



Close to nature.
Close to home.

The Bruce Trail Association

Cheltenham Badlands

BTA mission statement: To provide a public footpath along the Niagara Escarpment and promote protection of the Escarpment and appreciation of its natural beauty



Frequently Asked Questions

What are the greenish grey stripes?

There are many different opinions on the origin of these unusual stripes, but generally it is felt that they are a result of chemical alteration. For example, the majority of the shale you see is red, stained by red iron oxide. The red iron oxide can be chemically altered into greenish grey iron oxide, usually by chemicals naturally present in groundwater or in organic matter. This chemical alteration will also occur at locations where the Queenston Shale is in contact with other rock types (either overlying or underlying rock, or minor changes in layers within the shale).

Why are the Badlands significant?

Much of south-central Ontario is underlain by layers of shale which are protected with hard bedrock or sand and gravel. The red shale of the Queenston Formation is close to the surface at or near the base of the Niagara Escarpment, and does not have a protective layer of material. The Cheltenham Badlands have been identified as a *Provincially Significant Earth Science Area of Natural and Scientific Interest (ANSI)* as it is the best representative site of Badlands topography.

Where is the erosion from the Badlands deposited?

The eroded shale runs into a stream located at the base of the Badlands. This stream drains into the Credit River. Increased amounts of sediment, in the form of eroded shale, may be harmful to several of the fish species that use parts of the stream as a summer refuge.

Who owns the property?

In 1999 the Cheltenham Badlands property was bought for the Bruce Trail Association with funds from the Ministry of Natural Resources' *Natural Areas Protection Program*. The property was purchased to secure 1.7km of Bruce Trail Optimum Route, and to conserve a rare *Earth Science ANSI (Area of Natural and Scientific Interest)*. Title was vested in the Ontario Heritage Foundation to ensure its long-term protection as a natural area.

How is the property managed?

The BTA Land Stewardship program works towards conserving and restoring the natural features of the Niagara Escarpment. One of the stewardship goals is to minimize the amount of sediment entering the Credit River, while conserving the rare features of the Badlands.

What can YOU do to help preserve the Badlands?

Natural erosion processes cannot be stopped; wind and rain will continue to slowly erode the Badlands. However, erosion from human impact can be limited by staying on designated trails and preserving the existing vegetation. With appropriate, respectful use, we can ensure that this incredible site continues to be enjoyed now and in the future.



How did this... Become this?

Where you are now standing was once the edge of a warm, shallow sea. Far to the southeast, a mountain range the size of the Himalayas was building, and rivers from these mountains were sending red, iron-rich sediment from the mountains into the sea, forming a large, muddy delta. The sea was teeming with life, but on land, no plants or animals had yet developed.



Aerial View of Delta

Formation of the Queenston Shale

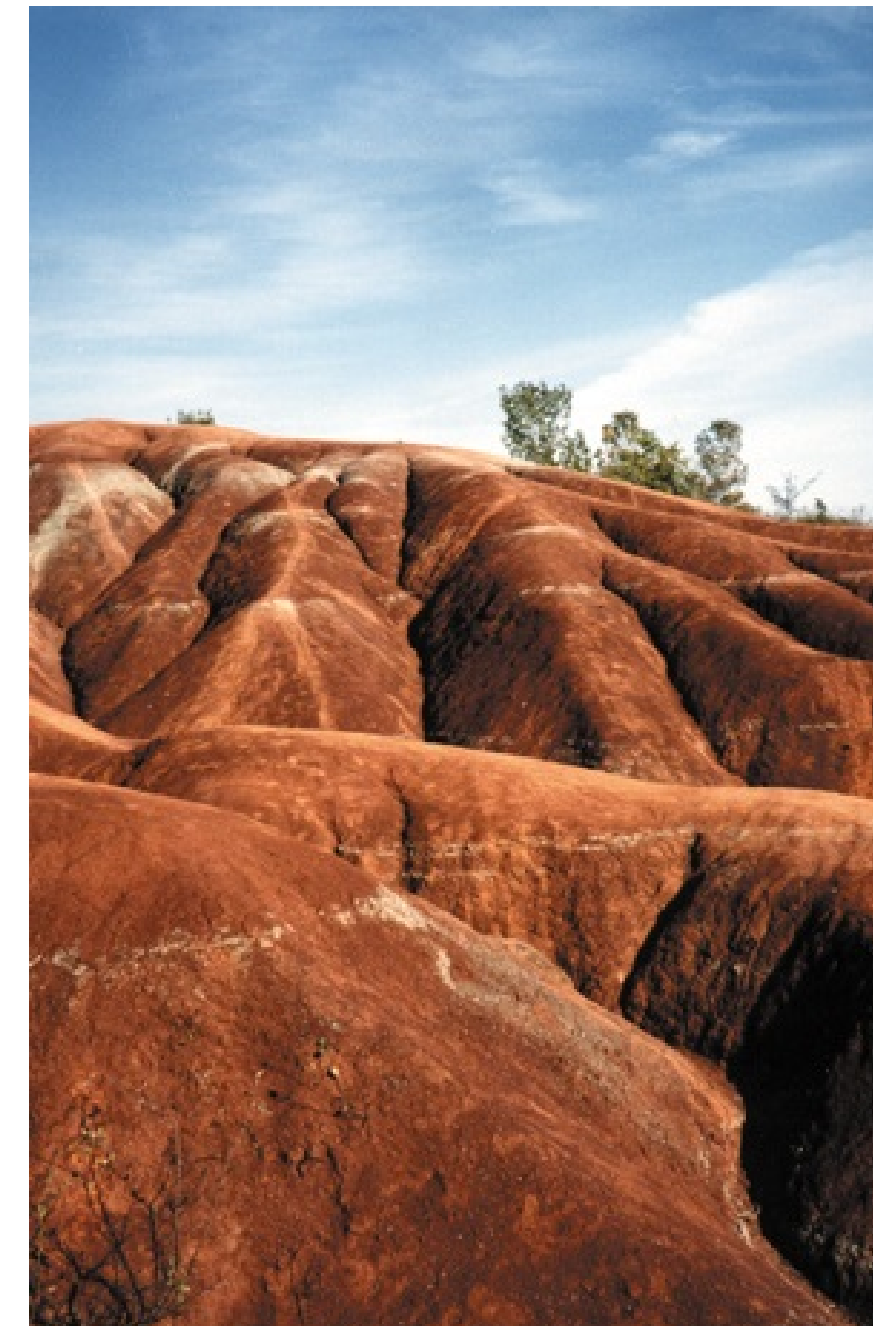
During the late Ordovician Period, approximately 430 million years ago, a large, shallow sea filled an area now inhabited by the Great lakes, called the Michigan Basin. The climate was tropical, and although the shallow sea was teeming with life, plants and animals had not yet been established on land.

