

# CHAPTER 1

## INTRODUCTION

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This report is a synthesis of the results of reconnaissance geological mapping projects in eastern Labrador in which the author has been involved, starting in 1979 and collectively extending over more than 30 years. It includes the eastern part of the Makkovik Province (Cape Harrison domain) and the eastern part of the Grenville Province in southern Labrador. The region mapped covers an area of roughly 80 000 km<sup>2</sup>, which is about 20% of the Province of Newfoundland and Labrador. It is equivalent to about 72% of the area of insular Newfoundland, or 0.8% the area of Canada. Twenty-five geological maps, at 1:100 000-scale, plus a 1:500 000-scale compilation of the whole area, have been published by the Government of Newfoundland and Labrador (Figure 1.1A). These collectively represent the final cartographic products of the mapping project (Gower, 2010a, b, 2011). The maps and this report are supported by a digital database to be released later.

### 1.1 LOCATION

Eastern Labrador, for present purposes, is that part of Labrador east of longitude 60° west (which is roughly 30 km east of Goose Bay), excluding some parts in the northwest of the region (Makkovik area), but including a relatively small area west of longitude 60° west, situated north of Lake Melville (Figure 1.1A, B). It includes all of NTS map areas 3D, 3E, 13A, 13B, 13G, 13H and 13I, most of 13J, parts of 12P and 13K, and small segments of 13O and 2M. Each of the 1:100 000-scale geological map regions delineated in Figure 1.1A has been assigned a geographical name by the author, based on a prominent geographic feature in that district, but having no formal significance otherwise.

