T1 CANADIAN SETTING

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Nova Scotia has a diversity of landscapes and habitats packed into 55 000 km^2 which is not found in many areas of comparable size in Canada. It also has 400,000 km^2 of continental-shelf and -slope waters, which support some of the most productive marine environments in the world. It is interesting to think of Nova Scotia as a kind of crossroads, where two ancient continents met millions of years ago, where now continent and ocean meet, and where the southerly climatic and forest regions make the transition into the northerly Boreal Zone.

The meeting of continent and ocean has many implications. In terms of geological processes, the continental margin is where evidence of crustal movements is most obvious. As the plates of the lithosphere move, the resulting pressures show up in folding, faulting, uplift, submergence and the intrusion and extrusion of igneous rock. This plate

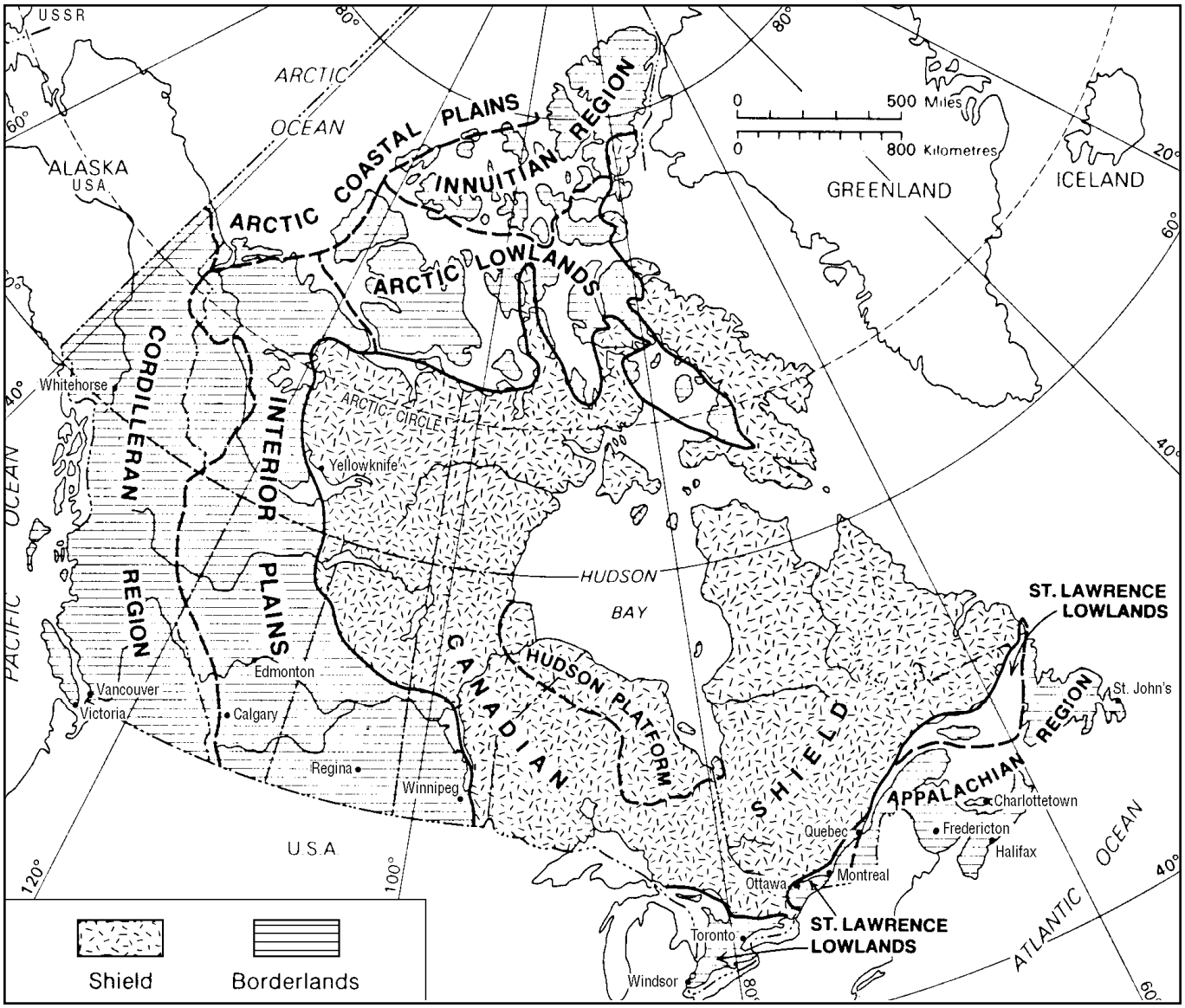

Figure T1.1: Physiographic Regions of Canada.[1]

margin activity has made a substantial contribution to the wide variety of rock formations in Nova Scotia.

