400
Atlantic Interior

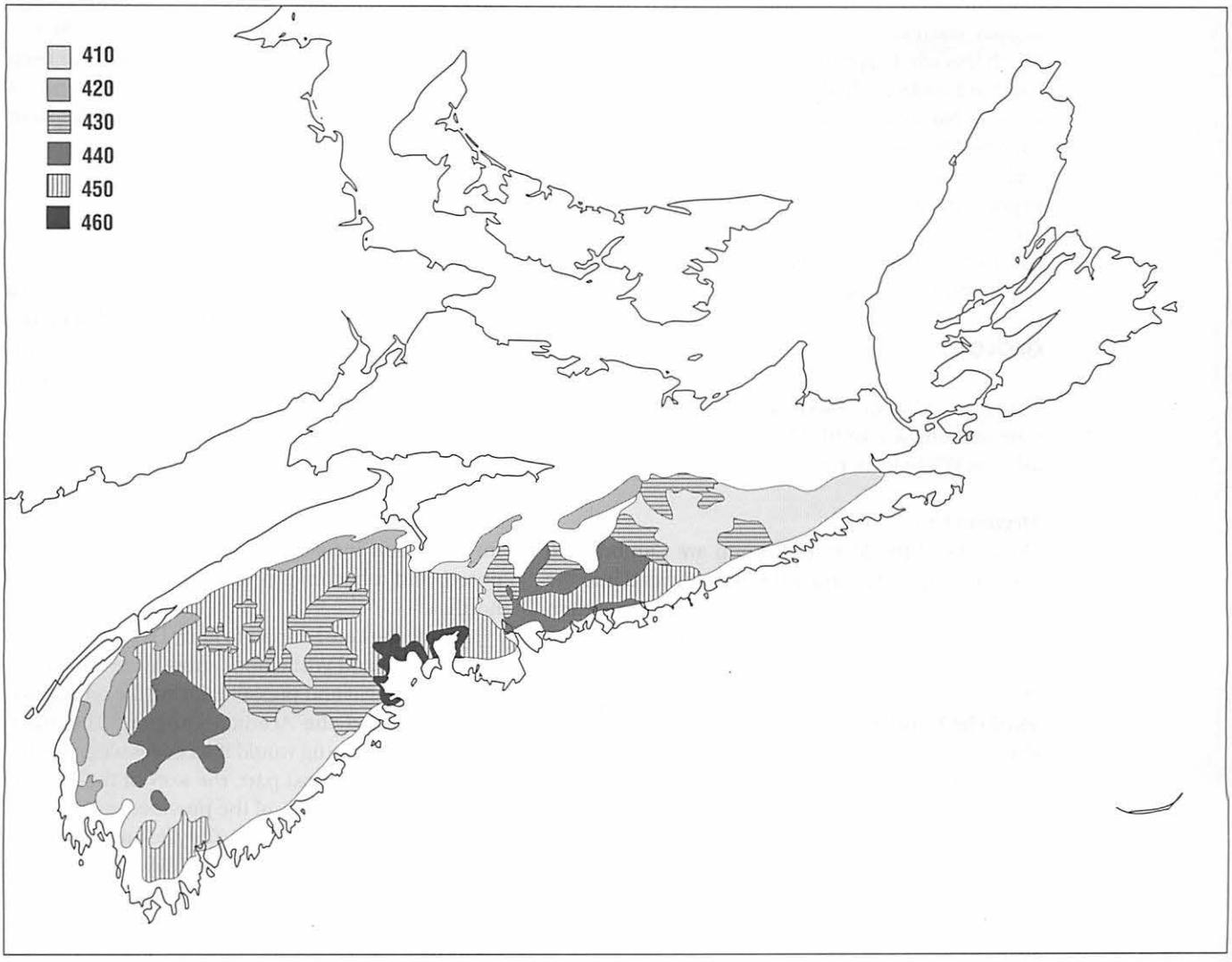

Figure 10: Region 400, Atlantic Interior, and its component Districts.

400 ATLANTIC INTERIOR

The Atlantic Interior is divided into six Districts on the basis of morphology, surficial deposits, and vegetation characteristics:

410 Quartzite Plains
420 Slopes and Ridges
430 Drumlins
440 Granite Barrens
450 Granite
460 Bays

REGIONAL CHARACTERISTICS

Inland from the coastal forest, the immediate climatic influence of the Atlantic Ocean is replaced by slightly warmer summers and cooler winters with much less wind exposure. The planed surface of the old, hard rocks is tilted gently to the southeast, and some of Nova Scotia's longest rivers flow across this surface. Most of the province's lakes have been created by glacial action on the relatively flat surface. Vegetation varies from the mature spruce-hemlock-pine forests common on the Kejimkujik Drumlins (Unit 433) to the heath vegetation on the Granite Barrens (District 440) (see Figure 11).

GEOLOGY

The Atlantic Interior has three main groups of rocks: slate and greywacke (the Meguma Group); lava and ash (the White Rock Formation); and granite.

Meguma Group

The rocks of the Meguma Group are Cambrian to Silurian in age. This group has been divided into the Goldenville Formation (after a mining area in eastern Nova Scotia where the strata are well exposed) and the Halifax Formation. The Goldenville Formation is made up of greywacke (a quartz-rich rock containing some clay), and the Halifax Formation is made up of slates.

Meguma Group strata are widely exposed across the Region and underlie about half of the terrain. They were deposited in an extensive offshore basin in which conditions stayed the same over wide areas and for long time intervals; consequently, they are rather uniform in colour and texture wherever they are found.

Gold deposits have formed within the Meguma on domes and plunging anticlines where the strata became fractured by folding. The richest veins usually occur in the zone of maximum curvature, with the largest veins in tightly folded anticlines. The veins were apparently deposited from solutions that arose deep within the lower areas and penetrated up through the fractures and along the bedding planes.

The entire thickness of the Meguma Group is unknown, because its base cannot be seen and its top has been eroded away. A section of Goldenville about 5,650 m thick has been measured between Sissiboo Falls and Weymouth in Unit 411; this appears to be close to the maximum exposed at present. Similar thicknesses are indicated in eastern Nova Scotia. About 3,650 m of the Halifax Formation have been deposited, and perhaps much more in the vicinity of Halifax. This thins out to a maximum of 1,225 m or less in southwestern Nova Scotia.

White Rock Formation

In the Silurian, following the deposition of the Meguma Group, one or more volcanic centres developed, probably close to what is now the coastal area near Yarmouth. A series of strata composed of (about 50 per cent) lavas and ash and (about 50 per cent) sandstone and mudstone built up. These strata are jointly called the White Rock Formation today. They are preserved in a series of synclines in the Yarmouth area, at Cape St. Mary, along the Sissiboo River, at Bear River, and in the Gaspereau area. The White Rock Formation is thickest at Yarmouth, where 3,000 m have been measured with only the bottom exposed, and it becomes progressively thinner to the north.

During the Late Silurian to Early Devonian period, the Meguma and White Rock strata were folded and changed by heat and pressure during the crustal disturbance called the Acadian Orogeny. The strata folded much as a rug would if its edges were pushed together. For the most part, the axes of the folds lie parallel to the long axis of the province and form an arc from Yarmouth to Canso. They lie an average of 5 km apart and can be traced lengthwise for up to 150 km. The folds are sometimes symmetrical, but they are often asymmetrical and often so tight that the crests have turned sideways and become overturned.

While lateral pressure was exerted, the temperature rose to a maximum of 650°C and the character of the original strata was changed. Under these conditions, the chemical elements of the rocks recombined to form a characteristic series of minerals: garnet, staurolite, andalusite, and sillimanite. The temperature and pressure conditions of this regional metamorphism can be estimated by examining the minerals that formed, because each only forms when certain temperatures and pressures exist.

Surveys carried out in the 1950s and 1960s reported soils developed from mica and hornblende schists, particularly in Yarmouth and Digby counties. Correlation of these soils with the geology is unclear, because zones of intense metamorphism of the quartzites are as frequent in Unit 412 as in Unit 411.

Granite

The third main group of rocks in the Atlantic Interior falls under the name "granite." This familiar, coarse-textured rock actually includes a whole range of related but different rock types. They have a variety of colours, textures, and compositions but commonly contain large greyish or pink crystals of potash feldspar in a matrix of smaller crystals dominated by quartz and mica.

Most of the granite lies in a huge body called the South Mountain Batholith, which is exposed in a giant arc from Yarmouth County northwards to the edge of the Annapolis Valley and around to Halifax. This batholith intruded during the late stages of the Acadian Orogeny as a hot, thick liquid. This magma rose by penetrating the overlying Meguma strata, broke off blocks, and assimilated them. In places near the contact, blocks of Meguma country rock can be seen in various stages of assimilation, as xenoliths. In some places they look almost unchanged, whereas in others they have been almost entirely absorbed and can be seen only as ghosts.

The heat given off during the intrusion, and later as the magma cooled, baked the surrounding Meguma strata and created a narrow contact aureole. In this aureole characteristic minerals have developed, in particular cordierite which is round and black and gives the slates a spotted appearance. Good examples of the changes that took place close to the contact can be seen west and north of the Northwest Arm near Halifax.

Pre-Carboniferous Erosion

Following the Acadian Orogeny and the emplacement of the granite came a period of very rapid erosion. Material several miles thick was removed within about 10 million years and the granite was exposed. The sediments generated during this erosion were carried off and deposited elsewhere. The erosion surface was later to form the basement upon which Carboniferous strata were deposited.

Development of the Present Topography

Probably during the Cretaceous the whole area was eroded down to a fairly level surface, which is now more or less coincident with the overall level of the Atlantic Interior. Large areas of granite became exposed, some of which now form domes or high, rounded hills. The overlying, folded greywacke and slates were eroded away and are now found mainly around the edges of the granite, or in what were the lower areas between the granite cupolas and domes. The slates, being the uppermost strata, were worn away when the Meguma folds were planed off, and the greywacke was exposed underneath. The slates are still preserved in many places in the synclinal troughs and now occur as long, narrow bands running east and west. The folds are steeper and more compressed east of Halifax than to the west, so that the slates between Halifax and central Guysborough County are in rather narrow bands, while northward in Hants County they form wide zones. The general pattern can be seen on the geological maps. Only in western Lunenburg County, and in adjacent Queens and Annapolis counties, are large areas of slate found.

Faults

The topography of southwestern Nova Scotia has not been influenced significantly by faults. However, east of Halifax, where there are many faults and the strata are also more intensely folded, the opposite is true. From St. Margarets Bay to Guysborough, the Meguma strata are shattered by innumerable faults, a number of which affect the outline of the coast and the topography inland. One at Cole Harbour continues inland up the valley of Lake Major; another at Sheet Harbour controls the upper bend of the harbour, continues up the deep valley of the West River, and stretches inland practically across the entire Southern Upland. The long, straight harbours at Indian Harbour, Country Harbour, and New Harbour in eastern Guysborough County are also determined by faults. The fault at Country Harbour is the most prominent: there, a deep, straight-sided channel penetrates inland about 25 km to form one of the best natural harbours in the world.

Topography

When viewed from North Mountain across the Annapolis Valley, or from an elevation looking south

towards the escarpment of Guysborough County, the surface of the Atlantic Interior presents an almost even, level skyline. This uniform surface is also evident inland, as in northern Annapolis County. There the upland surface is around 150 m above sea level and has a relief of barely 15 m. East of Halifax, near the coast, the river valleys are deep and cut far below the surface, but even here the uniform height of the upland surface is evident from a distance. In the southwest there is very little relief, and the land is either almost flat over large areas or has only low ridges and wide, shallow valleys.

The upland surface slopes southeast or directly towards the Atlantic coast, but there is also a distinct lowering of the elevation, and more uniform topography, southwestwards towards the Gulf of Maine. This is particularly evident from Queens County to Yarmouth.

The highest points along the northern border are rounded hills that rise gently from the surrounding country. Two granite knolls south of Kentville are typical: one of them, north of Lake George, rises to more than 275 m, and another, southwest of Gaspereau, is around 260 m. Several slate hills in the same general area are only slightly lower, at nearly 245 m. In northern Annapolis County, the highest area, southwest of Bridgetown, is a little over 275 m high, and from there the surface slopes gently down to Brier Island. In eastern Guysborough, along the northern edge of the narrow band of upland, the elevation is about 225 m above sea level. Only occasionally throughout the Atlantic Interior does a hill rise significantly above the surrounding area. One of these is Aspotogan Mountain on the peninsula east of Chester, which reaches a height of 145 m in an area with an average elevation of barely 75 m.

Granite Area

Granite comprises the most extensive areas of the Atlantic Interior and reaches the highest elevations. The rock is massive and seems resistant to chemical change, although post-glacial weathering has affected all exposed surfaces. Low, rounded hills or shapeless ridges generally rise less than 20 m above the mean elevation, with intervening broad, shallow depressions which are too irregular to be called valleys. High knolls occur occasionally, but the slopes are rounded and subdued throughout with no particular pattern or design. The drainage is poor, and sluggish rivers or streams meander from one shallow lake to another. Large boulders line these channels, and dot the lakes.

Greywacke Area

The greywacke topography is somewhat more varied. In eastern Nova Scotia, on the northern border of Halifax and Guysborough counties, the surface is much like a plateau, with long, low ridges running east and west. Large, angular blocks of greywacke cover the ground and the soil is usually thin and acid. The intervening hollows are swampy and have their long axes generally oriented parallel to the strike of the strata; drainage is impeded by deposits of glacial drift. The river channels in the interior are shallow because the streams run down the tilted erosion plain across the fold axes and cut across layers of resistant strata. Near the Atlantic coast, the topography is frequently more uneven and the stream channels are deeper, but even here the land tends to be monotonous and covered with scattered rocks of all sizes. Greywacke is also common in southwestern Nova Scotia, where, again, the topography tends to be flat and monotonous.

Slate Areas and Drumlins

The slate areas present a more interesting and varied topography than the areas of greywacke and granite. Slates weather relatively easily. The surface of the slate areas has been planed off, and the resultant loose material has been carried away to form a deep glacial drift with a high percentage of silt and clay. The advancing glacier moved over the area like a bulldozer, scraped off the weathered material, carried it for a kilometre or so, and then, overloaded by the mass of material, dropped it and sometimes shaped it into drumlins.

Where material is sufficient, drumlins produce a rolling topography. The drumlins may be isolated, may overlap to form irregular hills, or may be joined to make beaded ridges. The slate areas of Lunenburg County represent typical drumlin country, a very distinctive type of topography which can be recognized as soon as one enters it. Small, oval hills are scattered over the landscape, with ponds or lakes in the hollows between them. On land they appear as swarms, which are often quite well defined geographically.

CLIMATE

The Atlantic Interior is a large, contiguous region that includes considerable climatic variation but has basically an inland, lowland climate sheltered from direct marine influences. The climate is characterized by cold winters and warm summers. Variations in temperature and precipitation are, to a certain extent, governed by distance from the Atlantic coast and by latitude.

The mean annual temperature varies from 1°C towards the southwestern tip of the province to 5°C and higher in the more inland areas. In most of the Region, January mean temperatures are below -5°C and are generally warmer towards the coast. Mean temperatures rise above freezing by the end of March, with spring arriving somewhat earlier in the southwest. By July, most of the Region has warmed to a mean temperature in excess of 17.5°C, except in the more northerly areas of the Region in Halifax and Guysborough counties. The area around the LaHave drainage basin and Kejimkujik Lake tends to warm up earlier and has hotter summer temperatures. Freezing temperatures return to the Region by the second week in December, and a little later near the southwestern tip.

The mean total annual precipitation ranges from 1200 to 1600 mm. The drier areas are found near the southwestern tip and towards the interior. Mean total snowfall ranges from 150 cm near the coast to 250 cm or more in higher areas and further inland. The snow-cover season varies from about 110 days in the southwest to more than 130 days further north.

The frost-free period varies from less than 100 days in the interior to more than 140 days in the southwest. The number of accumulated growing degree-days are highest in the southern part of the Region and taper off towards the north.

FRESH WATER

Drainage patterns in Region 400 are typically deranged, and surface water is retained in a disorganized series of streams, lakes, and bogs. Chains of lakes, streams, and stillwaters occur in the interior, with low ridges following the trend of the underlying strata. Many of the streams are slow-flowing and interrupted by shallow, rocky ponds and lakes. In Queens and Shelburne counties the rivers and streams tend to cut across bands of harder rock to form rapids and low waterfalls, as along the Medway and Mersey rivers. In Yarmouth County the folds of the strata bend southward, and consequently the flow of the streams is along the strike of the structures rather than across them. The streams flow slowly through wide, shallow valleys, where lakes and stillwaters also occur. In parts of Shelburne County the land is practically flat as far as the eye can see, as if it had been planed off to a level surface to form broad expanses of poorly drained areas and bogs. Ponds and lakes are common in the hollows between drumlins. The highest elevation is near the northern border of the Region, where the divide between streams draining north and those flowing south makes a great arc, north from near Pubnico almost to the slope of the Annapolis Valley and around to the Waverley lakes near Halifax.