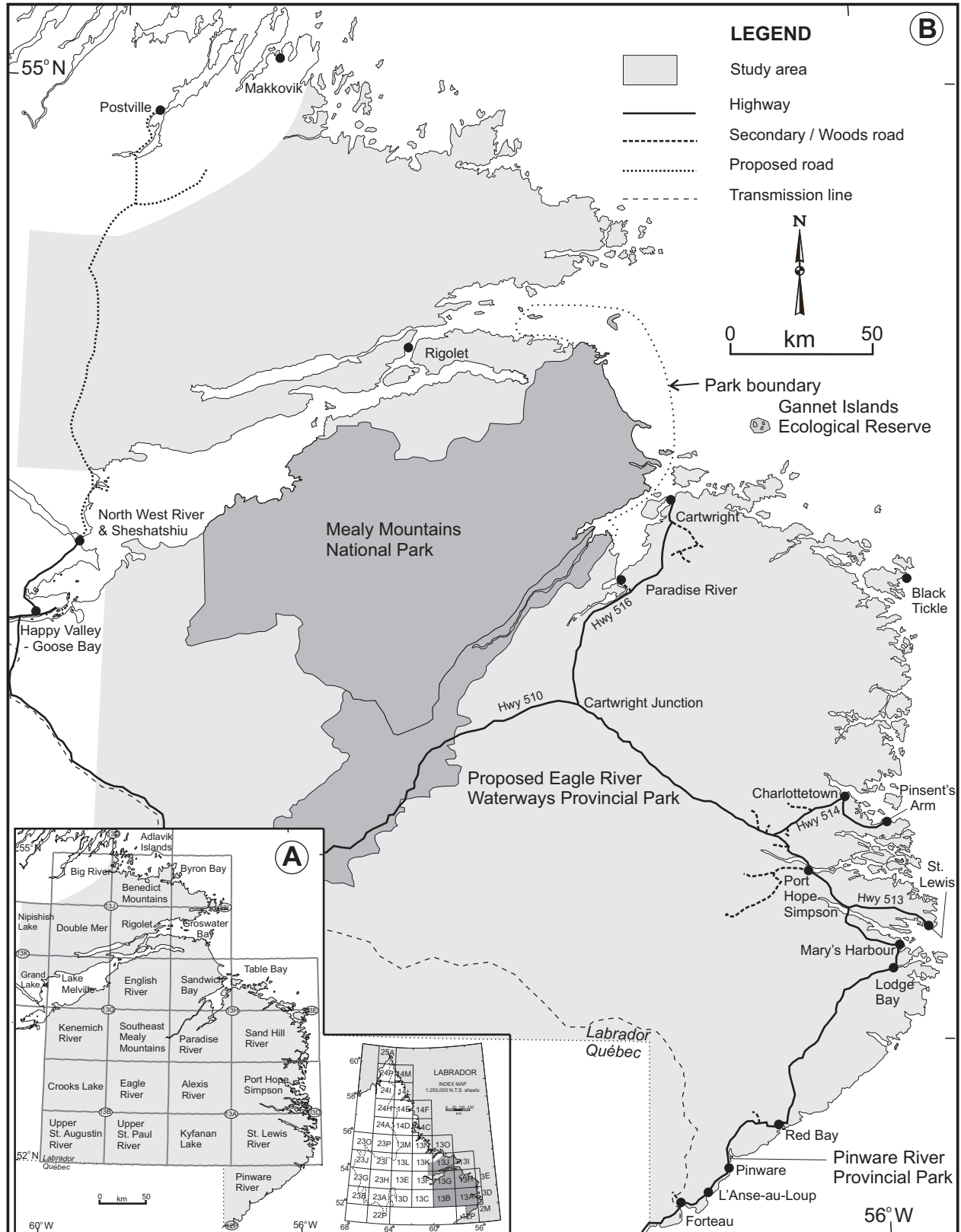
### 1.2 PHYSIOGRAPHY

Three key physiographic elements are the coast, rivers and uplands (Figure 1.2). The most striking feature of the coast is the 200-km-long, southwest-penetrating indentation defined by Groswater Bay and Lake Melville. Although termed a ‘lake’, Lake Melville is a saltwater tidal extension of Groswater Bay. Together with Double Mer, which is a parallel saltwater tidal indentation, Lake Melville and Groswater Bay define a northeast-trending region that owes its origin to late Neoproterozoic–early Phanerozoic rifting (Lake Melville rift system). The faulted margins of the rift are evident in the grey-shaded digital elevation model and its hypsometrically tinted colour version (Figure 1.2A, B)

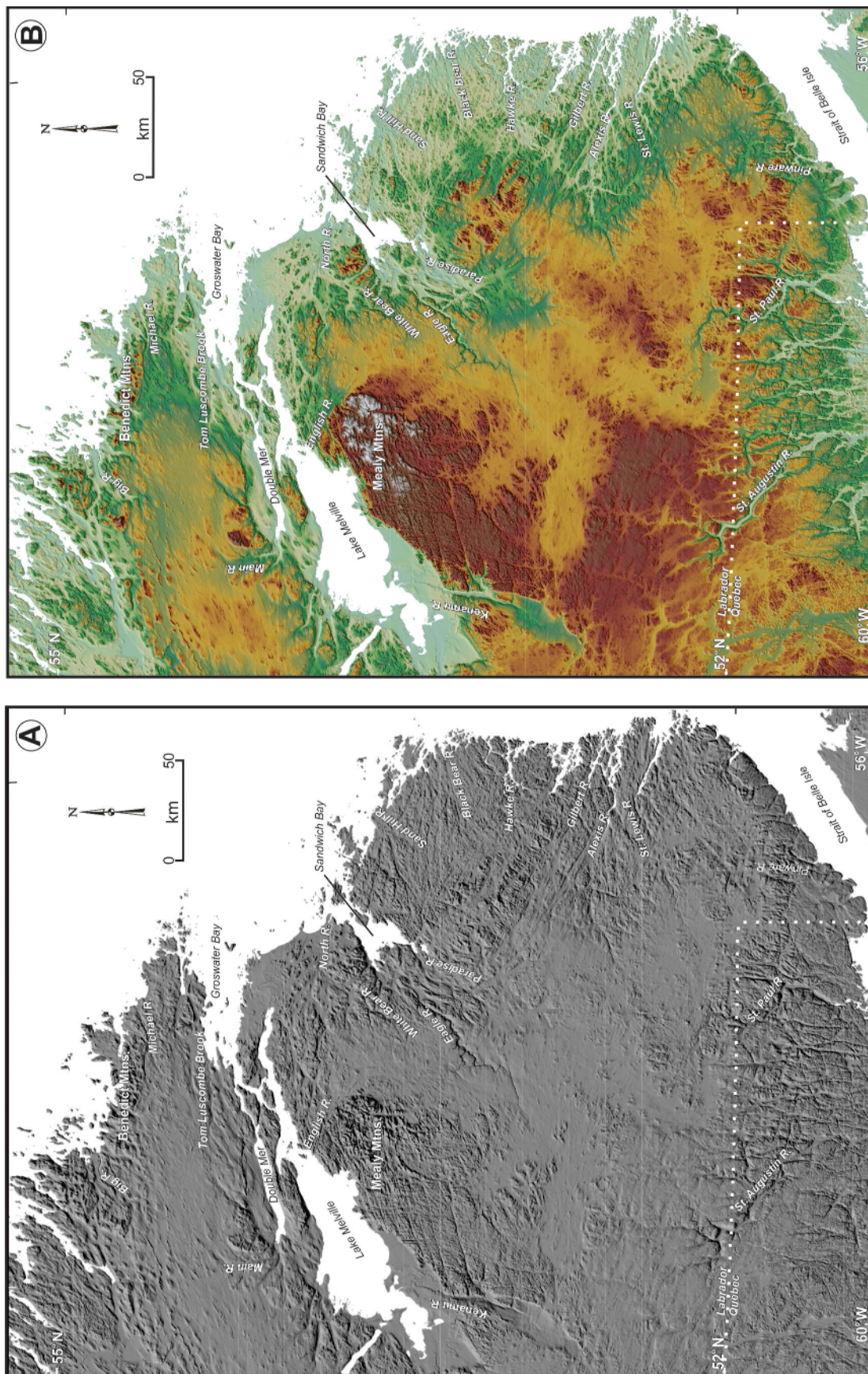
by smooth patterns correlating with the floor of the rift, contrasting with hackly patterns representing the flanking pre-rift basement rocks. Sandwich Bay, a smaller, subparallel indentation to the southeast also owes its origin to the same rifting event, as do the fault-controlled northeast-trending margins of the Strait of Belle Isle. Two straight sections of coastline (overall) are also evident between St. Lewis River and Black Bear River, trending north-northwest and north-northeast. Seismic and gravity data (*cf.* Gower *et al.*, 1997a) suggest the existence of north–south offshore basins (probably Phanerozoic), so these stretches of shoreline may also be fault controlled. Farther north, the orientation of the coastline is very dependent on the structural orientation of the bedrock. Most of the coastline comprises crystalline basement rocks, but spectacular sandy beaches exist north of Sandwich Bay (Porcupine Strand; Plate 1.1A).

