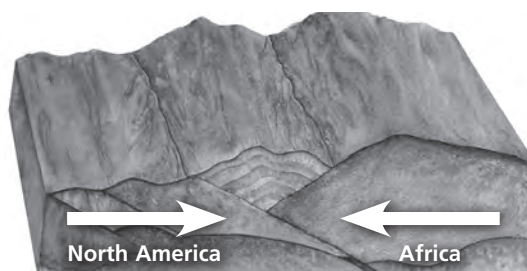
part of the country. A *gap* or *wind gap* is a break or pass through the mountains, in this case the Appalachian Mountains. A water gap is a pass that a river runs through the mountains.

How Does A Gap Form?

Though the geologic time frame may seem vast and remote, the results of geological processes are the mountains we hike on, the river we swim in, and the scenery we admire. There have been many ideas about how the Delaware

Water Gap formed. One current theory explains the Gap through a series of processes: continental shift (involving plate tectonics), mountain building (orogeny), erosion, and the *capturing* of rivers and streams.

Stage 1: Collision



The story begins 420 million years ago when the ancestral continents of North America and Africa collided. The impact caused the earth's crust to rise and mountains to form, including the Appalachian range.

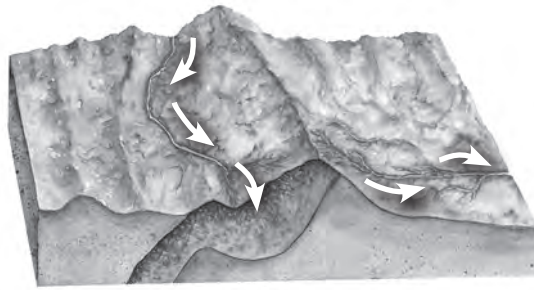
Streams flowing westward off these mountains eroded their slopes, carrying sand and pebbles west and depositing them in layers. These layers later compacted into erosion resistant gray

sandstone and conglomerate rock called the Shawangunk Formation. This rock is the dominant feature of the ridges on either side of the Delaware River today.

About 290 million years ago, in a second era of mountain building, further pressures crumpled and folded the layers of rock.

These layers eroded at different rates: softer limestones and shales eroded more quickly into valleys, while harder sandstone and conglomerate rock remained as mountains like Kittatinny Ridge. After this, the mountain part of today's Gap was essentially in place.

Stage 2: Erosion

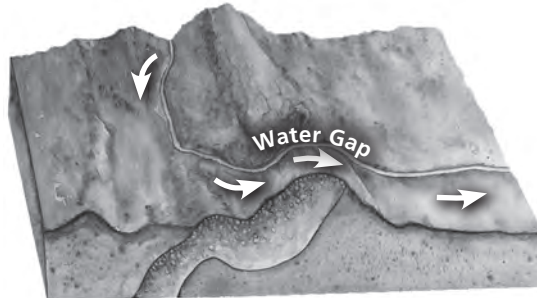


Millions of years ago, streams flowed into a river on the north side of the ridge, which flowed southwest.

Meanwhile, a second river whose headwaters were around present-day Trenton, New Jersey, flowed south to the sea.

The headwaters of this river eroded their way north toward the Kittatinny Ridge. The river headwaters eventually eroded an area of structural weakness in the Kittatinny Ridge.

Stage 3: Capture



When the headwaters of the second river eroded their way through the Kittatinny Ridge, they captured the river on the north side, forcing the water to flow through the gap.

Over time, this south flowing river has further eroded the soil and rock of the gap area and the river valley is continuing to deepen and widen the size of the gap to this day.

Are There Other Gaps?

Near the recreation area are several other gaps whose formation is related to that of Delaware Water Gap (See Figure 1).

At one time, rivers may have run through these gaps also, and it is possible that the Delaware River has captured the rivers in these other gaps as well.

When these gaps dried up, the erosive action of the river stopped, and most

of these gaps are much higher (less eroded) than the Water Gap.

While in the area, look on maps and signs for other gaps. There is Culvers Gap near Newton, NJ. On the Pennsylvania side Totts Gap, Foxtown Gap, and Wind Gap are examples of three gaps west of the southern end of the recreation area (See Figure 2).

West of Philadelphia, near Rt. 30, is a town simply named Gap.

Figure 1. A cross-section profile of the gaps in the ridges of Blue Mountain and Kittatinny Ridge today, looking northwest across the SW-NE axis shown in Figure 2.

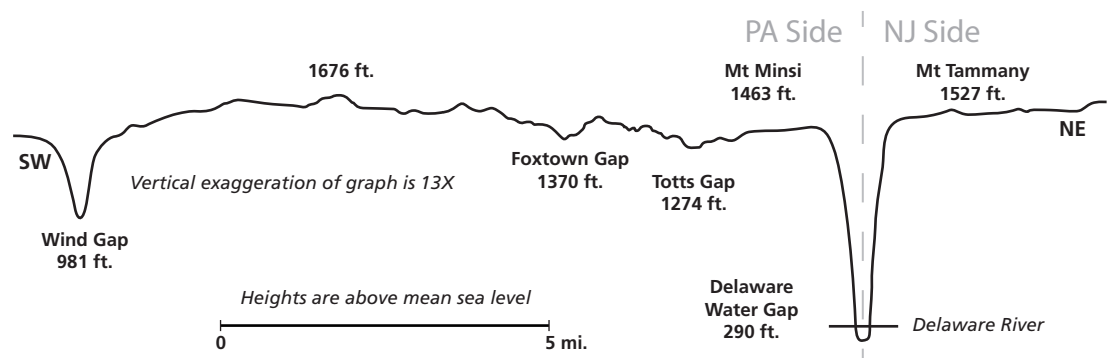


Figure 2. The same view showing surface features. The stream bed of Cherry Creek may indicate the ancient course of today's Delaware River. The creek runs under Route 611 in the Borough of Delaware Water Gap, PA, and continues east into the Delaware River.