Southeast of the Michigan Basin (roughly where the Appalachians are now) a mountain range was rising from the collision of the North American and European Plates. The rocks of these mountains were rich in iron, and rivers flowing down the mountains picked up the red, iron-rich sediment and transported it to the sea.

When the fast-moving rivers reached the calm sea, the sediment was deposited, creating a mighty delta. Today, similar deltas are being formed at the mouths of rivers such as the Ganges (see photo above), the Nile and the Mississippi.

In time, the sea occupying the Michigan Basin deepened and other sediments, many containing the shells of sea creatures, were deposited on top of the red delta mud. Compaction of this mud formed the Queenston shale; overlying sediments were compressed into the shale, limestone and dolostone that make up the rest of the Niagara Escarpment.

The sea occupying the Michigan Basin rose and fell several times during the Earth's geologic history. Other layers of sediment accumulated, but 250 million years ago the sea disappeared for the last time, and a long period of erosion began.



Badlands Topography

The land was cleared for farming in the early 1900s. Removal of the vegetation, combined with overgrazing by livestock, exposed the shale to the elements. Use of the land for grazing stopped in the early 1930s, but the shale has continued to erode, causing the badlands to increase in size each year.

Formation of the Badlands

Queenston Shale is a very soft rock, in comparison to the harder sandstone, limestone and dolostone that make up the rest of the Niagara Escarpment. Erosion of the shale can occur rapidly if layers of other rock or vegetation are removed, and particularly if the area is impacted by grazing and large numbers of people.

The Badlands probably began to form in the early 1900s when the trees were cut down to allow for a cattle pasture. The protective layer of vegetation was removed and the shale began to erode; although farming at the site ended in 1931, erosion of the badlands has continued to its present-day state.

The Badlands are part of Ontario's Niagara Escarpment, which was designated a *UNESCO (United Nations Educational, Scientific and Cultural Organisation) World Biosphere Reserve* in 1990.

The property contains one of the best examples of "badlands topography" development in southern Ontario, and has been identified as an *Earth Science Area of Natural and Scientific Interest (ANSI)* by the Ministry of Natural Resources. Badlands topography is rare in Ontario because in most areas the shale is protected from erosion by overlying hard rock (limestone, dolostone or sandstone), sand or gravel.

The Badlands lie within the *Inglewood Slope Environmentally Sensitive Area (ESA)*, which is an important groundwater discharge area. The coldwater stream on the property at the foot of the badlands is a tributary of the Credit River.

And how do we protect it?

The first step has already begun.

The Bruce Trail Association (BTA) manages this property through the BTA Land Stewardship Program, with assistance from the local volunteer land steward, the Caledon Hills Bruce Trail Club and the Caledon Countryside Alliance.

The Credit Valley Conservation Authority has also been consulted regarding the protection of this property, with particular focus on the streams and fish. A management plan has been developed to assure long term stewardship.

The BTA is a charitable, membership-based, volunteer organisation. The Bruce Trail assures free public access to the magnificent Niagara Escarpment, a *UNESCO World Biosphere Reserve*.

Please enjoy the Cheltenham Badlands responsibly. Consider making a donation to the BTA, or become a member or volunteer, and support the BTA's efforts to ensure public access to the Niagara Escarpment, while working to restore its natural habitat.

For more information about the Bruce Trail, call 1-800-665-HIKE or visit our web site at www.brucetrail.org

Purchase of the property and the interpretive sign were funded by the Natural Areas Protection Program of the Ontario Ministry of Natural Resources

Prepared by the Bruce Trail Association Environment Committee

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