



Enjoy your explorations!

Nova Scotia has some of the most varied, accessible and fascinating geological sites to be found anywhere. Varied because sites range from the ice-smoothed granite of Peggys Cove to the dinosaur-bearing red sandstone of the Minas Basin shores and the historically significant Coal Age deposits of Cape Breton Island and elsewhere. Accessible because of the marvelous rock exposures along the Province's coastline, such as at Blue Beach, Joggins Fossil Cliffs, and Green Cove. And fascinating because of the many colourful minerals and scientifically significant rocks and fossils found within Nova Scotia's boundaries. This brochure aims to give both Nova Scotians and visitors alike a taste of the Province's rich geological heritage, to suggest some good natural places to visit, and to showcase establishments that are geared toward aspects of Nova Scotia's minerals, rocks, fossils, and landscape.

Nova Scotia Rocks

Explore Our Geology

Brochure Reprint Committee: Jennifer Bates, Rob Fensome (Geological Survey of Canada - Atlantic), Sandra Barr, Rob Raeside, Chris White (Acadia University), and Tracy Webb. The committee gratefully acknowledges Sonya Dehler for the paleogeographic reconstructions, Ralph Stea for ice-retreat diagrams, the Nova Scotia Department of Natural Resources and Renewables, Geoscience and Mines Branch, for the geological map, and Nova Scotia Department of Communities, Culture and Heritage for the tourist map. We also thank Andy Henry, Patrick Potter, Graham Williams, and Nancy Muzzatti, who helped with the previous edition, Tanya Cockkanoff for the original graphic design, and all who provided photographs and suggestions for earlier editions.

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Blue Beach Fossil Museum and Research Centre

The fossils displayed at the Blue Beach Fossil Museum include the earliest assemblage of fossil footprints on Earth, a unique window on the invasion of the land by vertebrates at the beginning of the Carboniferous Period. Tours through the museum or along the fossil beach enlighten visitors with tales from 350 million years ago - considered by many to be no less than "evolution's greatest mystery" (cover, Discover Magazine, June 1995).

127 Blue Beach Road Hantsport, NS B0P1P0 Phone: 902-790-9541 Email: info@bluebeachfossilmuseum.com

OUT OF THE AGE 1



Cliffs of Fundy Geopark

The Cliffs of Fundy Geopark stretches 165 kilometres along the north shore of the Minas Basin and Bay of Fundy from Lower Truro to Apple River.

Home to the highest tides in the world and steeped in Indigenous legends, explore the geological diversity of this world-renowned region featuring amazing rock formations, cliffs, tidal estuaries, beaches, waterfalls, trails, and lighthouses. Here along the ancient Cobequid Fault you will also find evidence of the Earth's incredible natural history including the best example of how the supercontinent Pangea was formed 300 million years ago and broken apart 100 million years later.

Phone: 902-641-2225 fundygeopark.ca

OUT OF THE AGE 2



Fundy Geological Museum

The Fundy Geological Museum is the world centre for experiencing geological history interpreted from the unique features of Nova Scotia's Fundy region. In our gallery, an ancient Nova Scotia is revealed. See what the province was like 200 million years ago when dinosaurs roamed. View diverse collections of local minerals as well. Pay us a visit and stay for a while to discover our beautiful region along the north shore of the Bay of Fundy. Connect with an ancient past and discover a spectacular present, with the world's highest tides, breathtaking vistas and opportunities for active outdoor adventures.

162 Two Islands Road, Parrsboro, NS B0M 1S0 Phone: 902-254-3814 Toll free: 888-856-DINO (3466) email: fundygeo@novascotia.ca fundygeological.novascotia.ca handle: @fundygeomuseum

OUT OF THE AGE 3

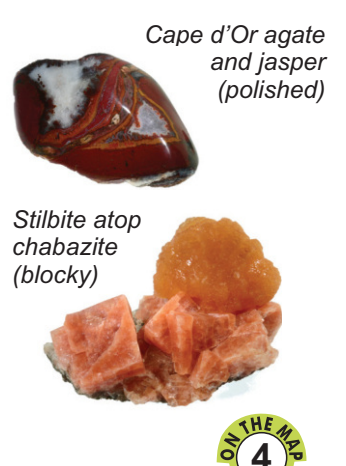


Tyson's Fine Minerals

Nova Scotia is famous for its zeolites - minerals associated with the basalt rocks along the shores of the Bay of Fundy and Minas Basin. Stilbite (Nova Scotia's provincial mineral) has a pearly lustre that led to its name (from the Greek "stilbe" for "mirror"). Chabazite specimens here are among the best in the world. Nova Scotia also boasts spectacular varieties of agate (Nova Scotia's provincial gemstone) and jasper.

Visit Tyson's to see their impressive collection of minerals from the local area and beyond.

