500 Carboniferous Lowlands

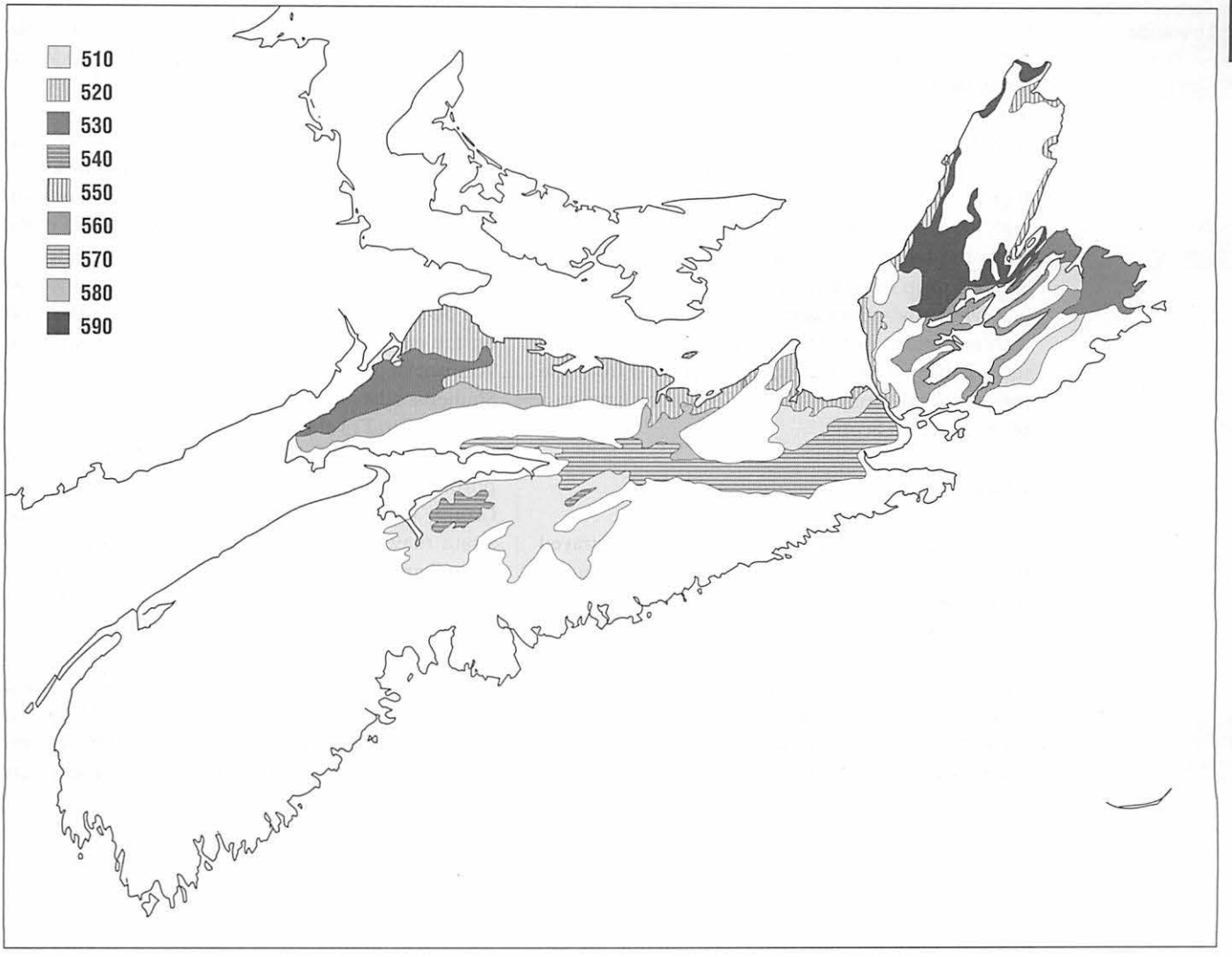

Figure 15: Region 500, Carboniferous Lowlands, and its component Districts.

500 CARBONIFEROUS LOWLANDS

The Region has been divided into nine Districts on the basis of topographic character and soil type:

510 Till Plain
520 Coastal Plain
530 Stony and Wet Plain
540 Clay Plain
550 Coastal Fringe
560 Submerged Lowland
570 Rolling Upland
580 Hills and Valleys
590 Dissected Plateau

REGIONAL CHARACTERISTICS

Lowland Nova Scotia is mainly Carboniferous sedimentary rocks on which deep soils have developed. Many of the rivers flow in valleys eroded from the unresistant Windsor Group rocks, which include gypsum. Horton Group sandstones are more resistant and form higher ground in District 510 in Cape Breton, and on the eastern mainland. Districts 580 and 590 abut the older upland blocks as foothills, while the less-resistant rocks of Districts 520, 550, and 560 form coastal plains, often with heavy soils. Flat-lying sandstones and shales are poorly drained with numerous bogs (Districts 530 and 540), while the relatively infertile sandy soils derived from the resistant sandstones of District 570 cover a large area of central Nova Scotia.

GEOLOGY

The geological character of the area is best portrayed through a description of the paleo-environment in which the sediments accumulated and the processes which affected them after deposition.

The first deposits were coarse sands and grits (Horton Group) washed from the uplifted and folded Meguma Zone and the highland blocks of the Avalon Zone (Pictou-Antigonish and Cape Breton) into basins between mountains. In some areas these deposits were preceded by extrusions of lava as crustal adjustments continued to take place. The first basins were in the Pictou and Mabou-Antigonish areas but, as sediments accumulated, they became increasingly extensive. The early Horton deposits have no fossils and now form resistant bands shouldering the uplands. Later came deposits of silts and fine sandstones which contained abundant fish and plant remains. Towards the end of this period in the Early Carboniferous a marine incursion took place; the basins became enlarged and interconnected, and an inland sea formed with a shoreline on mainland Nova Scotia which closely approximates the present boundary of the Carboniferous deposits. Within this sea was an archipelago of islands including the Wittenburg Ridge, Mount Aspotogan, the Pictou-Antigonish Highlands, the elongated blocks of the Avalon Zone in Cape Breton, and the Cape Breton highlands.

In the marine basin a laminated limestone formed, followed by deposits of evaporites (mostly gypsum) and red and green shales. Near the islands, shelly reefs developed, for example, at Gays River, Aspotogan, and East River (Mahone Bay). In the initial incursion of seawater, the intermontane basins and much of the surrounding area was flooded. The limestone deposited at that time lies on the Horton deposits and, where formerly dry land was covered, directly on the underlying topography. As the basin enlarged, later deposits of Windsor rocks were laid directly onto the older rocks of the basin margin, as can be seen in Mahone Bay, St. Margarets Bay, and on the eastern side of the Cape Breton highlands. Windsor deposits attain a thickness of 450 m in the Shubenacadie area and up to 750 m in Cape Breton.

At the end of the Windsor period, the land rose slightly and the sea withdrew to the east. Red and purple siltstones, shales, and sandstones (Canso Group) were deposited in streams and lakes. The strata may once have been very extensive across Nova Scotia but are now found in only a few major areas: around St. Georges Bay, the Strait of Canso, Stellarton–Mount Thom, and the Stewiacke Valley. They give red or purplish soils and, when exposed on the coast (e.g., Janvrin Island), bright red-coloured cliffs. This period was relatively quiet geologically; there were no tectonic upheavals, and the topography was subdued. The Early Carboniferous deposits were by this time very thick and had buried the lower elevations of the terrain. Rivers developed wide valleys with broad floodplains and estuaries. Sediments deposited in the environment had been compacted to fine sandstones, black shales, and thin coal seams (Riversdale Group). These strata also may once have been very extensive, but deep erosion has confined

existing deposits to a few areas: a fringe around the Cobequid Hills, Pomquet, Port Hood, Broad Cove to Margaree Harbour, and Port Hawkesbury to St. Peters.

About this time, conditions became suitable for the proliferation of fern-like swamp plants, which flourished in extensive wetlands across the flat landscape. Great thicknesses of organic deposits accumulated and were compressed (Cumberland, Pictou, and Morien groups). These Late Carboniferous strata, which are predominantly thick sandstones and shales, cover almost the entire area north of the Cobequids and about half of Cape Breton County. The major coalfields of Springhill, New Glasgow-Stellarton, and the Sydney area are all in this group.

Carboniferous strata are relatively unmetamorphosed because, on a geological scale, they were never deeply buried. However, they were affected by compressive crustal movements during the Permian and Jurassic periods. The most intensely affected area was a band across the northern part of the province from Chignecto Bay, through the Pictou coalfield, and up through the Aspy Valley in northern Cape Breton. Resistant strata such as the Late Carboniferous sandstones and the Horton grits were thrown into open folds, whereas the softer strata in the zone, such as shales and gypsum, were distorted and crushed. There was also movement along the Cobequid-Chedabucto and Aspy faults and related movement along associated parallel and crosscutting faults.

Carboniferous deposits accumulated to a depth of many thousands of metres and engulfed most features of the old landscape. The Early Permian erosion has removed hundreds of metres of Late and Middle Carboniferous strata, exposed the underlying Windsor and Horton group blocks, and revealed ridges and valleys of the old erosion surface upon which these beds were deposited. A wide range of different rock types, with different responses to erosive forces, is now exposed. The topography reflects both this differential resistance, the structural character (folds and faults) of the area, and the relationship between the Carboniferous strata and the underlying rocks.

LANDSCAPE DEVELOPMENT

The geomorphology within the Carboniferous Lowlands is variable. There are lowland plains, rolling uplands, and coastal fringe areas. The lowlands fall into three main areas: the Windsor Lowlands (Unit 511), from the Avon River to the Stewiacke Valley; the Coastal Plain of the North Shore (District 520); and the Bras d'Or Lowlands (District 560) of central Cape Breton. These three areas are dominated by unresistant Windsor Group deposits which have been deeply eroded in some places to well below present sea level. The rolling plains are underlain predominantly by Late Carboniferous sandstones of the Cumberland, Pictou, and Morien groups. They cover northern Antigonish, Pictou, Colchester, and Cumberland counties (Units 521 and 532) and the area between Mira Bay and Great Bras d'Or Channel (Unit 531). The strata are fairly resistant and moderately to strongly folded. In the Cumberland/Pictou area, younger and more easily eroded strata are exposed in the cores of the anticlines; consequently, the landscape has developed a ridge and valley topography with moderate relief.

The upland areas are underlain by resistant Horton deposits. The rolling upland which lies between the Chedabucto and St. Marys faults has been affected by folding and faulting to quite a degree, yet it remains a rather featureless elevated area across the central mainland (District 570). This suggests that the topography reflects the more uniform resistance of the different rocks, and therefore a similar response to the forces of erosion.

The Cape Breton uplands are underlain by Horton strata, interfolded with Windsor deposits. A large area in western Cape Breton exhibits strong relief and is varied and interesting. Windsor Group limestones and gypsum have been eroded to form the deep valleys occupied by the Baddeck, Middle, and Margaree rivers. Coastal fringe deposits skirt the Cape Breton highlands and form narrow coastal plains at the base of steep cliffs (District 550). Resistant Horton sandstones form an upland plateau surface which these valleys dissect.

The intervening hilly areas of the Carboniferous Lowlands have a topographic character transitional between lowland, plain, and upland. Faults transect the basins and often set strata of different resistance against each other. Downfaulted younger strata are set against older strata and are thereby preserved, for example, the Pictou Valleys (Unit 582).

Karst Topography

Throughout the Carboniferous Lowlands, in areas underlain by Windsor Group strata, pockets of gypsum and anhydrite (dehydrated gypsum) occur at the surface and produce a special feature called karst topography.

When anhydrite comes in contact with water, it expands and changes to gypsum. Gypsum is readily dissolved by rainwater and, when it lies above the permanent water table, it crumbles and washes away, leaving behind a small amount of reddish clay. Joints in the gypsum beds are enlarged and often

subterranean channels are formed. Streams flow through these channels, sometimes enlarging them into caverns. If the roof of the cavern collapses, a sinkhole forms; if the roof of a channel falls in, a long gully with vertical sides is left.

Often the ground over gypsum is so closely covered by pits that only narrow crumbling ridges exist at the surface. The depressions may be underlain by holes or channels, and the whole area is treacherous to walk across.

A good example of karst topography exists at Amherst Point; another is found behind the King's-Edgehill School in Windsor. Both locations have a number of sinkholes, with the largest ones found at Windsor. Caves are infrequent, but a well-developed one called Hayes Cave occurs near South Maitland. This cave can be penetrated for 400 m and has a maximum width of 60 m and a ceiling reaching 22 m. Sinkholes that become plugged form sinkhole ponds which have alkaline water with characteristic plants, such as Stonewort, and abundant molluscs and amphibians.

FRESH WATER

In general, strata of the Carboniferous Lowlands are moderately to highly permeable. Rivers and their tributaries tend to follow fold axes and joint directions, and often exhibit a rectangular pattern. Most of Nova Scotia's major floodplains and intervales are found on the larger, mature rivers of this Region. These include the Margaree River in Cape Breton, the East River of Pictou, the Stewiacke and Musquodoboit rivers, and those draining north from Cobequid Mountain, such as the Philip. Karst topography has developed on the gypsum with the classic pattern of intermittent streams and sinkholes. The groundwater in gypsum areas is usually heavily mineralized, and the lakes and ponds are often saline. Streams are intermittent, disappearing into holes and channels, only to reappear again some distance away.

Overall there is little surface water, except where glacial deposits have impeded drainage to create the few lakes found in the Region. There are exceptions where drainage is very slow on the flat heavy clays of the Stewiacke Barrens, where extensive peat bogs have formed (District 540), and on the very flat isthmus by which Nova Scotia is joined to New Brunswick (Unit 523).

Conductivity levels, and hence productivity, tend to be highest where surface waters drain areas consisting mostly of limestone and gypsum. The levels of pH range between slightly acidic to very alkaline. Infiltration rates are relatively high in the porous soils of this Region and, consequently, groundwater recharge is high.

CLIMATE

The Carboniferous Lowlands form a large, scattered Region. Within it, the climate shows considerable variation, although it is essentially an inland lowland climate characterized by cold winters and warm summers. The major modifying influences are elevation in Cape Breton, and marine influences from the Gulf of St. Lawrence, Bras d'Or Lake, and Atlantic Ocean.

Winters are cold, though not severe. January mean daily temperatures are less than 6°C. Because of the influence of the Atlantic, fall temperatures in the Sydney area are somewhat higher. Spring comes later to those areas near the coast because of the ice cover and persistent cold water. Mean daily temperatures rise above freezing before the end of March, and the growing season is under way before the end of April. Spring is later at higher elevations. Temperatures warm quickly on the mainland but stay cool in Cape Breton and along the coast of the Gulf of St. Lawrence because of winds off ice-covered waters.

By July the whole Region has warmed to a mean daily temperature of over 17°C. Mean daily temperatures of less than 0°C return in November in the mainland interior, and in early December in the rest of the Region.

The total annual precipitation varies throughout the Region. In general it is drier towards New Brunswick, where parts of the Northumberland Plain (Unit 521) receive less than 1000 mm, and wetter in Cape Breton, which receives 1200 to 1600 mm. Snowfall is heavy in the interior and in the Dissected Plateau (District 590) of Cape Breton, but lighter near the coast. The snow-cover season lasts more than 130 days in all areas, except northern Cape Breton and parts of the mainland interior where it can exceed 140 days.

Early spring fogs are a feature along the Northumberland Strait because of the influence of the cold seawater on warm winds. The frost-free period lasts less than 100 days in the interior but lengthens to 140 days or more along the coast and around Sydney. The number of accumulated growing degree-days is high, particularly along the North Shore, where the warm summer waters of the Northumberland Strait boost summer temperatures.

SOILS

The main factors affecting soil development in this Region are the great variety of rock types and landforms, the generally more erodable nature of the rock, and the varied forest vegetation. Soils vary considerably and form a more intricate soil mosaic than is found in Regions such as the Atlantic Interior. The tills tend to be deep, and the soils that have developed on them are often heavy-textured with impeded drainage. Lowland soils usually have fewer stones and are more readily compacted. As elsewhere in the province, humo-ferric podzols cover major areas, but luvisols, brunisols, and gleysols are well represented. Sandy loams occur on the Horton and Pictou-Morien formations, while shaly loams occur on the Windsor, Riversdale, and Canso formations. Extensive Regosols have developed on alluvial materials, especially in the larger river valleys common in this Region.