The meeting of land and water, maximized by Nova Scotia's long and convoluted coastline, also results in a variety of environments which are physically dynamic and biologically productive. The coastal and offshore waters are influenced by both the cold Nova Scotia Current and the warm North Atlantic current, which is the northern continuation of the Gulf Stream.

Finally, the province lies between the milder climatic region of the southern United States and the harsher boreal region of the Canadian north. The transitional nature of the region is reflected in a wide variety of forest associations and in the intermingling of plants and animals that have very northerly ranges with those that can be found in Louisiana or the Carolinas.

GEOLOGY

Nova Scotia developed through the incremental additions of other land masses to the northeast margin of the ancient North American continent, first the Avalon and then the Meguma Zone. This was followed by a period during which Nova Scotia was in the middle of a vast continental mass, and partly included in a large sedimentary basin. This supercontinent then rifted along what is now the continental shelf break. The eastern edge of North America continues to grow but in a more passive way, as sediments from continued erosion of the land are transported and eventually deposited on the shelf and in deeper waters beyond.

PHYSIOGRAPHY

Physiographically Nova Scotia is part of the Appalachian Region, which in turn is part of the Borderlands which form a crescent around the Precambrian rocks of the Canadian Shield (see Figure T1.1).[1]

The Shield is a core of old, crystalline rocks. Around it, the Borderlands form two concentric rings of younger, mainly stratified rocks. The inner ring consists of lowlands, plains and plateaus of generally flat-lying sedimentary rocks, while the outer ring, of which the Appalachian Region is part, is formed of discontinuous areas of mountains and uplands (see Figure T1.2).[1]

The Appalachian Region includes all of the Atlantic provinces, the Gaspé Peninsula and Eastern Townships of Quebec, the Green Mountains in Vermont, the White Mountains of New Hampshire and Maine and the New England uplands. The physiography of the Region is dominated by a well-developed planation surface, probably of Cretaceous age, which is generally highest in the northwest, sloping gently southeastwards towards the ocean. The differential erosion of soft and hard rocks has formed lowlands, highlands and uplands. This old erosion surface is evident in the highlands and uplands of Nova Scotia, sloping downward towards the Atlantic. The highlands and uplands of the Appalachian Region surround a lowland plain which has been almost entirely drowned to form the Gulf of St. Lawrence. The Maritime Plain, bordering the Northumberland Strait, forms part of these lowlands.

GLACIATION

Like most of Canada, Nova Scotia was glaciated, but its glacial history differs to a certain extent because it was at the edge of the glacial sheet. In the last stages, frequent glacial fluctuations, and the movements of local ice caps, scraped up considerable quantities of glacial debris from the underlying rocks, without transporting it elsewhere. This debris was then molded or deposited in a variety of morainal and fluvial landforms.

Deposits on the continental shelf have been reworked by rising sea level to form the sands and gravels of the present-day fishing banks.

CLIMATE

Nova Scotia's climate again reflects the meeting of continent and ocean. Its position between 43 and 47 degrees north latitude results in seasons with varied day lengths and temperatures. This difference is accentuated by the continental influence but tempered by the marine influence. Because the dominant sweep of the winds across North America is eastwards, Nova Scotia exhibits more of a continental climate than is found on Canada's Pacific coast. However, the modifying effects of the surrounding waters make winters milder and summers cooler than those experienced in the centre of the country.