114 Lambs Hill Road Parrsboro, NS B0M 1S0 Phone: 902-728-9364 www.tyson-minerals.com



OUT OF THE AGE 4

Fundy Ocean Research Centre for Energy VORCE

FORCE is Canada's lead research facility for tidal stream technology, created to better understand how this technology can play a role in Canada's clean energy future and help respond to climate change impacts like ocean acidification, sea level rise, and coastal erosion. The geology of the Minas Basin plays a role in making the study area an ideal test site with water depths of up to 45 metres at low tide and a sediment-free bedrock sea floor, straight flowing currents, and water speeds up to 5 metres per second. The FORCE test site hosts a visitor centre that offers exhibits, interactive displays, and stunning views.

1156 West Bay Road, Parrsboro, NS B0M 1S0 Phone: 902-254-2510 email: visitor_centre@fundyforce.ca Hours of operation at www.fundyforce.ca

OUT OF THE AGE 5



Cape Chignecto Provincial Park

Transacted by the Cobequid-Chedabucto Fault Zone, the Cape Chignecto Provincial Park is scenically spectacular and geologically fascinating. The Fault Zone, which marks where the Meguma terrane collided with ancient North America, can be seen on the beach at Red Rocks. Outstanding geological features also include the Three Sisters sea stacks, Nova Scotia's highest raised beach (almost 40 m above present sea level) at Squally Point, and fossilized evidence of "Coal Age" plants (like at Joggins) in the cliffs at Spicers Cove. A network of challenging hiking trails offers spectacular views and back-country camping, but please use caution due to high coastal cliffs and tides. Other park sites are the Red Rocks visitor centre and the Eatonville day use area.

1108 West Advocate Road, Advocate Harbour, NS Telephone: (902) 392-2085 parks.novascotia.ca/park/cape-chignecto

OUT OF THE AGE 6



Joggins Fossil Cliffs

A UNESCO World Heritage Site, the Joggins Fossil Cliffs reveal the world's most complete fossil record of life in the Late Carboniferous Period or "Coal Age". Fossils are embedded in the 15 kilometres of coastal cliffs and due to constant weathering by the highest tides in the world new fossils are always waiting on the beach to be discovered. Before you visit the Joggins Fossil Cliffs, stop by the Joggins Fossil Centre to learn more about the Carboniferous Period and see some of the best fossils from the Cliffs. The Centre also offers guided beach tours.

100 Main Street, Joggins, NS B0L 1A0 Phone: 902-251-2727 Toll-free: 1-888-932-9766 Email: info@jogginsfossilcliffs.net www.jogginsfossilcliffs.net

OUT OF THE AGE 7

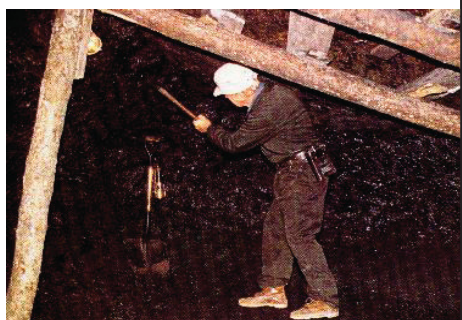


The Springhill Miners' Museum

Upon entering the Springhill Miners' Museum you are met with images and artifacts from the coal mining era. The museum presents a unique experience. Visitors can dig their own pieces of coal while hearing accounts from knowledgeable guides who actually lived the experience of the Springhill mines. During the tour you will descend into the depths of an authentic worked mine and hear stories of the disasters of 1891, 1916, 1956 and 1958, which in total claimed over 450 lives.

OUT OF THE AGE 8

145 Black River Rd Springhill, NS B0M 1X0 Phone: 902-597-3449



Creamery Square Heritage Centre

During the Permian Period, 290 million years ago, creatures walked across the soft sediment of a prehistoric landscape. In 1994, their fossilized footprints and trackways were discovered on a beach at Brule on the Northumberland Shore near Tatamagouche, and are now part of a diorama and interactive display at the Brule Fossil Centre in the Creamery Square Heritage Centre. These footprints and trackways reveal the earliest evidence of animal group behaviour, or herding. Also featured is the world's first known example of a *Walchia* (an ancient coniferous tree) forest. Open June-August.

30 Creamery Road, Tatamagouche, NS B0K 1V0 Phone 902-657-3449

OUT OF THE AGE 10



Location map for numbered points of interest

Inverness Miners' Museum

Located in scenic coastal Goldboro overlooking Isaac's Harbour on Route 316 of the Marine Drive, the Goldboro Interpretive Centre displays artifacts and photos documenting the area's mining, shipbuilding, and fishing past.