Surface waters are dystrophic throughout this Region. Primary productivity tends to be low and most lakes are oligotrophic. Surface water also tends to be low in dissolved solids, providing little buffering capacity. Combined with the low buffering capacities of the thin soils and tills associated with the quartzite, slate, and granite bedrock, much of the fresh water in this Region is susceptible to acidification. Surface water is less acidic in the drumlin areas.

Groundwater in this Region is stored and transmitted through fractures and joints and along fault and contact zones in the bedrock. It tends to be low in dissolved minerals but, like the surface water, is susceptible to acidification from acidic runoff and to discolouration from contact with naturally occurring minerals such as iron and manganese associated with granite and quartzite. The slates of the Halifax Formation tend to have a good overburden of till that somewhat buffers the natural sulphides that can contaminate ground and surface waters.

SOILS

The major factors affecting soil development in this Region are the resistant granite and quartzite bedrock, the undulating and often poorly drained terrain, and the influence of finer-textured tills transported by glacial action from Carboniferous areas. Over most of the Region, strong scouring has left a thin, bouldery till cover on which humo-ferric podzols predominate, with considerable areas of gleysol, Rockland, and peat. Coarse, bouldery, sandy loams have formed in granitic areas, while on quartzite the stony, sandy loams have slightly finer textures. Where soils developed from till over slates and schists, vigorous vegetative growth is prevalent, in marked contrast to that of the quartzite soils. The soils themselves are usually very permeable, but drainage is often impeded by topography or underlying bedrock. Soils are strongly leached and very acidic. An important feature of the soils of this Region are the drumlin fields. Soils formed on drumlins are often better drained, finer textured, deeper, and somewhat more fertile.

PLANTS

The Atlantic Interior covers three of Loucks' Forest Zones. The largest area falls within the predominantly softwood Red Spruce, Hemlock, Pine Zone. The LaHave basin, between Kejimkujik Lake and the

LaHave River, is in the Sugar Maple–Hemlock, Pine Zone. The hilly areas around the Musquodoboit River fall within the Sugar Maple, Yellow Birch–Fir Zone.

The main influences on regional vegetation are the inland climate with its warm summers; the sandy, acid soils; the mixed drainage; and extensive disturbance by fire and logging. Softwoods dominate, but shade-intolerant hardwoods frequently occur on burnt-over land, and pockets of shade-tolerant hardwoods are found on higher, better-drained sites. Red Spruce and Eastern Hemlock were once abundant throughout much of the Region, but both have been depleted by cutting.

In the southern part of the Region, south and west of a line from Windsor to Halifax, where the soils are generally better drained and summer temperatures are slightly higher, spruce and Eastern Hemlock are found in association with Red Oak and White Pine. Balsam Fir and Red Maple are found on disturbed sites, but the fir usually disappears within 30 years. Beech was once abundant but is now found mostly on drier ridges. Ash is found on seepage slopes throughout the Region, particularly on the sides of drumlins. Bogs and swamps are very common, particularly towards the southwestern tip of the Region.

In the more northerly part, north and east of a line from Windsor to Halifax, where summer temperatures are slightly cooler and drainage is poorer, Red Spruce and Eastern Hemlock are found with Black Spruce and Balsam Fir. Sugar Maple and White Pine are found on rolling hills, particularly inland. Black Spruce swamps and peat bogs are extensive, and Red Maple, aspen, and Wire Birch predominate as post-fire species, rather than Red Oak. On the rolling hills around the Musquodoboit Valley, higher elevations and better drainage favour shade-tolerant hardwoods and mixedwoods.

The southern part of this Region is distinguished by the presence of Southwest Flora, or Coastal Plain Flora. This is a group of plants normally restricted to more southern ranges, but because of the milder climate in Nova Scotia, they are able to establish themselves here.

ANIMALS

Softwood and mixedwood forest habitats predominate in this Region, favouring fauna of a more boreal association. Disturbance is widespread, and there are very few areas of mature forest. Moose and bear are scattered with a concentration in the area of the brush barrens east of Yarmouth. With the exception of these barrens, deer are found throughout the Region. New growth on recently cut-over or burnt areas provides good forage for ungulates. Bogs and inland barrens are common. Small-mammal diversity is low to moderately high, depending upon habitat. Two species, White-footed Mouse and Southern Flying Squirrel, are disjunct in Nova Scotia from other North American populations. The Southern Flying Squirrel has a restricted distribution (Kejimkujik Park), but the White-footed Mouse distribution coincides with the boundaries of the Region. Lakes and streams cover a considerable proportion of the Region, but the very acidic and deeply coloured character of the water supports an impoverished freshwater vertebrate fauna.

CULTURAL ENVIRONMENT

The forests of the Atlantic Interior have been commercially managed since the eighteenth century and have experienced repeated fires. Log drives took the timber from the interior to sawmills on the coast where it was exported as lumber. Many sawmills still operate in this Region.

The vigorous regeneration of Balsam Fir has led to the establishment of the Christmas tree industry, centred in District 430. Small pockets of agricultural land are scattered through the Region, often in association with drumlins (District 430). The Lunenburg Drumlins attracted German settlers, and Loyalist, Irish, and Scottish immigrants farmed the Annapolis, Ponhook, Kejimkujik, and Eastern Shore drumlins. Many marginal farmlands were later abandoned, giving way to oldfield succession.

Metals and minerals mined have included gold, tin, and limestone, as well as sand, gravel, and crushed rock. Peat resources underlie much of this land. At various localities, hydroelectric power has been harnessed.

The southwestern part of Nova Scotia is the most significant archaeological area in the province. Many parts of the Atlantic Interior were important to the Mi'kmaq for hunting and fishing. Shell middens found along St. Margarets Bay (sub-District 460b) and arrowheads found along canoe routes at Kejimkujik Park (Unit 433) give evidence of former aboriginal occupation. When sport hunting developed in the latter half of the nineteenth century, Mi'kmaq guides were employed by American hunters for moose-hunting and fishing expeditions. Thus began the hunting and fishing lodge tradition in the southwestern Atlantic Interior where the Tobeatic Game Sanctuary is found. Hunting and fishing continues in many of these areas today. Other recrea-

tional land uses include canoeing, hiking, bird-watching, and camping, particularly at Kejimkujik National Park, which was established in the 1960s.

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Associated Topics

T2.2 The Avalon and Meguma Zones, T2.3 Granite in Nova Scotia, T3.1 Development of the Ancient Landscape, T3.3 Glaciation, Deglaciation and Sea-level Changes, T3.4 Terrestrial Glacial Deposits and Landscape Features, T4.2 Post-glacial Colonization by Plants, T5.2 Nova Scotia's Climate, T8.1 Freshwater Hydrology, T8.2 Freshwater Environments, T8.3 Freshwater Wetlands, T10.2 Successional Trends in Vegetation, T10.4 Plant Communities in Nova Scotia, T10.6 Trees, T11.13 Freshwater Fishes, T11.16 Land and Freshwater Invertebrates, T12.2 Cultural Landscapes, T12.3 Geology and Resources, T12.10 Plants and Resources, T12.11 Animals and Resources.

Associated Habitats

H3 Freshwater, H4 Freshwater Wetlands, H5.1 Barren, H6.1 Hardwood Forest (Maple, Oak, Birch Association; Sugar Maple, Elm Association), H6.2 Softwood Forest (Spruce, Hemlock, Pine Association; Pine Association).

410 QUARTZITE PLAINS

Three Units are distinguished within the Quartzite Plains District on the basis of surficial deposits:

411 Southwest Schists
412 Mersey Meadows
413 Quartzite Barrens

GEOLOGY AND LANDSCAPE DEVELOPMENT

District 410 is underlain predominantly by resistant metamorphic rocks: greywacke and schist. It lies on the lowest part of the tilted planation surface, so elevations are low and there is little relief. The lowest part is in the southwest, where elevations rarely exceed 100 m and average 50 m. In the southeast the average is nearer 100 m, with the highest elevations around 150 m.

The bedrock is blanketed and obscured by a thin, sandy till but is exposed locally where the surface has been scraped clean. Beneath the till, the eroded folded strata produce a topography of low parallel ridges separated by shallow valleys.

FRESH WATER

The drainage is controlled by glacial lineations and deposits, and the pattern that develops reflects the angle between the fold structures and the glacial direction. In the west there is parallel drainage, while in the east drainage patterns are at right angles.

SOILS

Where the soils have not been burned, especially near Lake Rossignol (sub-Unit 412a), organic matter in the soil provides good forest-growing conditions. Where repeated burning has occurred, organic matter is depleted and slow to rebuild. This is the situation in the rest of Unit 412 and throughout much of Unit 413. Greater proportions of fine materials in the soils derived from schists in Unit 411 provide good forest growth.

The following description, written by C.D. Howe in 1912, applies to soils in areas where only local quartzite materials are available. It is most relevant to areas in Halifax and Guysborough counties (Unit 413) but also applies to some southern areas of Unit 412 in Queens, Shelburne, and Yarmouth counties: "[Quartzite], composed entirely of quartz and mica, when decomposed, yields about as much plant food material as glass. Moreover, the quartzite soils, unless increased by ice- or water-deposited materials, are naturally thin, often not over two inches [5cm] deep. They support an abundant growth of heath plants, like the blueberries and laurel [Sheep Laurel], whose leaves in decomposing make a sour soil. The fact that usually these quartzite soils are ill-drained adds to the acidity of the soil. In a sour condition, the vegetable matter does not decay normally but accumulates in a peaty mass called raw humus. A sour soil is no more favourable to the growth of trees than to the ordinary farm crops. While the quartzite areas have been extensively burned and are now semi-barren or barren, it is probable that this is not far removed from their original condition. At all events it may be reasonably inferred they never supported forest trees larger than those of pole-wood size."

SCENIC QUALITY

Although this District comprises extensive tracts throughout the Southern Upland, there are common scenic characteristics. There is very little relief and the forest cover is often poor and stunted, particularly in boggy areas. Owing to the paucity of soils for farming, most areas lack settlement and therefore roads. On the positive side, the many lakes provide interest and beauty and allow extensive back-country areas to be reached by canoe. Landscapes rate from low (where lakes are absent) to moderately high (e.g., around Lake Rossignol, Grand Lake) but are generally in the medium range.

411 SOUTHWEST SCHISTS

GEOLOGY AND LANDSCAPE DEVELOPMENT

Unit 411 covers an area in southwestern Nova Scotia that is southwest and west of the South Mountain Granite (sub-Unit 451a). The greywacke-dominated bedrock contains mica and hornblende schists, interfolded with slate in the central area. As suggested in the regional description, the occurrence of schists and soils developed from them is not clearly documented.

The present landscape, morphology, and drainage reflects several phases of glacial deposition (these are considered in more detail under Unit 421). The low-lying bedrock has been covered and its relief obscured by glacial deposits, but in places a system of west- and southward-trending valleys can be seen. The present drainage has been glacially imprinted and is to the south.

The surface deposits are of quartzite and schist tills with numerous low drumlins, 2–20 m high. Drumlins on the quartzite are lower and less frequent than on the schists.

A few small eskers are present south and east of Wentworth Lake in the centre of the Unit, but generally the most interesting glacial deposits are along the shores of St. Marys Bay, where outwash deposits, raised beaches, and deltas, usually less than 5 m deep, are found (these are considered in detail in the description of District 820).

FRESH WATER

Drainage occurs through a deranged pattern of sluggish streams and, because the drumlins create additional impoundments, numerous lakes are scattered across the surface. The surface-water coverage in the southern part of this Unit is one of the highest in Nova Scotia. Lakes are generally shallow and dystrophic. Wetlands are scattered throughout, and concentrations of peat bogs are found in the southern areas.

Unit 411 contains most of the Tusket River, which is sluggish and meanders from one shallow lake to another. Productivity in this system is relatively high, and it is a favoured recreational area for salmon, trout, and gaspereau.

Conductivity in the lakes averages about 45 micromhos/cm, and pH ranges between 4.3 and 6.5.

SOILS

The soils in this Unit are derived mostly from quartzite and schist and are, with the exception of scattered drumlinoid features, generally shallow and stony sandy loams. The major soils derived from quartzite series are well-drained Halifax Formation and imperfectly drained Danesville, with small areas of poorly drained Aspotogan soil and peat. The schists have developed Yarmouth, Mersey, Liverpool, Deerfield, and Pitman soils. Soil drainage patterns are very complex and are reflected in the varied plant cover (see Figure 13).

PLANTS

This Unit falls within the Wentworth Lake District of Loucks' Red Spruce, Hemlock, Pine Zone. Deeper soils on the tops of drumlins, derived from schists, support the shade-tolerant deciduous trees—Sugar Maple, Yellow Birch, American Beech with Red Oak—and some shade-intolerant hardwoods. More Red Spruce, hemlock, and pine occur on the lower slopes with birches and aspen.

Swamp stands are composed of Black Spruce, Balsam Fir, larch, and, in certain localized areas, White Cedar. Swamps of Red Maple and Black Ash are also a common feature. In oldfields, Red Spruce, White Spruce, and Balsam Fir are the colonizers, with White Pine invading oldfields and pastures on coarser soils.

Coastal-plain plants are found on lake margins, meadows, and bogs. Most common in the Tusket Valley, they include some endangered species such as Pink Coreopsis and Plymouth Gentian. Other rare species include Water-pennywort and Dwarf Chain Fern.

ANIMALS

This Unit provides moderately good wildlife habitat, particularly for wintering Bald Eagles, migratory Woodcock (fall), Snowshoe Hare, and bobcats. The brush barrens in the southern portions provide abundant berries, and Black Bear are common. The Tusket River provides habitat for a diversity of freshwater molluscs and arthropods, some with coastal-plain affinities. Typical fish include Gaspereau, White Perch, Yellow Perch, Brook Trout, White Sucker, Chain

Pickerel, Golden Shiner, and Brown Bullhead. The Atlantic Whitefish was once found in this area, but appears to be extirpated.

CULTURAL ENVIRONMENT

Part of this area makes up the French shore of Nova Scotia, where Acadians settled on their return after 1763. Backland forests have experienced repeated cutting and fires. Forest management is economically important here. Hydroelectric power has been harnessed at Weymouth Falls. The Tusket River supports an important Gaspereau fishery. The Tusket Valley runs through this area. A small area on Wilsons Lake has been designated as an ecological reserve to protect the habitat of rare coastal-plain plant species. Tin deposits were mined around Kemptville in the 1980s, but the mine was closed down in the early 1990s because of plummeting tin prices.

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Sites of Special Interest

- Hectanooga (IBP Proposed Ecological Site 54)—largest known stand of White Cedar in Nova Scotia
- Belliveau Lake (IBP Proposed Ecological Site 57)—spring-fed lake with diverse aquatic plant communities, only known locality for Sweet Pepperbush

Ecological Reserves

- Tusket River Nature Reserve

Provincial Parks and Park Reserves

- Ogden Lake

Proposed Parks and Protected Areas System includes Natural Landscape 5.

Scenic Viewpoints

- Lake Vaughan

Associated Topics

T2.2 The Avalon and Meguma Zones, T3.4 Terrestrial Glacial Deposits and Landscape Features, T4.1 Postglacial Climatic Change, T10.12 Rare and Endangered Plants, T11.4 Birds of Prey, T11.8 Land Mammals, T12.8 Fresh Water and Resources.

Associated Habitats

H3 Fresh Water, H4.1 Bog, H4.3 Swamp, H5.2 Oldfield, H6.1 Hardwood Forest (Sugar Maple, Yellow Birch, Beech Association), H6.2 Softwood Forest (Spruce, Hemlock, Pine Association; Spruce, Fir Association; Black Spruce, Larch Association).

412 MERSEY MEADOWS

Unit 412 is divided into three sub-Units with similar features:

(a) Lake Rossignol
(b) Millipsigate Lake
(c) Rocky Lake

GEOLOGY AND LANDSCAPE DEVELOPMENT

The three sub-Units of the Mersey Meadows are blanketed with quartzite till but have only a few scattered drumlins of the same material (see Figure 13). Glacial outwash deposits and ice-contact drift (such as collects in crevasses) are found on the upper reaches of the Argyle River. Eskers are common in many river valleys but particularly those of the Argyle, Jordan, and Sable rivers (sub-Unit 412a).

FRESH WATER

The area has a number of lakes, but drainage is relatively unimpeded and the rivers form dendritic patterns. Here the rivers flow perpendicularly to the bands of interfolded quartzite and shale, sometimes forming small waterfalls where resistant quartzite ridges are encountered. Many of Nova Scotia's major rivers flow north-south through this Unit, i.e., the Clyde, Roseway, Jordan, Sable, and Broad rivers. Lake Rossignol is the largest lake, dominating surface-

Plate 4: Region 400. Oblique aerial view of Southwest Cove, Tangier Grand Lake in Unit 453, showing an impermeable landscape with abundant surface water and spruce forest. Photo: O. Maass.

water coverage in the northeast. This Unit has the largest concentration of fens and raised and sloped peat bogs in Nova Scotia (see Figure 11). Surface water is fairly acidic, with pH levels ranging from 4.0 to 6.1. Dissolved solids are limited, and conductivity and primary productivity are low.