Gypsum areas are usually overlain by glacial tills rather than by soils developed *in situ*, and exhibit a variety of soil types. However, because some gypsum has usually mixed into the tills, the local soil is often improved in structure and permeability. For this reason, the soils in gypsum areas are usually well-drained, even when otherwise fine-textured. The soils are also less acidic because of the influence of the gypsum. One type of soil commonly associated with gypsum is the Falmouth series, developed from a clay loam till deposited over gypsum. Falmouth soils can be important for agriculture, but when they occur over gypsum, their use is often limited by the sinkhole (karst) topography.

PLANTS

The Carboniferous Lowlands spread over three of Loucks' Forest Zones. One zone is dominated by softwoods, while in the other two, more northerly, semi-upland zones, hardwoods are more prominent. The Windsor Lowlands and the Northumberland Plain fall within the Red Spruce, Hemlock, Pine Zone. The Antigonish, Guysborough, and Bras d'Or areas are in the Sugar Maple–Eastern Hemlock, Pine Zone, and the higher Dissected Plateau District of Cape Breton is in the Sugar Maple, Yellow Birch–Fir Zone.

The main influences on the regional vegetation are the warm summers and cold winters, the heavier soils, and extensive disturbance through logging, fires, and farming. The Windsor Lowlands near Windsor and Truro grow mostly softwoods—Red Spruce, Black Spruce, Balsam Fir, Red Maple, and Eastern Hemlock. On the Northumberland Plain, where landforms are level and drainage is often poor, Black Spruce, Red Spruce, and Balsam Fir are the most common species, sometimes mixing with pine, Red Maple, or shade-tolerant hardwoods. In Cape Breton, White Spruce and Balsam Fir dominate the lowlands, while Red Maple, White Birch, and Yellow Birch are more common on the hilly lands. On the higher ground near Lake Ainslie, better drainage and cooler summers result in larger numbers of shade-tolerant hardwoods.

Bogs are generally not as prominent a feature here as in areas of more impermeable bedrock, but they are still common in the Windsor Lowlands, Bras d'Or, and Sydney areas. Salt marshes and freshwater marshes are abundant. Rich intervale lands in central mainland areas and on Cape Breton Island often provide habitat for rare or unusual Alleghanian plant species.

The vegetation of gypsum areas is influenced by the calcareous nature and dryness of the soils and by a karst topography that limits disturbance through forestry and agriculture. The main form of disturbance associated with gypsum is mining, but this is now mostly confined to deep, unweathered deposits; gypsum outcrops and cliffs are more likely to be left untouched. Mixed forest (often including Eastern Hemlock, Red Spruce, and Red Oak) is interspersed with bare or scrubby areas where the soil is too thin and dry to support tree growth.

Botanical interest is provided by a number of rare or unusual plants that survive in gypsum areas because of the comparative lack of competition. The flowers are best in the early spring, before the soil becomes parched. Fleabane can be found growing on the crumbling cliff faces, and above it on the cliff tops, Gypsum Ragwort grows. Trout Lily and Yellow Lady's-slipper can be found beneath trees on the plateau. Several hardy shrubs exist here, including Round-leaved Dogwood, Buffalo Berry and Shrubby Cinquefoil. Some of these plants require basic soils, while others (cinquefoil and Yellow Lady's-slipper) can also be found in acidic bogs, where the mechanisms to reduce evaporation, which are so necessary on the dry gypsum, help to prevent the plant from being poisoned by excessive take-up of acid water. Rarities occasionally found in gypsum areas include Leatherwood and the Ram's-head Lady's-slipper.

ANIMALS

This Region provides a diverse mix of open-land, oldfield, and forest habitats. There are few lakes of much size, but many wide and slow-moving rivers. Deeper soils and level terrain result in numerous productive freshwater marshes. Along the North Shore, the gentle slope of the shoreline provides important intertidal habitat, even though the tidal range is small.

Small-mammal diversity ranges from low (coastal marshes) to high (Ainslie Uplands), depending upon habitat. In agricultural areas an open-land mammal fauna is found: fox, raccoon, and skunk. In the wilder, less-accessible parts of the Region, moose, deer, and some bear can be found. Muskrat and mink are plentiful along streams and rivers. The gypsum provides calcareous soils, which support the greatest diversity of land snails found in Nova Scotia. The caves in gypsum provide hibernating sites for bats. Productive aquatic habitats support a more diverse freshwater fauna than is found elsewhere in the province.

In the Gulf of St. Lawrence the warm summer water temperatures permit the existence of disjunct populations of Virginian marine fauna. The Bras d'Or Lake has an impoverished marine fauna.

This Region provides important freshwater and coastal habitats for waterfowl.

CULTURAL ENVIRONMENT

Many areas of the Carboniferous Lowlands were significant Mi'kmaq hunting and fishing grounds. In the seventeenth century, Acadians settled in marshland areas around the Minas Basin and its river tributaries, choosing to dyke the tidal marshes to create fertile farmland rather than clear the forests. This engineering feat dramatically transformed the coastal landscape. After the Acadian deportation, eighteenth-century Planters and Loyalists claimed these lands. Scottish and Irish immigrants farmed other areas of the Carboniferous Lowlands. Today, parts of the Carboniferous Lowlands comprise some of the most productive and prosperous farms in Nova Scotia.

In the past, hydro power was harnessed by gristmill waterwheels. Now hydroelectric stations operate on various waterways which have been significantly altered to harness maximum hydro energy. Forest management has been intensive in this Region and has supplied diverse industries, including shipbuilding.

Mineral deposits have been exploited, including manganese, gypsum, anhydrite, barite, clay and shale, copper, salt, limestone, and coal. The mining of coal from the Sydney Coalfield and Pictou Valleys has been a major factor in the industrial and social development of Nova Scotia. There are several coal-fired electricity-generating stations in this Region. Sand and gravel deposits and sandstone quarries have also been important to the construction industry.

Coastline areas of the Carboniferous Lowlands have relied on the economically important fisheries of the Northumberland Strait and around Cape Breton. Many rivers of this Region are good for salmon fishing. Hunting, fishing, and other recreational activities are widespread. Scenic vistas and cultural heritage museums also attract tourism to the Carboniferous Lowlands.

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Associated Topics

T2.4 The Carboniferous Basin, T3.1 Development of the Ancient Landscape, T3.2 Ancient Drainage Patterns, T3.4 Terrestrial Glacial Deposits and Landscape Features, T5.2 Nova Scotia's Climate, T8.1 Freshwater Hydrology, T8.2 Freshwater Environments, T9.1 Soil-forming Factors, T10.2 Successional Trends in Vegetation, T10.4 Plant Communities in Nova Scotia, T10.12 Rare and Endangered Plants, T11.2 Forest and Edge-habitat Birds, T11.5 Freshwater Wetland Birds and Waterfowl, T11.8 Land Mammals, T11.10 Ungulates, T11.16 Land and Freshwater Invertebrates, T11.17 Marine Invertebrates, T12.2 Cultural Landscapes, T12.3 Geology and Resources, T12.11 Animals and Resources.

Associated Habitats

H2.3 Sandy Shore, H2.5 Tidal Marsh, H3.1 Freshwater Open-Water Lotic, H3.3 Freshwater Bottom Lotic, H3.5 Freshwater Water's Edge Lotic, H5.2 Oldfield, H5.5 Cave, H6.1 Hardwood Forest (Sugar Maple, Elm Association), H6.2 Softwood Forest (Spruce, Fir, Pine Association; Spruce, Hemlock, Pine Association).

510 TILL PLAIN

District 510 has been divided into two widely separated Units, each of which has a distinctive topographic character:

511 Windsor Lowlands
512 Salmon River Lowland

GEOLOGY AND LANDSCAPE DEVELOPMENT

Across central mainland Nova Scotia is a large area characterized by the close interrelationship of underlying, resistant Horton Group strata and overlying, less-resistant Windsor Group limestone, salts, and shales.

The large rivers (e.g., the Avon and Shubenacadie) that flow across this area follow fault lines or the courses of ancestral rivers. However, their tributaries tend to flow northeast or southwest in synclinal hollows between anticlinal ridges.

The Carboniferous strata were readily eroded by glacial action during the last ice age, and the District is heavily blanketed with glacial debris. Outwash deposits are common.

SCENIC QUALITY

The common element in these areas is human settlement, originally and still largely related to farming. Although settlers were initially interested primarily in dykelands along the tidal Avon and Shubenacadie river systems, they later fanned out across much of the fertile till plain. The farmscapes of the Region's core farming areas, centred on Windsor, Shubenacadie, Stewiacke, and Middle Musquodoboit, provide open vistas and much of scenic interest. A dairy industry offers distinctive landscape elements (grazing cattle, silos, large barns) in areas close to the metropolitan market. Wide tidal rivers add much to the beauty of a scene, as does the steep fault-scarp of Martock Mountain, southeast of Windsor. The Windsor vicinity achieves the highest scenic ratings, largely owing to stronger relief, and the Shubenacadie and Upper Musquodoboit areas rate as medium to moderately high.

511 WINDSOR LOWLANDS

The Windsor Lowlands Unit is divided into two sub-Units:

(a) Shubenacadie River
(b) East Mountain

The Windsor Lowlands cover a very large area south of the Minas Basin, from the Avon River east to the Shubenacadie and Stewiacke river valleys (sub-Unit 511a), and a small area north of Truro (sub-Unit 511b). These two areas are part of the same depositional area and have the same characteristics.

GEOLOGY AND LANDSCAPE DEVELOPMENT

The southern boundary of sub-Unit 511a against the Atlantic Interior is essentially identical to the shoreline of the Carboniferous depositional basin in this part of Nova Scotia. The Horton deposits range in thickness from zero at the margins to nearly 1,000 m near North Mountain. The Wittenburg Ridge was an upland at the time of deposition, and the Horton deposits thin out on its flanks. It is evident that the Rawdon Hills were not uplands because the same thinning does not occur. Good exposures of Horton strata are found at Victoria Park in Truro, and at Horton Bluff, where fossiliferous middle Horton sandstone and shales outcrop. During the period in which deposition was taking place from the Windsor sea, reefs formed near the shoreline. One of these, north of Wittenburg Ridge, is at Gays River; others are found on the Atlantic Coast at East River and

Plate 5: Region 500. View looking south across the upper branch of East St. Mary's River (Unit 572) to a landscape of rolling hills partly cleared for agriculture that is typical of much of the Carboniferous Lowlands. Photo: R. Merrick.

Aspotogan, where they developed in another arm of the sea which extended to Sable Island.

The Windsor Group deposits are about 425 m thick and overall consist of about 50 per cent shales and 25 per cent each of limestone and gypsum. From Windsor to Brooklyn, white cliffs of gypsum can be seen from the road. A wide area of gypsum is preserved in the Cheverie syncline.

The mantle of glacial till attains a thickness of 75 m near Stewiacke. Under the glacial till at Dutch Settlement, spruce branches have been found dating back to the Wisconsinan glaciation 18,000 years ago. The East Milford gypsum quarry has provided much information on glacial tills and the character of interglacial life. There have been many finds of plants and freshwater animals in ancient sinkholes. Remains of mastodon and other animals were discovered in 1991–93 and provisionally dated as 70,000 years old. Sands and gravels are seen in many locations, including the Stewiacke River and its South Branch, and at Hilden, south of Truro.

FRESH WATER

The landscape generally has low elevations and little relief, and the river system has a rectangular pattern. The rivers tend to be slow-moving mature floodplain rivers with associated intervales (see Plate 5). The Kennetcook, Avon, and Shubenacadie are influenced by the tidal actions of the Bay of Fundy. Water flow in the river valleys fluctuates greatly, sometimes flooding extensively. Small lakes are scattered throughout the Unit, including oxbow and solution lakes. An excavated lake occurs at the East Milford quarry in sub-Unit 511a.

Most of sub-Unit 511a falls within two secondary watersheds draining north into Cobequid Bay. The Avon River (see Figure 16) cuts across low ridges whose intervening valleys are occupied by its tributaries. The Halfway and Cogmagun rivers flow into the Avon estuary from the west and east sides, respectively. The Upper Avon, Kennetcook, and St. Croix rivers lie parallel on either side of the estuary. The lower part of the Avon River valley has been drowned, forming a wide estuary which extends into the tributary rivers. The red silt that forms the wide mud banks within the river is derived from erosion of the Triassic deposits and is carried in from the Minas Basin. The upper courses of these rivers meander widely across a lowland bordered by tidal marshes and meadows. The Avon River may occupy a course similar to its ancestral river, which, it is hypothesized, flowed northwards from the southern uplands during the Cretaceous.

The Shubenacadie River, like the Avon, cuts across the fold axes and bands of hard and soft strata, reaching Cobequid Bay west of Truro. At its mouth a narrow band of Horton rocks overlain by Windsor limestone can be seen at Black Rock. For the next five kilometres inland, it cuts through soft red sandstone containing bands of fibrous gypsum (see Figure 11). North of the South Maitland bridge the river cuts a narrow channel through a faulted block of coarse Horton grits. To the south, a cliff of gypsum is exposed at Big Plaster Rock. Further up the river, passing more grits and red sandstone, a fossiliferous limestone containing corals and shells is exposed at Anthonys Nose.

The Stewiacke River, a major tributary of the Shubenacadie River, flows parallel to the fold axes. The relief and altitude in this area are so low that neighbouring streams flow for long distances in opposite directions. For example, the South Branch follows a narrow bed of Windsor Group rocks northeast, while the Stewiacke flows southwest. Many oxbow lakes are associated with the Stewiacke.

The southeastern portion of sub-Unit 511a falls within the Atlantic coast drainage area, and many first- and second-order streams feed into the Musquodoboit River as it meanders towards Musquodoboit Harbour.

Wetlands include flat bogs and fens and large freshwater marshes. Tidal marshes are scattered along the St. Croix, Avon, and Kennetcook rivers.

Surface-water productivity and diversity are generally high, and pH averages 7.5. Groundwater is high in dissolved minerals, particularly around Windsor and in areas associated with karst topography. There are several aquifers along the Stewiacke River.

SOILS

Shubenacadie River (sub-Unit 511a)

A considerable variety of soils is found in this area, but the dominant series is Queens, an imperfectly drained, sandy clay loam developed on clay loam till derived from shale and sandstones. Well-drained Hansford sandy loams have developed on Horton sandstone in the Hantsport-Walton area. Mottled Hantsport soils, also from shales and sandstones, are found in low-lying areas and close to the coast. Drumlinoid features are common from Brookfield to Enfield, and lacustrine deposits often occur on the till plain. Alluvial soils such as Stewiacke, Cumberland, and Chaswood often occur along stream and river valleys. These range in texture from gravelly sandy loams to silty clay loams.

East Mountain (sub-Unit 511b)
The main soil series in this sub-Unit is Diligence, an imperfectly drained clay loam over clay till derived from grey shales. Along North River, Cumberland gravelly sandy loams occur.

PLANTS

The main factors influencing the vegetation of this Unit are the gentle relief, poor drainage, and the repeated cutting and burning of the forests. The spruces, fir, White Birch, Red Maple, Eastern Hemlock, and White Pine are the major species, with scattered Sugar Maple, American Beech, and Yellow Birch occurring on better-drained low ridges. Abandoned farmlands are common and have usually been recolonized by White Spruce, Red Spruce, and Balsam Fir. In other areas, repeated burning has encouraged Wire Birch, White Pine, Red Pine, and Black Spruce. Repeated disturbance sometimes leads to the development of semi-permanent shrub cover. American Elm, Black Ash, the occasional Sugar Maple and American Beech may be found along the rivers.

