

# Temiskaming Shores

## Flat Farmland, Diamonds and a Rift Valley

The surprising appearance of flat and fertile farmland at New Liskeard as you drive north on Highway 11 may cause you to think that you are in southern Ontario. Rugged Canadian Shield landscape is replaced by flat land and agriculture of the "Little Clay Belt". The city of Temiskaming Shores, which includes the towns of New Liskeard and Haileybury, lies adjacent to this distinctive, out-of-place landscape and has a unique geology for you to explore. This GeoTour guide highlights the geology at a popular viewpoint, 2 parks on Lake Timiskaming, and a remarkable rock garden. Collectively, these sites tell us about a dynamic rift valley with faults and earthquakes, a modern search for diamonds, and rocks with fossils from an ancient seafloor.



Rich soils deposited on the floor of an ancient glacial lake support farming along Highway 11 north of New Liskeard.

## How to get to Temiskaming Shores

Temiskaming Shores is 217 km by highway northeast of the city of Greater Sudbury. Once there, you can take Highway 558 (which becomes West Rd. then Main St.) into Haileybury for GeoTour stops 2, 3 and 4, or continue north 3.5 km to GeoTour stop 1, on the outskirts of New Liskeard.

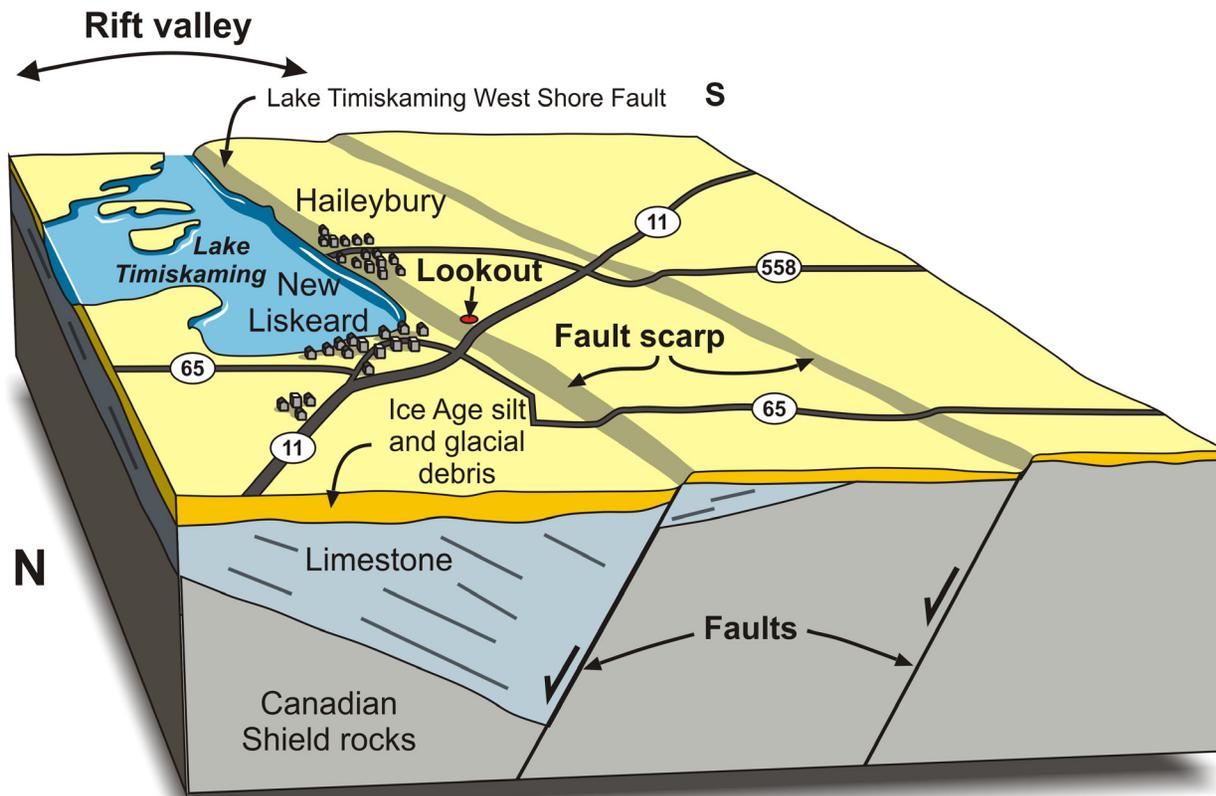


Map of GeoTour stops in the city of Temiskaming Shores.