SOILS

Lake Rossignol (sub-Unit 412a)
Moderately coarse-textured soils that developed from schistose parent materials include large areas of well-drained Mersey soils, and imperfectly drained and mottled Liverpool soils. Towards the coast, imperfectly drained Danesville soils are common, while inland are large areas of well-drained Halifax and Gibraltar gravelly, sandy loams. Around Greenfield is a large area of well-drained Bridgewater sandy loam. A feature of this sub-Unit is the substantial acreage of barrens, some of it caused by repeated burning, but some underlain by a dense ortstein layer. The effects of repeated burning have been profound for these soils. A band of heavily burned forest extends from the Municipality of Argyle eastwards to the Broad River in Queens County. Organic matter loss to fires has severely reduced the ability of this area to support good forest growth. Lands to the north of this burnt section, extending from the Roseway River to the Medway River, south of Lake Rossignol, are able to support good forest growth, even though their origins are similar, because they have been less severely burned.

412
Mersey
Meadows

Millipsigate Lake (sub-Unit 412b)
Soils in this sub-Unit are predominantly shallow, Bridgewater series. North of Minamkeak Lake, and between Millipsigate and Hebb lakes, Rockland occurs.

Rocky Lake (sub-Unit 412c)
Well-drained but shallow Farmville soils derived from slaty to gravelly tills occur with Farmville and occasional Bridgewater drumlins.

PLANTS

The southwestern part of this Unit has been the most extensively burned, regenerating as a mixed forest (see Plate 4) with pockets of White Pine and Red Oak. The natural vegetation appears to have been White Pine and Red Oak, but now many of the hills support only low shrubs and scattered Black Spruce. Barren and semi-barren areas with depleted soils are now colonized by huckleberry, which appears after cutting and after fires. In deeper soil areas, White Pine with shade-intolerant hardwoods occur, with Red Oak on the ridges. Open peatlands are dominated by low ericaceous shrubs such as Leather-leaf, Sheep Laurel, Rhodora, and Labrador Tea.

Describing the southwestern section of this Unit in 1912, C.D. Howe wrote: "Deep sands to coarse materials covered only with a thin layer of sand may be found spread out in billowy masses. Such sands are very common ... giving rise to extensive areas of white pine forests; while the coarse materials are frequent along the southern border of the granite. ... Being heavy and coarse they never got far from their original source. ... They are barren or semi-barren because of too thorough drainage and natural poverty of plant food materials. ... One frequently finds drained lake beds in the possession of coarse grasses and sedges. ... The lower and middle courses of the rivers ... from the Clyde to the Sable are characterized by low undulating deposits of sand interspersed by rocky or gravelly ridges, bogs and swamps. The two latter are most extensive in the valleys of the Clyde and Sable where they occupy from one-third to one-half of the area. They contain spruce and fir pulpwood in about equal proportions, usually, however, the spruce predominates. One finds in these regions blocks of several thousand acres, not over five percent of which are forested, the rest being barren, open bogs and brushland. Thickets of wire birch, red maple and red oak cover the gravelly and rocky ridges. Along the bases of the ridges the young hardwoods are mixed with spruce and fir."

In the less-severely burned areas south of Lake Rossignol, the undulating terrain supports Eastern Hemlock and Red Spruce, with some shade-tolerant hardwoods on well-drained sites. Very large Yellow Birch are found in these forests. Large expanses of organic soils support mature trees. Deeper organic soils are characterized by Red Maple and Ash, while shallower organic soils support larch. The luxurious understory in these larch swamps contains larger-than-usual Interrupted Fern.

In the lower valleys of the Jordan and Sable rivers, sandy soils are found which are extensively burnt and support White Pine stands with Red Oak. Further inland, the Upper Ohio area, which has not been heavily burned, is characterized by Red Spruce, Eastern Hemlock, and White Pine on the drier ridges, with more Yellow Birch than elsewhere.

Coastal-plain plants are relatively common in this Unit.

ANIMALS

Large areas of barren and bog limit the productive wildlife habitat. Snowshoe Hare and bobcat are relatively abundant, and Black Bear occur, particularly where berry bushes are abundant on the barrens. There are large concentrations of deer. The Common Shrew, Short-tailed Shrew, Red-Backed Vole, and White-footed Mouse are the most common small mammals. Rivers and lakes are acidic and often dystrophic, with low natural productivity. Painted Turtles and endangered Blanding's Turtles are found here. Snakes are unusually common in the larch swamps.

CULTURAL ENVIRONMENT

The barren nature of much of the land has left this area sparsely settled. Repeated fires have contributed to the widespread barrens. However, hunting, fishing, and canoeing have long been popular pursuits in the Mersey Meadows, and the Mersey River was a traditional transport route for the Mi'kmaq and the French. New immigrants cut the forests, especially White Pine, to supply timber to the shipbuilding market. Log drives transported timber down the Mersey River, which connects the hinterland with the port of Liverpool.

Lake Rossignol was flooded in the 1920s for hydro power use by pulp and paper companies. Today, six hydroelectric generating stations are located on the Mersey River. The flooding of Lake Rossignol affected animal wildlife populations and, consequently, Mi'kmaq hunting and fishing guides could no longer fish salmon or hunt moose here for a period of time.

The Tobeatic Wildlife Management Area spans part of the Mersey Meadows and is one of the largest remaining wildland areas in Nova Scotia.

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Sites of Special Interest

- Tobeatic Game Sanctuary (provincial) (see also sub-District 440a)
- Burnaby Lake (IBP Proposed Ecological Site 42)—mature Red Spruce stand
- Shelburne River (IBP Proposed Ecological Site 43)—old Eastern Hemlock stand
- Sixth Lake (IBP Proposed Ecological Site 44)—Red Spruce, Eastern Hemlock forest
- Broad River (IBP Proposed Ecological Site 45)—Red Spruce forest
- Silvery Lake (IBP Proposed Ecological Site 47)—old Eastern Hemlock forest
- Quinan Lake (IBP Proposed Ecological Site 50)—an example of old mixed forest
- Lake Rossignol—significant archeological site

Ecological Reserves

- Ponhook Nature Reserve

Provincial Parks and Park Reserves

- Ten Mile Lake
- Welcum

Proposed Parks and Protected Areas System includes Natural Landscape 13, and Candidate Protected Areas 28 Lake Rossignol and 30 Tidney River.

Associated Topics

T2.2 The Avalon and Meguma Zones, T3.4 Terrestrial Glacial Deposits and Landscape Features, T8.2 Freshwater Environments, T8.3 Freshwater Wetlands, T10.1 Vegetation Change, T10.3 Vegetation and the Environment, T11.9 Carnivores, T11.10 Ungulates, T11.15 Amphibians and Reptiles, T12.8 Fresh Water and Resources.

Associated Habitats

H3 Fresh Water, H4.1 Bog, H4.2 Fen, H5.1 Barren, H6.1 Hardwood Forest (Maple, Oak, Birch Association), H6.2 Softwood Forest (Pine Association; Spruce, Hemlock, Pine Association; Black Spruce, Larch Association).

413 QUARTZITE BARRENS

The Quartzite Barrens are divided into two sub-Units:

(a) Halifax
(b) Guysborough

GEOLOGY AND LANDSCAPE DEVELOPMENT

The mantle of quartzite till ranges in thickness from 1–10 m in this Unit but averages less than 3 m. There are several large areas of exposed rock where the till has been scraped off by glacial ice. Specific localities are:

- north and west of Mount Uniacke
- around the Halifax International Airport
- around Anderson Lake in Dartmouth
- several areas from the Liscomb Game Sanctuary to Country Harbour River

The bedrock-dominated topography of these extensive barrens is best described as "ridge-swamp-swale" in seemingly endless repetition (see Figure 11). Where greater thicknesses of glacial till have accumulated, drumlins and drumlinoid till features are found.

Welt-shaped drumlins of reddish Lawrencetown Till (sub-Units 435a and 435b) are scattered throughout. This glacial material is derived predominantly from the reddish sandstones and siltstones of the Carboniferous and Triassic areas to the north but also includes material from the Cobequid Hills and Pictou-Antigonish Highlands.

Additional small patches of "unmoulded" red till are found in central Guysborough in association with small glacial outwash deposits. At Indian Harbour River, the valley is filled with thick layers of outwash sand and gravel.

In the Halifax-Guysborough area the many long sub-parallel faults create linear valleys which are followed by rivers and sometimes filled by lakes; for example, Porters Lake, Lake Charlotte, Sheet Harbour River, Indian Harbour, and St. Marys River.

FRESH WATER

The many glacial lakes in this Unit vary in size and tend to be dystrophic. In the more developed areas, eutrophication is common. The scattered wetlands, mainly bogs and swamps, tend to be biologically productive. Bogs are raised and associated with flat fens. The Sackville River has an extensive floodplain.

The pH levels have been recorded as low as 5.0 in Beaver Lake and as high as 7.5 in Lake William (sub-Unit 413a). The average pH tends to be around 6.5. Conductivity ranges between 12 micromhos/cm in Indian Lake (sub-Unit 413b) and 98 micromhos/cm in Micmac Lake (sub-Unit 413a).

SOILS

Halifax (sub-Unit 413a)
Much of this area is covered by Halifax soils—well-drained, stony, sandy loams, developed on till derived principally from quartzite. The poorly drained associate Danesville occurs in areas of low relief, together with Aspotogan soils and peat. Some Bridgewater soil, derived from slates, is also found. Scattered Wolfville drumlins occur, with larger areas of continuous Wolfville soil in the Beaverbank and Dollar Lake areas (see Unit 436).

Guysborough (sub-Unit 413b)
Halifax, Danesville, and Aspotogan soils again predominate. Scattered Wolfville drumlins occur, concentrated in the central part of the sub-Unit (see Unit 435). Hebert, Cumberland, and Chaswood soils have developed on alluvial and outwash material along the St. Marys River.

PLANTS

In this Unit the higher and broader ridges are capped by American Beech, Yellow Birch, Red Maple, and Sugar Maple. On the hardwood hills around Liscomb, big Sugar Maples and Yellow Birch occur. Mixed stands of Red Spruce fringe these hardwood hills with some Balsam Fir, Yellow Birch, Eastern Hemlock, and White Spruce. In the depressions, swamps dominated by Black Spruce and larch alternate with patches of sand with some White Pine. Slow-moving streams are bordered by broad, swampy areas with Balsam Fir, Red Maple, and Black Spruce. Extensive shrub-dominated barrens occur, with Wire Birch, Red Maple, and aspen. Scattered Black Spruce and White Pine are also found on the barrens, depending on soil drainage conditions. Bog

vegetation includes various species of grass, bulrushes, and low ericaceous shrubs.

This impoverished forest area was characterized in the early twentieth century by C.D. Howe. Since he wrote, there has been a reduction in the number of fires and a consequent improvement in forest conditions. His description in 1912 was: "In the western portion, the country has the appearance of a plateau, in which the low narrow ridges have nearly vertical strata, bare of soil and bare of trees except in the crevices of the rock. The depressions between the ridges are filled with patches of sand, on which are pine stands alternating with swamps in which balsam fir and black spruce predominate. The broader and higher ridges are capped with hardwoods and mixed stands are found on the lower slopes. Most of these are now in a severely culled or second growth condition. The slow moving streams are bordered by broad, swampy areas in which fir and red maple form two-thirds of the stand, the other third being made up of black spruce, yellow birch and black ash in about equal proportions. ... (To the east) the ridges are farther apart and have more extensive sand deposits and bogs between them. ... The fire barren on the quartzite east and northeast of Halifax harbour is covered to the extent of 80 percent with wire birch, the rest being red maple with scattering yellow birch and beech. Fir prevails along the margins of the numerous lakes and ponds and it frequently covers the tops of low ridges. Overtopping these are scattered mature white pine and an occasional red pine. ... For the most part the surface is strewn with boulders and the soil is sandy, although the greater part of the volume is occupied by pebbles and boulders of various sizes. ... It is evident that such soil does not encourage heavy forest growth, even when not pauperized by frequent fires."

ANIMALS

Extensive forest cutting has provided good browsing habitat for deer and Snowshoe Hare. The abundance of hare also supports a good population of bobcat. Small-mammal diversity is moderately high in well-drained mixed and hardwood forest habitats, especially along rivers and streams; elsewhere it is quite low. St. Marys River is an important salmon river. Typical fish species include White and Yellow Perch, White Sucker, Brown Bullhead, Brook Trout, Banded Killifish, sticklebacks, Golden Shiner, Lake Trout and American Eel.

CULTURAL ENVIRONMENT

The Quartzite Barrens have been the most productive area in Nova Scotia for gold mining during the past century, with mines at Goldboro, Goldenville, Waverley, Moose River, and other sites. Hydroelectric power is harnessed at Malay Falls and Ruth Falls.

Loyalist refugees settled in this area, and communities such as Sheet Harbour became prosperous centres for the lumber industry. Black Loyalists settled in Preston (sub-Unit 413a) on small lots situated in swampy areas or on barren, unproductive soil.

The Shubenacadie Canal attempted to provide a link between the Atlantic Ocean and the Bay of Fundy.

Woodlot management occurs in this Unit, and there are two game sanctuaries: the Waverley Game Sanctuary in the Halifax Quartzite Barrens and the Liscomb Game Sanctuary in the Guysborough Quartzite Barrens. St. Marys River is an important site for salmon and trout fishing and other outdoor recreation.

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Sites of Special Interest

- Indian River—fault valley filled with glacial outwash deposits
- Route 101 to Mt. Uniacke from Halifax—bedrock ridges overlain with a veneer of quartzite till; an occasional crosscut drumlin
- Liscomb Game Sanctuary–Abraham Lake (IBP Proposed Ecological Site 31)—mature Red Spruce forest
- Melrose (IBP Proposed Ecological Site 27)—old Eastern Hemlock forest
- St. Marys River
- Sherbrooke Village Restoration—heritage village museum
- Fairbanks Centre, Dartmouth, Shubenacadie Canal interpretation
- Hemlock Ravine—urban park of historic and national significance

Provincial Parks and Park Reserves

- Uniacke Estate Museum Park
- Bell
- Cockscomb Lake
- Rocky Lake
- Portobello
- Lake Echo
- Lawrencetown
- Lake Charlotte

- Salsman
- Sheet Harbour
- Stillwater

Proposed Parks and Protected Areas System includes Natural Landscapes 30a and 35b and Candidate Protected Areas 15 Liscomb River, 16 The Big Bog, and 17 Alder Grounds.

Scenic Viewpoints

- Middle Country Harbour Provincial Park (sub-Unit 413b)

Associated Topics

T2.2 The Avalon and Meguma Zones, T3.4 Terrestrial Glacial Deposits and Landscape Features, T11.9 Carnivores, T11.11 Small Mammals, T11.13 Freshwater Fishes, T12.3 Geology and Resources, T12.10 Plants and Resources, T12.11 Animals and Resources.

413 Quartzite Barrens

Associated Habitats

H3 Freshwater, H4.3 Swamp, H5.1 Barren, H6.1 Hardwood Forest (Sugar Maple, Yellow Birch, Beech Association).

420 SLOPES AND RIDGES

District 420 has been divided into three Units:

421 Sissiboo Lowlands
422 South Mountain Slope
423 Slate Ridges

GEOLOGY AND LANDSCAPE DEVELOPMENT

The geology in this District is dominated by Halifax slate, which occurs in folds within the Goldenville greywacke. In most of the District the slate is overlain by Silurian White Rock volcanics and sometimes also by Early Devonian sandstones.

The Units within this District are distributed around the northern and western margins of the Atlantic Interior. Their topography reflects the somewhat lesser resistance of slate compared to the surrounding strata. The District may be divided into seven sub-Units: in three the slate has been buried by glacial deposits and forms a flat lowland, in two the slate forms valleys on the upland slope, and in two the slate forms ridges.

SCENIC QUALITY

This District contains a variety of landscapes because it is geologically rather than topographically defined. The Sissiboo Lowlands (Unit 421) has much glacial till and as a consequence supports good forest growth and some marginal farming activity. The lack of relief is offset by numerous lakes, giving medium scenic ratings. The two South Mountain Slope sub-Units (422a and b) have deep valleys that cut back from the sedimentary lowlands, notably the valleys of the Bear, Nictaux, and Gaspereau rivers. Though small in scale, these valleys have high scenic value, particularly where there is farming settlement on the valley floor. The slate ridges of Rawdon Hills and Wittenburg Ridge (Unit 423), by contrast, rise above surrounding soft-rock areas. They have moderate relief (the Rawdon Hills being more indented) but lack of settlement and lakes gives them only medium scenic value.

421 SISSIBOO LOWLANDS

This Unit has three subdivisions:

(a) Sissiboo Lowlands
(b) Meteghan Lowland
(c) Lake George

GEOLOGY AND LANDSCAPE DEVELOPMENT

These areas are underlain by synclines containing Halifax slate with, in the Sissiboo and Lake George areas, thicknesses of Silurian White Rock volcanics.