C.D. Howe made the following observations on the soil-forest relationships of this area in 1912: "Along the coast, the ridges are capped with hardwoods and the depressions support a mixed forest in which either red spruce or hemlock prevails; and frequently, the conifers occur in pure stands. The mixed forest is very luxuriant on the broad gentle slopes where the composition is from one-half to three-fourths red spruce and usually about 15 percent is yellow birch and five percent beech. The soil is deep and consists mostly of silt and fine sand. When the top of the ridges are narrow, they are crowned with hardwoods, otherwise the mixed type extends over them."

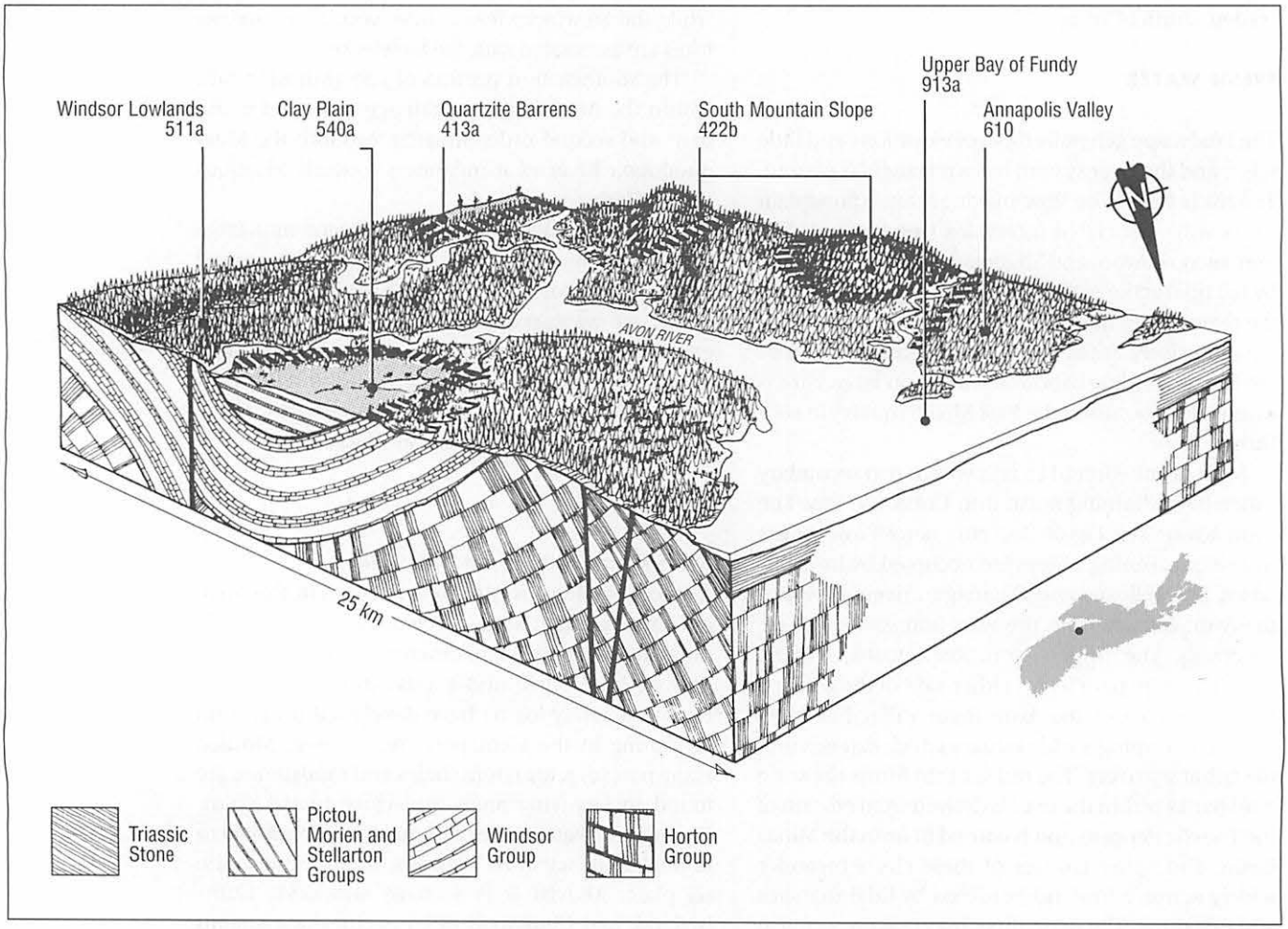

Figure 16: Avon River area. A rising sea level has drowned the Avon River estuary which drains the Windsor Lowlands (Unit 511). The river cuts through resistant Horton sandstones between high banks. Wherever the less-resistant Windsor rocks are encountered, wide valleys have been excavated. The extensive karst topography that developed on the gypsum (part of the Windsor Group) is prominent. Uplands of the Atlantic Interior (Region 400) define the Avon River's drainage basin.

ANIMALS

This Unit offers a mix of lowland, disturbed forest habitats, scattered farmlands, some dykelands, tidal marshes, and fertile river valleys. The mix of land types and fertility provides habitat for a great variety of Nova Scotia wildlife. Deer, which are creatures of edge habitat, thrive in the Windsor Lowlands. Some deer are concentrated in the upper basin of the Stewiacke, but because of the low topography throughout this Unit, there are no huge winter concentrations like those which occur at the foot of the Cobequid Hills (Unit 311). Moose are occasionally seen, but for the most part are absent.

There are few lakes, but the rivers and streams are comparatively productive and the freshwater fauna is diverse. The Unit provides good habitat for raccoon, muskrat, and mink, and diverse breeding habitats for waterfowl. Significant wetland habitats occur at South Branch and Otter Brook. Wood Turtles are abundant in the Musquodoboit Valley and in the Kennetcook and Five Mile Rivers. River Otter find good habitat associated with the major rivers, and beaver are common. Beaver dams do not persist and lodges are often built into riverbanks. Shallow, eutrophic Lake Egmont and its associated freshwater marsh provide one of the richest freshwater plant and animal localities in the province.

The tidal waters of the Shubenacadie and Stewiacke rivers allow anadromous fish species to reach fresh water for spawning, and allow their offspring access to the ocean, where they mature. Striped Bass occur in both rivers, and many thousands of American Shad spawn in the Stewiacke. Faster-flowing streams that feed the Stewiacke River are important spawning and nursery areas for Atlantic Salmon. Brown Trout, which is an introduced species, and Brook Trout also inhabit the Stewiacke River.

The anadromous Atlantic Tomcod spawns in the Shubenacadie River in January, attracting concentrations of 50–100 Bald Eagles. The greatest concentrations of eagles occur in the Riverside area. Besides winter visitors, Bald Eagles are seen around roughly 10 or more nesting sites in this Unit in summer. Common Mergansers and Black Ducks overwinter here.

Ospreys have recently become more numerous, and Canada Geese also nest in this Unit. Ring-necked Pheasant can be found here, but in much smaller numbers than in the Triassic Lowlands (Region 600).

A cave near South Maitland is a significant bat hibernation site.

CULTURAL ENVIRONMENT

Many parts of the Windsor Lowlands were favourite spots of the Mi'kmaq for hunting and fishing, and many place names in this area are of Mi'kmaq origin. The name Shubenacadie is derived from the Mi'kmaq word meaning "place where groundnuts grow." It has long been a Mi'kmaq settlement and today features one of the largest Mi'kmaq communities in the province. The name Stewiacke is also derived from Mi'kmaq and means "flowing out in small streams" and "whimpering or whining as it goes."

In the seventeenth century the Acadians settled in the Windsor Lowlands, including along the St. Croix River, the Avon River (which the Acadians called the Pisiquid), and the Kennetcook River (known to the Acadians as the Quenetcou). Dyking significantly altered the coastal and estuarine landscape.

After 1760, New England Planters settled on vacant dykelands and employed remaining Acadians to maintain them. Soon Germans, Yorkshiremen, and a huge influx of Loyalists came to the Windsor Lowlands to farm its fertile soils. Parts of the Windsor Lowlands are today some of the most productive farming areas in Nova Scotia. Much of this area has also been logged for its timber, and many lumbering and sawmill operations are found here.

The mineral resources of the Windsor Lowlands have long attracted mining operations. In 1876, manganese was first mined in Tennycape and the mineral was produced intermittently for the next three decades. Mining operations at Milford, Miller Creek, and Wentworth Creek, among others, exploit the large deposits of gypsum and anhydrite. At Dutch Settlement (Hants County) the gypsum beds are 60 m thick. One billion tonnes have been blocked out and another four billion are in reserve. A large barite deposit near Walton was mined for 30 years, but the mine closed in 1971. Clay and shale deposits at Lantz, Milford, and Shubenacadie are exploited to produce virtually all the province's supplies of brick. Dolomite is quarried for agricultural purposes at Upper Musquodoboit.

A large outwash deposit known as the Hardwoodlands Aquifer is found south of the Shubenacadie Indian Reserve. It is a significant freshwater resource in an area of saline groundwater.

Sites of Special Interest

Avon River Area

- Horton Bluff (north of Hantsport)—fossil plants, invertebrates, fish, amphibian bones, and tracks (including the largest footprints of Horton Group age ever reported)
- Blue Beach, Hants County—Early Carboniferous strata with bones and footprints of early amphibians and reptiles
- Newport Landing (northeast of wharf)—good exposure of early Windsor Group fossiliferous limestone containing brachiopods, gastropods, bryozoans, cephalopods, and pelecypods; this is underlain by gypsum, limestone, shale, sandstone; fossil corals outcrop on the shore
- Cheverie (near Mutton Cove)—late Horton-age tree stumps 10–20 cm high and 10–30 cm in diameter, karst topography
- Cheverie Point to Summerville—Horton-age soil beds with rootlets
- Wolfville to Windsor (along Highway 101)—road runs along the Wolfville Ridge anticline with the Gaspereau syncline to the south
- Hantsport—road descends into the syncline of Halfway River and up the slope of the next anticline (Grey Mountain)
- Brooklyn—in a gypsum area to the west, Yellow Lady's-slipper, *Shepherdia*, and *Carex flacca* are found
- Gypsum areas (karst topography)—Cheverie, Walton through Goshen to Lower Burlington, Mount Denson to Windsor Forks to Newport Corner; gypsum cliffs along the St. Croix River; sinkhole behind King's-Edgehill School
- St. Croix River (IBP Proposed Ecological Site 66)—mixed forest on karst topography harbouring rare orchids
- Shand House Museum, Windsor—products of the former Windsor Furniture Company

Shubenacadie River Area

- Black Rock (mouth of Shubenacadie)—Horton strata overlain by Windsor limestone
- Eagles Nest (Shubenacadie River)—Horton sandstone
- Big Plaster (Whites) Rock—gypsum cliff
- Anthonys Nose (Shubenacadie River)—fossiliferous limestone, 15 m thick, containing shells and corals
- Victoria Park (Truro)—steeply inclined Horton sandstone and siltstone
- Gypsum areas (karst topography)—Urbania (south of Maitland), South Maitland (Hayes Cave), East Milford (large working gypsum quarry, site of mastodon finds), Dutch Settlement
- East Milford quarry, Halifax County—removal of the overburden of glacial till as part of gypsum mining operations frequently uncovers fossiliferous interglacial deposits. Fossils of plants, insects, molluscs, and vertebrates, including mastodon remains, are found, particularly in deposits in sinkholes
- Lantz—clay for brickmaking
- Shubenacadie (IBP Proposed Ecological Site 68)—clearcut in mixedwoods, regenerated with Leatherwood; *Carex aurea*; *Milium effusum*, var. *cisatlanticum*; Bulblet Fern; and Alder-leaved Buckthorn
- South Maitland (IBP Proposed Ecological Site 69)—river intervale, gypsum cliffs, mixed forest, and cave system
- Lawrence House Museum, Maitland—shipbuilding history
- Creighton Forest Environment Centre, entrance of Shubenacadie Wildlife Park—documents historical aspects of forestry and wildlife in Nova Scotia
- Lake Egmont—diverse freshwater community

Provincial Parks and Park Reserves

- Shubenacadie Wildlife Park
- Smiley's
- Musquodoboit Valley
- St. Croix
- Cheverie
- South Maitland

Proposed Parks and Protected Areas System includes Natural Landscape 28.

Scenic Viewpoints

- Avon area—Highway 101 near exit 4 (view of St. Croix floodplain, gypsum cliffs); Highway 101 south of Hantsport, looking north (view of Minas Basin)
- Shubenacadie area—Highway 102 north of exit 9, looking east (view of large dairy farms); Highway 102 north of exit 11 (view of tidal Stewiacke River)
- Caddell Rapids—lookoff

Associated Topics

T2.4 The Carboniferous Basin, T3.2 Ancient Drainage Patterns, T3.4 Terrestrial Glacial Deposits and Landscape Features, T7.3 Coastal Landforms, T8.1 Freshwater Hydrology, T8.2 Freshwater Environments, T10.12 Rare and Endangered Plants, T11.4 Birds of

Prey, T11.10 Ungulates, T11.13 Freshwater Fishes, T11.15 Amphibians and Reptiles, T12.1 Cultural Landscapes, T12.3 Geology and Resources, T12.10 Plants and Resources.

Associated Habitats

H2.4 Mud Flat, H2.5 Tidal Marsh, H3 Freshwater, H5.2 Oldfield, H5.3 Cliff and Bank, H5.5 Cave, H6.1 Hardwood Forest (Sugar Maple, Elm Association), H6.2 Softwood Forest (White Spruce Association; Pine Association), H6.3 Mixedwood Forest (Spruce, Fir, Pine–Maple, Birch Association).

512 SALMON RIVER LOWLAND

GEOLOGY AND LANDSCAPE DEVELOPMENT

South of the East Bay Hills, a large wedge of Late Carboniferous sandstone has been downfaulted between blocks of ancient Avalon Zone strata. This is the Salmon River Lowland. The elevations are low in this part of Cape Breton, being on the low side of the tilted planation surface, and the area has been thickly covered by glacial deposits.

The Salmon River has been impounded by ridges of glacial debris to form Loch Lomond, Lake Uist, and Enon Lake, which lie just to the south of the area. Another deposit, oriented north-south, divides a small lake into two at the northern end of the lowland. In general the terrain is low and rolling, with few elevations greater than 100 m.

FRESH WATER

Drainage is dendritic, and many tributaries feed the Salmon and Gaspereaux rivers in the northeastern areas. The headwaters of the Grand River are located in Cape Breton County. Southwestern portions in Richmond County are dominated by the Lake Uist and Loch Lomond system. A drainage divide separates the northeastern and southwestern areas. Surface-water pH levels range between 6.3 and 7.0. Concentrations of raised bogs can be found in the southwestern areas, and wetlands are associated with lake edges throughout.

SOILS

Shulie soils (well-drained sandy loams) cover much of this Unit. Around Rock Elm, to the north of the Unit, is a small area with complex soils—clay loams such as Millbrook and Kingsville, and alluvial soils such as Cumberland and Millar. Near Gaspereaux Lake, in an area known as the Big Barren, poorly drained Arichat and imperfectly drained Debert soils occur, with better-drained Woodbourne soils derived from a gravelly clay loam till. Around the Loch Lomond lakes, the soils are mostly imperfectly to poorly drained, usually sandy or silt loams over compact clay tills such as Millbrook, Woodbourne, Masstown, Debert, and Kingsville soils.

PLANTS

This Unit is transitional between Loucks' Coastal Forest Zone and Sugar Maple–Hemlock, Pine Zone. Shade-intolerant hardwoods also occur with scattered shade-tolerant species. The compact clay soils support mostly Balsam Fir, with lesser amounts of White Spruce. Shade-intolerant Red Maple and White Birch with aspen and a few American Beech grow on the better-drained slopes.

CULTURAL ENVIRONMENT

Farming and forestry characterize land use in this area. Lead ore was mined in the Salmon River area from 1946 to 1966, and a small amount of by-product silver was also recovered. The Mi'kmaq traditionally fished the Salmon River. Today, recreational anglers fish Atlantic Salmon and Brook Trout in these waters.

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Provincial Parks and Park Reserves
- Two Rivers

Proposed Parks and Protected Areas System includes Natural Landscape 54.

Associated Topics
T2.4 The Carboniferous Basin, T3.1 Development of the Ancient Landscape, T3.4 Terrestrial Glacial Deposits and Landscape Features, T12.3 Geology and Resources, T12.11 Animals and Resources.

