

## Geology

The reddish cliffs at the Hopewell Rocks were first formed millions of years ago as a massive mountain range – older than the Appalachians and larger than the Canadian Rockies – slowly eroded. Mud, pebbles and rock washed down the mountains into the valley. Over time, these deep layers of sediment compressed into solid rock, forming the basis for the flowerpot formations.

Through the millennia, as the earth's crust twisted and tilted, the rock layer broke into blocks, creating vertical fissures. Rain and ice whittled away at these fissures, separating the cliffs into chunks of rocks. The last ice glacier retreated about 13,000 years ago.

This area was once a dry rift valley, but after the Ice Age, the valley filled with water, creating the Bay of Fundy. While rain and ice continue to erode from the top, the daily tidal action wears away at the bases of the cliffs and rock formations. One can clearly see how high the tides rise by looking at the narrow curved bases of the formations.

Today, visitors clambering over and between clusters of rounded mounds cloaked in rockweed may not realize that these are the remains of age-old formations, toppled by the tide, and slowly disintegrating as the Bay of Fundy tides continue to sculpt the flowerpots of the future and erase those of the past.

*The fascinating geology of the natural rock formations at the Hopewell Rocks, on the Bay of Fundy, is a history worth learning.*

The story begins over 600 million years ago when two continents collided and the Caledonia Highlands Mountain range was formed. Over time, these mountains eroded; rocks and pebbles washed down from the mountain into the level ground of a wide rift valley. Over millions of years, these layers of rock and pebble compressed and cemented together into a large shelf of conglomerate rock interspersed with layers of fine sandstone.

Millions of years later, during a period of tectonic activity, these layers of conglomerate, sandstone and shale were uplifted and tilted to a 30-45° angle. Vertical cracks or fissures divided the rock into large blocks. Ice and rain caused these fissures in the rocks to widen and erode forming the beginnings of the flowerpot formations.

With the retreat of the Ice Age, a mere 13,000 years ago, this dry valley bed filled with the glacial meltwater and the sea level rose. This was the birth of the Bay of

Fundy.

## **Flowerpot Rocks**

As tidal action became stronger, it began to erode the soft sandstone along the shoreline. Surface water, filtering down through the vertical cracks in the cliffs, eroded from the top, gradually separating these large blocks of rock from the adjoining cliffs – many with the vegetation still intact. Meanwhile, powerful tides began to carve away the bases, leading to the creation of numerous sea caves and, most noteworthy...the world famous Flowerpot Rocks.

Striations in the rock formations are evidence of upheaval. Today, while walking along the ocean's floor at low tide, visitors can see the evidence of this tilting in the layers of rock, the vertical cracks which are the genesis of new formations, and the telltale high tide marks along the cliffs.

At low tide, the rockweed-covered mounds, which are evidence of toppled formations, show how much these cliffs have eroded. Geologists estimate, though, that there is still enough conglomerate rock for another 100,000 years of sculpted flowerpots.

## **Nicknames**

The tidal action of the Bay of Fundy has sculpted the formations into intriguing shapes – which many have called the 'Flowerpot Rocks'.

Through the years, park staff and visitors have given them other nicknames, as well . One of the most familiar in this region was Elephant Rock, and for many years, this formation was featured on New Brunswick's Medicare cards. Unfortunately, a number of years ago, the elephant's trunk succumbed to erosion and collapsed.

Other formations are Dinosaur Rock, Mother-in-Law, E.T., Lover's Arch, Turtle Rock, The Bear, Diamond Rock, Apple Rock and Castle Rock...just to name a few. Our [park map](#) identifies their locations on the beach.

## **Sea Caves**

The conglomerate cliffs of Hopewell Cape have two weak points: the vertical fractures and the layers of sandstone. The red sandstone is so porous, it will rub off on your fingers, but the conglomerate layer near the top of the cliffs is much harder.

Rain, ice and tidal action wear away at the soft sandstone layers in these vertical fractures that sometimes extend deep into the cliffs. As the harder layers of conglomerate are left unsupported, chunks collapse, sometimes creating small caves

that grow larger over time. The Hopewell Rocks park has several small caves, but our largest, and most visible, is one that has a picture window!

Additional links:

<http://www.bayoffundytourism.com/>

<http://www.bayoffundytourism.com/media/storyideas.php>

[http://www.bayoffundytourism.com/things\\_to\\_do/ecozones/cliffs\\_fossils.php](http://www.bayoffundytourism.com/things_to_do/ecozones/cliffs_fossils.php)