Major rivers are labelled in Figure 1.2A, B. Of particular note are the Kenamu and Eagle rivers in Labrador and the south-draining rivers in eastern Québec, which discharge into the Gulf of St. Lawrence, including the labelled St. Augustin and St. Paul rivers. All these are eroding back into the plateau area and have become deeply incised. This is a consequence, at least in part, of isostatic rebound following the last glaciation. The incised rivers are not markedly influenced by bedrock structural trends, except the Kenamu River, which follows a splay fault of the Lake Melville rift system. In contrast, the southeast-draining rivers (Hawke, Gilbert, Alexis and St. Lewis rivers) are all strongly controlled by a complex system of southeast-trending strike-slip faults dating from at least 1000 Ma (Ma = 1 million years). Except for the largest water courses, the rivers are mostly fairly shallow, boulder-strewn, have numerous rapids, and a few small waterfalls (rarely more than a few metres high; Plate 1.1B). They are swift flowing during spring runoff, but by late summer are much reduced in flow rate. The rivers are mostly unnavigable in small craft beyond a few kilometres from their mouths.

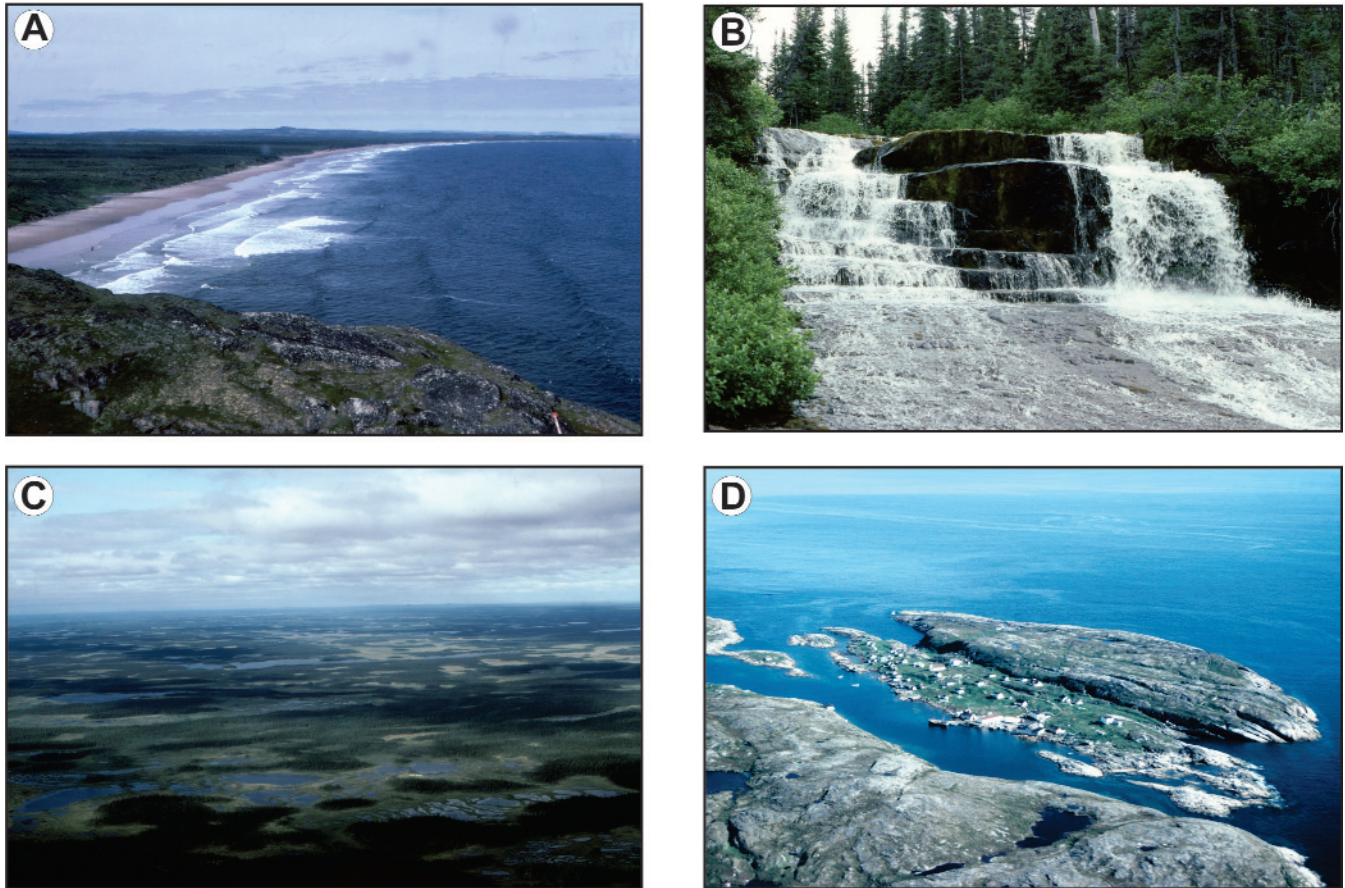
The overall topography of eastern Labrador is that of an east-sloping plateau, modified by the Lake Melville and Sandwich Bay rift basins. The highest area, which rises above the plateau, is the Mealy Mountains, south of Lake Melville, reaching a height of 1097 m (3599 feet). The mountains in this area partly owe their existence to the resistant nature of the bedrock (massive anorthosite). A smaller area of mountainous terrain is present in the north



**Figure 1.1.** Eastern Labrador showing area addressed in this report. A. Names and locations of 1:100 000-scale geological maps for eastern Labrador; B. Major communities and cultural features (present and proposed roads, parks and power transmission line).



**Figure 1.2.** Physiographic features of eastern Labrador showing area addressed in this report. A. Digital elevation model, B. Hypsometrically tinted version of same data (pale-green – low elevations; brown – high elevations). Highest point is in Mealy Mountains at 1097 m.



**Plate 1.1.** Selected physiographic features in southeast Labrador. A. Porcupine Strand looking north from Cape Porcupine, B. 'Staircase' Falls; tributary of St. Paul's River, C. Wetlands southeast of Mealy Mountains, D. Battle Island and the settlement of Battle Harbour:

part of the region, termed the Benedict Mountains. The highest point is *ca.* 730 m (2395 feet). The mountains are massive granitoid rocks.

The plateaux are generally characterized by low, rounded, wooded hills with intervening wetlands, including string bogs, and numerous shallow lakes and ponds (Plate 1.1C). Most bedrock in interior regions is covered in a blanket of various types of surficial deposits. Progressing toward coastal areas, the hills lose their forest covering, showing, first of all, bare-rock-outcropping hilltops, and eventually, within a few kilometres of the coast, losing their forest covering (Plate 1.1D), except for scrubby, stunted trees in sheltered hollows and taller trees in valleys. In coastal areas, outcrop is good, albeit lichen covered.

A brief summary, such as this, must ignore the wealth of valuable detail that the physiography offers to the field geologist. Apart from a subtle east-southeast 'grain' due to glacial dispersion, almost every feature is explicable in terms of rock type or structure, and repeated reference is made to such features in the ensuing text. Undoubtedly, physio-

graphic features have strongly influenced the interpretations embodied in the author's geological maps.

### 1.3 INFRASTRUCTURE AND LAND USE

In addition to providing information on current infrastructure, this section also addresses some current and potential developments likely to affect eastern Labrador in the near future (Figure 1.1B). It is an update of that given by Gower (2010c).