Associated Habitats
H3 Fresh Water, H4.1 Bog, H6.1 Hardwood Forest (Maple, Oak, Birch Association), H6.3 Mixedwood Forest (White Spruce, Fir–Maple, Birch Association).

520 COASTAL PLAIN

The Coastal Plain District is divided into three Units:

521 Northumberland Plain
522 Judique Coastal Lowland
523 Tantramar Marshes

GEOLOGY

District 520 of the Carboniferous Lowlands is one of the three true lowland areas of Nova Scotia; the other two are the Windsor Lowlands (Unit 511) and the Submerged (Bras d'Or) Lowland (District 560). This District borders the Northumberland Strait (with one interruption) from Tidnish to Port Hood. It is underlain by Middle and Late Carboniferous strata (Windsor to Pictou groups) which are all unresistant. Consequently the relief is low, and the topography is flat and undulating. This area is also submergent, and many long inlets and estuaries extend inland from sheltered harbours.

SCENIC QUALITY

The most scenic feature of this region is the coast, for two reasons: the water and the farming landscapes. Scenic potential tends to be higher around enclosed bays and along drowned estuaries, particularly Wallace Harbour, Amet Sound, Pictou Harbour, and Antigonish Harbour. The juxtaposition of land and sea in these inlets provides greater visual interest than straighter stretches of coast. Farming tends to be more extensive in the same areas, providing greater visibility and more road access. Scenic ratings are thus very high in coastal embayments, moderately high elsewhere on the coast, and at medium levels inland. Where settlement and farming are absent inland, as around Amherst Head (Route 6), the forested plain has low scenic value. Although not beautiful to every eye, the flat and treeless dykelands near Amherst deserve special mention: their expanses of open prairie may either exhilarate or intimidate.

521 NORTHUMBERLAND PLAIN

The Northumberland Plain is divided into two sub-Units:

(a) Northumberland Strait
(b) St. Georges Bay

GEOLOGY AND LANDSCAPE DEVELOPMENT

Northumberland Strait (sub-Unit 521a)

This coastal plain stretches from the Cumberland Basin to Pictou and Merigomish Island and is underlain by fine red sandstones of the Late Carboniferous Pictou Group (from Merigomish to Knoydart, Canso strata predominate). These sandstones have been thrown into broad folds. In Cumberland County there are two main anticlines: one runs from Pugwash Harbour west to Nappan, Amherst Point, and the area south of Minudie; the other runs from Malagash Point past Oxford and then plunges downward east of Springhill. The crests of these anticlines have been partially eroded away, exposing underlying Windsor evaporites or Canso Group strata. Gypsum outcrops in many places.

In addition to the two main anticlines, there are many minor folds which run east-west before plunging downwards. Differential erosion has created ridges and valleys parallel to the fold axes, creating an undulating landscape. In central Cumberland County, they rise to 120 m or more, for example, Streets Ridge east of Oxford.

Alternating low ridges and valleys determine the outline of the coast along Northumberland Strait (see Figure 17). The ridges run out to sea as headlands at Pugwash and Wallace, and nearly enclose Tatamagouche Bay and Amet Sound. Smith Point, Malagash Point, and Cape John are prominent projections; Caribou Island is a continuation eastwards of the Pictou County shore; and Pictou Island is a remnant of a ridge that existed in the centre of the Northumberland Strait.

Valleys form inlets and harbours along the coast where estuaries of the river were drowned by a rise in sea level.

At the eastern end of the Cobequid Hills the strata have been domed up as the once-underlying crustal block of the Cobequids rose upwards. Consequently, due west from Pictou, progressively older rocks are exposed—Early Carboniferous to Late Devonian to Middle Devonian. These strata become progressively more resistant and form a hilly upland projection at the eastern end of the Cobequids in District 320 (see Figure 9).

From Merigomish to Knoydart, the Northumberland Plain continues as a submerged rolling coastal lowland.

St. Georges Bay (sub-Unit 521b)

Middle Carboniferous strata (Windsor, Canso, and Riversdale) underlie a lowland on the south side of St. Georges Bay. Elevations rarely exceed 50 m. Fine red Canso and grey-brown Riversdale sandstones and siltstones predominate, with a faulted block of Windsor evaporites exposed east of Antigonish. This band of Windsor strata has been eroded and drowned to form Antigonish Harbour. In places where gypsum outcrops, karst topography has developed. At Crystal Cliffs to the north, a 75-m high cliff with bands of white and pink gypsum faces the bay.

On the south side of St. Georges Bay, drowned river valleys that cut through Carboniferous rocks have created several harbours: Pomquet, Tracadie, Little Tracadie, and Havre Boucher.

A variable but ubiquitous cover of glacial till is found throughout the area. Eskers and outwash material are found along River John and elsewhere where rivers carried meltwater from the ice cap over the Cobequids.

FRESHWATER ENVIRONMENTS AND COASTAL WETLANDS

The streams flowing over the lowlands east of Amherst lie in an area of gentle topography and branch irregularly to form dendritic drainage patterns. Most of sub-Unit 521a lies north of the primary watershed boundary that dissects the Cobequids (Unit 311). Five secondary and numerous tertiary watersheds drain north in this part of the Unit. Streams flowing northwards from the Cobequids have been superimposed on bands of alternating weak and resistant strata. The Wallace River, for example, flows directly north from Folly Lake into the Northumberland Strait; its tributaries are adjusted to bands of weaker rocks and join it at right angles to form a trellised drainage pattern. River Philip and River Hebert also have tributaries that have adjusted

to the strike of the strata. A small area in the southwest that includes the Nappan River drains west into Cumberland Basin. Flat bogs and swamps are widely scattered in the northwestern areas, and beaver-influenced wetlands are common throughout. Inactive beaver flowages become wet meadows and shrub swamps. Wide floodplains occur along some of the slow-moving mature rivers, such as the Pictou, West, Middle, and Merigomish rivers (see Figure 19).

Lakes on this coastal plain are infrequent, and those that occur tend to be elongated and shallow. Stratified lakes, such as Layton Lake in sub-Unit 521a, are meromictic. Surface-water pH levels are generally alkaline, ranging from 6.5 to 8.0.

The Northumberland Strait sub-Unit (521b) also drains north. It is bisected north-south by a secondary watershed boundary, and numerous tertiary and coastal watersheds drain into St. Georges Bay. A few small, scattered bogs are found in the western areas.

There are brackish lakes at Oxford and salt springs between River Philip and Springhill. The coast is characterized by extensive intertidal marshes and subtidal Eelgrass beds. Barachois ponds and tidal marshes occur in the harbours and inlets.

SOILS

The sandstones and shales that underlie the entire area have produced glacial tills of a sandy loam to sandy clay loam texture. One common characteristic is the tight, impermeable nature of the subsoil. This effectively prevents rapid vertical movement of water, which must therefore be removed laterally, or through evapotranspiration. The most common soils are Debert, an imperfectly drained sandy loam, often with fragipan development; and Queens, a fine-textured, imperfectly drained sandy clay loam. Well-drained soils include Pugwash and Tormentine series on rolling topography. Kingsville and Masstown series occupy most of the poorly drained sites. Hebert soils on outwash materials, and Cumberland and finer-textured Chaswood soils on alluvial materials, are common along streams and rivers.

PLANTS

This Unit falls within the Maritime Lowlands Ecoregion of Loucks' Red Spruce, Hemlock, Pine Zone. The forests are heterogeneous mixtures of early to mid-successional stages dominated by hardwoods and much influenced by site characteristics and disturbances. Black Spruce, Jack Pine, White Spruce, Red Spruce, and Red Maple are the most abundant species, although Eastern Hemlock and White Pine are not uncommon. Eastern Hemlock may occur in pure stands and can be among the first species to colonize disturbed areas. Larch and Black Spruce occur in the extensive boggy areas. American Beech and Sugar Maple are found on a few slopes near the larger streams. Repeated fires have encouraged Jack Pine, especially around Oxford. Although large numbers of poplar remain in the area, they are gradually being replaced by conifers. Much of the area is farmed, and oldfields generally recolonize in alders followed by White Spruce. Larch more commonly colonizes wet fields underlain by fragipan along the coast.

Winds from the Northumberland Strait, often recorded at twice the speed of winds inland, are a strong influence. Trees often lean away from the wind, have one-sided crowns, and do not attain full height. Extensive salt marshes and Eelgrass beds occur in bays.

ANIMALS

This Unit provides mostly oldfield, agricultural, and mixed forest habitats. The amount of abandoned farmland is significant. Relatively flat topography and imperfectly drained soils have resulted in an abundance of beaver-influenced wetlands. The coyote is common, especially in areas associated with agriculture. This is an excellent area for muskrat, mink, and raccoon and provides average habitat for Red Fox. River Otter occur but are not numerous. Freshwater habitats are relatively productive and support an enriched fauna, including Atlantic Salmon, Gaspereau, Brown Trout, and Brook Trout. The rare Brook Stickleback is found in this Unit, as is the threatened Wood Turtle, which can be seen along the abundant river habitat.

Many water birds breed mainly in coastal habitats, and many other species breed in freshwater marshes, which mostly arise near the coast. Given the steep rocky shores and extreme tidal range around the Fundy coast, most species in these bird groups breed in Cumberland County, where the extensive intertidal areas formed by the very shallow slope of the sea bottom provide appropriate waterfowl breeding and staging areas. This occurs mainly in sub-Unit 521a and Unit 523. These species include most ducks and marsh birds, Osprey, Bald Eagle, Semipalmated Plover, and Common Tern. Another group of birds, including Red-breasted Merganser, Willet, Herring Gull, Great Black-backed Gull, and Sharp-tailed Sparrow, breed in suitable situations on both low-lying and steeper coasts, appearing only in sub-Unit 521a and Unit 710.

The most significant bird habitats are around Fox Harbour, Wallace Harbour, Tatamagouche Bay, Brule Harbour, and John Bay, where large numbers of ducks and geese congregate in late March and April, and again in September until ice forms in December. Other important areas include Coldspring Head and the mouth of the Shinimicas River; Pugwash Harbour and River Philip; Caribou Harbour; Pictou Harbour, East River, Middle River, and West River; and Little Harbour and Merigomish Harbour. Freshwater impoundments are breeding areas for Pied-billed Grebe, American Bittern, Northern Harrier, Virginia Rail, Sora Rail, and many ducks.

Various bird species, such as Spruce Grouse, Northern Waterthrush, and Mourning Warbler, that are more characteristic of cooler areas are scarce in sub-Unit 521a. However, a few forest birds, such as Broad-winged Hawk and Brown Creeper, are widespread in this sub-Unit but scarce or absent in Units immediately to the south. Rough-legged Hawk, Snowy Owl, and Snow Bunting occur in winter on fields in the more upland areas of sub-Unit 521a.

The Northumberland Strait is a very distinct marine area in which warmer-water species such as oysters and quahogs are found.

CULTURAL ENVIRONMENT

Coastal areas of the Northumberland Plain had traditionally been the summer camps of the Mi'kmaq, and many place names in this area are derived from Mi'kmaq words. Antigonish meant "the place where branches are torn off the trees by bears gathering beechnuts" and Tatamagouche, situated at the mouth of the French and Waughs rivers, meant "the meeting of the waters." Settlers of largely English and Scottish descent cleared much of the land for agriculture, which continues to be an important economic activity. This area once supported many grist mills.

Farming, forestry, and fishing serve as the economic base for most communities here. Agricultural land in the Northumberland Plain is multi-cropped. The largest concentration of small fruit growers in the province has earned Cumberland County the title of "Blueberry-Growing Capital of the World." Vineyards at Malagash produce good quality grapes for wines. The marine life from the Northumberland Strait has been extremely important to the economies of coastal communities on the Northumberland Plain, with lobster, scallop, and oyster fishing predominating. Important seaweed beds of Irish Moss and *Furcellaria* are also harvested commercially.

This area features significant mineral deposits and mining operations. The earliest recorded exploration for copper in the province was near Caribou in 1828, and a small amount of copper production was achieved from mining chalcocite along the Wallace River. In 1946 a huge deposit of salt was discovered at Nappan and, since then, salt mines have operated both there and in Pugwash. Salt deposits at Malagash were mined for 40 years, and deposits up to 450 m thick have been drilled in this area. Today, limestone is mined at Southside Antigonish Harbour to supply the Scott Maritimes paper mill at Abercrombie, which processes pulpwood from surrounding areas. Red and grey sandstones at Amherst and Wallace were quarried to provide building stone for Province House and Government House in Halifax, as well as many other buildings of the early nineteenth century.

Various wildlife management areas (Wallace, Abercrombie) and the Brule Point Game Sanctuary are also found on the Northumberland Plain. Ducks Unlimited has converted many old, inactive beaver flowages back to shallow marshes. Cottages occur along stretches of the coastline. These are the warmest waters for swimming on the Nova Scotia coastline.

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Sites of Special Interest

- Crystal Cliffs—75-m cliff with bands of pink and white gypsum
- Antigonish Harbour—drowned estuary, karst topography
- Pugwash—salt mines
- River John—outwash deposits and eskers
- Oxford—round, water-filled sinkholes make small lakes
- Streets Ridge (120 m high)—brackish lakes
- Amherst Point—sinkholes
- Laytons Lake—a flooded gypsum sinkhole that is permanently stratified
- Pomquet Beach—best example of a prograding dune system in the province
- Amet Island—the only offshore islet with breeding seabirds (gulls and cormorants) in sub-Unit 521a
- Smith Point/Oak Island flats—the most significant area in sub-Unit 521a for shorebirds, with up to 12 species present in late summer, including concentrations of the rare Hudsonian Godwit
- Linden Bay—often significant for Canada Geese and currently the most regular stopover site for migrating Brant in spring

- Tidnish Dock—a useful vantage point for viewing water birds on the extensive shoal waters of Baie Verte and the most regular location in sub-Unit 521a for Red-necked Grebes in autumn
- National Wildlife Areas—Wallace Bay, Chignecto (includes Lusby Marsh and Amherst Point Bird Sanctuary)
- Provincial Wildlife Management Area—Antigonish Harbour, Federal Migratory Bird Sanctuary
- Black River Road (IPB Proposed Ecological Site 6)—Jack Pine forest
- Balmoral Grist Mill—example of early agricultural technology
- Sutherlands Steam Mill, Denmark—once manufactured carriages, sleighs, sleds, and doors from local timber
- McCulloch House Museum, Pictou—home of Thomas McCulloch, one of Nova Scotia's great naturalists and educators
- Northumberland Fisheries Museum, Pictou

Provincial Parks and Park Reserves

- Tidnish Dock (also an historic site of the Chignecto Ship Railway)
- Northport Beach
- Heather Beach
- Gulf Shore
- Fox Harbour
- Tatamagouche
- Barachois Harbour
- Balmoral Mills
- Shinimicas
- Rushton Beach
- Cape John Beach
- Waterside Beach
- Mackenzie Beach
- Doctors Island
- Caribou
- Lyons Brook
- Boat Harbour
- Powells Point
- Melmerby Beach
- Merigomish Harbour
- Big Island
- The Ponds
- Mahoneys Beach
- Pomquet
- Bayfield
- Barrios Beach
- Cape Jack Beach
- Malagash—Beatty Marsh Park Reserve

Proposed Parks and Protected Areas System includes Natural Landscape 22.

Scenic Viewpoint

- Unit 521a: Hardwood Hill, looking east over Pictou Harbour

Associated Offshore Unit

914 Northumberland Strait.

Associated Topics

T2.4 The Carboniferous Basin, T3.2 Ancient Drainage Patterns, T3.3 Glaciation, Deglaciation and Sea-level Changes, T3.4 Terrestrial Glacial Deposits and Landscape Features, T6.2 Oceanic Environments, T8.2 Freshwater Environments, T9.3 Biological Environment, T11.5 Freshwater Wetland Birds and Waterfowl, T11.13 Freshwater Fishes, T11.17 Marine Invertebrates, T12.3 Geology and Resources, T12.11 Animals and Resources.