Open noon to 5 pm, July and August, closed Mondays Phone: 902-387-2454 12881 Hwy 316, Goldboro, NS B0L 1L0 interpretivecentregoldboro@gmail.com

OUT OF THE AGE 11



Established in the former MacKenzie and Mann Railway Station (1900), the museum consists of extensive displays illustrating the geologic history of the Inverness area. Complemented with artifacts, paintings, drawings, murals, a fossil collection, and archives, the museum reflects both the pioneering and coal-mining history of the community from 1803 to the end of the mining industry in 1954.

Open 8 to 4 weekdays, 12 to 5 weekends, summer Phone: 902-258-3822 62 Lower Railway St, Inverness, NS B0E 1N0 www.invernessminersmuseum.com

Goldboro Interpretive Centre

Located in scenic coastal Goldboro overlooking Isaac's Harbour on Route 316 of the Marine Drive, the Goldboro Interpretive Centre displays artifacts and photos documenting the area's mining, shipbuilding, and fishing past.

Open noon to 5 pm, July and August, closed Mondays Phone: 902-387-2454 12881 Hwy 316, Goldboro, NS B0L 1L0 interpretivecentregoldboro@gmail.com

OUT OF THE AGE 12



Goldenville Gold Mining Museum and Interpretive Centre

View genuine mining artifacts, historic maps, charts, and photographs. Enjoy first-hand stories told by knowledgeable retired miners. Once the largest gold producer in Nova Scotia, Goldenville was known as "the Little Klondike". Genealogical records of local families are also available. Open daily June - mid-October.

3 km west of Sherbrooke Village 175 Goldenville Road, Goldenville, NS B0J 3C0 Phone: 902-522-4653

OUT OF THE AGE 13



Cape Breton Fossil Centre

A billion years in the making, Cape Breton Island has witnessed the birth of complex animals, colliding continents, the growth of the first great forests, the rein of giant insects, and the brutal cold of the Ice Age. These stories—written in the Island's rocks and fossils—are passionately told of our 500 sq metres facility. Open seasonally, every visit includes a guided tour of our fossil gallery, laboratory space, and scientific collections, and a hands-on lesson in fossil identification. Family-friendly fossil tours along the 'Coal Age' coast are available by appointment. The Centre is wheel-chair accessible and just 5 km from the North Sydney Ferry Terminal.

159 Legatto St, Sydney Mines (902) 544-0992 capebretonfossilcentre.com

OUT OF THE AGE 14



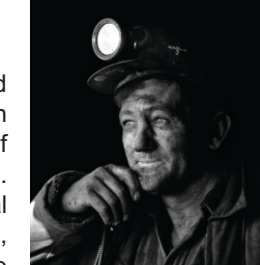
Cape Breton Miners Museum

This modern museum complex, located on a beautiful 15-acre site, provides an attractive showcase for the history of coal mining on Cape Breton Island. Exhibits focus on the geological development of the Sydney coalfields, the various techniques used to mine the seams since 1720, the history of labour in mining communities, and the importance of coal as an energy source.

The highlight of a visit to the Miners Museum is a guided, 40-minute underground tour of a once-active coal mine, the Ocean Deeps Colliery, located beneath the museum. After the tour, visit the gift shop or the adjacent Miners Village and Restaurant.

17 Museum Street, Glace Bay, Nova Scotia P.O. Box 310 Sydney, NS B1A 5V8 Phone: 902-849-4522 Email: info@minersmuseum.com

OUT OF THE AGE 15



Moose River Gold Mine Museum

The museum, housed in a former one-room schoolhouse, displays artifacts from the district's gold-mining period of the mid-1800s to the 1930s. A special display is devoted to the 1936 cave-in and rescue, from which the first live radio broadcast was heard around the world. Nearby is the Moose River Gold Mines Provincial Park, a picnic park built around the site where the cave-in took place, with interpretive panels about the rescue.

Open 10 to 4 daily, July and August Phone: 902-471-1701 6752 Moose River Road, Moose River Gold Mines, NS B0N 1X0 Email: bettybelmore@gmail.com

OUT OF THE AGE 16



The Nova Scotia Museum of Natural History

Nova Scotia has an incredibly diverse geological history that spans over a billion years. The Museum's exhibits show some of the province's geological highlights, including diverse fossils, agate (the provincial gemstone), stilbite (the provincial mineral), and many other minerals. The Museum also has on display the *Our Amazing World 360* exhibit featuring Canada's first Science on a Sphere™ system. This exhibit showcases many programs on Earth's history, geology, and environment. The Museum is in continuous renewal of its exhibits, both permanent and traveling, and offers programs on our natural world.