#### 1.3.1 HIGHWAYS

##### 1.3.1.1 Trans-Labrador Highway

On 16<sup>th</sup> December, 2009, the provincial government announced the opening of Phase III of the Trans-Labrador Highway. Phase III involved highway construction between Cartwright Junction and Happy Valley–Goose Bay. Further work was carried out during the summer of 2010 to officially complete the highway. Upgrading and paving of the highway is currently in progress.

The Trans-Labrador Highway stretches approximately 1150 km from southeasternmost Labrador to southwest Labrador, passing through Happy Valley–Goose Bay, Churchill Falls and Labrador City–Wabush. The highway (Hwy 510) in southeast Labrador links various communities between Blanc-Sablon and Red Bay, then, north of Red Bay, passes by Lodge Bay, Mary's Harbour and Port Hope Simpson. Branch roads have been constructed to link up St. Lewis (Hwy 513), Charlottetown and Pinsent's Arm (highways 514 and 515), and Cartwright (Hwy 516). Distances are as follows: Blanc-Sablon to Cartwright Junction – 306 km; Cartwright Junction to Happy Valley–Goose Bay Junction – 287 km; branch road to St. Lewis – 30 km; branch roads to Charlottetown and Pinsent's Arm – 29 + 24 km; Cartwright Junction to Cartwright – 91 km. Note that Pinsent's Arm is also known as Pensons Arm.

### 1.3.1.2 Secondary Road Access

The construction of the highway has been the catalyst for a network of subsidiary roads. The longest is a woods road that extends over 50 km in a general southwest direction from Port Hope Simpson, plus a 12-km subsidiary road leading west, branching off about 14 km west of Port Hope Simpson. Part of this road existed before the construction of the Trans-Labrador Highway, but has been upgraded since then. Several woods roads in the Charlottetown junction area are gradually being developed. Three of them have each reached about 10 km from various departure points on the highway. In addition, southeast of Cartwright, about 40 km of roads have been constructed to provide access to a communications installation and for wood-harvesting purposes. South of Red Bay, there are several short roads that have been in existence for many years, but none of them extends inland for more than a few kilometres.

### 1.3.1.3 Possible Highway from Northwest River to Postville

Aurora Minerals has outlined plans to construct a 140-km-long road from Northwest River to Postville *via* its Michelin U deposit, with a branch road to its Jacques Lake U deposit (<http://www.aurora-energy.ca/?p=projects&s=labrador>; 2010).

## 1.3.2 PARKS

### 1.3.2.1 Mealy Mountains National Park

In February 2010, the federal and provincial governments agreed to take the necessary steps to establish a

national park reserve in the Mealy Mountains area of Labrador. Final agreement was reached and the Mealy Mountains National Park was declared on July 31<sup>st</sup>, 2015. The park will protect 10 700 km<sup>2</sup>. This represents roughly 50% of the 22 000 km<sup>2</sup> area earlier designated as the Mealy Mountains National Park study area, which included, not only the Mealy Mountains and much of the Eagle River drainage basin, but also Porcupine Strand and the northwest side of Sandwich Bay. The 40% region excluded includes some of the western Mealy Mountains and large areas south of the Mealy Mountains, as well as areas east of Rigolet and south of The Backway.

### 1.3.2.2 Provincial Parks and Reserves

When the joint federal–provincial announcement regarding the creation of the Mealy Mountains National Park was made, the provincial government expressed its intention to create the Eagle River Waterways Park. This will be adjacent to the proposed national park and, will protect an area over 2700 km<sup>2</sup>. Formal establishment of the provincial park is still awaited.

The Gannet Island Ecological Reserve is situated 42 km northeast of Cartwright, and was designated as such in 1983. It takes in 22 km<sup>2</sup>, of which 20 km<sup>2</sup> is ocean surrounding the islands.

The Pinware River Provincial Park is a 68 hectare park situated near the mouth of the Pinware River, about 32 km from Red Bay. It opened in 1974, and caters mainly to campers and day visitors.

## 1.3.3 HYDROELECTRICITY

Nolan *et al.* (1978) prepared a report on the hydroelectric potential of southeast Labrador, identifying possible dam sites on the Eagle, Paradise, Alexis, St. Lewis and Pinware rivers. Various schemes for water diversion from one drainage basin to another were also indicated. There has been very little recent public discussion regarding these possible hydroelectric developments and it seems unlikely that any development will take place in the near future, proposals having been superseded in favour of developing hydroelectric power at Muskrat Falls on the Churchill River, west of Happy Valley–Goose Bay. A power line corridor from Muskrat Fall to Forteau has been constructed across southeast Labrador (Figure 1.1B).