The three sub-Units lie within the Digby-Yarmouth area and share the same complex glacial history. (See also Unit 411.) Four separate glacial phases have been recognized from the last ice advance. In the first phase the ice came from the east and produced a grey till derived from local material. The second pulse was the major one from New Brunswick, which engulfed the entire province and deposited a red till (Red Head Till) in this area. The third pulse of glacial ice, presumably from an ice sheet in Nova Scotia, flowed parallel to the coastline and deposited the Saulnierville Till. Finally, a weak flow from an ice cap on the Southern Upland deposited the loose material of the Beaver River Till. The Beaver River Till is at the surface of the quartzite and slate tills from which the soils have formed over most of the area. Both this and the Saulnierville Till contain fragments of Meguma Group rocks and White Rock volcanics. The relationship between the four different till layers is best seen along coastal sections, although occasionally inland a lower till is just partly covered and revealed in the centre of younger till deposits, for example, from Cape St. Mary north to Lac de Gruau.

The three areas differ somewhat in the composition of the Beaver River Till exposed on the surface. In the Sissiboo Lowlands and Meteghan Lowland, slate tills and drumlins predominate, whereas at Lake George the till and drumlins are composed predominantly of quartzite.

A few isolated deposits of water-deposited debris are present within this Unit; the best examples can be found along the shore of the Tusket River (Unit 831). There are one or two isolated eskers; one is found on the west side of Gaspereau Lake in the Meteghan Lowland.

Overall, the Sissiboo Lowlands have a low relief and a stony drumlin terrain.

FRESH WATER

Lakes are numerous and are elongated north-south, often forming chains. Scattered wetlands are typically raised bogs associated with fens. Swamps are also typical of the Sissiboo Lowlands. Several large areas of shrub swamp and marsh are found in sub-Units 421b and 421c.

Freshwater is generally dystrophic. Conductivity levels range between 32 and 59 micromhos/cm, and pH levels range between 5.4 and 6.7.

SOILS

Sissiboo Lowlands (sub-Unit 421a)
Well-drained Bridgewater and imperfectly drained Riverport soils, both sandy loams derived from slate, occur in this sub-Unit.

Meteghan Lowland (sub-Unit 421b)
Near the coast, Riverport and Bridgewater soils occur on gentle to undulating terrain. Further inland, well-drained Mersey and imperfectly drained Liverpool soils have developed from schists and quartzite, accompanied by poorly drained, mottled Pitman soils and areas of peat.

Lake George (sub-Unit 421c)
Moderately well-drained Yarmouth soils derived from schist and quartzite occur, with mottled Deerfield soils in areas with less relief. Liverpool and Pitman soils occur on very flat areas. To the north of this sub-Unit some well-drained Medway soils have formed on sands and gravels.

PLANTS

This entire Unit exhibits excellent forest growth on schisty and slaty soils. The Sissiboo Lowlands sub-Unit (421a) has considerably more hardwoods than the other sub-Units. The terrain is rolling and, on better-drained sites, American Beech and Red Oak with Sugar Maple, Yellow Birch, and aspen grow interspersed with shade-intolerant hardwoods. On moderately drained sites, a Red Spruce and Black Spruce mixture occurs. Ash is found with the spruces on Deerfield soils. The shade-intolerant Red Maple and White Birch are also mixed with ash on the

Pitman soils. The Meteghan Lowland (sub-Unit 421b) is predominantly mixed with Red Spruce, Black Spruce, Red Maple and White Birch. The Lake George sub-Unit (421c) has been very heavily disturbed. Pure stands of White Spruce have recolonized oldfields and pastures, and American Beech, Yellow Birch, and shade-intolerant hardwoods are abundant.

Shorelines of lakes and streams may include coastal-plain plants, some of which are considered rare in Nova Scotia.

ANIMALS

An inland breeding colony of Black-backed Gulls and Double-crested Cormorants occurs at Lake George. Freshwater habitats have a relatively rich aquatic fauna with some coastal-plain species of molluscs and arthropods. Fish species include Smallmouth Bass, Yellow Perch, Brown Bullhead and White Sucker. Creek Chub, Atlantic Salmon, Brown Trout, American Eel, and Gaspereau are also found in sub-Unit 421c.

CULTURAL ENVIRONMENT

Acadians settled parts of this area after the deportation of 1755. Forests supplied lumber for the shipbuilding industry in the nineteenth century along the shores of St. Marys Bay. Much of the fertile land in this Unit has been cleared for agriculture and many areas are still actively farmed. White Spruce is recolonizing abandoned farmlands. Hydroelectric power was harnessed at Sissiboo Falls. The rivers support sport fishing for Brook Trout, Smallmouth Bass and Atlantic Salmon.

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Sites of Special Interest

- Placid Lake in sub-Unit 421a (IBP Proposed Ecological Site 56)—dystrophic lake, flood plains, and old Eastern Hemlock stand
- Cape St. Mary to Lac de Gruau in sub-Unit 421b—older till exposed in centre of younger till

Provincial Parks and Park Reserves

- Ellenwood Lake (sub-Unit 421c)
- Corberrie (sub-Unit 421a)

Proposed Parks and Protected Areas System includes Natural Landscape 5.

Associated Topics

T2.2 The Avalon and Meguma Zones, T3.3 Glaciation, Deglaciation and Sea-level Changes, T3.4 Terrestrial Glacial Deposits and Landscape Features, T11.16 Land and Freshwater Invertebrates.

Associated Habitats

H4.1 Bog, H4.2 Fen, H4.3 Swamp, H4.4 Freshwater Marsh, H5.2 Oldfield, H6.1 Hardwood Forest (Sugar Maple, Yellow Birch, Beech Association), H6.2 Softwood Forest (White Spruce Association; Black Spruce, Larch Association).

422 SOUTH MOUNTAIN SLOPE

This Unit has two subdivisions:

(a) Bear River
(b) Gaspereau Valley

GEOLOGY AND LANDSCAPE DEVELOPMENT

The two sub-Units of the South Mountain Slope—Bear River and the Gaspereau Valley—are underlain by Halifax slate (Cambrian-Ordovician) interfolded with White Rock Group volcanics (mostly ash) and sandstone (Silurian); and Torbrook sandstones and siltstone (Early Devonian). The younger White Rock and Torbrook deposits are preserved in synclines.

The volcanic ash deposits are relatively thin in this area compared to the 3,000 m of ash and lava in the Yarmouth area. They contain no volcanic bombs and offer no evidence of a volcanic centre nearby, adding weight to the view that the Silurian volcano was well over 100 km to the south, near Yarmouth.

The slates, sandstones, siltstones, and ash deposits are truncated to the south by contact with the South Mountain Granite (see Figure 25). To the north they are overlain by soft Triassic deposits in the Annapolis Valley. They are therefore intermediate in hardness and form a dissected shoulder to the granite next to the low-lying valley floor. Deep valleys have been cut in these rocks, which are relatively unresistant, compared to the granite outcrops to the south. Bear River has cut a deep valley across the fold axis of the slates to reach the Annapolis Basin, which is cut into even less-resistant sandstones. The Gaspereau, in contrast, follows the fold axis and flows parallel to Annapolis Valley sandstones before emptying into the Minas Basin.

Bear River (sub-Unit 422a)

Bedrock in the Bear River area is overlain by a thick glacial till derived from the Halifax slate. This, in turn, is overlain by a thin, clay till veneer. Along the coast are thick deposits of outwash gravel which form a series of terraces from The Joggins in the west to Cornwallis in the east. These date from the immediate post-glacial period when the sea level rose rapidly as the ice caps melted. The sands and gravels washed down from South Mountain formed terraces, beach deposits, and deltas at sea level. When the land rebounded in response to the removal of the ice, the sea level became relatively lower and deposits were left well above high tide. At the same time, in response to the lowering of the sea level, Bear River and Acadia Brook deepened their valleys.

Gaspereau Valley (sub-Unit 422b)

The western part of this sub-Unit is covered with Rawdon till, a ground moraine derived from a mixture of slate, sandstone, and carbonate rocks. Along Halfway River, north and south of Greenfield, are pockets of glacially derived gravel that may be kames and kame terraces. Eskers are also indicated.

An interesting geographic feature in this area is the classic example of river capture shown by the Gaspereau River. The Gaspereau, with a lower base level, has cut back towards the Black River, which originally flowed directly northwards through Deep Hollow to join the Cornwallis River. The Gaspereau eventually captured the headwaters of the Black River, leaving an undersized stream to flow through the original valley and a wind gap just north of White Rock.

FRESH WATER

Rivers make up most of the surface water in this Unit. Bear River divides sub-Unit 422a and is tidal where it drains into the Annapolis Basin. The pH level has been recorded as low as 4.7. Several large rivers and smaller streams flow down from the South Mountain into the Annapolis Valley in sub-Unit 422b. Levels of pH in the larger rivers range between 5.1 and 5.9; Sunken Lake has a pH of 7.4.

SOILS

Soils derived from shaly loam glacial tills characterize this Unit. Bridgewater soils, derived from slaty till, and its associate Riverport and Middlewood soils dominate the Bear River area (sub-Unit 422a). The proximity of various other rock types and different directions of glacial movement has resulted in various other soils, including Wolfville (red-brown sandy till) and Digby (outwash deposits). In the Gaspereau Valley (sub-Unit 422b), the reddish-brown shaly loams have produced Morristown soils. Very steep slopes along the river valleys throughout the Unit have unstable soils with seepage spots.

PLANTS

The usually deep soils support productive mixed forest with spruce, pine, hemlock, aspen, and maple.

ANIMALS

The Gaspereau Valley provides Bald Eagle wintering habitat. The Gaspereau River supports abundant fish spawning runs of Gaspereau, and Striped Bass are known to feed here.

In the cultivated lowland areas, small mammals are predominantly those species associated with non-forested habitats, for example, the Meadow Vole and Meadow Jumping Mouse. The small-mammal diversity is relatively high in well-drained, mixed, and deciduous forest habitats, especially along rivers and streams; elsewhere it is quite low. This Unit supports disjunct populations of the Southern Flying Squirrel.

CULTURAL ENVIRONMENT

This Unit has been extensively cut over and supports a considerable amount of agricultural activity. Planters, and later Loyalists, settled in various parts of Bear River (sub-Unit 422a) and the Gaspereau Valley (sub-Unit 422b), which were soon cleared for farmlands with relatively fertile soils. The stream now known as Bear River is derived from the name Hebert River, which appeared on a map by Lescarbot published in 1609. Lumbering activities take place in wooded backland areas. Hydroelectric power has been harnessed at Hells Gate. A hiking trail at White Rock in the Gaspereau Valley is a popular recreational spot.

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Sites of Special Interest

- Bear River above highway bridge at Roop Point—gravel terrace 27 m above sea level
- Bear River, east of river mouth—gravels 30 m above sea level
- Deep Brook—terrace 42 m above sea level
- Smiths Cove—fine stratified sands 30 m above sea level
- The Joggins—fine sands extending westwards for 4 km
- Gaspereau Valley—river capture, and wind gap at Deep Hollow

Provincial Parks and Park Reserves

Proposed Parks and Protected Areas System includes Natural Landscapes 3 and 5.

Scenic Viewpoints

- Sub-Unit 422a: Bear River village
- Sub-Unit 422b: Nictaux Falls; South Mountain south of Morristown; Hells Gate trail at White Rock; Deep Hollow north of White Rock; South Mountain south of Gaspereau village

Associated Topics

T3.2 Ancient Drainage Patterns, T3.3 Glaciation, Deglaciation and Sea-level Changes, T3.4 Terrestrial Glacial Deposits and Landscape Features, T11.4 Birds of Prey, T11.11 Small Mammals, T11.13 Freshwater Fishes, T11.18 Rare and Endangered Animals, T12.9 Soil and Resources, T12.10 Plants and Resources.

Associated Habitats

H5.2 Oldfield, H6.2 Softwood Forest (Spruce, Hemlock, Pine Association), H6.3 Mixedwood Forest (Spruce, Fir, Pine–Maple, Birch Association).

423 SLATE RIDGES

This Unit has two subdivisions:

(a) Rawdon Hills
(b) Wittenburg Ridge

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Rawdon Hills and Wittenburg Ridge are two ridges of slate located at the margins of the Windsor Lowlands (Unit 511). They may both be ancient landscape features dating back to the pre-Carboniferous period. The Wittenburg Ridge may have been an island or peninsula in the Early Carboniferous sea that covered this part of the province, because the Horton deposits wedge out on its flanks. The same does not appear to be true for the Rawdon Hills, which were probably engulfed early in this depositional period.

The two ridges are abutted by Early Carboniferous deposits. Both Horton and Windsor deposits outcrop against the Rawdon Hills; the Wittenburg Ridge is almost surrounded by Windsor Group deposits. Where Halifax slate and Windsor deposits are juxtaposed, the latter are preferentially eroded, leaving the slate as higher land. This situation is in contrast to the more common relationship of slate and greywacke in which the slate, being softer, forms valleys (see Figure 11).

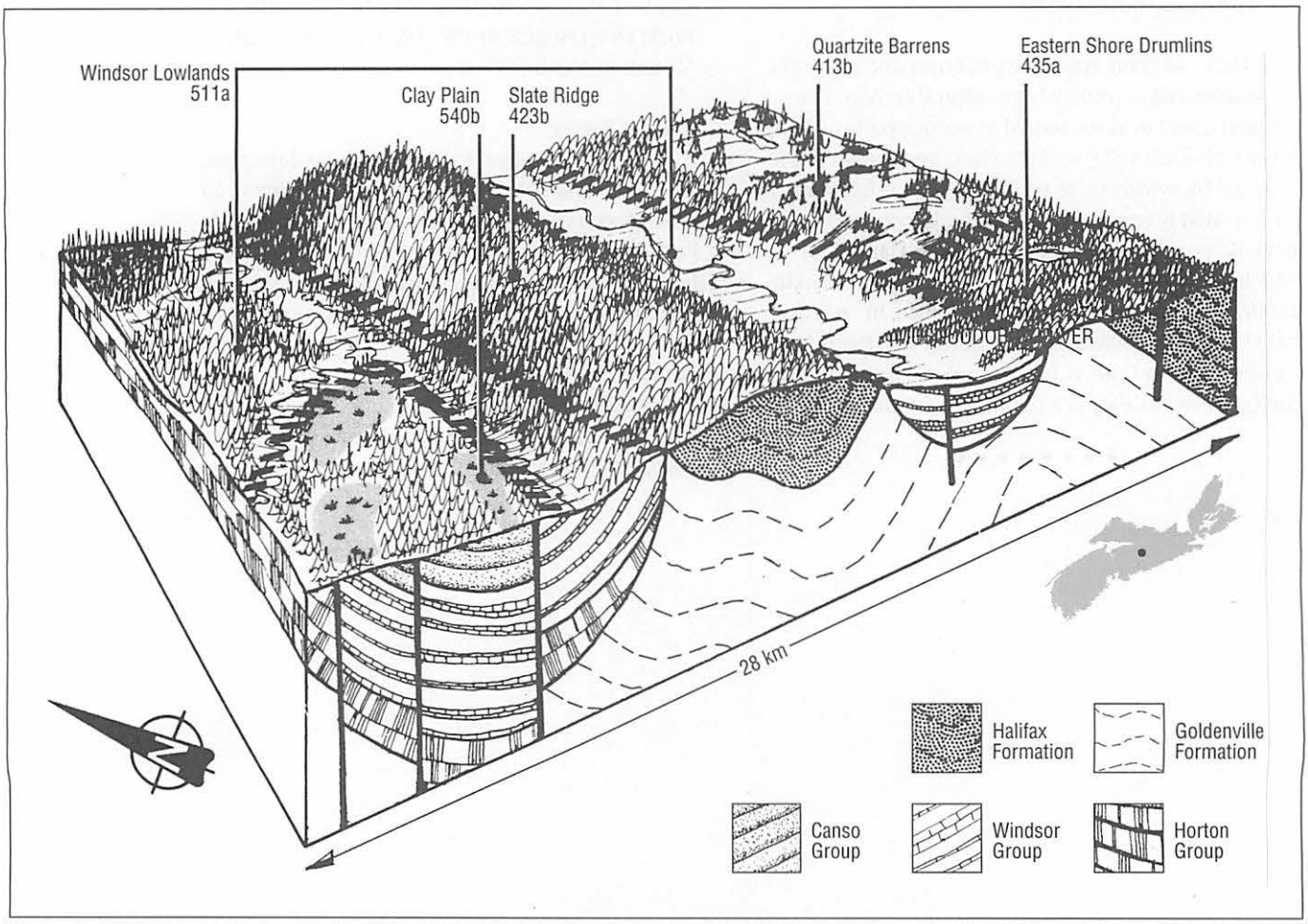

Figure 11: Wittenburg Ridge area. This outlying ridge of slates (Unit 423) is part of an ancient landscape that is still being exhumed from its cover of more recent sedimentary deposits. The south branch of the Stewiacke River flows to the north of the ridge and the Musqodoboit River valley is to the south. Both form parts of the Windsor Lowlands till plain (Unit 511). Parts of the Atlantic Interior are in the background: Quartzite Barrens (Unit 413) and one of the Eastern Shore Drumlin fields (Unit 435). Flat-lying clays derived from Canso Group rocks form the poorly drained clay plain (Unit 540).