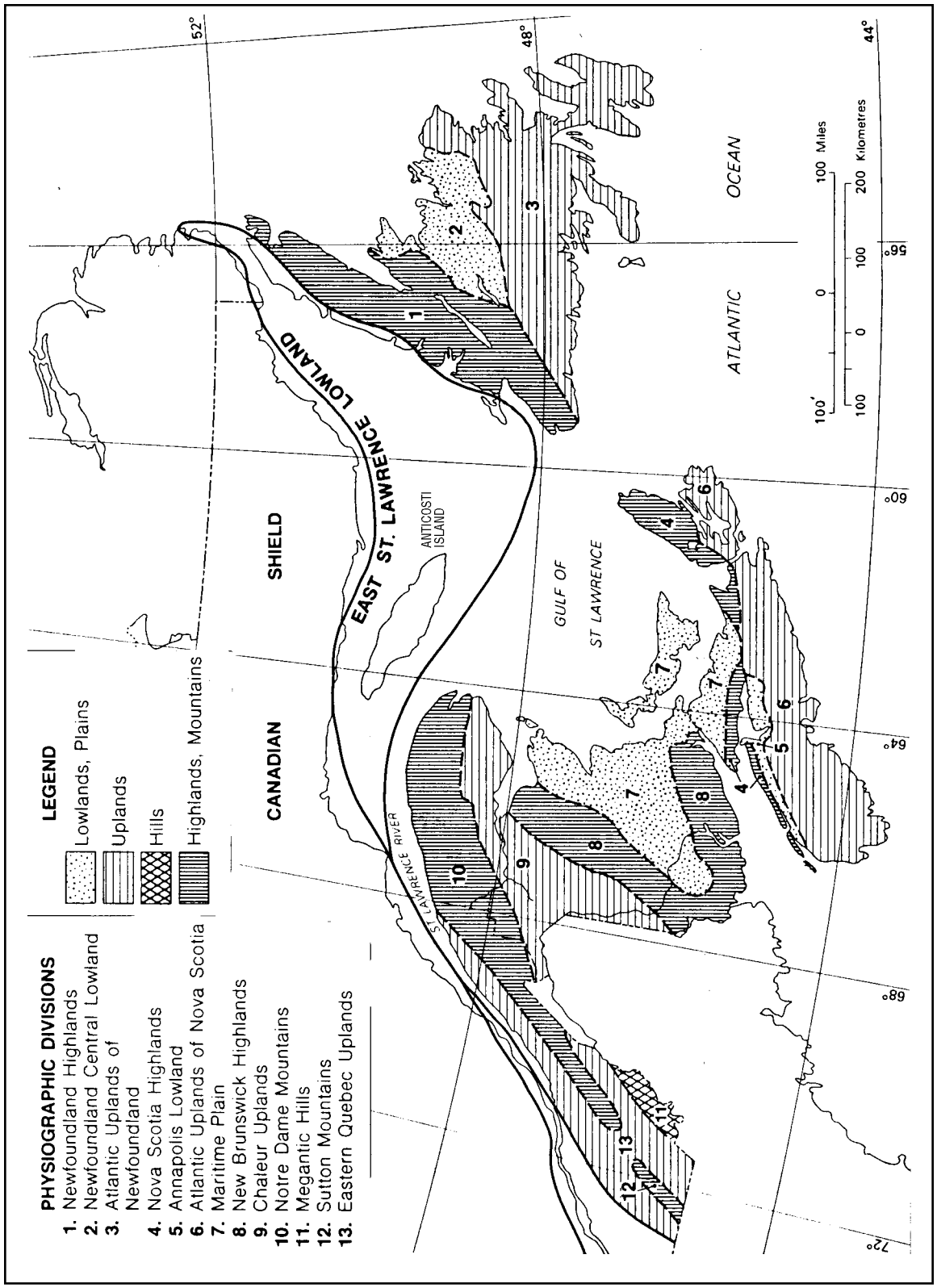

Figure T1.2: Physiographic Divisions of the Appalachian Region in Canada.[1]