# Temiskaming Shores

## An ancient rift

Temiskaming Shores lies within an ancient rift valley that formed as ancient cracks in our continent. These cracks, or faults, formed about 155 million years ago as the supercontinent of Gondwana broke into 2 landmasses to form the new smaller continents of North America and Europe, with the Atlantic Ocean filling in between them. Cracks penetrated the North American continental rocks, creating faulted rift valleys. Today, these ancient rifts contain the valleys of the St. Lawrence River, Ottawa River, Lake Ontario and Lake Timiskaming.



This block diagram looks south across the rocks and faults of the rift valley that underlies Temiskaming Shores.

# Temiskaming Shores

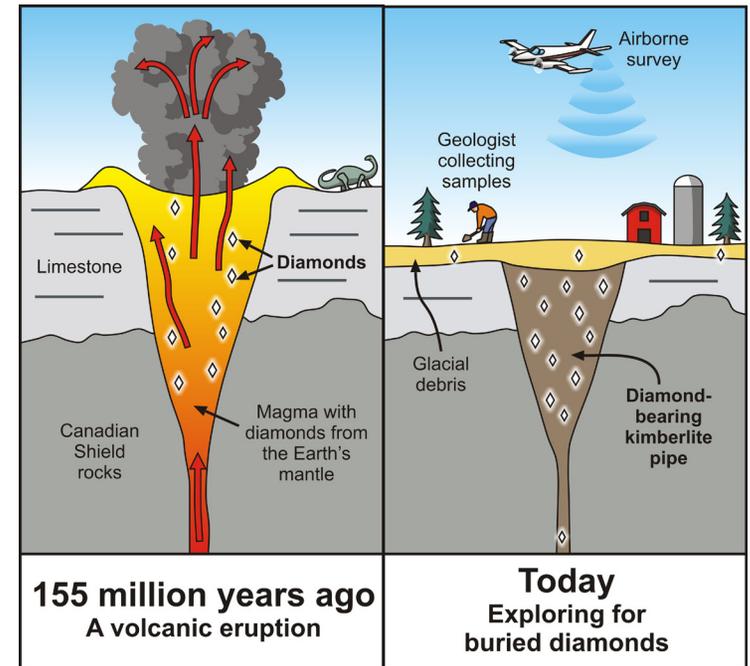
## Diamonds from the deep – Geologic exploration challenges

Geologists have recently discovered diamonds in rocks near Temiskaming Shores. These diamonds are in volcanic features referred to as kimberlite pipes that lie buried below the cover of glacial sediments in the area. To date, none of these kimberlite pipes has been found to contain sufficient diamonds to economically mine. However, they are similar to those at Ontario's first diamond mine near Hudson Bay, southwest of Attawapiskat, and so geologists continue to search for an economic deposit.

Why are there diamonds at Temiskaming Shores? Diamonds can only form at the tremendous temperatures and pressures found deep in the Earth's mantle. During the Jurassic Period, about 155 million years ago, the North American continent moved across a super-heated plume in the underlying Earth's mantle. This hot spot caused volcanic eruptions of kimberlite magma, and some of the kimberlite eruptions carried diamonds up from the upper mantle. The faults of the Lake Temiskaming rift provided a pathway through the continental crust for the eruptions. Geologists therefore continue to explore the rift valley for diamond-rich kimberlites.



This aeromagnetic map was produced using magnetic sensors carried on an airplane and shows variations in the Earth's magnetic field. Geologists interpret these variations and correlate their signatures with different types of rock. It gives geologists a road map of what lies below the surface. The Geological Survey of Canada and Ontario Geological Survey provide digital versions of these maps free of charge to the public. In this image, a geologist points to a magnetic feature on the map that has been interpreted as a kimberlite pipe, buried below a layer of glacier debris. Prospectors and exploration companies routinely use these maps to identify potential targets for further groundwork, such as geochemical soil sampling.



Volcanic eruption creates a kimberlite pipe (a carrot-shaped body of igneous rock that sometimes contains diamonds) and later, erosion and burial below glacial debris creates an exploration challenge for geologists.

# Temiskaming Shores

## ➤ Stop 1: Goudreault Memorial Park Scenic Lookout

GPS co-ordinates: N47° 30.625', W79° 41.800'

Just west of New Liskeard, Highway 11 descends a long hill. Midway down the hill is the entrance to Sergeant Martin Goudreault Memorial Park on the right. From the lookout at the park, there is an expansive view eastward across a broad valley of farmland. This is the Little Clay Belt, a lowland over 40 km wide that straddles the Ontario–Quebec border. The lowland is underlain by rich soils that were deposited on the floor of a glacial lake that once covered the valley 10 000 years ago. Lake Timiskaming is a remnant of that larger glacial lake.