Both the Rawdon Hills and Wittenburg Ridge are covered by sheets of the reddish Lawrencetown Till, which is derived from the Carboniferous Lowlands, interspersed with locally derived grey till.

FRESH WATER

Both ridges are drainage divides, but the Rawdon Hills are also crosscut by a number of streams that are tributaries of the Avon River. The Herbert River, Meander River, and Glen Brook all have valleys which lie directly across the ridge and which must have been superimposed by downcutting from a higher level. These three river valleys also contain extensive deposits of outwash gravel on the northern side of the ridge where the slope meets the Windsor Lowlands. The Wittenburg Ridge is the partial headwater for the Musqodoboit River system.

SOILS

Rawdon Hills (sub-Unit 423a)
Soils in this sub-Unit have developed from slates and shales. Soils of the Rawdon catena are most common; they are shaly, sandy loams derived from slates and shales, ranging from rapidly to moderately slowly drained. Elmsdale soils also occur, derived from shales and sandstones, with slate and quartzite cobbles.

Wittenburg Ridge (sub-Unit 423b)
Queens clay loams occur on the slopes, with some imperfectly drained Hantsport soil north of Upper Musquodoboit. On top of the ridge, well-drained Kirkhill shaly loams occur, with small areas of poorly drained Middlewood and Riverport soils, developed from shaly loams.

PLANTS

Although the Rawdon Hills and Wittenburg Ridge are considerably lower than the other areas included in Loucks' Sugar Maple, Yellow Birch–Fir Zone (Maritime Uplands Ecoregion), they are still high enough to produce local climates that encourage shade-tolerant hardwoods. These occur as stands of Sugar Maple, Yellow Birch, and American Beech, but extensive cutting has produced a predominantly mixed forest with Red Spruce, Eastern Hemlock, pine, Balsam Fir, maple, birch, and ash. A vigorous understory of Balsam Fir and Red Spruce under hardwood stands is present throughout the Slate Ridges Unit. Pine is somewhat less common on the Rawdon Hills.

CULTURAL ENVIRONMENT

Both the Rawdon Hills and Wittenburg Ridge have hosted lumbering activity. Farming is marginal in these areas. Gold was once mined at settlements such as Gore. Stibnite, the chief ore of antimony, was mined intermittently at West Gore between 1884 and 1917.

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Scenic Viewpoints
- Sub-Unit 423a—Highway 14, east of Centre Rawdon

Provincial Parks and Park Reserves
Proposed Parks and Protected Areas System includes Natural Landscapes 29a and 29b.

Associated Topics
T2.4 The Carboniferous Basin, T3.1 Development of the Ancient Landscape.

Associated Habitats
H6.1 Hardwood Forest (Sugar Maple, Yellow Birch, Beech Association), H6.3 Mixedwood Forest (Spruce, Fir, Pine–Maple, Birch Association).

430 DRUMLINS

The Drumlins District has been divided into six units:

431 Annapolis Drumlins
432 Ponhook Drumlins
433 Kejimkujik Drumlins
434 Lunenburg Drumlins
435 Eastern Shore Drumlins
436 Headwater Lakes

GEOLOGY AND LANDSCAPE DEVELOPMENT

Nova Scotia's drumlins are mostly confined to the Atlantic side of the province, where the ice moved across level areas or down a slope, with a free exit to the continental shelf. Most of the drumlins are associated with slate areas. Slate strata are sheared off more readily and to a greater depth than other types of strata, so a large amount of material was available for molding by the ice. Drumlins in Nova Scotia are rare along a band one to five kilometres wide on the northwestern side of a slate area, but to the southeast they may extend for several miles into a greywacke area. Occasional drumlins may be found in a granite area, but generally they quickly disappear once the granitic border is crossed. This restriction to the slate areas is not so well marked in the Halifax-Guysborough area, where drumlins sometimes appear in

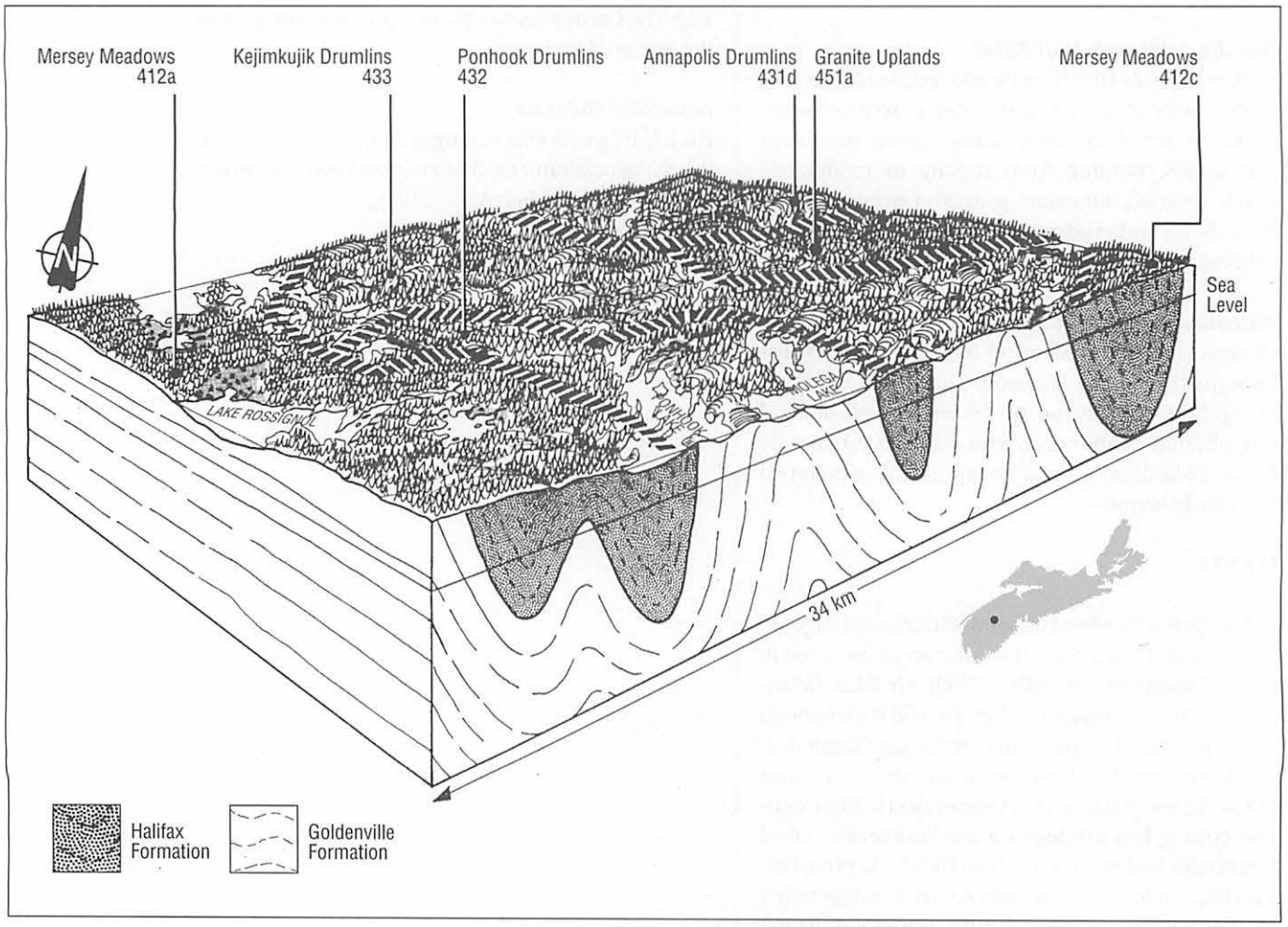

Figure 12: Drumlin field. Lakes and drumlins are major features dominating the peneplain surface of Meguma Group rocks of the Atlantic Interior (Region 400). Three types of drumlins are shown: those derived from slate (Unit 433) which hold moisture throughout the summer, and loose, droughty drumlins derived from granite (Unit 431) or quartzite (Unit 432). Lakes and associated bogs of the otherwise featureless Mersey Meadows (Unit 412) are shown in the left foreground.

a predominantly greywacke area where bands of slate are narrow and widely separated; there, perhaps, more material had been accumulated from areas farther north. Carboniferous materials with a distinct red colour form the eastern sections of the large drumlin field in Lunenburg County (Unit 434), and the drumlins on the Eastern Shore and north of Halifax. Isolated "red" drumlins may occur in any part of the Atlantic Interior. Slate drumlins are "grey," providing an easy field identification of their origins. Almost all drumlins—of any origin, local or distant—seem to exhibit a thin cover of granite pebbles and boulders.

Drumlins were formed with their long axes parallel to the direction in which the ice was moving. Those in southwestern Nova Scotia indicate a nearly southerly ice movement becoming southeasterly in eastern Lunenburg and western Halifax counties. Drumlins around Halifax have about the same size and orientation as those in central Lunenburg County. However, from Sheet Harbour east to beyond the Guysborough County border, the drumlins again have a north-south orientation, as if they were formed by ice that moved directly down from the Gulf of St. Lawrence. The few around Canso are oriented more to the southeast. In general, the ice appears to have moved directly across central and western mainland Nova Scotia from New Brunswick, whereas in eastern Nova Scotia the ice moved southward from Pictou and Antigonish counties and spread out to the east into Chedabucto Bay.

The composition of the drumlins is greatly varied. Most are composed of fine-textured tills derived from underlying or adjacent rocks. In several areas, material from Carboniferous rocks to the north composes the drumlins or drumlin field (see Figure 12):

431 Annapolis Drumlins—granitic materials
432 Ponhook Drumlins—quartzite materials
433 Kejimkujik Drumlins—slate materials
434 Lunenburg Drumlins, 435 Eastern Shore Drumlins, and 436 Headwater Lakes—Carboniferous materials, predominantly "red" drumlins with some slate

SCENIC QUALITY

The drumlins within a single drumlin field or "swarm" have a similar size, shape, and orientation. However, Nova Scotia's drumlin fields provide markedly dissimilar landscapes, depending primarily on their suitability for early farming and settlement. Of the six Districts, only the Lunenburg Drumlins (Unit 434) and Kejimkujik Drumlins (Unit 433) were extensively exploited for their well-drained loam soils. Here farms still dot the landscape (even though there has been much land abandonment) and provide variety and interest. They cling to the frequent small hills interspersed between lakes and bogs. The dense road network allows easy visual access to the landscape and scenic ratings range from medium to moderately high. The other drumlin Units (431, 432, 435, and 436) have poorer soils and historically have supported very little farming. As a consequence, they have less scenic interest and are also provided with less road access.

431 ANNAPOLIS DRUMLINS

This Unit has four subdivisions:

(a) Fisher Lake
(b) Spectacle Lake
(c) Alma Lake
(d) Round Lake

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Annapolis Drumlins are found in four small, isolated localities on the South Mountain Granite. Drumlins do not normally form from granitic material. Those drumlins frequently have a rock core. Occasional granitic drumlins are found in non-granite areas such as on Graves Island, but this is unusual. These drumlins contain large granite boulders, are often well- or excessively well-drained, and have soils with characteristics similar to Gibraltar soils (see Figure 12).

FRESH WATER

Many lakes of various sizes and several chain lake systems are found in sub-Units 431a and 421b. All four sub-Units contain significant wetlands, typically flat bogs associated with fens. This Unit contains the partial headwaters of the Mersey and Medway rivers. The highest recorded conductivity level is 32 micromhos/cm, and pH averages 6.0.

PLANTS

The drumlins provide very productive forest sites. On the better-drained tops and slopes, a mixed forest is most common, with Eastern Hemlock, Red Spruce, White Pine, Sugar Maple, Yellow Birch, and some Red Maple. On the wetter sites between the drumlins, spruce, fir, and pine with shade-intolerant hardwoods predominate. Ash is often found on the steep side slopes where seepage occurs.

ANIMALS

Fish species include White Suckers, Yellow Perch, Banded Killifish, Brown Bullhead, Smallmouth Bass, Creek Chub, and Golden Shiner.

CULTURAL ENVIRONMENT

Drumlins have been used for agriculture in this area, but some of these farms were later abandoned and underwent successional forest regeneration. The woodlands attracted migrants from the timber trade, but it was the fertile drumlins that made them settle. Tourism had its beginnings in this area with the arrival of American sportsmen in the 1870s who came for a hunting and angling experience in the backwoods of Nova Scotia, described by travel books as being "unsurpassed game country." Country lodges and cabins were built to accommodate these first American tourists. Today, tourism and outdoor recreation continue to be an important land use.

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Associated Topics
T3.4 Terrestrial Glacial Deposits and Landscape Features, T12.9 Soil and Resources, T12.12 Recreational Resources.

Associated Habitats
H3.2, H3.4, H3.6 Freshwater Lentic; H6.1 Hardwood Forest (Sugar Maple, Yellow Birch, Beech Association); H6.2 Softwood Forest (Spruce, Hemlock, Pine Association).

Provincial Parks and Park Reserves
Proposed Parks and Protected Areas System includes Natural Landscapes 16a and 16b.

432 PONHOOK DRUMLINS

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Ponhook Drumlins lie on a narrow belt of greywacke within the slate-dominated area northeast of Lake Rossignol. The till sheet and drumlins are composed of quartzite till, and their distribution almost exactly coincides with the boundaries of the greywacke from which they were derived (see Figure 12). This illustrates how closely the bedrock geology and the composition of the till are related in this part of the Atlantic Interior. The till cover ranges from 1–10 m, and averages 3 m in thickness. The drumlins are generally low, 2–20 m high, and are strongly aligned northwest-southeast.

These drumlins are very stony, and the matrix containing the rocks is very porous. Drainage is therefore excessively rapid in these Halifax sandy loam soils.

The terrain in this area is very flat, with most of the relief being provided by the drumlins. Overall the landscape is hummocky.

FRESH WATER

Many lakes are found in this Unit, but surface water coverage is dominated by Ponhook and Molega lakes. A few scattered fens and flat bogs are associated with the lake edges.

PLANTS

These dry drumlins support a mixture of White Pine, Red Oak, and aspen with some shade-intolerant species. Burned areas often regenerate in American Beech and aspen. Representatives of Coastal Plain Flora include Buttonbush, Gold-crest, Redroot, Long's Bulrush and Cat Brier. These species are associated with lakeshore wetlands.

CULTURAL ENVIRONMENT

Lumbering and farming attracted settlers to the Ponhook Drumlins. Gold mining took place at Molega in the late 1800s. By the mid-nineteenth century, angling and hunting in wilderness backlands had become a sport for many of the well-to-do, who employed Mi'kmaq guides for moose-hunting expeditions. The sporting reputation of Queens and Annapolis counties brought many Americans to this area by the late nineteenth century. Hunting lodges were built in the 1920s, and by the 1930s tourism had become an important economic factor.

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Ecological Reserves
- Ponhook Nature Reserve

Provincial Parks and Park Reserves
Proposed Parks and Protected Areas System includes Natural Landscape 15.

Associated Topics
T2.2 The Avalon and Meguma Zones, T3.4 Terrestrial Glacial Deposits and Landscape Features, T12.10 Plants and Resources, T12.11 Animals and Resources.

Associated Habitats
H3.2, H3.4, H3.6 Freshwater Lentic; H4.1 Bog; H4.2 Fen; H6.2 Softwood Forest (Pine Association).

433 KEJIMKUJIK DRUMLINS

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Kejimkujik Drumlins or "grey" drumlins cover an extensive area from Lake Kejimkujik to the drainage basin of the southwestern branch of the LaHave River. The underlying bedrock is entirely composed of Halifax slate, and it is from this that the till sheet is derived. The till ranges in thickness from 1–10 m and has a loose matrix with fragments of bedrock. The drumlins are composed of slaty (Hartlen) till which is compact and clayey (see Figure 12).

The landscape of the Kejimkujik Drumlins is hummocky, with relief provided entirely by the low drumlins, 15–30 m high. The coastal equivalent of Unit 433 is described in Unit 832, LaHave Drumlins.

FRESH WATER

The drainage pattern is deranged with many irregularly shaped lakes and sections of some of the larger rivers. Most runoff in this area is eventually directed to the Medway or LaHave rivers. Scattered small flat fens and bogs are found mainly inland. Kejimkujik is generally considered a clear water lake, as it is low in nutrients. Conductivity in this lake is between 23.8 and 25.8 micromhos/cm, and pH has been recorded as low as 5.0. Other lakes in this Unit have conductivity levels ranging between 24 and 42 micromhos/cm, and pH averages 6.0.

SOILS

Soils in this Unit have been mostly derived from slate. Bridgewater soil, a well-drained sandy loam, mantles both the drumlins and the ground in between. Many of the drumlins have been cleared. In the southwest part of the Unit, Bridgewater drumlins spill over into an area of Halifax soils derived from quartzite. On flat and depressed terrain, pockets of poorly drained Riverport and Middlewood soils occur. There are also a few small areas of coarse-textured LaHave and Torbrook soils, developed on water-deposited materials.