1747 Summer Street, Halifax, NS B3H 3A6 Phone: 902-424-7353 naturalhistory.novascotia.ca

OUT OF THE AGE 17



The Atlantic Geoscience Society (AGS) brings together earth science professionals, students, and aficionados in the Atlantic Provinces. AGS is a volunteer, non-profit society with a small membership fee. We are a member of the Canadian Federation of Earth Sciences (CFES) and we are affiliated with the Geological Association of Canada (GAC), the Canadian Energy Geoscience Association (CEGA) and the American Association of Petroleum Geologists (AAPG).



This painting by artist J.O. Pennanen shows what Canada's earliest dinosaurs, whose bones have been found at Wessons Bluff near Parrsboro, may have looked like. They were prosauropods, forerunners of the giant sauropod (or long-necked) dinosaurs, and date from earliest Jurassic times, about 200 million years ago.

One of AGS's main goals is to encourage an interest in Earth science, especially in the Atlantic Provinces. As part of this effort, the Society has developed a series of resources for students and the general public.

Print publications:

- Last Billion Years: A Geological History of the Maritime Provinces of Canada (2nd ed., 2022)
- Nova Scotia Geological Journey Map (4th edition, 2022)

Videos:

- Search YouTube for "Atlantic Geoscience Society". Some items include:
 - Joggins Fossil Cliffs
 - Time Travel at Arisaig, Nova Scotia
 - York Redoubt
 - Atlantic Canada's (Newest) Global Geoparks
 - Halifax Harbour: A Geological Journey

Other resources (available from AGS):

- Geology of Nova Scotia: Touring Through Time at 48 Scenic Sites, by Martha Hickman Hild and Sandra Barr (2015)
- Four Billion Years and Counting: Canada's Geological Heritage (2014)
- Quatre milliards d'années d'histoire: Le patrimoine géologique du Canada (2014)
- The Joggins Fossil Cliffs - A Coal Age Galapagos, by John Calder (2012)
- Nova Scotia Pebbles Guide (free brochure)
- Nova Scotia Minerals and Gems (free brochure)
- Geology of Green Cove (free brochure)

If you are interested in joining the Atlantic Geoscience Society or purchasing any of the above resources, please visit the Society's website: atlanticgeosciencesociety.ca

Important things to know

Safety:

You are responsible for your own safety, so always use caution. Cliffs can be high and steep and may have overhangs — rock falls can be lethal. Wear a hard hat if possible and stay at least the same distance from a cliff as the cliff is high. Rocks and seaweed are often slippery. Tread carefully and never explore alone.

The Bay of Fundy has an extremely high tidal range. To check tide times, visit www.tides.gc.ca or google Canadian Tide Tables. Always begin trips on a falling tide and ensure that you have time to return to access points before the rising tide cuts you off at headlands or other parts of the coast where there are cliffs. Note that conditions can differ depending on date, weather and locality, so it is wise check tide times for the area you plan to visit.

Rules:

All fossils in Nova Scotia are protected by the Special Places Protection Act. Under the Act, it is illegal to collect fossils without a valid Heritage Research Permit.

If you discover an unusual fossil, please take notes detailing its description and location and, when possible, photograph the fossil and note its location with GPS coordinates. Send this information to the Nova Scotia Museum of Natural History, the Fundy Geological Museum, or your local museum for identification.

For more information, visit nslgislature.ca/lego/statutes/specplac.htm or google Special Places Protection Act.

Hours:

To avoid disappointment, contact centres or museums prior to visiting to confirm hours of operation.

Plate Tectonics

As long ago as the 16th Century, some scholars noticed that if the Atlantic Ocean were to be closed up, Africa and Europe to the east would fit snugly into the Americas to the west, like jigsaw puzzle pieces. However, few accepted the idea of "continental drift" until the early 20th Century, when some scientists noted that certain geological features on opposite sides of the Atlantic could best be explained if that ocean had opened in relatively

recent geological times. The idea met with strong resistance until the 1960s, when a mechanism was proposed for how continents could move. Before the end of the decade, the idea had grown into the theory of "plate tectonics", now universally accepted among geoscientists as a unifying concept of the science. Plate tectonics explains how the planet's crust and upper mantle is formed of several large and many small tectonic plates, which move on a

layer at a depth of about 100-300 kilometres in the upper mantle that, due to heat and pressure, flows much as ice in a glacier flows. The rigid lithospheric plates can move apart to form oceans, converge to form major mountain belts like the Himalaya and volcanic arcs such as Japan, and slide past each other to produce great earthquakes, as along California's San Andreas Fault. Because of plate tectonics, the positions of continents and oceans on our

planet's surface are ever-changing, as shown in this series of maps from 550 million years ago to the present day. These maps show that what was to become Nova Scotia has drifted north from near the South Pole to 45°N.

You can find out more about plate tectonic processes in the book *The Last Billion Years* (referenced elsewhere in this brochure) or google "USGS Dynamic Earth".

