



United Nations  
Educational, Scientific and  
Cultural Organization



Stonehammer  
UNESCO  
Global Geopark

# BRUNDAGE POINT RIVER CENTRE



STONEHAMMER

DRIFTING APART



**Conservation designations:** *Stonehammer UNESCO Global Geopark, Grand Bay-Westfield Municipal Heritage Trail, Trans-Canada Trail, International Sculpture Trail, The Canadian Heritage Rivers System*

**Grid reference:** GPS: 45.3476675, -66.2236648

**Address:** 4 Ferry Road, Grand Bay-Westfield, NB E5K 0A8

**Parking available:** Yes

**Personnel to be contacted prior to visit:** Lauren Lennan at 506-738-6406 or rivercentre@towngbw.ca

## Driving Directions:

From Saint John: Take highway NB-7 N to NB-102 N in Grand Bay-Westfield. Take exit 80 from NB-7 N, then take NB-177 S to Ferry Rd.

From Fredericton: Take highway NB-7 S. At Grand Bay-Westfield take exit 80 from NB-7 S and follow NB-102 N and NB-177 S to Ferry Rd

## Site specific hazards and risks:

- Traffic
- Railway
- Open water
- Walking paths may become icy in winter
- Ferry crossing: *hazard of crossing on foot with cars, have plan for lining up, embarking and disembarking ferry if on foot*

## Useful Equipment:

- Camera
- Hiking equipment
- Drill to test ice depth and shovel if planning to take a group on the ice in the winter

## RELEVANCE PROVINCIAL CURRICULUM

**Grade 7 Unit 2 Earth's Crust.** *Examine catastrophic events that occur on or near the earth's surface-volcanoes, earthquakes; classify and describe rocks on the basis of their transformation in the rock cycle; explain various ways that rocks can be weathered*

**Grade 8 Unit 1 Water Systems on Earth.** *Unit 1 processes of erosion and disposition that result from wave action and water flow*

**Grade 9 Social Studies 9.2.1** *Demonstrate an understanding of the basic features of Canada's landscape and climate: explain the creation and characteristics of mountains and plains; examine a map showing the earth's major plates and their direction of movement; identify zones of compressional and zones of tensional forces; Physical weathering or chemical weathering; use block diagrams (i.e., cross-sections) to describe the landform features resulting from continental glaciation (e.g., medial moraine, terminal moraine, esker, drumlin, and erratics) and alpine glaciation (e.g., medial moraine, terminal moraine, hanging valley, horn); develop a photo-essay to illustrate some of the coastal features formed by wave action (e.g., tombolo, spit, bay beach, stack, sea arch, sea cave); 9.2.4 analyse the effect of geographic features on the development of Canada and of a selected country with similar geographic features.*

**Physical Geography 110:** *Geological emphasis Unit 5G: From Continental Drift to Plate Tectonics: Field Work and Local Studies*

**Canadian Geography 120:** *The Physical Basis of Canadian Geography: evolution of the Canadian landscape through geologic time; landform processes.*

## Mitigation measures:

- Park in a designated area
- Do not collect rocks or fossils
- Keep away from erosion areas of riverbanks
- Do not feed or disturb wildlife habitat
- Do not litter

**Topics to cover before visit** Rock cycle, plate tectonics, subduction, volcanoes, glaciation, terranes, fundy tides, fossils and fossil preservation and erosion

**Keywords** Subduction, terrane, tectonic plates, margins, volcano, Silurian, Ordovician, Quaternary, lava, ash, plate margin, glaciation, erosion, river, hills, fish, cyathaspis, sculpture, black loyalists, dacite, rhyolite, igneous

## Rock types and geological processes observed

Landscape vista of rolling Silurian volcanic hills (Kingston Peninsula). Saint John River follows fault line and empties into the Bay of Fundy through the Reversing Falls Rapids.

**Geological structures** Rolling hills are the roots of ancient volcanoes; River carved by glaciation and following the path of a fault

**Earth Processes** Volcanoes, Ice age, subduction, glaciations, and continental drift

**Geological periods present** Ordovician, Silurian, and Quaternary

## Did you know?

A characteristic of subduction zones is often a volcanic arc which forms at the surface and often results in lava flows, intrusions and extrusions as well as ash deposits from eruptions. About 435 million years ago, during the Silurian, this area was a volcanic arc above an active subduction zone. Volcanic action formed the rolling hills you can see today although these have been subject to millions of years of erosion and sculpted during the most recent period of glaciation. This ancient volcanic activity has become known as the Kingston Terrane Volcanics.

## Geological history\*

The landscape at Brundage Point is comprised of volcanic rock, dacite and rhyolite, mostly grey to purple in colour, and some are 435 million years old from the Silurian age. These rocks contain volcanic ash and lava from volcanoes which formed above a subducting plate margin. It is common for volcanic arcs to develop above subduction zones and this ancient volcanic activity near Saint John has become known as the Kingston Terrane Volcanics.

Evidence of active earth movements and processed during the Silurian suggests a period of mountain building or orogeny, as India collided with Eurasia to form the Himalayas. This action formed the ancient Caledonian-Appalachian mountain belt. The ancient mountains here have been shaped by millions of years of erosion and sculpted by the most recent period of glaciation to produce the vegetated rolling hills seen today.

The Saint John and Kennebecasis river valleys follow major fault boundaries separating geological terranes. Stonehammer UNESCO Geopark is made of many terranes and has a complicated geological history.



Fossil Fish: *Cyathaspis acadica* (Matthew)

- Fossilized fish discovered in Silurian age rock near Brundage Point. From the extinct *Heterostracans* family of jawless fish. The front of the body is covered with bony plates.
- George Matthew described this fossil specimen in 1886, the first of its kind known in North America
- Found near Brundage Point
- Sedimentary inclusion in the volcanic formation
- Only Silurian fossil found in Stonehammer



Dacite

- Igneous intrusive (near-extrusive)
- Small grain size
- Greenish colour
- Mineral content similar to granite
- No fossils present



Rhyolite

- Igneous extrusive
- Small grain size
- Grey and pink colour
- Mineral content similar to granite
- No fossils present