PLANTS

This Unit, together with Unit 434, Lunenburg Drumlins, falls within Loucks' Sugar Maple–Hemlock, Pine Zone, in which shade-tolerant hardwoods are found on a wide range of sites. The bowl-shaped depression occupied by this Unit has a distinct local climate: relatively low rainfall and relatively high summer temperatures. The older forest for much of the Unit is Sugar Maple, Yellow Birch, and American Beech, but extensive disturbance by fire and cutting has resulted in large areas of mixed forest: Red Spruce, Eastern Hemlock, pine, and Balsam Fir with the shade-intolerant maple and birch. In this Unit the coarser, drier soils on some drumlins support more White Pine, and more hardwood stands—particularly American Beech, Trembling Aspen, and Red Oak. Many of the drumlins' tops are cleared for agriculture or have been colonized by a post-fire maple, oak, birch association.

Many coastal-plain flora species can be found in this Unit. The disjunct species Gold-crest has been found in wet areas near Fancy Lake, Lunenburg County.

ANIMALS

A warmer climate permits the survival of a distinct relict fauna, including Blanding's Turtle, the Southern Flying Squirrel and the Northern Ribbon Snake. They also allow greater species diversity and greater numbers of reptiles and amphibians. The hardwood forests provide good Ruffed Grouse habitat. Extensive agricultural settlement provides open-land habitat. There are concentrations of White-tailed deer. Distinctive birds include the Scarlet Tanager, Great-crested Flycatcher, and Wood Thrush. The introduced American Dog Tick is frequently encountered here in early summer. Typical fish species include Brook Trout, Lake Chub, Golden Shiner, Brown Bullhead, perch, Banded Killifish and White Sucker. The Petite-Rivière watershed also contains the only known population of Atlantic Whitefish in the world.

CULTURAL ENVIRONMENT

A portion of Kejimkujik National Park occurs within this Unit. This park was established in 1965, its name taken from the largest lake within its boundaries. Kejimkujik is a Mi'kmaq word which has been given various translations such as "attempting to escape" and "swelled waters." A more credible translation, suggested by Thomas Raddall, is "the stricture passage," given by Mi'kmaq to the outlet of the lake where waters backed up or "swelled" as a result of the placement of weirs. Mi'kmaq artifacts such as arrowheads have been found at former campsites and along canoe routes. Around 1835 the Fairy Lake Indian Reserve was established within the park boundaries at a time when the Mi'kmaq were encouraged by the government to abandon their nomadic life. By the turn of the century, the Mi'kmaq had left this reserve.

A significant number of migrants were attracted by the timber trade in the nineteenth century and then stayed to farm. From the early 1800s to 1940, agriculture was the stable base on which communities in this area were formed. Many farmers were also part-time loggers. By the early years of the twentieth century, log drives often began on the Mersey River above Lake Kejimkujik and continued down waterways to Milton and other points near Liverpool. Water-powered sawmills operated throughout this area. Large sawdust piles and accumulations of slabs at various points in the park and the general area remain as evidence of a vanished industry. Vigorous regeneration of disturbed sites by Balsam Fir has formed the basis for the Christmas tree–growing industry in this Unit and adjacent Unit 434. The Kejimkujik Drumlins area experienced about 20 years of prosperous gold mining, from 1883 to 1905, around Whiteburn and Brookfield. A fish hatchery and culture station is located at McGowan Lake.

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Sites of Special Interest
- Part of Kejimkujik National Park
- Big Dam Lake (IBP Proposed Ecological Site 63)—old Eastern Hemlock forest
- LaHave Drumlins—global site for classic drumlin field

Ecological Reserves
- Ponhook Nature Reserve

Provincial Parks and Park Reserves
- Fancy Lake
- Cookville
- Camerons Brook
- Nineveh

Proposed Parks and Protected Areas System includes Natural Landscape 15.

Scenic Viewpoints
- Unit 433: LaHave River, both sides below Bridgewater

Associated Topics
T2.2 The Avalon and Meguma Zones, T3.4 Terrestrial Glacial Deposits and Landscape Features, T11.3 Open-habitat Birds, T11.10 Ungulates, T11.15 Amphibians and Reptiles, T11.18 Rare and Endangered Animals, T12.2 Cultural Landscapes, T12.8 Fresh Water and Resources, T12.10 Plants and Resources.

Associated Habitats
H3.2, H3.4, H3.6 Freshwater Lentic; H5.2 Oldfield; H6.1 Hardwood Forest (Maple, Oak, Birch Association); H6.2 Softwood Forest (Pine Association).

434 LUNENBURG DRUMLINS

GEOLOGY AND LANDSCAPE DEVELOPMENT

These "red" drumlins are composed of materials carried into the area from at least 30 km to the north. In some instances, the reddish Carboniferous rocks have been carried at least 60 km and probably further. These distinctive red tills form prominent drumlins up to 25 m high. Occasional slaty till drumlins derived from local material are found among the red drumlins (see Figure 14).

Two reddish tills have been distinguished: the clayey Hartlen Till and the sandier Lawrencetown Till. Most drumlins have a core of Hartlen Till and a mantle of Lawrencetown Till. This drumlin field reaches the coast in Unit 832.

FRESH WATER

There are many medium to large irregularly shaped lakes in this Unit. Scattered wetlands are associated with the many rapidly flowing shallow watercourses. Swamp and peat areas are more common towards the coast where there is less relief. Conductivity ranges between 23.5 and 33.5 micromhos/cm and pH averages 7.1, although it has been recorded as low as 5.1 in the LaHave River.

SOILS

Drumlins in this Unit are mantled in reddish-brown Wolfville soils, well-drained loams over sandy, clay loams containing Carboniferous material. Soils between the drumlins are mostly Bridgewater sandy loams derived from slate, with poorly drained Riverport soil on flat land.

PLANTS

This Unit, together with Unit 433, Kejimkujik Drumlins, falls within Loucks' Sugar Maple–Hemlock, Pine Zone, in which shade-tolerant hardwoods are found on a wide range of sites. This is due to the Unit's position in a bowl-shaped depression, with a distinct local climate: relatively low rainfall and relatively high summer temperatures. The old forest for much of the Unit is American Beech, Sugar Maple, and Red Oak, but extensive disturbance by fire and cutting has resulted in large areas of mixed forest: Red Spruce, White Pine, Eastern Hemlock, and Balsam Fir. The heavier Wolfville soils on the drumlins result in less White Pine, more Red Spruce, and few pure hardwood stands. Regeneration on drumlin tops is predominantly spruce and Balsam Fir. If left alone, Balsam Fir is replaced by other tree species after about 30 years.

ANIMALS

A distinct relict fauna is supported in this Unit by a warmer climate. Blanding's Turtle, Northern Ribbon Snake and the Southern Flying Squirrel can be found here. Reptiles and amphibians are found in great numbers and exhibit considerable species diversity. Small-mammal diversity within the Atlantic Interior Region is probably highest in this Unit. Deer are common, as are perch, White Sucker, Lake Chub, Brown Bullhead and Golden Shiner.

CULTURAL ENVIRONMENT

This area was settled in the eighteenth century by Germans who quickly cleared forested drumlins to establish prosperous farms. Farmers made use of the woodlands, recognizing the different qualities of specific tree species. Much of the timber cut in the area supplied the shipbuilding industry in Lunenburg. Many of the drumlin tops have been cleared for agriculture and are still farmed today. The vigour of regenerating Balsam Fir on abandoned drumlin farms has resulted in the establishment of the Christmas tree-growing industry in this and adjacent Unit 433.

Sites of Special Interest

- Ross Farm Museum—the story of pioneer farming traditions

Provincial Parks and Park Reserves

- Pinehurst
- Wentzells Lake
- Maitland

Proposed Parks and Protected Areas System includes Natural Landscape 15.

Associated Topics and Habitats

(See Unit 433.)

435 EASTERN SHORE DRUMLINS

This Unit has two subdivisions:

(a) Tangier River
(b) Moser River

GEOLOGY AND LANDSCAPE DEVELOPMENT

Unit 435 is underlain by interfolded greywacke and slate, which form a series of wide bands oriented east-west. These are overlain by a thin quartzite till (averaging three metres in thickness), and in the Moser River area by a mixture of quartzite and Lawrencetown Tills called Red Till. Above these are drumlins of red, sandy Lawrencetown Till. The latter is derived from the Carboniferous Lowlands to the north and contains fragments of rock from the Cobequid Hills and the Pictou-Antigonish Highlands.

The Moser River watershed contains several deposits of outwash sands and gravels. The largest ones fringe Necum Teuch Bay.

The relief in the Tangier and Moser river areas is low, with most of the visual variety being provided by the drumlins (see Figure 11). The average elevations are different in the two areas, however. At Moser River the hills rarely exceed 80 m, whereas in the Tangier River area the hills average 100–130 m.

FRESH WATER

The drainage in both areas is deranged, with many irregularly shaped small to medium-sized lakes and many streams and brooks. Scattered raised and flat bogs are associated with flat fens. Conductivity is low and pH levels average 6.3 in the lakes and 5.2 in the larger streams.

SOILS

Tangier River (sub-Unit 435a)
The drumlins are mantled in medium-textured Wolfville loam over sandy clay loam till containing Carboniferous material. Between the drumlins, the soil is mostly imperfectly drained Danesville sandy loam, derived from quartzite, with some better-drained Bridgewater soil, derived from slate.

Moser River (sub-Unit 435b)
The drumlins are also covered with Wolfville soil. Between them the soil is mostly Danesville to the east where the topography is flatter, and better-drained Halifax to the west—both are derived from quartzite. Patches of Aspotogan soil and peat occur in depressions.

PLANTS

Shade-intolerant species (Red Maple and White Birch) are found on the better-drained drumlin tops, with Black Spruce, White Spruce, Balsam Fir, and larch growing on the wetter sites in between. Red Spruce occurs on the drumlins more frequently in the Tangier River sub-Unit.

C.D. Howe noted the prominence of these hardwood ridges in his 1912 survey: "One is impressed by the predominance of yellow birch and paper birch on the hills around the lakes. In some places the former makes up four-fifths of the stand and pure stands of the latter are frequent."

ANIMALS

Little information is recorded on the terrestrial fauna of this Unit. Common fish species include White Sucker, Gaspereau, Golden Shiner, sticklebacks, Banded Killifish, Lake Chub, and Brook Trout. The Moser River contains one of the largest populations of sea-run Brook Trout in the province.

CULTURAL ENVIRONMENT

Forest exploitation has characterized land use in this sparsely populated area. Gold was once mined at the Caribou Gold Mines. This Unit contains one of two viable peat-moss sites in Halifax County.

Sites of Special Interest

- Necum Teuch Bay—large outwash deposit of sand and gravel

Provincial Parks and Park Reserves

- Judds Pool

Proposed Parks and Protected Areas System includes Natural Landscape 36b and Candidate Protected Area 18 Boggy Lake.

Associated Topics

T2.2 The Avalon and Meguma Zones, T3.3 Glaciation, Deglaciation and Sea-level Changes, T3.4 Terrestrial Glacial Deposits and Landscape Features, T12.3 Geology and Resources, T12.10 Plants and Resources.

Associated Habitats

H3.1 Freshwater Open-Water Lotic, H3.2 Freshwater Open-Water Lentic, H6.1 Hardwood Forest (Maple, Oak, Birch Association), H6.2 Softwood Forest (Black Spruce, Larch Association; Pine Association).

436 HEADWATER LAKES

This Unit has two subdivisions:

(a) Beaverbank
(b) Dollar Lake

GEOLOGY AND LANDSCAPE DEVELOPMENT

Both sub-Units are underlain by parallel bands of greywacke and slate oriented east-west. These form a low ridge and shallow valley topography which has little variety except where river valleys or lake basins interrupt the rolling surface.

The bedrock is covered by a till sheet dominated by red, sandy Lawrencetown Till. In several locations large areas of rock are exposed. The till sheet changes to a quartzite till composition to the west of Beaverbank Lake, where both Lawrencetown and quartzite tills are overlain by a swarm of drumlins composed of Lawrencetown Tills.

FRESH WATER

In general the drainage in both sub-Units is deranged, with several small irregular lakes connected by wandering streams. The Beaverbank area possesses a long chain of lakes (the Waverley chain), which extends nearly one-third of the way across the province to the head of the Shubenacadie River. These lakes may form part of an ancient river system which rose on the Scotian Shelf and flowed northwards during the Cretaceous. Scattered bogs and fens can be found throughout, but larger wetlands tend to be found in the northern areas. The Sackville River in sub-Unit 436a is on a significant floodplain.

SOILS

Beaverbank (sub-Unit 436a)
Medium textured, red Wolfville loams are dominant in this sub-Unit with some areas of well-drained Halifax and imperfectly drained Danesville sandy loam to the north.

Dollar Lake (sub-Unit 436b)
Fairly deep, red Wolfville soils cover most of this sub-Unit.

PLANTS

Red Spruce and Eastern Hemlock are the characteristic species in this Unit, with White Pine, Balsam Fir, Red Maple, and Yellow Birch. Shade-intolerant birches and aspens occur on shallow soil in burnt areas, and shade-tolerant species grow on well-drained hilltops.

ANIMALS

Shubenacadie Grand Lake supports a landlocked population of Atlantic Salmon as well as unique, freshwater population of striped bass that lives in the lake but spawns in the intertidal portions of the Stewiacke River. Dollar Lake and Pockwock Lake contain relict populations of Lake Trout.

CULTURAL ENVIRONMENT

In earlier times, small-scale farming was a feature of the landscape in this area. Today, primary land uses involve forestry and related industries, such as sawmill operations. The Sackville and Fall River areas have become suburban commuter communities, and the surrounding lakelands are now dotted with cottages.

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Sites of Special Interest
- Lake Charles to Shubenacadie Grand Lake—the valley of the Waverley chain of lakes (part of the 19th-century Shubenacadie canal system)

Provincial Parks and Park Reserves
- Dollar Lake
- Oakfield
- Laurie

Proposed Parks and Protected Areas System includes Natural Landscape 30 and Candidate Protected Area 21 Clattenburgh Brook.

Associated Topics
T2.2 The Avalon and Meguma Zones, T3.2 Ancient Drainage Patterns, T3.4 Terrestrial Glacial Deposits and Landscape Features, T12.10 Plants and Resources.

Associated Habitats
H3 Fresh Water, H4.1 Bog, H4.2 Fen, H6.3 Mixedwood Forest (Spruce, Fir, Pine–Maple, Birch Association).

440 GRANITE BARRENS

This District has two subdivisions:

(a) Flintstone
(b) Bloody Lake

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Granite Barrens are found in two areas in southwestern Nova Scotia. One is at the southwestern extremity of the South Mountain Granite (sub-Unit 451a), and the other lies directly east of the Tusket River near the boundary of Yarmouth and Shelburne counties. As the name indicates, the bedrock in each case is granite. Other areas of granite (District 450) also contain extensive barrens. Unit 452, the Shelburne Granite Plain, has barrens in its western extremity.

Both areas are overlain with a thin cover of loose, stony granite till with no drumlins. The surface is strewn with boulders and is poorly drained (see Figure 13).

The elevations in the two localities are quite different. Flintstone is part of the South Mountain granite body and has undergone extensive erosion. However, owing to its extreme resistance to erosion, the granite is still elevated at over 125 m, higher than the surrounding Meguma strata.