Associated Habitats

H1.1 Offshore Open Water, H1.2 Offshore Benthic, H2 Coastal, H3.1 Freshwater Open-Water Lotic, H3.3 Freshwater Bottom Lotic, H3.5 Freshwater Water's Edge Lotic, H5.2 Oldfield, H6.2 Softwood Forest (Pine Association; Black Spruce, Larch Association).

522 JUDIQUE COASTAL LOWLAND

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Judique Coastal Lowland forms a very narrow band along the eastern side of St. Georges Bay and is the geological continuation of sub-Unit 521b. It appears likely that the entire bay area was once composed of the same strata as is now exposed around its rim. The bay may have been carved out by an ancestral river flowing from the Scotian Shelf through the Strait of Canso.

At Port Hood a small area of grey Riversdale sandstone and shale contains thin coal seams. These dip under the waters of the bay at an angle of 20°.

FRESH WATER

Several small, isolated tertiary watersheds run parallel to each other and drain first-order streams into the east side of St. Georges Bay. A few small bogs are scattered further inland.

SOILS

The soils in the Unit are predominantly imperfectly drained Queens clay loams, with their poorly drained associate, the Kingsville series, occurring frequently and over substantial acreages. Better-drained soils of the Woodbourne and Shulie series are developed on tills derived from sandstone in small areas throughout the Unit. Around Port Hood, Springhill soils occur. These sandy loams, related to Shulie soils, occupy imperfectly drained sites where water movement is restricted by the topography. Small areas of peat, coarse Hebert soils, and Falmouth and Cumberland soils occur throughout.

PLANTS

Loucks places this unit in the Sugar Maple–Hemlock, Pine Zone. The main influences on the vegetation are the wet clay soils, the late spring, and the effects of agricultural clearing. Conifers are dominant. Many of the oldfields are regenerating in White Spruce and Balsam Fir. Black Spruce and Larch are found in the wetter areas. Shade-tolerant deciduous trees grow on some slopes, while a mixed forest of spruce and fir with some shade-intolerant hardwoods covers much of the area.

CULTURAL ENVIRONMENT

Small-scale farming, fishing, and woodlot exploitation form the economic basis of communities in this area. In former times, coal was mined at Port Hood.

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Sites of Special Interest
- Port Hood—coal seams in Riversdale strata

Provincial Parks and Park Reserves
- Craigmore

Proposed Parks and Protected Areas System includes Natural Landscape 59.

Associated Offshore Unit
914 Northumberland Strait.

Associated Topics
T2.4 The Carboniferous Basin, T3.2 Ancient Drainage Patterns.

Associated Habitats
H3.1 Freshwater Open-Water Lotic, H3.5 Freshwater Water's Edge Lotic, H5.2 Oldfield, H6.2 Softwood Forest (White Spruce Association; Black Spruce, Larch Association), H6.3 Mixedwood Forest (Spruce, Fir, Pine–Maple, Birch Association).

523 TANTRAMAR MARSHES

The Tantramar Marshes, also known as the Border Lowland, occupy a large area at the head of the Cumberland Basin where the flat terrain meets the sediment-loaded waters of the Bay of Fundy. Extensive grasslands occupy much of the former salt marshes that have been dyked and are no longer exposed to siltation. The John Lusby portion of the Chignecto National Wildlife Area is the only large tract still subject to siltation processes.

GEOLOGY AND LANDSCAPE DEVELOPMENT

The marshes are built-up silts and clays that were carried from the Bay of Fundy by the spring tides. The amount of sediment deposited by one tide depends upon the depth of water that covers the marsh and the rapidity with which it drains away. Radiocarbon dating has determined that 25 m of sediment was built up at Aulac Station between Amherst and Sackville, New Brunswick, over a period of 3,000–5,000 years.

The marshes built up quickly during a period of land subsidence and rising sea levels. Increasing tidal ranges in the Bay of Fundy during the last 6,000 years have controlled their formation. The marshes have extended further inland during this period but have always been exposed to erosive forces at their outer edges. As the Bay of Fundy enlarges through rising sea levels and the erosion of headlands, continual deposition of sediments in the littoral zone occurs, creating the foundation for future salt marshes outside the present dykelands.

As the marsh erodes, remains of submerged forests and freshwater marshes are uncovered. The best examples are in New Brunswick off Fort Beausejour. Often the stumps and roots are washed away quickly once they have been uncovered, though more are revealed as new areas are exposed. A submerged forest off Fort Lawrence disappeared around 1985. Along the Missaguash River, however, stumps still remain after 150 years of exposure. At previous times the remains of spruce, beech, pine, and Larch have all been seen.

CLIMATE

The Fundy influence in this area creates climatic conditions similar to those of the fog belt of Nova Scotia: lower temperatures and higher humidity.

FRESH WATER

Two tertiary watersheds drain most of the northern portions of this Unit. The Missaguash and La Planche rivers and their tributaries form the main drainage channels flowing into the Cumberland Basin. In New Brunswick, the Tantramar River forms a third finger at the head of the basin. The headwaters of the Missaguash, Tidnish, and La Planche occur here. A small area of this Unit around the mouth of River Hebert in the southern section drains into the Cumberland Basin.

On the flat terrain, fresh water is impeded from flowing into Chignecto Bay (sub-Unit 913b) by the elevated salt marshes. Rising sea levels and siltation have built the marshes higher than the inland areas, forming a low dam behind which extensive freshwater peat bogs have developed. The abundance of freshwater wetlands is one of the most distinctive features of this Unit. Wetlands include dammed reservoirs and waterfowl impoundments.

SOILS

Three soil types dominate this Unit. The reclaimed dyked soils known as Acadia occur at the coast and extend several miles inland. Fresh water impounded inland from these marshland soils has formed extensive peat bogs. Adjacent mineral soils on flat, low-lying terrain are predominantly very poorly drained Masstown soils.

Acadia soils exhibit little horizon development because of the continued deposition of marine sediments. These silty clay loams are either red-brown or grey with an abrupt boundary; the colour is thought to indicate gleying. When reclaimed and drained, these soils are fertile and valuable agricultural soils.

As the peat is mainly formed on low-lying areas inland of the Acadia soils, it is usually no more than one metre thick. Former forests are often buried in the peat.

Masstown soils are poorly drained because of depressional locations or fragipans. A surface layer of organic material has developed up to 15 cm in depth. The underlying "A" horizon is 25 cm thick. This sandy "A" horizon can dry out very quickly when the water table drops, hence the soil tends to be either saturated or dry.

PLANTS

Extensive grasslands cover much of the former salt marshes. In the brackish and saline marsh areas the dominant species are Cord Grasses, with rushes, sedges, Common Reed, and a variety of other halophytes, for example, Sea-blite, Orach, Sea-lavender, Glasswort, Arrowgrass and Seaside Plantain. Extensive mud flats are exposed at low tide beyond the salt marshes.

Lake and bog areas contain a wide variety of aquatic plants. Cattails, bur-reed and sedge associations predominate in emergent areas. Various pondweeds and Yellow Pond-lily occur in open-water areas. Common species include Arrowhead, Water-parsnip, and bulrushes.

A poorly drained lowland forest composed mostly of spruce and fir lies inland from the dyked fields and marshes of the Chignecto Isthmus and forms part of the cool coastal forest around the Cumberland Basin (see also Unit 532).

ANIMALS

Intertidal areas in the Cumberland Basin form extensive mud flats that harbour the marine crustacean *Corophium*. Thousands of shorebirds congregate in July and August to feed on the crustaceans and polychaete worms.

The Maccan marshes provide significant waterfowl breeding areas and are part of the Cumberland Basin area. High tides usually clear the Lusby Marsh of snow, and each year in late March the first northward flights of Canada Geese and ducks land here to feed. As the ice leaves, many species of ducks move into the managed freshwater marshes. These include Black Duck, Green-winged Teal, Pintail, American Wigeon, Blue-winged Teal, and Ring-necked Duck. The managed marshes have attracted rare or uncommon ducks and marsh birds, including the Northern Shoveler, Gadwall, Redhead, and Ruddy Duck, and the Long-billed Marsh Wren, American Coot, Common Moorhen, Black Tern, Virginia Rail, Sora Rail, and Pied-billed Grebe.

Various species of hawks and owls can be observed hunting small mammals on the marshes year-round. The Marsh Hawk is common in summer, and the Rough-legged Hawk is seen in winter. Shallow lakes, such as Long Lake, support large populations of Brown Bullhead and White Perch. This food source, along with Gaspereau, support several nesting Osprey. The Snowy Owl and Snow Bunting occur commonly in winter on the dyked grasslands.

The marshes also provide good habitat for raccoon, muskrat, mink, fox, beaver, and sometimes otter. Generally, small-mammal diversity is low. The rare Arctic Shrew occurs here, far from other known records. This shrew requires marsh or wet meadow habitat and is usually very limited in range, since continuous large expanses of that habitat are rare. In summer and fall, deer frequent the marshland, but in winter they move westward to more-forested areas in the Tidnish watershed.

CULTURAL ENVIRONMENT

The name Tantramar is derived from the French word "tintamarre," meaning "racket" or "hubbub," a term the Acadians used to describe the sound of the great flocks of waterfowl that visit this area on their seasonal migrations. The "Tantramar Marsh" as it is locally known is in New Brunswick, and the collective term is the Nova Scotia–New Brunswick Border Marshes. Locally dyked lands are known as marshes, unlike in the Minas Basin area where they are called dykelands. This landscape has been extensively altered through agricultural and wildlife management.

Early settlers created farmland by cutting channels to the sea through which the sediment-rich waters of the bay flowed to deposit silts above the peat. The dyking controlled the natural siltation. The John Lusby Marsh is the only remaining salt marsh in this Unit still subject to siltation. Acadian farmers dyked and drained the marshland until 1755, and the English and New Englanders later settled the area in 1760. In the early nineteenth century, a system of tide canals and ditches transformed more marshland into fertile pastures. Where dykelands have been maintained for agricultural use, they are covered by a variety of forage, grain, and introduced plants. Many farms on the Tantramar Marshes were later abandoned, allowing the regeneration of the land. Most farms and homes in the Tantramar Marshes Theme Unit are built on dry ridges, which were once heavily forested. Lands closer to the Cumberland Basin have

a deeper accumulation of marine soils and are used for lawn sod cultivation, pasture, or hayland.

The Missaguash and East Amherst freshwater marshes were developed on provincial lands by Ducks Unlimited. The Chignecto National Wildlife Area encompasses the Amherst Point Bird Sanctuary and the John Lusby Salt Marsh. The freshwater impoundments created on the marshes have encouraged a number of new waterfowl and marsh bird species to nest in Nova Scotia. Geese now feed on the dykelands, especially the Amherst sod farm, as much as or more than on the salt marshes.

Today the Tantramar Marshes continue to serve as an important transportation corridor linking Nova Scotia with New Brunswick. The nature of the marshlands and their position to magnetic north resulted in this area being chosen by CBC Radio as a site for short-wave transmission radio towers that span the marshes. This Unit is used extensively for bird-watching. Muskrat are harvested here.

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Sites of Special Interest

- Amherst Point Bird Sanctuary—interpetive trail
- Chignecto National Wildlife Area: Amherst Point—the salt-marsh spit is a unique vantage point to observe the tidal bore in the Maccan/Hebert River estuary; John Lusby Marsh (IBP Proposed Ecological Site 4)—salt marsh
- Missaguash Marsh
- East Amherst Marsh
- Eddy Marsh, LaPlanche Marsh, Maccan Marsh—areas impounded for waterfowl; Eddy Marsh is also used for the production of wild rice
- Elysian Marsh—largest dyked grassland in Nova Scotia and the least disturbed of the large dykelands

Provincial Parks and Park Reserves

Proposed Parks and Protected Areas System includes Natural Landscape 21.

Associated Offshore Sub-Unit

913b Chignecto Bay.

Associated Topics

T2.4 The Carboniferous Basin, T3.3 Glaciation, Deglaciation and Sea-level Changes, T6.1 Ocean Currents, T6.4 Estuaries, T7.1 Modifying Forces, T8.3 Freshwater Wetlands, T11.5 Freshwater Wetland Birds and Waterfowl, T11.6 Shorebirds and Other Birds of Coastal Wetlands, T11.13 Freshwater Fishes, T11.17 Marine Invertebrates, T12.10 Plants and Resources, T12.11 Animals and Resources.

Associated Habitats

H2.4 Mud Flat, H2.5 Tidal Marsh, H4.1 Bog, H6.2 Softwood Forest (Black Spruce, Larch Association), H6.3 Mixedwood Forest (White Spruce, Fir–Maple, Birch Association).

530 STONY AND WET PLAIN

District 530 is divided into two Units:

531 Sydney Coalfield
532 Chignecto Plains

GEOLOGY AND LANDSCAPE DEVELOPMENT

District 530 is underlain by thick deposits of Late Carboniferous sandstone and siltstone, which are either flat-lying or gently folded. The strata contain numerous seams of coal, which provide evidence of the environments of deposition.

During the Late Carboniferous the landscape in this area was low, with little relief. Much of the area was covered with shallow lakes, swamps, and coastal floodplains. In some places (Unit 532) rhythmic variations occurred in the overall rate of subsidence of the basin. Periodic subsidence enabled thick layers of organic material to accumulate before being engulfed with sediments. In other places (Unit 531) the layers of organic material were separated by alluvial material deposited as the rivers meandered across floodplains.

The sandstones were deposited under continental conditions on river floodplains and contain few fossils of aquatic life. Coal seams and shales, however, provide imprints of leaves and delicate parts of plants. Fossil trees are also common and can usually be seen in present-day coastal sections.

Overall, the terrain varies from flat to rolling and is evenly covered with sandy to stony glacial till. This till is thin, and bedrock is frequently exposed at the crests of minor ridges. A complex landscape of bedrock sandstone ridges and poorly drained depressions with organic deposits characterizes these nearly flat landscapes.

SCENIC QUALITY

These areas are generally flat and featureless inland, although the Chignecto Plains (Unit 532) exhibit somewhat greater relief. Scenic values are typically low to medium, but much higher values occur where there is farming settlement (e.g., along River Hebert and on Boularderie Island) and wherever bays and estuaries extend water views inland (e.g., Sydney Harbour and the coastal lagoons of Sydney South Side). Coal mining has produced distinctive landscape elements both at Joggins and on the Sydney field. Although there are now few active mines, coal and steel have created a highly urbanized landscape on the coastal stretch between Little Bras d'Or and Port Morien. The mining settlements are not pretty, but as planned company towns they exhibit strong architectural unity and an almost palpable sense of community.

531 SYDNEY COALFIELD

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Sydney Coalfield lies within an area of Pictou-Morien Group sandstones and siltstones which cover an area of about 1300 km². Within 1,500–2,000 m of strata, about 1,300 m contain coal seams. The strata have been relatively undisturbed and lie in open folds that dip gently seawards at angles of 4–15°.

The area is mantled with sandy to stony till, and the coast offers the best geological exposures, although only a few layers can be seen at any one location. From Point Aconi to Port Morien, including the drowned estuary of Sydney River, exposures of sandstone with coal seams are found. One section northwest along the coast from Cranberry Point, which represents a 560-m vertical section, contains 34 coal seams, and fossil trees. A seam of coal one metre thick is exposed in the cliff at Point Aconi, and abundant plant fossils can be found in the shales on the beach. The shales are rich in leaves and other plant parts, but some beds contain only one species, for example, *Sphenophyllum* in the dark shales at Point Aconi.

The 12 productive seams in the Morien Group average 1–2 m in thickness. They are paralic in character; that is, they tend to be extensive laterally and end abruptly against rock benches rather than merge into shales. The seams also tend to divide laterally. These characteristics reflect their origins on a river floodplain.

CLIMATE

Although rainfall is highest in November and snowfall is highest in January, total precipitation is highest in December when snow and rain occur interchangeably. The annual average fog occurrence is 80 days, with four days per month from December through February, and 11 days per month from May to July. Prevailing winds in fall and winter are from the west or north, and southwest or south-southwest in spring and summer.