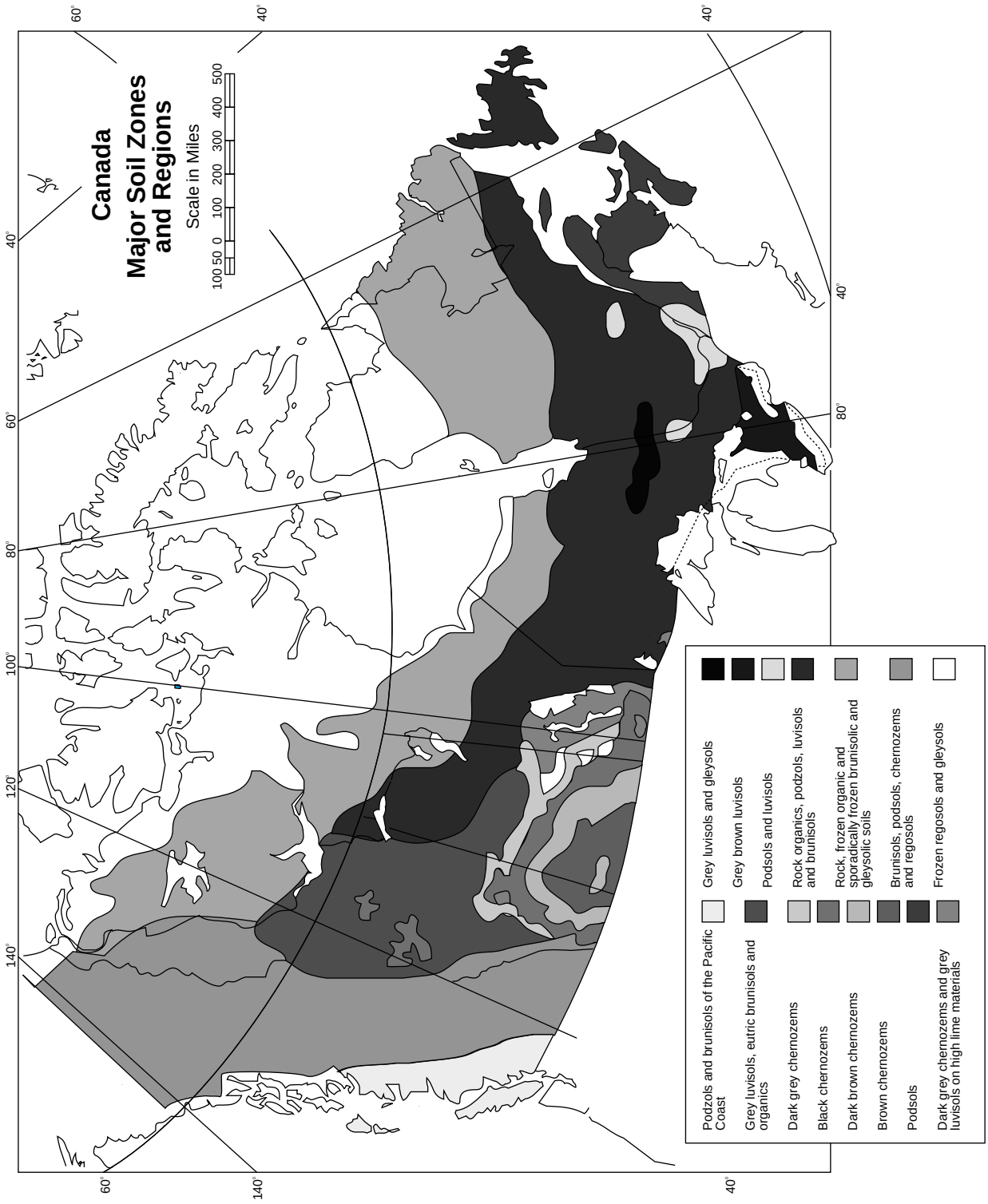

Figure T1.3: Major Soil Zones and Regions of Canada.[1]