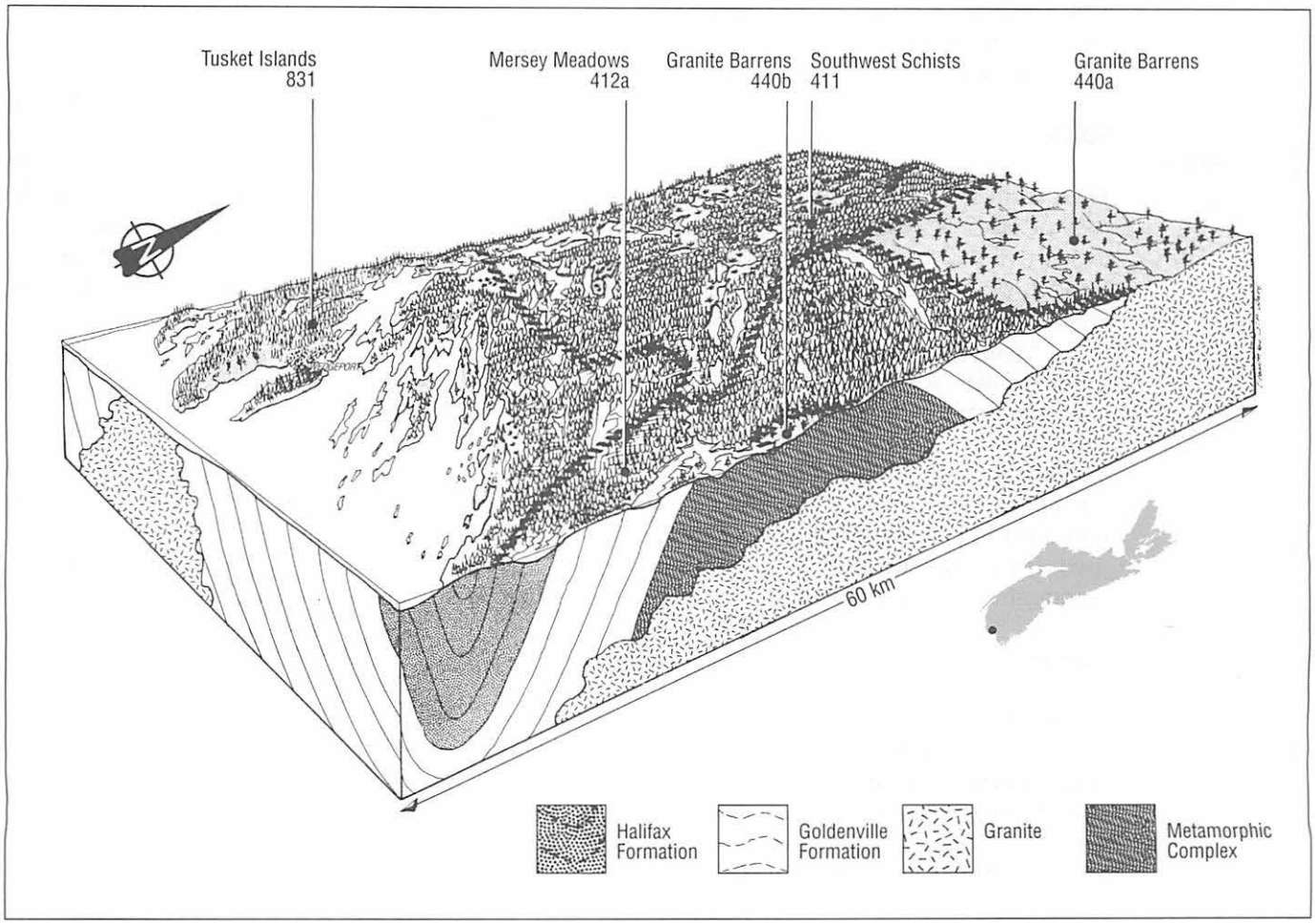

Figure 13: Tusket Islands area. The planation surface of the southwestern peninsula dips gently into the Atlantic (Unit 911). Inland, extensive barrens are mainly confined to granite outcrops (District 440). Richer soils and more vigorous tree growth are found on the schists in Unit 411 than on the impoverished soils derived from the quartzite tills of Unit 412. At the coast (District 830) the forest grows on a varied landscape of drumlins and tidal marshes which provide habitat for interesting and rich flora and fauna.

Bloody Lake lies over a small granite exposure which is probably a cupola in a large granite body still lying at depth. It has only (geologically) recently been exposed and thus has the same average elevation as the surrounding Meguma terrain, about 30–40 m above sea level.

FRESH WATER

Many streams flow between shallow irregular lakes, and peat bogs are common. Lakes and rivers are yellowish, turbid, and acidic, with considerable amounts of humic matter. Swamps, swales, and bogs occur throughout the Unit. Sub-Unit 440a contains the headwaters of the East Branch Tusket River system. The water in the rivers is highly coloured and very acidic (pH less than 4.6). Large fens occur along the slower rivers such as the Shelburne. Fourth Lake and Fifth Lake flowages dominate sub-Unit 440a and are the headwaters for the Sissiboo River. Sub-Unit 440b contains a few large, sloped, raised bogs, fens and a few medium-sized lakes with peatland borders. Many streams dissect sub-Unit 440b.

SOILS

Flintstone (sub-District 440a)
Soils are basically coarse-textured, well-drained Gibraltar (gravelly, sandy loams derived mostly from granite), with small areas of slowly drained Bayswater and Aspotogan soils on nearly level to depressional topography. All soils are very shallow and stony, and there are large areas of exposed bedrock. Ortstein iron pans are widespread.

Bloody Lake (sub-District 440b)
Gibraltar soils occur to the south of the sub-Unit, with areas of well-drained Halifax sandy loam derived from quartzite, to the north. Patches of Aspotogan soil and peat are also present.

PLANTS

Five factors can lead to the presence of barrens: deep, repeated burns; iron pans; numerous boulders; excessive leaching, causing very low fertility; and the establishment of heath vegetation that prevents the growth of tree seedlings. Because fires are better controlled today than in the early days of forestry, some fire barrens are regenerating in forest species. However, limited planting of Red and Jack pines has resulted in only very slow growth.

Forest vegetation does best in the drainage trenches alongside the deranged drainage system. Here linear forests of Red Maple, ash, and Wire Birch occur between the slightly higher intervening barren heathlands. The characteristic shrubs on these areas are huckleberries, Sheep Laurel, Wild Raisin, and alder. Also common is a low scrub which may include White Pine, aspen, Black Spruce, Red Maple, Wire Birch, or Red Oak. On boggy sites, Black Spruce, Red Maple, and Larch are common. Several orchids are found in these bogs. They include Grass Pink, Rose Pogonia and Dragon's Mouth Orchid.

ANIMALS

The barrens and semi-barrens are generally unproductive wildlife habitat, except there are some small mammals, which have a low to moderately high diversity, and moose, which have one of the best populations in western Nova Scotia. Although there is some beaver, otter, muskrat, and duck-nesting habitat, aquatic fauna is generally depauperate.

SCENIC QUALITY

Lack of fertile soils and inaccessibility combine to make this Nova Scotia's "empty quarter." It has never been settled and has no roads. Scenically, it presents a bleak landscape of heath and low scrub, relieved by higher trees along shallow drainage trenches. Frequent lakes and bogs add further visual interest, but scenic ratings are generally low to medium. However, these barrens are quite striking in autumn with the changing colours of the vegetation.

CULTURAL ENVIRONMENT

Forestry has characterized land use in some parts of the Granite Barrens. However, much of this area is known for recreational use of waterways and for hunting and fishing. The Tobeatic Game Reserve is part of the Granite Barrens.

Sites of Special Interest

- Tobeatic Resource Management Area
- Tobeatic Game Sanctuary
- Birch Lake (IBP Proposed Ecological Site 61)—old White Pine forest

Ecological Reserve

- Sporting Lake Nature Reserve

Provincial Parks and Park Reserves

Proposed Parks and Protected Areas System includes Natural Landscapes 8a and 8b and Candidate Protected Area 29 Tobeatic.

Associated Topics

T2.2 The Avalon and Meguma Zones, T2.3 Granite in Nova Scotia, T8.2 Freshwater Environments, T9.1 Soil-forming Factors, T11.9 Carnivores, T11.10 Ungulates, T11.11 Small Mammals.

Associated Habitats

H3 Fresh Water, H4.1 Bog, H4.2 Fen, H4.3 Swamp, H5.1 Barren, H6.2 Softwood Forest (Black Spruce, Larch Association), H6.3 Mixedwood Forest (Spruce, Fir, Pine–Maple, Birch Association).

450 GRANITE

This District is divided into three Units:

451 Granite Uplands
452 Shelburne Granite Plain
453 Granite Ridge

GEOLOGY AND LANDSCAPE DEVELOPMENT

Granite underlies over 50 per cent of the Atlantic Interior and outcrops in several areas. The largest granite body is the South Mountain Batholith, which stretches in an arc from near the Tusket River across to the Halifax-Dartmouth area. Two other much smaller bodies are the Granite Ridge along the Eastern Shore and the Shelburne Granite Plain. Other smaller outcrops of granite are found throughout the Region.

All of the granite exposed within the Atlantic Interior was intruded during the Acadian Orogeny in the Late Devonian and Early Carboniferous periods. It is quite variable in chemical composition, texture, and colour but has a common origin in the crustal disturbance of the period.

Granite is very resistant to erosion and tends to form the highest ground in an eroded landscape such as the Atlantic Interior. It forms a rounded landscape of shapeless ridges and depressions with occasional knolls.

The drainage across granite is generally severely deranged, with most of the low areas being waterlogged. If the outcrop is narrow, it may form a ridge and thus a drainage divide, as does the Granite Ridge along the Eastern Shore.

SCENIC QUALITY

Granite localities vary in elevation, topography, and vegetation but have common scenic elements. They lack human settlement and their thin soils support a sparse and scrubby second-growth forest. The forest is interspersed with exposed bedrock and barrens, and large glacially deposited boulders are found throughout. The deranged drainage provides many lakes that add much to scenic value and aid recreational access. All areas are plateau-like, but scenic value is greatly enhanced along the steep flank of the South Mountain in Annapolis County, and to a lesser extent on the northern edge of Ten Mile Stream (sub-Unit 451b), overlooking West River St. Marys. With these exceptions, granite areas typically exhibit low to medium scenic ratings.

Associated Topics
T2.3 Granite in Nova Scotia, T9.1 Soil-forming Factors.

Associated Habitats
H5.1 Barren, H6.2 Softwood Forest (Pine Association).

451 GRANITE UPLANDS

This Unit has two subdivisions:

(a) South Mountain
(b) Ten Mile Stream

GEOLOGY AND LANDSCAPE DEVELOPMENT

Despite its size, the South Mountain Granite is a rather uniform topographic feature. It presents a level horizon when viewed from North Mountain, and the surface steadily decreases in elevation down to its southern, eastern, and western boundaries, where fairly steep slopes mark the boundary with Meguma strata (see Figure 25).

Across the surface of the granite are many large boulders that were plucked out and then dumped by the ice. Some were carried beyond the granite boundaries and dropped, as erratics, on unrelated rocks further away. Long, prominent eskers occur in the Kejimkujik area and to the west.

The granite terrain in the Ten Mile Stream sub-Unit is typical. The surface is elevated above the greywacke and slate bands on three sides by about 50 m but forms a rather steeper escarpment on the northern side where it is undercut by the West River St. Marys. Here the drop is nearly 100 m in places.

The surface is thinly covered with coarse granite till with some areas of thicker Lawrencetown Till. Some glacial outwash deposits are found on the northern side.

FRESH WATER

The South Mountain Granite has a typically deranged drainage pattern, but two chains of lakes have maintained a more or less straight line across it. One extends south of Milford in Annapolis County and the other south from Panuke Lake. These may represent old river courses that were superimposed upon the granite as it was exposed.

This Unit contains the headwaters of some of Nova Scotia's largest rivers, such as the Tusket-Silver, Bear, Mersey, Medway, Nictaux, LaHave, and Avon. Except for the tidal rivers, most tend to be shallow and fast flowing.

In the South Mountain sub-Unit (451a), wetlands are scattered along streams and rivers. The occasional lake occurs in Annapolis, Kings, and Digby counties. These counties also contain many raised bogs. Wetlands tend to become more widely scattered and smaller in the eastern portions of sub-Unit 451a. Halifax County has several long north-south oriented lakes running along fault lines.

In the Ten Mile Stream sub-Unit (451b), surface-water coverage is greater in the western portions. Here the numerous, small irregular lakes tend to be oligotrophic and linked by small streams. Raised bogs can be found in the southwestern part of sub-Unit 451b.

Conductivity tends to be below 35 micromhos/cm throughout the Unit and pH ranges between 5.4 and 6.5.

SOILS

The major soil series throughout this large Unit is Gibraltar: a coarse-textured, well-drained gravelly, sandy loam derived from granite—usually shallow, heavily leached, and very acidic. Gibraltar soils are also associated with poorly drained Bayswater and Aspotogan soils, along with many areas of peat. Near the north slope are two large areas of Halifax sandy loam derived from quartzite. Bridgetown soils around Gaspereau Lake and south of Hardwood Lake have developed on tills derived from a mixture of basalt, granite, quartzite, and Carboniferous material. A small number of Wolfville drumlins also occur near these areas. Scattered areas of exposed rock are present throughout the Unit, particularly in Halifax County. Soils in unforested areas have a tendency to form hardpans.

PLANTS

This Unit basically corresponds to the Fisher Lake–Halifax District in Loucks' Red Spruce, Hemlock, Pine Zone. The characteristic species are Red Spruce, Eastern Hemlock, White Pine, Balsam Fir, and Red Maple, with scattered Red Oak. Warm summer temperatures result in high evapotranspiration, which would normally encourage shade-tolerant deciduous trees, but here it appears to favour Red Spruce and Eastern Hemlock. Fire has played a prominent role, but the regeneration of pine and spruce under Red

Maple and Red Oak suggests that the area is returning to a mainly coniferous forest. American Beech was formerly abundant, but has been depleted by fire.

White Pine, Red Spruce, and Eastern Hemlock often occur on sites which have not been burned, while fire stands are commonly Red Oak, Red Maple, and White Birch. American Beech, Sugar Maple, and Red Oak are found on exposed slopes and hilltops. Black Spruce and Balsam Fir occupy poorly drained lands. Barrens and semi-barrens are common. Some old Red Spruce and Eastern Hemlock stands can still be found. Coastal-plain plants occur along water courses in this Unit.

Observations made in 1912 by C.D. Howe give some historical insight into the development of present-day forests: "The slopes, facing the Annapolis valley, are abrupt with relatively short streams flowing from them, while the southerly facing slopes are gentle, and their streams have worn rather wide valleys separated by low rounded ridges. In the portion draining northward the forests are of the mixed type with red spruce and hemlock predominating over the hardwoods, but there are frequently hills of pure over-mature and decrepit hardwoods, half composed of beech, 40 per cent hard maple and the rest yellow birch. In going southward, especially between the LaHave and Port Medway rivers, hemlock is of more common occurrence than the red spruce, in some places reaching as high as eighty percent of the stand. Frequent barren and semi-barren areas are scattered through the county, doubtless, in most cases, the result of repeated fires. One type, however, approaches the character of a natural barren, that is, a low rocky ridge, usually ten to fifty feet above its surroundings, covered chiefly with scrubby red oak and red maple. The largest areas of these latter barrens are found east and northeast of the Milford lakes and south of the Molly Upsum and McGill lakes. The very numerous lakes and ponds usually have at their upper ends, extensive peat bogs and black spruce and fir swamps. ... The cut of the mills in the western portion of the county [Kings] consists of approximately 50 per cent hemlock, 40 per cent red spruce and 10 per cent white pine, and these species form from 75 per cent to 80 per cent of the forest. In the eastern portion of the county, the ridges are broader and higher; the hardwoods become more prevalent, and finally dominate. ... Along the basin of the St. Croix lakes the larger percentage of the stands is hemlock. Eastward to the headwaters of Ingram river, red spruce prevails over the hemlock. These areas are near the centre of the granite mass. Both eastward and westward to the limits of the granite in the county, the forest is mixed hardwoods and softwoods, with spruce mostly predominating. ... Southwest of Ingram river and east of Island lake the forest is second growth, paper birch and red spruce being the most common species, with fir and yellow birch next in abundance. Northwest near the Hants County line, hardwood hills compose about one-fifth of the stand, between which red spruce and hemlock prevail, with the spruce in the lead. ... The granite area in the north-western corner of Guysborough county is about one-fourth burned and barren. The soil on the rest is deep, and hardwoods prevail, with frequent patches of pure red spruce and fir."

ANIMALS

The second-growth mixed forests support only sparse wildlife populations. Small-mammal diversity is low to moderate. High concentrations of White-tailed deer occur in sub-Unit 451a. Aquatic environments are acidic and have low productivity, providing poor waterfowl habitat. The area sustains substantial populations of Smallmouth Bass. The south basin of Sherbrooke Lake also supports a relict population of Lake Trout.

CULTURAL ENVIRONMENT

Forestry activities are the dominant land use in this sparsely inhabited area. Mining has also taken place at various localities. Recreational use of the land includes hunting, fishing, hiking, and boating activities.

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Sites of Special Interest

- Kejimkujik National Park (part)—eskers and Southern Flying Squirrel (sub-Unit 451a)
- Hollahan Lake (IBP Proposed Ecological Site 41)—Jack Pine forest (sub-Unit 451a)
- Shady Brook (IBP Proposed Ecological site 67)—Red Spruce, Eastern Hemlock forest (sub-Unit 451a)
- Wight Nature Preserve, Hubbards (sub-Unit 451a)

Ecological Reserve

- Panuke Lake Nature Reserve

Provincial Parks and Park Reserves

(All are in sub-Unit 451a, except for Cox Lake.)

- Falls Lake

- Lake George
- Lumsden Pond
- Holden Lake
- Card Lake
- Simms Settlement
- Hollahan Lake
- Halifax Watershed
- Lewis Lake
- Upper Tantallon
- Cox Lake (sub-Unit 451b)

Proposed Parks and Protected Areas System includes Natural Landscape 7a and Candidate Protected Areas 26 Cloud Lake and 27 McGill Lake.

Associated Topics

T2.3 Granite in Nova Scotia, T3.2 Ancient Drainage Patterns, T3.3 Glaciation, Deglaciation and Sea-level Changes, T3.4 Terrestrial Glacial Deposits and Landscape Features, T4.2 Post-glacial Colonization by Plants, T4.3 Post-glacial Colonization by Animals, T8.2 Freshwater Environments, T8.3 Freshwater Wetlands, T10.12 Rare and Endangered Plants, T11.18 Rare and Endangered Animals.

Associated Habitats

H3 Fresh Water, H4.1 Bog, H4.2 Fen, H4.3 Swamp, H5.1 Barren, H6.1 Hardwood Forest (Maple, Oak, Birch Association), H6.2 Softwood Forest (Spruce, Hemlock, Pine Association; Pine Association; Black Spruce, Larch Association), H6.3 Mixedwood Forest (Spruce, Fir, Pine–Maple, Birch Association).