**Stop 1:** View from the scenic lookout across the escarpment created by the Lake Timiskaming West Shore Fault to the farmland of the Little Clay Belt situated on the rift valley.

### How to get there

The entrance to Goudreault Memorial Park is on the east side of Highway 11 on the outskirts of New Liskeard.

However, there is more to this story. The hillslope you are standing on is very unusual; it continues in a straight line to the northwest and to the southeast, along the steep western shore of Lake Timiskaming, for a total distance of 70 km. This hill is an escarpment, or scarp, created by ancient movement on the Lake Timiskaming West Shore Fault. This is one of several faults that form the Lake Timiskaming Rift Valley.

**Stop 1:** Limestone block beside the parking area. The limestone was quarried locally from a formation that underlies the valley. Layers in the limestone were deposited as lime mud on an ancient seafloor 400 to 500 million years ago.



# Temiskaming Shores

## Step 2: Hughes Lookout, Lake Timiskaming

GPS co-ordinates: N47° 27.644', W79° 38.407'

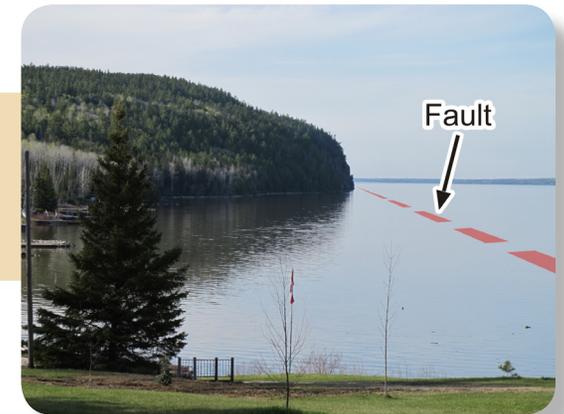
This small pullout along Highway 11B north of Haileybury provides a view along the shore of Lake Timiskaming. This straight and steep-sided shoreline is the result of ancient movement on the Lake Timiskaming West Shore Fault. The name of the lake comes from the Algonquin word *temikami*, or *temikaming*, which means “deep waters”. Vertical movement on the fault has created a deep basin, and in places the lake is over 200 m deep.

### How to get there

Hughes Lookout is on Lake Shore Road (Highway 11B) about 1.5 km north of Main Street in Haileybury.



**Stop 2:** Steep rock cliffs (scarps) along the shores of Lake Timiskaming, such as this cliff south of Haileybury known as Devil's Rock, mark the location of ancient faults.

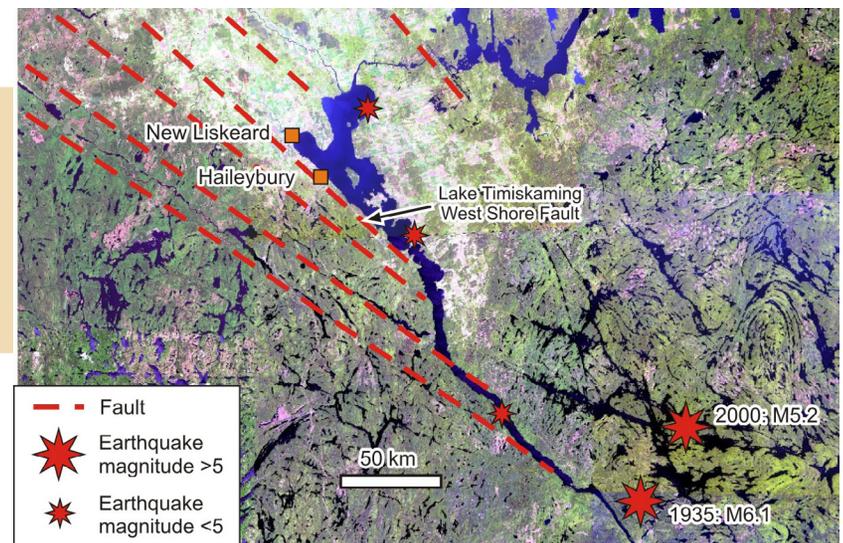


**Stop 2:** Looking southeast down the fault-bound shore of Lake Timiskaming.

### Timiskaming trembling

Although the faults that created the Lake Timiskaming Rift Valley are ancient, movement continues on some of these faults. On average, the Lake Timiskaming region experiences 1 earthquake every other year that measures greater than magnitude 3 on the Richter scale. The 2 most significant earthquakes in the last century were the magnitude 5.2 earthquake on January 1, 2000, and the magnitude 6.1 earthquake in 1935, shown in the satellite image.

A satellite image of the Lake Timiskaming region showing the location of major faults and the epicentres of historic earthquakes.