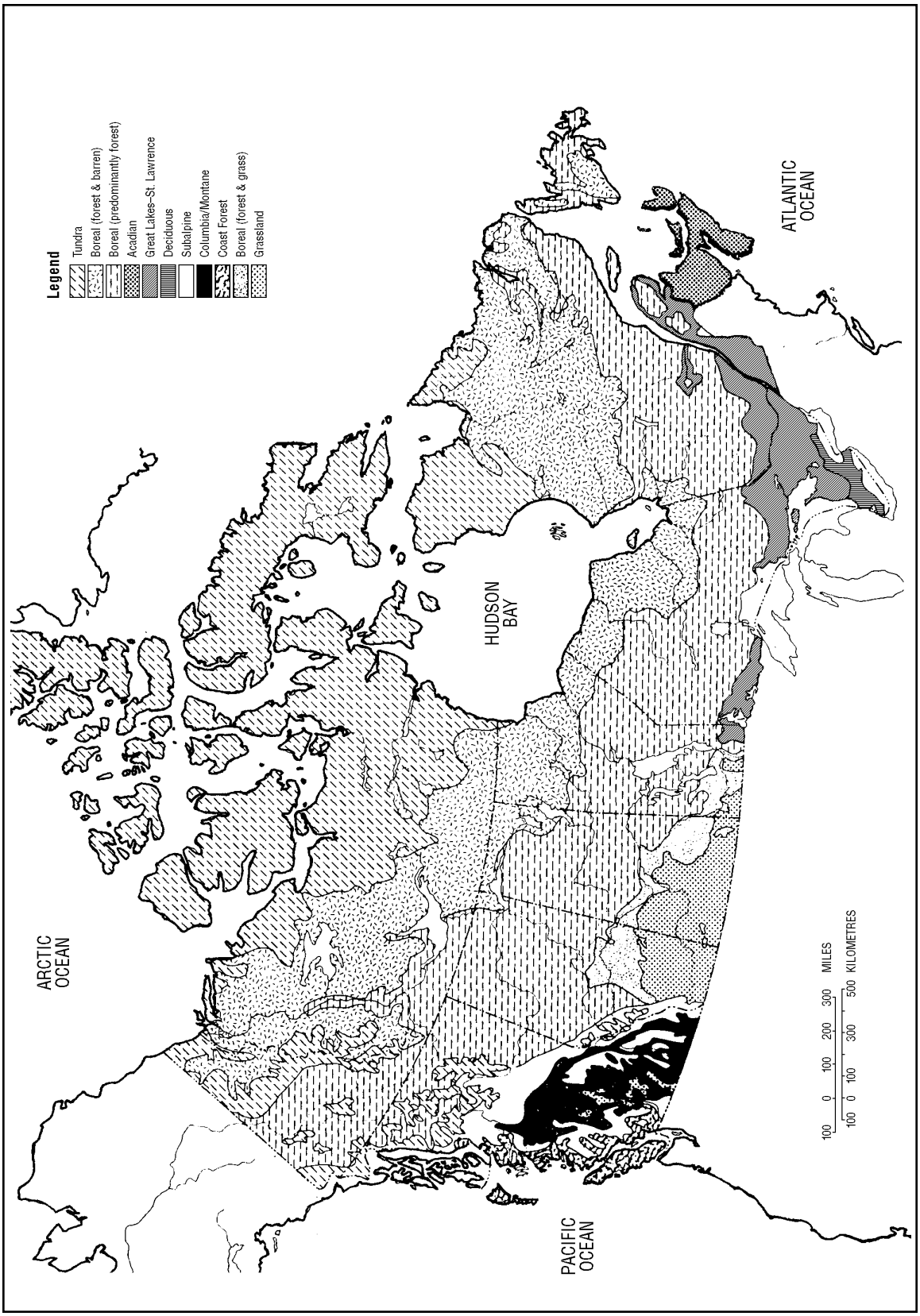

Figure T1.4: Forest Regions of Canada adapted from Rowe.[2]

The Atlantic region experiences changeable weather and ample precipitation, resulting from the shifting positions of the three major air masses that abut over the region, and from the frequent passage of eastward-moving low-pressure cells. This produces a high incidence of cloud and fog and places Nova Scotia in the perhumid and humid moisture regions, along with the other Atlantic provinces and much of Quebec.

SOILS

The predominant soil-forming process in the Appalachian Region is podsolization. This process occurs where high precipitation in a cool climate works on coarse glacial deposits under mixed or coniferous forest cover. The result is strongly leached soils with high surface acidity. Podsolic soil types occur in a broad belt along the edge of the Precambrian Shield, as far west as Alberta. The Appalachian Region soils differ mainly in the intricacy of the soil mosaic, which reflects the varied textures of the bedrock as well as the complex glacial deposits (see Figure T1.3).[1]

VEGETATION

Nova Scotia lies within the Acadian Forest Region (see Figure T1.4).[2] This is a transitional area between the coniferous Boreal Region to the north and the Deciduous Region to the south. The transitional nature results in a variety of different forest associations. Red Spruce, Balsam Fir, Yellow Birch and Sugar Maple are characteristic of this area, with lesser numbers of Red Pine, White Pine and Hemlock. A Boreal element, particularly evident in the highlands of Cape Breton, is dominated by Black Spruce, Balsam Fir, White Spruce, with a minor component of poplar and birch. Coastal exposure is a modifying factor, resulting in a "fog belt" of coastal forest, mostly spruce and fir.

Nova Scotia is one of the earliest areas settled by Europeans, and as a result its forests have been intensively cut for lumber or cleared for agriculture. The subsequent abandonment of much former crop and pasture land and the influence of fire have contributed to the development of a wide range of successional forest types.

FAUNA

Although the main part of the fauna is boreal in character, post-glacial events in Nova Scotia allowed colonization both by subarctic species, now seen only as relicts, and later by warm-temperate species from the south. The present climatic conditions have not allowed a full development of any of these groups of animals, with the results that species diversity tends to be less than is experienced further to the west or south.

Nova Scotia's populations of both aquatic and terrestrial animals are often disjunct, in that they are separated from main populations inland, or along the coast of North America, by hundreds of kilometres. Populations that have been disjunct for several thousands of years are liable to have acquired distinct genetic character.

As a result of several hundred years of European settlement, both the fauna and flora contain high proportions of introduced species.

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References

1 Agriculture Canada (1977) *Soils of Canada. Volume 1: Soil Report.*

2 Rowe, J.S. (1972) Forest Regions of Canada. *Canadian Forestry Service, Publication* 1300.