452 SHELBURNE GRANITE PLAIN

GEOLOGY AND LANDSCAPE DEVELOPMENT

This Unit presents a typical granite terrain, hummocky and covered with large boulders. The elevations are low, in keeping both with its position on the planation surface and with the fact that the granite body is probably not fully exposed.

The surface has a mantle of thin, stony till with no drumlins.

FRESH WATER

Great Pubnico Lake, the largest body of water in this Unit, is the headwater for the Barrington River. Smaller lakes are dispersed throughout and connected by a network of streams and rivers. Scattered medium to large wetlands tend to be associated with the larger watercourses. There are concentrations of sloped and raised bogs. Conductivity averages 35 micromhos/cm, and pH ranges from 4.7 in the Clyde River and Great Pubnico Lake to 6.5 in Alvin Lake.

SOILS

Soils in this Unit have developed from various parent materials—granite, quartzite, and schist. Large areas are poorly drained, either because of topography, shallow depth to bedrock, or the presence of a cemented ortstein layer. Sand plains are common. In the Yarmouth County corner of the Unit, Gibraltar, Bayswater, and Aspotogan soils—all derived from granite—occur with patches of peat. In the rest of the Unit, poorly drained Bayswater and Aspotogan soils, and imperfectly drained Liverpool and Danesville soils, each often gleyed and mottled, are dominant on the largely level topography towards the coast, with some areas of better-drained Medway, Mersey, and Port Hebert soils where the relief is more pronounced.

PLANTS

This Unit is the most southerly portion of Nova Scotia not directly affected by the cold and fog associated with the Atlantic Coast. The growing season is hot and subject to drought on shallow soils. The natural vegetation appears to have been White Pine and Red Oak, but repeated burning has reduced many of the pine sites to a shrub cover of cinquefoil, Bearberry, and Broom-crowberry, with scattered Black Spruce. Black Spruce predominates on ill-drained lands, while Red Oak covers the ridges. Eastern Hemlock and Red Spruce are found in the few unburned areas. The warm climate is indicated by the presence of plants which otherwise occur no further north than southern Maine, for example, Inkberry.

ANIMALS

The barrens do not provide productive wildlife habitat, and this Unit has the lowest small-mammal diversity in the Region, with no more than four species commonly occurring. It does, however, support one of the best moose populations in western Nova Scotia. Typical freshwater fishes include Brook Trout, Yellow Perch, Brown Bullhead, and Golden Shiner.

CULTURAL ENVIRONMENT

Much of this area is barren as a result of repeated fires. Around the turn of the century, meadows in southwestern Nova Scotia were burned annually to promote hay growth, and barrens were burned periodically for production of blueberries. Although there were fewer forest fires than today, they were often unattended unless they threatened settlements and therefore burned much larger areas. From 1900 to 1914, more timber was lost to fire, disease, storms, and old age than was harvested. Barren lands of the Shelburne Granite Plain feature significant moose populations that attract seasonal hunters.

Sites of Special Interest

- Many eskers along the shoreline, along Clyde River and north of Clements Pond

Provincial Parks and Park Reserves

Proposed Parks and Protected Areas System includes Natural Landscape 8c.

Associated Topics

T2.3 Granite in Nova Scotia, T3.4 Terrestrial Glacial Deposits and Landscape Features, T9.1 Soil-forming Factors, T10.1 Vegetation Change, T11.10 Ungulates, T12.10 Plants and Resources.

Associated Habitats

H4.1 Bog, H5.1 Barren, H6.2 Softwood Forest (Black Spruce, Larch Association; Spruce, Hemlock, Pine Association).

453 GRANITE RIDGE

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Granite Ridge along the Eastern Shore forms a prominent feature 80 km long and about 8–10 km wide. It rises sharply, sometimes with cliffs, to a narrow plateau 100 m above the Atlantic Coast Region (see Figure 27).

The granite has been cut by faults in two places: along the valley from Spider Lake through Lake Major, and along the Porters Lake valley.

The Musquodoboit River also cuts across it in a narrow gorge and must have been superimposed by downcutting since the Cretaceous.

The surface of the granite has a thin veneer of coarse granite till which, at the eastern end of the ridge, is overlain with a few drumlins of red Lawrencetown Till (Wolfville soils). These have spilled over from the area of the Eastern Shore Drumlins (sub-Unit 435a) to the north.

FRESH WATER

The surface-water coverage in this Unit is very high, with many irregularly shaped lakes and long narrow lakes and rivers following fault lines. A few small, scattered raised bogs and fens are found. Parts of the Musquodoboit River are bordered by large wetlands. Conductivity averages around 42 micromhos/cm, and pH ranges between 4.7 and 6.8.

SOILS

Gibraltar soils (well-drained, gravelly, sandy loams derived from granite) are dominant, with large areas of exposed bedrock and small areas of imperfectly drained Danesville soil and peat bogs.

PLANTS

This Unit is somewhat cooler in summer than Unit 451 and has a climate quite similar to Unit 452. Red Spruce, Balsam Fir, birch, Eastern Hemlock, and White Spruce are common species on well-drained sites. Black Spruce, Balsam Fir, and Larch occur in wetter areas. Parts of the Unit are semi-barren. Scattered Red Oak occurs around the Lake Charlotte area. Shade-intolerant birch and aspen colonize burnt areas.

The ruggedness and effects of repeated burns, which still continue, were well described by C.D. Howe, writing in 1912: "The crests of the granite hills east of Halifax harbour have been deeply eroded by glacial action and have naturally very thin soils; and frequent fires have so exposed the rocks, that from a distance most of the rounded domes appear white. When not burned, they are sparsely covered by a black forest, that is, coniferous, in striking contrast to the lighter green of the hardwoods prevailing on the lower slopes. The higher slopes, especially when facing southward are covered with spruce overtopped by scattered white and red pine. The hardwoods go nearly to the top on the northerly-facing slopes. The low ridges usually support pure hardwoods. Red spruce prevails in the broader flats between the ridges, while hemlock predominates in the ravines and gullies, and at the base of steep slopes along the rivers and smaller lakes."

ANIMALS

There is little recorded information about terrestrial animals in this Unit. Fish species include White Sucker, Brook Trout, White Perch, Gaspereau, Yellow Perch, Brown Bullhead, Banded Killifish, and shiners.

CULTURAL ENVIRONMENT

Forest management predominates in this area. However, farming has also been important in the Musquodoboit Valley. Other resource-based industries here include Christmas tree farms. The Waverley Game Sanctuary spans part of the Granite Ridge. Seasonal hunting is common in this area.

Sites of Special Interest
- Waverley Game Sanctuary

Provincial Parks and Park Reserves
- Paces Lake
- Caribou Lake

Proposed Parks and Protected Areas System includes Natural Landscape 34 and Candidate Protected Areas 19 Tangier Grand Lake, 20 White Lake, and 22 Waverley–Salmon River Long Lake.

Associated Topics
T2.3 Granite in Nova Scotia, T3.2 Ancient Drainage Patterns, T12.11 Animals and Resources.

Associated Habitats
H4.1 Bog, H6.1 Hardwood Forest (Maple, Oak, Birch Association).

460 BAYS

This District has two subdivisions:

(a) Mahone Bay
(b) St. Margarets Bay

GEOLOGY AND LANDSCAPE DEVELOPMENT

St. Margarets Bay and Mahone Bay are ancient landscape features that were formed during a period of rapid erosion before the Carboniferous. During the Middle Carboniferous, an extension of the Carboniferous sea transgressed this part of the old erosion surface and deposited limestone and evaporites. Most of these strata have now been eroded away, and only a fringe is left around the margins of the two bays. Granite is the dominant rock-type in this District, with slate forming a series of peninsulas on the west side of Mahone Bay.

The slates tend to be covered by fairly deep surficial deposits in the form of glacial tills and drumlins. The drumlin swarms continue into the sea, particularly in Mahone Bay where they form islands called "whalebacks" (see Figure 14). These have been extensively eroded by the sea in recent times to form shoals, spits, and bars. Finer sediment is deposited in small salt-marshes in the low-energy environments at the heads of the bays. Small, sandy pocket beaches

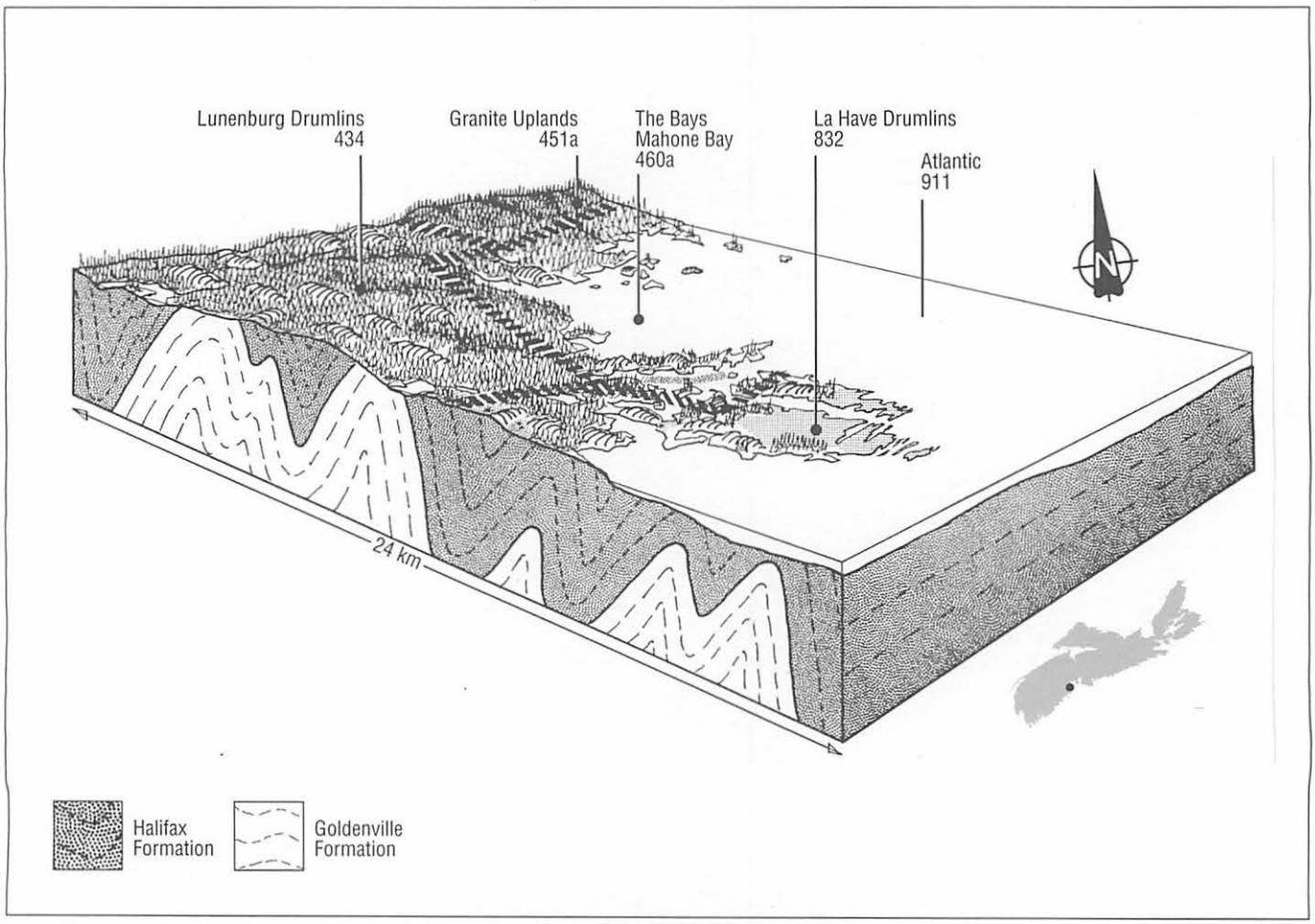

Figure 14: Mahone Bay area. Drumlins cover the surface of the tilted planation surface as it dips beneath the Atlantic (Unit 911). Many of the drumlins are composed of "red" tills (Unit 434) carried by glaciers at least 100 km from the north. Erosion of drumlin islands and headlands has formed many shoals, some beaches, and tidal marshes in Mahone Bay (District 460). Exposed slate headlands with scattered drumlins have a harsher climate, resulting in coastal forest habitat (Unit 832).

are present on exposed coasts at the bay heads, but deep water inland of sills at the bay entrances has prevented the rising sea level from moving nearshore sand deposits onto the present coastline.

A coastal lowland that developed on Carboniferous rocks around the bays is abruptly terminated by the steep-sloping granite inland. On the Aspotogan Peninsula, which separates Mahone Bay from St. Margarets Bay, the till is very thin as a result of the scarcity of softer Carboniferous rocks.

FRESH WATER

Several large rivers drain into this Unit, for example, the Gold River in sub-District 460a and the Ingram River in sub-District 460b. The levels of pH in these rivers ranges between 4.7 and 5.4.

SOILS

Mahone Bay (sub-District 460a)
The soils around Mahone Bay are mostly derived from granite, quartzite, and slate, with some Carboniferous material. Upper Blandford to East Chester is mostly Gibraltar soil with areas of exposed bedrock. Chester Peninsula, including the islands, is mostly Bridgewater soil (sandy loam derived from slate). The remaining soils are a mixture of Bridgewater, imperfectly drained Danesville in flatter areas, well-drained and coarse-textured Farmville (derived from a mixture of granite, quartzite, and slate), and Wolfville loams. A number of drumlins are mantled by either Farmville or Wolfville soils. Most of the islands are Wolfville drumlins.

St. Margarets Bay (sub-District 460b)
St. Margarets Bay shows less variety of soil types than Mahone Bay. Gibraltar predominates, with Rockland areas and a few small patches of Wolfville soil.

PLANTS

The vegetation around both bays has been extensively disturbed and is essentially a modified version of the coastal forest—mainly conifers, with Red Spruce, White Spruce, and Balsam Fir.

ANIMALS

The western shore of Mahone Bay, including the islands, has local importance for waterfowl and shorebirds. Waterfowl found at various times from spring through early winter include Black Duck, Common Goldeneye, Oldsquaw, Scoter, and Red-necked Grebe. The Osprey is a common nesting bird on islands in this area. Rainbow Smelt and American Eel are common.

SCENIC QUALITY

St. Margarets Bay and Mahone Bay differ visually as a result of bedrock and glacial deposits, but both provide a wealth of beautiful scenes, some panoramic, some intimate. Scenic value is provided partly by the bays themselves, which are visually enclosed or embraced by land, and partly by the many small fishing settlements (supplemented by farming settlements on the drumlins of western Mahone Bay). The whaleback islands of Mahone Bay add much interest, but St. Margarets Bay is more easily comprehended as a whole and impresses by its size. Beauty spots can be found in all localities, but scenic ratings are highest on the northern shore of Mahone Bay and the eastern shore of St. Margarets Bay.

CULTURAL ENVIRONMENT

Shell middens have been found at various sites around St. Margarets Bay and Mahone Bay, indicating the presence of traditional Mi'kmaq camps. In the eighteenth century this area was settled by German and British immigrants who formed fishing villages and towns around the bays. Sheep farming is the major industry in this Unit. Extensive logging operations began in St. Margarets Bay in the 1940s, and forest exploitation today supplies a hardboard plant at East River. In the 1920s the tidewater hydroelectric generating station was built at the Head of St. Margarets Bay on the site of an old sawmill. Other hydro plants in this area include Sandy Lake and Mill Lake. Rocks are quarried in the Bays District by a large crushed-rock producer. Hunting and fishing pursuits first brought tourists to the area in the 1870s, but its attraction as a scenic destination with beaches, inlets, and villages really grew with the advent of the automobile and the development of better roads in the 1920s. Today, although some people living in this area are involved in the fishery or forestry resource industries, many others are commuters who work in Halifax.

Sites of Special Interest

- Peggys Cove and Masons Cove are good examples of intertidal zonation on rocky shores

Provincial Parks and Park Reserves

- Graves Island
- East River
- Second Peninsula
- First Peninsula
- Fox Point
- Hubbards
- Cleveland Beach
- Queensland Beach

Proposed Parks and Protected Areas System includes Natural Landscape 14.

460
Bays

Scenic Viewpoints

- Sub-Unit 460a: Graves Island Provincial Park, Chester Harbour, Mahone Bay, Second Peninsula Provincial Park
- Sub-Unit 460b: Queensland Beach, Cleveland Beach

Associated Offshore Unit

911 Atlantic.

Associated Topics

T2.4 The Carboniferous Basin, T3.3 Glaciation, Deglaciation and Sea-level Changes, T3.5 Offshore Bottom Characteristics, T6.1 Ocean Currents, T6.2 Oceanic Environments, T6.3 Coastal Aquatic Environments, T11.6 Shorebirds, T11.7 Seabirds, T12.10 Plants and Resources, T12.11 Animals and Resources.

Associated Habitats

H1.1 Offshore Open Water, H2.1 Rocky Shore, H2.2 Boulder/Cobble Shore, H2.5 Tidal Marsh, H6.3 Mixedwood Forest (White Spruce, Fir–Maple, Birch Association).