FRESH WATER

There are no major rivers in this Unit. Many short streams and brooks form a modified trellis drainage pattern connecting numerous small lakes and ponds. There are four complete tertiary watersheds, parts of two others, and direct shoreline drainage. Streams have pH levels between 6.4 and 7.1, while lakes tend to average between 6.0 and 6.6. Ponds around Point Aconi are soft with shallow anaerobic bottoms. Extensive peat bogs are found in the depressions. Aquifers are confined by the low permeability of the overlying hills.

SOILS

The topography in this Unit is fairly level. On the gently undulating areas away from the coast, well-drained Shulie soils have developed on stony, sandy loam tills. Towards the coast where the terrain is flatter, imperfectly drained Springhill and poorly drained Economy soils have developed from the same material.

Over much of the area the bedrock closely approaches the surface and can be readily observed as slabby sandstone outcrops along roadcuts and shorelines. Around Boularderie Island, imperfectly drained Diligence silt clay loams occur, with small areas of well-drained Falmouth soils formed over gypsum (see Unit 511), and some Hebert soils formed on outwash sands and gravels.

PLANTS

This Unit has a somewhat milder climate than much of the Carboniferous Lowlands, although cold strong winds from the northeast retard springtime warming. A second major factor has been the high degree of disturbance. The Unit lies within Loucks' Sugar Maple–Hemlock, Pine Zone, but repeated disturbance has resulted in a forest dominated by conifers—White Spruce, Black Spruce, Balsam Fir, and Larch. Shade-intolerant species occur on ridges in the coniferous forests, while the maple, aspen, and birch fire association is found on extensive burnt areas.

There are a few salt marsh areas with Eelgrass beds in Lingan Basin, Glace Bay, and Port Morien. Scouring by sea ice in winter limits the growth of marine algae.

ANIMALS

A large proportion of this Unit is taken up by urban land uses and mammals include those typically found in proximity to developed areas such as deer, coyote, Red Squirrel, Snowshoe Hare, and Red-backed Vole. Elsewhere, mostly scrub or early successional forest habitats are provided. Some Bald Eagle nesting habitat occurs. A significant faunal component exists along the coast, which includes vertical cliffs that provide seabird nesting sites, and sheltered bays cut off from the open sea by barrier beaches. There are few islands, but two of them, Ciboux and Hertford (Bird Islands), are nationally important nesting areas for Razorbill, Atlantic Puffin, Leach's Storm-petrel, and Black-legged Kittiwakes. Big Glace Bay Lake and Morien Bay provide stopover areas for modest numbers of migratory waterfowl but are of particular interest because a wide variety of species are included. The Piping Plover nests at the Glace Bay Sanctuary. Cormorant breeding colonies occur along the coast.

CULTURAL ENVIRONMENT

This Unit has been extensively clearcut for forestry and for transmission-line development. Spruce Budworm infestations have been notable.

Sydney boomed at the turn of the century with the building of the Dominion Steel and Coal Company steel plant at Whitney Pier. Coal was also excavated privately, and in a few areas around Glace Bay the land is unstable due to underground mine tunnels which have caused houses to shift and heave. Sydney Steel and Coal Company (Sysco) is primarily responsible for the creation of the Sydney Tar Ponds, the largest chemical waste site in the country. In 1986, a 10-year Tar Sands Clean Up program was launched—the largest toxic excavation project ever undertaken in Canada. At present, mines extend 8 km from shore under the Cabot Strait, and within the present 10-km economically mineable limit there are 1,000 million tonnes of recoverable coal.

At Coxheath near Sydney, copper occurrences were reported in 1825, with mining production taking place intermittently until 1896. Numerous sand and gravel deposits are commercially exploited in this area. Coal-generated steam turbine power plants at Glace Bay, Lingan, and Point Aconi supply electrical power to the province. Small-scale farming has taken place along the Mira River, and stretches along the river are now cottage country. Outdoor recreational attractions in this area include the Bird Islands, famous for their breeding colonies of Razorbill, Atlantic Puffin, and other seabirds.

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Sites of Special Interest

- Coastline northeast of Cranberry Head—34 coal seams and fossil trees
- New Waterford to Morien Bay—Coastal exposure of the Upper Carboniferous sediments of the Cape Breton coalfield, with plant and animal fossils, including species found nowhere else in North America
- Point Aconi—coastal exposure of Upper Carboniferous sediments with upright tree fossils; plant imprints and fossils in the shales along the beach
- Bird Islands (IBP Proposed Ecological Site 24)—bird nesting site, with rare arctic-alpine plants, one island owned by the Nova Scotia Bird Society, the other by the Department of Natural Resources
- Big Glace Bay Lake Migratory Bird Sanctuary
- Miner's Museum, Glace Bay—outlines aspects of the area's mining history and portrays the life of miners who work the Sydney coalfields in tunnels that stretch miles under the ocean floor

Provincial Parks and Park Reserves

- Groves Point
- Big Bras d'Or
- Dalem Lake
- Dominion Beach
- Lingan

Proposed Parks and Protected Areas System includes Natural Landscape 56.

Scenic Viewpoints

- Dominion cemetery—view over Indian Bay to Lingan power station
- New Waterford, eastern edge—operating coal mine (Lingan) and Lingan power station
- Point Aconi (north end of Highway 162)—operating Prince coal mine and power station

Associated Offshore Unit

915 Sydney Bight.

Associated Topics

T2.4 The Carboniferous Basin, T4.2 Post-glacial Colonization by Plants, T6.2 Oceanic Environments, T7.3 Coastal Landforms, T8.3 Freshwater Wetlands, T9.3

Biological Environment, T10.1 Vegetation Change, T11.6 Shorebirds and Other Birds of Coastal Wetlands, T11.7 Seabirds and Birds of Marine Habitats, T12.3 Geology and Resources, T12.12 Recreational Resources.

Associated Habitats

H5.3 Cliff and Bank, H4.1 Bog, H6.1 Hardwood Forest (Maple, Oak, Birch Association), H6.3 Mixedwood Forest (White Spruce, Fir–Maple, Birch Association).

532 CHIGNECTO PLAINS

GEOLOGY AND LANDSCAPE DEVELOPMENT

The geology varies in this Unit. The northern part is more like Unit 581. However, most of the area is underlain by Cumberland Group strata made up of grey sandstones, siltstones, and shales. In places the sandstone is coarse; in others it is fine-grained and has been used for millstones and building stone. The strata have been thrown into open folds, which become tighter close to the Cobequids (Unit 581). Some of the anticlines in the east of Unit 532 have been eroded, exposing the underlying Early Carboniferous or Mississippian Windsor Group deposits. In these places the folding is accentuated by the movement of salt, which has risen through the strata to form domes.

Glacial deposits mask most of the Chignecto Plains, and the strata can best be seen along the shore of Chignecto Bay. The most important section lies in the 15 km between Minudie and Shulie, where a vertical section of 4,444 m of Cumberland Group strata is exposed. These strata form part of a shallow basin that extends from Minudie to the Cobequids (Unit 311). Towards Shulie the younger strata begin to slope upwards towards the base of the Cobequids.

From the Joggins area to Maccan and Springhill, the luxuriant growth of *Lepidodendron, Sigillaria, Calamites, Chordaites,* tree ferns, and seed ferns resulted in the formation of many coal seams. Up to 70 seams have been found in this basin, with the thickest ones near Joggins (from Joggins to Ragged Reef). The main seam at Joggins is 1.25 m thick.

The seams can be traced inland for 30 km but gradually coalesce towards Springhill. Four outcrop at River Hebert, two each at Maccan and Chignecto. At Springhill the section of coal-bearing strata is 800 m thick and contains 31 coal seams.

The coal seams in the Cumberland Basin formed in an unstable environment characterized by subsidence, plant growth, inundation, and burial by mud and sand, more growth, and so on in a cyclic pattern. The coal seams tend to grade into shaly coal and coaly shale, vertically and laterally. They are structurally weak and dangerous to work at depth.

At a well-known locality near Joggins is a classic coastal section of Late Carboniferous strata. Between Coal Mine Point and Lower Cove, fossilized tree stumps of *Lepidodendron* and *Sigillaria* can be seen in their original growth positions. Siltstones rich in plant debris occur, as well as limestones containing the shells of freshwater and brackish water pelecypods and ostracods. Amphibian and reptile bones and the tracks of giant arthropods have also been found. Sedimentary structures in the strata include ripple marks, wave ripples, current bedding, mud cracks, rain prints, and channel deposits.

Outcrops of sandstone bedrock create a bedrock-dominated landscape west of River Hebert. To the east of the river, extensive sandy tills mask the bedrock, particularly in the Chignecto Game Sanctuary and in the Sand River area, creating a distinct landscape.

FRESHWATER ENVIRONMENTS AND COASTAL WETLANDS

The watershed predominantly consists of numerous second- and first-order rivers and streams, flowing in a modified trellis pattern. The Unit is dissected by a secondary watershed boundary. To the south, the Shulie River and East Apple River fall within separate tertiary watersheds. River Hebert and its tributaries dominate the landscape to the north. Numerous short streams have direct shoreline drainage. There are extensive bog systems, and numerous tidal marshes occur along the coast.

SOILS

Grey and brown sandstones and reddish brown conglomerates have provided the parent materials for the dominant soils of this Unit. Shulie, imperfectly drained Springhill, and poorly drained Economy soils have developed from sandstones. For the most part they are relatively shallow, stony loams. West of the River Hebert are large areas of very shallow soils. The haphazard interference of bedrock with soil drainage creates an intricate pattern of imperfectly and poorly drained depressions.

PLANTS

This Unit falls within the Maritime Lowlands Ecoregion of Loucks' Red Spruce, Hemlock, Pine Zone and has been heavily disturbed by repeated cutting and burning and by scattered agricultural settle-

ments. Sandy areas have a coniferous forest dominated by Jack Pine, Red Spruce, and Black Spruce. Scattered pure stands of Yellow Birch occur on side slopes and ridges near Chignecto Bay. Jack Pine, aspen, spruces, and Grey Birch are abundant after fire. Heathland has formed on some of the old burns, while others are reverting to Red Spruce, Black Spruce, and Balsam Fir. A marked band of coastal forest a few kilometres wide borders the Bay of Fundy. The so-called Chignecto Barrens are now regenerating in Red Spruce and Black Spruce; some have been planted with Red Pine. Well-drained hills are covered with mixed deciduous forest and some shade-tolerant hardwoods. Some cedar is found in this Unit and the adjacent areas. Other areas in Nova Scotia with native cedar include the southern part of Digby County.

In 1912, C.D. Howe made the following observations on soil-forest relationships in this fire-devastated area: "The sandy plain is covered with small sandy knolls from one to two feet above the little depressions which are from a yard to five yards in diameter. The bedrock is a hard, fine-grained sandstone which, in general, is apparently not more than two feet below the surface. The vegetation is composed of wire birch and scattering jack pine, which escaped the fire, with an undergrowth of blueberry, sheep laurel and hair cap moss. The damp pockets contain purple laurel (rhodora), Labrador tea and sometimes spruce seedlings. Jack pine seedlings are frequent on the knolls."

ANIMALS

This Unit is mostly a mix of forest habitats, with few agricultural areas. Cliffs and intertidal sands and muds occur along the coast.

Moose have responded to the regenerating forest following Spruce Budworm infestation by developing one of the more vigorous populations in mainland Nova Scotia. Deer do not winter along Chignecto Bay, which is exposed to westerly winds. In hard winters, deer are absent from the Chignecto Game Sanctuary, preferring to migrate south.

There are few lakes or wetlands, and beaver and otter densities are low. Bobcat, coyotes, and Red Fox are common. Raccoons are found near the scattered agricultural settlements. Black Bear occur in moderate numbers. American Shad, Gaspereau, Sea Lamprey, and Atlantic Salmon enter River Hebert to spawn in fresh water. Gaspereau are known to travel as far as Welton Lake, where they spawn along the lake shore. Salmon also enter Apple River. The edges of River Hebert, Shulie River, Kelly River, and Atkinson Brook provide interesting habitat for a variety of wildlife.

Mud flats towards Minudie are important feeding areas for shorebirds that roost on the New Brunswick shore at high tide. Smaller numbers roost at Mill Creek and at West Apple River during high tides. Approximately 100 Black Ducks winter at Apple River estuary.

The Northern Ringneck Snake has been seen at Chignecto Game Sanctuary.

CULTURAL ENVIRONMENT

The first record of mining in the Cumberland Basin dates to the early eighteenth century, when the "old French Workings" were mined at Joggins. Acadians had once extracted coal from the cliffs here. The Joggins mine was completely closed in the 1960s, and the River Hebert coal mine closed in 1980. A coal-fired steam turbine plant was operated at Maccan. Good harbours are not found on the shores of the Cumberland Basin, so fishing activity is limited. In the 1970s, when the harnessing of the Fundy tides was under serious consideration, the Cumberland Basin was designated as a candidate site for a tidal power generating station. The forest cover in this Unit is variable as a result of past disturbances. Pines may average higher than in other areas, but the Red Pines planted on the sandy areas (after major fires early in the twentieth century) are more prominent than naturally regenerated stands. Forests facing Chignecto Bay were severely affected by Spruce Budworm in the late 1970s and 1980s. The extensive forest harvest areas where infected forest stands were salvaged provide good moose habitat.

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Sites of Special Interest

- Joggins (Coal Mine Point to Lower Cove)—coastal exposure of Upper Carboniferous (Pennsylvanian) sediments and coal seams of the Cumberland Basin coalfield; these cliffs are famous for their fossils, which include trees, reptiles, and amphibians; features include sedimentary structure, a classic Late Carboniferous section, coal seams outcropping along the shoreline of Chignecto Bay, and two district tills, different in colour, containing boulders of granite and limestone; this is a protected site, under consideration as a world heritage site because of its scientific interest
- Chignecto Game Sanctuary

- Shulie River (IBP Proposed Ecological Site 2)—Red Spruce stand
- Chignecto River (IBP Proposed Ecological Site 3)—pure stand of Red Pine
- Parrsboro Geology Museum

Provincial Parks and Park Reserves
Proposed Parks and Protected Areas System includes Natural Landscape 19.

Scenic Viewpoints
- River Hebert, both sides—dyked farmland

Associated Offshore Units
912 Outer Fundy, 913b Chignecto Bay.

Associated Topics
T2.4 The Carboniferous Basin, T3.4 Terrestrial Glacial Deposits and Landscape Features, T7.3 Coastal Landforms, T8.1 Freshwater Hydrology, T10.2 Succesional Trends in Vegetation, T10.6 Trees, T12.3 Geology and Resources.

Associated Habitats
H2.4 Mud Flat, H4.1 Bog, H5.1 Barren, H5.3 Cliff and Bank, H6.1 Hardwood Forest (Sugar Maple, Yellow Birch, Beech Association), H6.2 Softwood Forest (Pine Association; Spruce, Fir Association).

540 CLAY PLAIN

District 540 is divided into two sub-Districts:
(a) Cogmagun River
(b) Stewiacke Barrens

GEOLOGY AND LANDSCAPE DEVELOPMENT

In the two sub-Units within the Clay Plain (District 540) are found Middle to Late Carboniferous deposits of Canso and Pictou strata (see Figure 11). These strata are predominantly fine red or grey-brown sandstones and siltstones, known as the Scotch Village Formation, which lie horizontally on top of the Windsor deposits.

FRESH WATER

Cogmagun River (sub-District 540a)
This area contains the headwaters of the Tomcod, Walton, and Cogmagun rivers. It falls within three tertiary drainage areas, including a portion of the Kennetcook River watershed, and drains into the Minas Basin. The several extensive wetland systems include Collins Bog and McDonald Bog, both of which are larger than 400 hectares.

Stewiacke Barrens (sub-District 540b)
This landscape is within the Shubenacadie River watershed and contains numerous tributaries that feed into the Stewiacke and Shubenacadie systems.

SOILS

The soils in this Unit are mainly of the Kingsville series—poorly drained clay loams, usually strongly mottled, that have formed from till deposits derived from grey sand and siltstones. Large areas of peat have developed in level and depressed areas.

PLANTS

This clay till plain with scattered mounds supports mostly Black Spruce, with some Red Oak and Balsam Fir. On the better-drained gravelly ridges, Red Pine (on burnt sites) and the shade-intolerant Red Maple and White Birch occur.