# Temiskaming Shores

## ➤ Stop 3: Haileybury Beach and Marina

GPS co-ordinates: N47° 26.921', W79° 37.813'

The Haileybury Beach and adjacent marina together make up a popular waterfront park for residents and tourists. Located at the foot of Main Street in Haileybury, the marina provides views across Lake Timiskaming, and has some interesting geology in the rock blocks that make up the breakwater.

Take a walk along the pathway built on the breakwater around the marina. The breakwater is made of large limestone blocks that were quarried nearby. Limestone is a common rock type in southern Ontario, but is rarely seen exposed along highways in northern Ontario. Fossils such as coral, crinoids and gastropods in the rock indicate that this limestone is 400 to 500 million years old. Limestone once covered most of the Canadian Shield, as it does today in southern Ontario. Erosion over the millennia has removed much of this limestone, exposing the Canadian Shield rocks in much of northern Ontario and northern Canada. However, limestones that were down-dropped by faulting within the Lake Timiskaming Rift Valley have been protected from erosion and underlie the valley.



**Stop 3:** Boats at the Haileybury Marina are protected behind breakwaters made of limestone blocks that contain fossils.

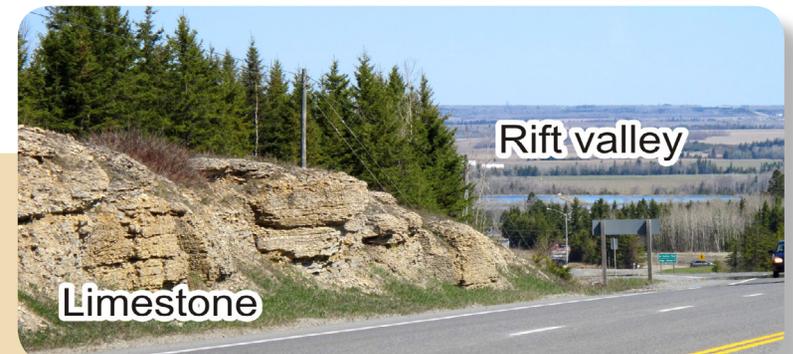
**Stop 3:** An ancient fossil snail (gastropod) in a limestone block at the Haileybury Marina. Penny for scale is 1.9 cm in diameter.



## How to get there

Haileybury Beach and Marina are at the foot of Main Street along Farr Drive in downtown Haileybury.

Outcrops of flat-lying layers of limestone are exposed along Highway 11 west of Haileybury.



# Temiskaming Shores

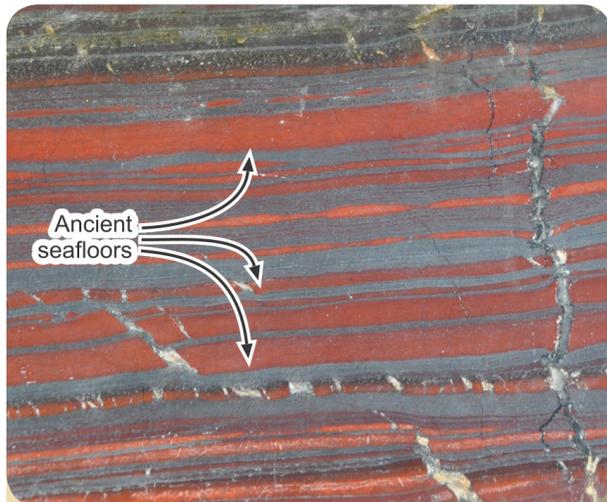
## ➤ Stop 4: Rock Walk Park at Northern College

GPS co-ordinates: N47° 27.125', W79° 38.389'

On the back streets of Haileybury is the campus of Northern College, home of the Haileybury School of Mines. For the last 100 years this school has played a critical role in the mining industry and economic development of northern Ontario by training mining technicians that have become the miners, engineers and managers of mines across Canada and around the world. Spread out in a large park-like setting beside the campus is Rock Walk Park, a massive outdoor geological garden. Here visitors can examine rock samples and learn about the rich ores and diverse rocks of northern Ontario and Canada.



**Stop 4:** Large rock specimens with information plaques line the pathways of the Rock Walk Park.



**Stop 4:** Close up of bands in the iron formation.

**Stop 4:** A large cut and polished monolith of banded iron formation is from the former Sherman Mine near Temagami. The rock contains colourful layers that were deposited as iron-rich sediments over 2.7 billion years ago on an ancient seafloor.



## How to get there

From Main Street on the west and higher elevation side of Haileybury, go north on Rorke Avenue and west on Florence Street to the Haileybury Campus of Northern College. The Rock Walk Park is on the south side of the college building.

# Temiskaming Shores

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