SCENIC QUALITY

These featureless plains have some of the lowest scenic ratings in the province. With little relief, few lakes, and no human settlement, the only variation is provided by bogs and extensive cutover areas (in District 540a). There is little public access to these areas; the only paved road is south of Middle Stewiacke (District 540b).

CULTURAL ENVIRONMENT

These sub-Districts have a history of forestry. At present, recreational use of the land includes an airfield that was a Commonwealth training field during the Second World War. Peat harvesting potential exists on the Clay Plain.

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Sites of Special Interest
- Scotch Village Barrens—extensive peat deposits

Provincial Parks and Park Reserves
Proposed Parks and Protected Areas System includes Natural Landscapes 27a and 27b.

Associated Topics
T2.4 The Carboniferous Basin, T8.1 Freshwater Hydrology, T12.10 Plants and Resources.

Associated Habitats
H4.1 Bog, H3.1 Freshwater Open-Water Lotic, H3.3 Freshwater Bottom Lotic, H5.1 Barren, H6.2 Softwood Forest (Pine Association; Spruce, Larch Association).

550 COASTAL FRINGE

District 550 is divided into two Units, primarily on the basis of oceanographic and climatic conditions:

551 Inverness Coastal Plain
552 Victoria Coastal Plain

GEOLOGY AND LANDSCAPE DEVELOPMENT

Around the shoreline of the northern Cape Breton peninsula is a narrow fringe of Carboniferous strata. This forms a usually flat area at the base of the steep, dissected shoulder of coarse Horton deposits and volcanics which flank the highlands massif.

The widest parts of this band of lowland are found between Margaree Harbour and Chéticamp, and in the Aspy Valley. Around St. Anns Bay to Cape Smokey the band is very narrow, with only vestiges of the original deposits. Many of the strata are Windsor Group deposits that are being eroded very rapidly. Where gypsum underlies the surface, karst topography has formed.

On the west side of the peninsula from Margaree Harbour to Chéticamp, the Windsor deposits are overlain by a narrow strip of younger rocks: Riversdale strata (including some coal seams) and, further north near Chéticamp, red Canso strata. All around the coastline, a pre-Wisconsin wave-cut notch can be seen overlain by loose glacial material. Glacial sands and gravels washed down from the highlands are common throughout the District.

SCENIC QUALITY

Lying between mountains and ocean, these narrow lowlands display scenery that ranges from pleasant to spectacular. Where the mountain plateau is set further inland or rises less abruptly (as at Inverness, Belle Côte, and Cape Egmont), the dramatic effect is somewhat reduced. However, the settled Acadian farmlands between Belle Côte and Chéticamp have much interest and allow unrestricted vistas. Particularly noteworthy are the long-lot field patterns. Vestiges of farming settlement remain in the Aspy Valley, where the embracing effect of surrounding mountains provides a sense of shelter and seclusion.

551 INVERNESS COASTAL PLAIN

The Inverness Coastal Plain is divided geographically into two sub-Units:

(a) Inverness/St. Rose Coalfield
(b) Chéticamp Coast

GEOLOGY AND LANDSCAPE DEVELOPMENT

Inverness/St. Rose Coalfield (sub-Unit 551a)
From Inverness northwards towards Margaree Harbour lies a hilly, faulted, and narrow belt of Late Carboniferous strata. They form two small basins, one centred at Inverness and the other at Chimney Corner. At Inverness they are in Pictou strata and at Chimney Corner in Riversdale strata. Both basins contain coal seams which dip steeply under the Northumberland Strait.

Chéticamp Coast (sub-Unit 551b)
Beyond Margaree Harbour, a thin strip of Windsor strata, overlain by red Canso Group sandstones and siltstones and greyish Riversdale sandstones, form a narrow coastal plain (see Figure 21). The Windsor strata form a valley at the base of the highland slope and, where gypsum is present, karst topography occurs. Crystalline gypsum (selenite) is common.

Chéticamp Island is composed of red Riversdale sandstones and is undergoing rapid erosion. At present it is connected to the mainland by a long sand and gravel bar. Just to the north, coastal erosion has reduced a deposit of red Carboniferous sandstone to stacks which lie at the mouth of Trout Brook. The sandstone generally forms low cliffs along the shore.

North of Chéticamp Village is a terrace of glacial outwash material. A bar has formed across the mouth of the Chéticamp River, and an esker projects out to the bar, dividing the lagoon into two.

FRESH WATER

The short, straight streams in this Unit drain directly into the Northumberland Strait. In sub-Unit 551a, streams flow from ravines and also from Lake Ainslie (Unit 584). The mouth of the Margaree occurs in sub-Unit 551b, and several small tidal marshes occur near Chéticamp. Freshwater systems are productive and generally alkaline. Conductivity in Grand Lac has been recorded at 200 micromhos/cm. Sinkholes and small solution lakes associated with karst topography are common.

SOILS

The soils in this Unit form a complex mix, ranging from sands to clay loams. The dominant soil is Shulie, which has developed from glacial tills derived from coarse grey and brown sandstones of the Riversdale group. They range from stony loam to stony, sandy loam in texture.

Inverness/St. Rose Coalfield (sub-Unit 551a)
The outlet of Lake Ainslie is marked by a large sand plug, with outwash sands and gravels, on which well-drained Canning loamy sands have developed. These soils are on level to rolling terrain and tend to be droughty. Elsewhere, imperfectly drained Queens and poorly drained Kingsville clay loams have developed. Well-drained Shulie soils occur on higher ground north of Broad Cove.

Chéticamp Coast (sub-Unit 551b)
Small areas of sandy Canning soils occur around Margaree Harbour. Further north along the coast, Queens, Kingsville, and Shulie soils occur with some well-drained Pugwash sandy loam and its poorly drained associate Masstown. Digby soils (excessively drained sandy loams) have developed on beach deposits. Near Chéticamp, Hebert soils are found on outwash sands and gravels. Chéticamp Island is a mix of Shulie, Debert, Masstown, and Kingsville soils.

PLANTS

The vegetation in this Unit is heavily influenced by the prevailing westerly winds off the Gulf of St. Lawrence. White Spruce is the most common species, but shade-tolerant hardwoods are found on the better-drained and more sheltered sites. Black Spruce and larch grow in wet depressional areas. Elsewhere, a mixed forest of spruce, fir, and pine with maple and birch is common. Marsh Marigold is scattered along the low lands in wet places.

ANIMALS

Margaree Island provides some breeding habitat for seabirds, including a moderate population of Black Guillemot.

CULTURAL ENVIRONMENT

Coal has been mined at Inverness and Chimney Corner in sub-Unit 551a, but the seams dip steeply out under the Northumberland Strait and much of the coal is inaccessible. Near Chéticamp, where the plain broadens (sub-Unit 551b), extensive gypsum deposits have been mined down to the underlying rock.

Acadians settled the Chéticamp area after the deportation, turning to fishing as well as subsistence farming for a living. Protected from Atlantic fogs by the Cape Breton highlands, the fishing stations along the gulf shore of Cape Breton, particularly Chéticamp, were the best places for drying fish. In the eighteenth and nineteenth centuries, Chéticamp fishermen traded dried cod to the Channel Islands (United Kingdom) merchants who controlled the Cape Breton fishing industry and exported dried cod to world markets. Today the lobster and crab fisheries are particularly important in Chéticamp.

In the nineteenth century, Scots settled the Inverness area (sub-Unit 551a), and fishing, farming, and forestry have provided a means of livelihood from the land. Coal continues to be mined at St. Rose, Inverness County. The beaches and scenic coastal views of the Inverness Coastal Plain attract tourism and recreational activities such as whale-watching excursions out of Chéticamp.

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Sites of Special Interest

- Petit Étang (IBP Proposed Ecological Site 16)—eutrophic marsh with uncommon plants such as Canada Anemone and Shrubby Cinquefoil
- Chimney Corner, Chéticamp, Cape North, and St. Anns Bay—a pre-glacial wave-cut notch in the side of the cliffs
- Chéticamp—selenite in an old gypsum quarry; karst topography
- Chimney Corner and Inverness—thin coal seams in the sandstone and siltstone along the shore
- Trout Brook (north of Chéticamp)—stacks of red sandstone
- Inverness Miners' Museum—coal mining history
- Chéticamp—exhibition centre for the Cape Breton Highlands National Park

Provincial Parks and Park Reserves

- Broad Cove Marsh
- Friars Head
- St. Joseph du Moine

Proposed Parks and Protected Areas System includes Natural Landscape 61.

Scenic Viewpoints

- Sub-Unit 551b: Margaree Harbour (estuary of Margaree River); north of Chéticamp on the Cabot Trail (view of Jerome Mountain to the north)

Associated Offshore Unit

914 Northumberland Strait.

Associated Topics

T2.4 The Carboniferous Basin, T3.3 Glaciation, Deglaciation and Sea-level Changes, T3.4 Terrestrial Glacial Deposits and Landscape Features, T6.1 Ocean Currents, T7.3 Coastal Landforms, T11.7 Seabirds and Birds of Marine Habitats, T12.3 Geology and Resources, T12.11 Animals and Resources.

Associated Habitats

H6.3 Mixedwood Forest (White Spruce, Fir–Maple, Birch Association).

552 VICTORIA COASTAL PLAIN

The Victoria Coastal Plain Unit is divided into three sub–Units:

(a) Aspy River
(b) Ingonish River
(c) St. Anns Bay

GEOLOGY AND LANDSCAPE DEVELOPMENT

Aspy River (sub-Unit 552a)
The Aspy Valley lies south of the escarpment of the Aspy Fault. From the bars across the harbour south to Sunrise, the valley is underlain by Windsor strata which form a broad level lowland (see Figure 5). Where gypsum underlies the surface, karst topography with sinkholes has formed. South of Sunrise, the Aspy Valley contains Horton strata which form hills below the escarpment.

Ingonish River (sub-Unit 552b)
At Ingonish, Windsor strata lie directly on top of basement rocks with no Horton strata present. They form a narrow lowland on the north side of Ingonish Bay.

St. Anns Bay (sub-Unit 552c)
The coastal margin from Cape Smokey to Indian Brook consists of a narrow band of Windsor and related strata. On the west side of St. Anns Bay are resistant Horton strata. At the southern end of St. Anns Harbour, a strip of Windsor strata lies between the plateau to the west and the parallel upland block to the east known as Kellys Mountain.

The extent of coastal erosion is indicated by the location of the Carboniferous deposits, which once covered a much wider area on the coastline.

FRESHWATER AND COASTAL AQUATIC ENVIRONMENTS

Aspy River (sub-Unit 552a)
The North, Middle, and South Aspy rivers flow parallel to each other, draining into Aspy Bay. A tertiary watershed boundary separates the North Aspy channel from the other two. Tidal marshes and barachois ponds occur in the backwaters.

Ingonish Beach (sub-Unit 552b) and St. Anns Bay (sub-Unit 552c)
Numerous parallel tertiary watersheds drain first-order streams from river valleys in District 220 into North and South Bay Ingonish in sub-Unit 552b, and into St. Anns Bay in sub-Unit 552c. There are large tidal marshes at the back of Ingonish Harbour in Unit 552, and scattered barachois ponds in sub-Unit 552c. Freshwater Lake, located behind a barrier in sub-Unit 552b, has a neutral pH.

SOILS

This Unit is notable for its outwash deposits, on which gravelly sandy loams of the Hebert series have developed. On upland slopes, the soils are derived principally from granite and are mapped as well-drained Gibraltar and imperfectly drained Bayswater sandy loams. Along St. Anns Bay, Thom soils are also found on the slopes. The Aspy River has cut terraces in alluvial deposits. These successive terraces present an ideal opportunity for measuring the time and intensity of soil development processes.

PLANTS

On the floodplains, willow, aspen, Sugar Maple, and Yellow Birch are found. On better-drained gravels, White Birch and beech occur. On granitic slopes, White Spruce is common, with scattered Yellow Birch and Sugar Maple. Along the coast, winter ice scour restricts marine algae.

ANIMALS

Scattered eagle-breeding habitat occurs in this Unit. A moderate-sized heron colony exists in Aspy Bay, which is also visited by a wide variety of waterfowl from spring through fall, though not in large numbers. Barachois ponds occur behind barrier beaches and support a diverse aquatic fauna.

CULTURAL ENVIRONMENT

The fisheries (lobster, mackerel, and others) have been the economic focus of communities in much of this area, along with some subsistence farming. Gypsum was once mined at Dingwall in sub-Unit 552a. Harnessing water power from the Cape Breton highlands, the Wreck Cove hydro station supplies electricity to the province. A wind-turbine electric plant also operates at Wreck Cove. The scenery of the Cabot Trail and the hiking trails of the Cape Breton Highlands National Park attract tourism and encourage the use of this land for recreation.

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Sites of Special Interest
- Dingwall—gypsum and karst topography

552 Victoria Coastal Plain

Provincial Parks and Park Reserves
- Cabots Landing
- Ingonish
- Birch Plain
- Breton Cove
- Plaster

Proposed Parks and Protected Areas System includes Natural Landscapes 73 and 76.

Scenic Viewpoints
- Sub-Unit 522a: White Point Road (south side of Aspy Bay)
- Sub-Unit 522b: Ingonish Bay (views from Keltic Lodge golf course)

Associated Offshore Unit
915 Sydney Bight.

Associated Topics
T2.4 The Carboniferous Basin, T3.4 Terrestrial Glacial Deposits and Landscape Features, T6.2 Oceanic Environments, T6.3 Coastal Aquatic Environments, T7.1 Modifying Forces, T7.3 Coastal Landforms, T10.9 Algae, T11.4 Birds of Prey, T12.8 Fresh Water and Resources, T12.11 Animals and Resources, T12.12 Recreational Resources.

Associated Habitats
H2.1 Rocky Shore, H2.2 Boulder/Cobble Shore, H5.3 Cliff and Bank, H6.1 Hardwood Forest (Sugar Maple, Elm Association).

560 SUBMERGED LOWLAND

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Submerged (Bras d'Or) Lowland forms a fringe around the upland areas of central and eastern Cape Breton (see Figures 8 and 19). The lowlands are underlain by Windsor Group strata containing siltstone, shale, reddish sandstone, limestone, gypsum, anhydrite, and salt. These strata once ranged in thickness from 650–1,200 m. They were often laid down in cyclical deposition patterns under a variety of conditions: in shallow offshore environments, in restricted basins where there was greater evaporation, and in open basins. The depositional basins lay around and between the upland blocks of the Creignish Hills, North Mountain, Sporting Mountain, East Bay Hills, and Boisdale Hills (see Figure 29).

During the Tertiary period a dramatic drop in sea level, probably caused by crustal uplift after the formation of the Cretaceous planation surface, allowed deep erosion to take place. At that time, major features such as the Gulf of St. Lawrence were carved out, and in central Cape Breton the lowlands were eroded to well below present sea level. When the land subsided, the sea was able to enter through two channels, the Great Bras d'Or and Lennox Passage, forming a deep lake 180 m deep in a few places, with access to the sea. Now the Windsor strata form an eroding broken fringe at sea level around the base of the uplands. The landscape consists of steep slopes with some cliffs, dropping to a coastal plain where there are white gypsum deposits and red sedimentary strata. The uplands, lowlands, and channels are oriented in a northeast-southwest direction in accordance with the structural trend in Cape Breton.

FRESH WATER

Most of the streams in this District are short, fast-flowing first- or second-order streams that drain directly into the Bras d'Or Lake down steep banks. The exception occurs in the area around Denys Basin and *St. Patricks* Channel, where larger systems include the River Denys and River Inhabitants. Tributaries feed into these systems from the Creignish Hills (sub-Unit 313a) to the northwest. The River Denys is also fed by streams flowing from North Mountain to the south in sub-Unit 313b.

The water at the head of St. Patricks Channel is stratified as a result of the restriction of tidal influences at Little Narrows. This creates an interesting marine benthic and freshwater pelagic community.

The largest wetland complex, Big Marsh, a productive wildlife habitat, is associated with the River Denys and contains elements of shallow freshwater marsh, shrub swamp, and grassy meadow.

SOILS

Shales and mudstones have produced most of the soils in this area. Gypsum occurrences are very frequent and produce improved drainage in soils immediately above them. Well-drained Falmouth, imperfectly drained Queens, and poorly drained Kingsville soils predominate. These are loams and clay loams derived from clay loam tills. Areas of coarser-textured Thom and Westbrook soils also occur. Millar soils have developed on outwash deposits. Although these are coarse-textured sandy loams, they are poorly drained because of the depressional topography.

PLANTS

This Unit is part of Loucks' Sugar Maple–Hemlock, Pine Zone, but the heavy soils and repeated disturbances have resulted in a largely coniferous forest, with White Spruce, Balsam Fir, and scattered Eastern Hemlock. Shade-tolerant deciduous trees are found on some of the better-drained slopes. Red Maple and White Birch occur in mixed stands. Oldfields and former pasture have regenerated in pure stands of White Spruce, or in spruce and fir. Black Spruce and larch grow in the wetter areas. The salt marsh vegetation is influenced by fresh water and includes Sweet Grass.

ANIMALS

The Submerged Lowland District includes a mix of flat or rolling softwood or mixed forest habitats, oldfields, open brackish water, sheltered marshy inlets, and exposed rocky shoreline. The Bras d'Or Lake supports a distinct warm-water marine community that is impoverished compared with other estuaries or coastal waters in Nova Scotia. Polychaete and bi-

valve communities are found in the mud and gravel bottom. The Unit provides very important Bald Eagle nesting habitat, particularly in the vicinity of Boom Island. Great Blue Heron and Double-crested Cormorant colonies are also present. River Denys and the upper Denys Basin are important areas for waterfowl production and act as a staging area for migrating Teal, Black Duck, and Ring-necked Duck; this is also known as a wintering area for Bald Eagles. The estuaries and streams provide good muskrat and mink habitat. Snowshoe Hare and bobcat also use habitats in this Unit.

SCENIC QUALITY

Fine scenery is found along all shores of the Bras d'Or Lake and its associated channels. Where the lowland is squeezed between lake and mountains (e.g., Whycocomagh, north side of West Bay, and south side of East Bay), very high scenic ratings are attained. This District's scenic resources, however, lie mostly offshore and are only fully available to those with boat access to the lake. The inland area between North Mountain and the Creignish Hills is less attractive than the lakeshore, though scattered farms add interest.

CULTURAL ENVIRONMENT

The shores of Bras d'Or Lake have long been an important area for the Mi'kmaq, and today several Mi'kmaq reserves are located around the lake, including Eskasoni, the largest in the province. Since the 1970s, various aquaculture operations for oysters, trout, and salmon have been started in Bras d'Or waters with varying degrees of success. People of Scottish descent settled the fertile tracts of land around Bras d'Or Lake in the first quarter of the nineteenth century, clearing large tracts of forests for farming and often selling timber for export or shipbuilding. Many of these farms have since been abandoned and regenerated into forests. Since Bras d'Or Lake is accessible from the sea, the import-export trade thrived here in the nineteenth century. Visual clues to this former activity are the many remnants of wharves around the lake. Baddeck alone had three major wharves and numerous cargo sheds, principally shipping produce from surrounding farms to the Newfoundland market. Nineteenth-century records indicate that fishing activity took place here, with catches of cod, herring, and mackerel. Significant mineral deposits exist in this area, with gypsum mining at River Denys and Little Narrows, and limestone quarried at Irish Cove. Boating and sailing have become popular activities on the Bras d'Or Lake.

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Sites of Special Interest
- Spectacle Island Game Sanctuary—nesting cormorants
- Alexander Graham Bell Museum—aspects of the area's history, focusing on the inventions of Bell at his summer home in Baddeck
- Island Point—spectacular example of karst topography

Provincial Parks and Park Reserves
- Big Harbour Beach
- Ross Ferry
- Baddeck Inlet
- Battery
- Orangedale
- Hay Cove
- Irish Cove
- Castle Bay
- Blacketts Lake
- Dundee

Scenic Viewpoints
- Whycocomagh Bay
- Baddeck
- Marble Mountain
- Irish Cove

Associated Offshore Unit
916 Bras d'Or Lake.

Associated Topics
T2.4 The Carboniferous Basin, T3.1 Development of the Ancient Landscape, T6.1 Ocean Currents, T6.4 Estuaries, T8.1 Freshwater Hydrology, T11.4 Birds of Prey, T11.8 Land Mammals, T11.17 Marine Invertebrates, T12.2 Cultural Landscapes, T12.3 Geology and Resources, T12.11 Animals and Resources.

Associated Habitats
H1.1 Offshore Open Water, H1.2 Offshore Benthic, H2.1 Rocky Shore, H2.5 Tidal Marsh, H3.1 Freshwater Open-Water Lotic, H3.3 Freshwater Bottom Lotic, H5.2 Oldfield, H6.2 Softwood Forest (Spruce, Fir Association; White Spruce Association).

570 ROLLING UPLAND

District 570 is divided geologically and topographically into two Units:

571 Mulgrave Plateau
572 St. Marys Fault Block

GEOLOGY AND LANDSCAPE DEVELOPMENT

From the Strait of Canso across the southern side of the Pictou-Antigonish Highlands to the southern border of the Cobequid Hills, Devonian and Carboniferous strata form a rather featureless central axis to Nova Scotia. South and west of the Salmon River in Guysborough County, the boundaries of this block are the major faults that cross the province from east to west. To the north is the Chedabucto Fault, which extends from Cooks Cove across southern Pictou County, merging with the Cobequid Fault along the southern border of the Cobequid Hills. To the south, the St. Marys Fault extends from eastern Guysborough County across to the Stewiacke Valley. The southern district boundary continues along the Cobequids as the Portapique Fault. The area from Salmon River northward to the Strait of Canso is the extension of this band of rocks on the northern side of the escarpment of the Chedabucto Fault.

SCENIC QUALITY

This District is generally of medium scenic quality, being undistinguished in terms of relief, lacking extensive agricultural settlement, and with few lakes (except for the area east of Highway 7, and the lakes inland from the Strait of Canso). There is stronger relief along the Canso Strait shoreline, Milford Haven–Roman Valley, portions of the Chedabucto and St. Marys faults, and in the upper Stewiacke valley. Settlement tends to occur along these same relief lines, which further increases their attractiveness. Milford Haven and the Canso Strait shore are particularly scenic.

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Associated Topics

T2.1 Introduction to the Geological History of Nova Scotia.

571 MULGRAVE PLATEAU

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Mulgrave Plateau lies within the Avalon Zone of Nova Scotia. The Avalon basement strata are overlain by resistant Middle and Late Devonian rocks, including coarse sandstones and conglomerates with basalts, other volcanic deposits, and a dyke. These strata were deposited at about the time of the Acadian Orogeny when the Avalon and Meguma zone rocks joined together, and it is reasonable to expect that they would reflect these crustal disturbances.

The elevation on the Mulgrave Plateau reaches over 200 m on the west side, falling to below 130 m near the Strait of Canso. At Cape Argos and Chedabucto Bay it is about 50 m. The scarp along the Chedabucto Fault separates these Devonian rocks from younger Horton strata and is an important physiographic feature.

Apart from this regional slope to the east, there is little variation in relief on the plateau (see Figure 17). The upland surface is uniformly covered in a stony till, and there are few features of interest. One rather beautiful area lies along the Roman Valley where the river has exploited a fault line, producing a steep-sided valley which cuts into the plateau. The river flows into a large drowned estuary to Milford Haven and Guysborough.

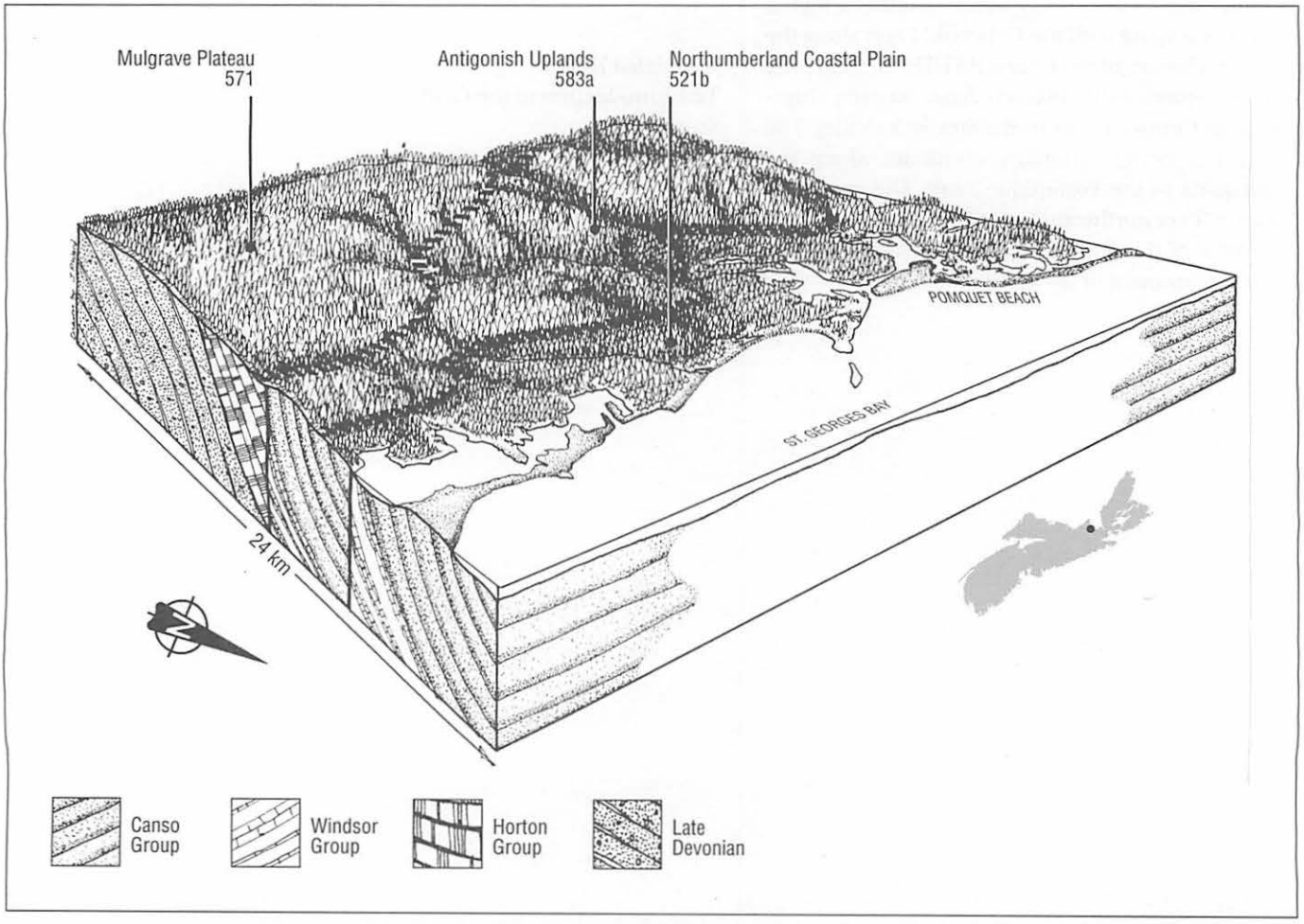

Figure 17: St. Georges Bay area. Slabby sandstones of the Horton Group and Late Devonian underlie the featureless upland called the Mulgrave Plateau (Unit 571). Drainage from this upland dissects the Antigonish Uplands (Unit 583) before entering the Northumberland Plain (Unit 521), with its sandy barrier beaches and extensive coastal lagoons.

FRESH WATER

A primary watershed division bisects this Unit horizontally in the northern portion. The east side is drained by several tertiary watersheds into Chedabucto Bay. The western area falls within a secondary watershed draining the Salmon River system. There are many small, irregularly shaped glacial lakes. Surface water pH levels range between 6.2 and 6.8.

SOILS

Soils in this Unit are derived mainly from shales and tend to be heavy and comparatively shallow (see Figure 28). Millbrook clay loams occur north of Chedabucto Bay. Elsewhere the soils are mainly Riverport and Kirkhill shaly loams, with some blocks of Thom sandy loams, associated with upland areas.

PLANTS

This Unit includes a wide variety of forest associations. On the deeper soils west of Mulgrave, mixedwoods predominate, with Balsam Fir, Black Spruce, Eastern Hemlock, Sugar Maple, and American Beech. On the wetter sites, Black Spruce, Balsam Fir, and larch occur, with White Spruce, Yellow Birch, and aspen appearing on better-drained sites. On shallow soils, such as those around Lincolnville, fir, Black Spruce, and White Spruce grow with larch, shade-intolerant Red Maples, birches, and aspen.

West of Middle Melford, where the clay soils have been waterworked, the better drainage encourages a mixed forest. The changing nature of the forest can be gauged from the following observations on soil-forest relationships made by C.D. Howe in 1912: "The forestal nature of the [western] portion may be characterized very briefly: barrens and semi-barrens interspersed with bogs and low hardwood ridges. The forest on the broad belt of Lake Lochaber is of the mixed type with hardwoods, chiefly yellow birch, forming one-half of the stand, the rest being red spruce and fir in about equal proportions. The crests of the hills and ridges are pure hardwood, 90 percent of which is often yellow birch, the remaining being beech, hard maple [Sugar Maple] and paper birch. East of the Cross Lake region to the Guysborough river, practically pure hardwoods prevail. As one approaches the coast from the interior, fir and spruce form a large proportion of the forest." This "forest" is the coastal forest (Region 800).

CULTURAL ENVIRONMENT

This area is sparsely settled, and forestry is the dominant resource activity. Farming takes place in river valleys. Communities on the Mulgrave Plateau are largely of Scottish descent. Black Loyalists settled the town of Lincolnville.

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Sites of Special Interest

- Goshen—view southwards across the St. Marys Fault Block to the escarpment of the St. Marys Fault
- Roman Valley—steep-sided, V-shaped valley leading to a wide estuary near Milford Haven

Provincial Parks and Park Reserves

- Lochaber
- Giants Lake
- Port Shoreham
- Wharf
- Guysborough Railway (part)

Proposed Parks and Protected Areas System includes Natural Landscape 46 and Candidate Protected Area 12 Ogden Round Lake.

Scenic Viewpoints

- Pirate Harbour, on the Strait of Canso
- Roman Valley to Milford Haven
- Roachvale (Salmon River)

Associated Topics

T2.2 The Avalon and Meguma Zones, T3.2 Ancient Drainage Patterns, T3.4 Terrestrial Glacial Deposits and Landscape Features, T8.1 Freshwater Hydrology.

Associated Habitats

H3 Fresh Water, H6.1 Hardwood Forest (Sugar Maple, Yellow Birch, Beech Association), H6.2 Softwood Forest (Spruce, Hemlock, Pine Association; Black Spruce, Larch Association), H6.3 Mixedwood Forest (White Spruce, Fir–Maple, Birch Association).

572 ST. MARYS FAULT BLOCK

GEOLOGY AND LANDSCAPE DEVELOPMENT

South of the Cobequid-Chedabucto Fault is a band of Horton rocks lying in a graben (a downfaulted block lying between two parallel faults). Across central Nova Scotia it is about 15 km wide and has an escarpment on the south that becomes increasingly prominent from the Eden Lake–Caledonia line eastwards.

Within the graben the elevations decrease gradually to the south and west. In Pictou County the elevation is 225–240 m, falling to 175 m at the Southern Uplands and 120 m near Melrose. From Trafalgar westwards the drainage is all towards the St. Marys River confluence at Melrose (see Figure 18). The East River St. Marys drains along the Chedabucto Fault in southern Pictou County, eroding crushed material from the fault zone before heading southwards to Melrose. West River St. Marys has extended its headwaters along the line of the St. Marys Fault and has captured all the drainage flowing south across the graben in that area. Erosion by the river has exposed the fault scarp, which becomes increasingly prominent towards Melrose. The drainage pattern in the watershed of West River St. Marys and its tributaries is rectangular. The north-south and east-west directions probably reflect the joint pattern in the coarse Horton sandstones.

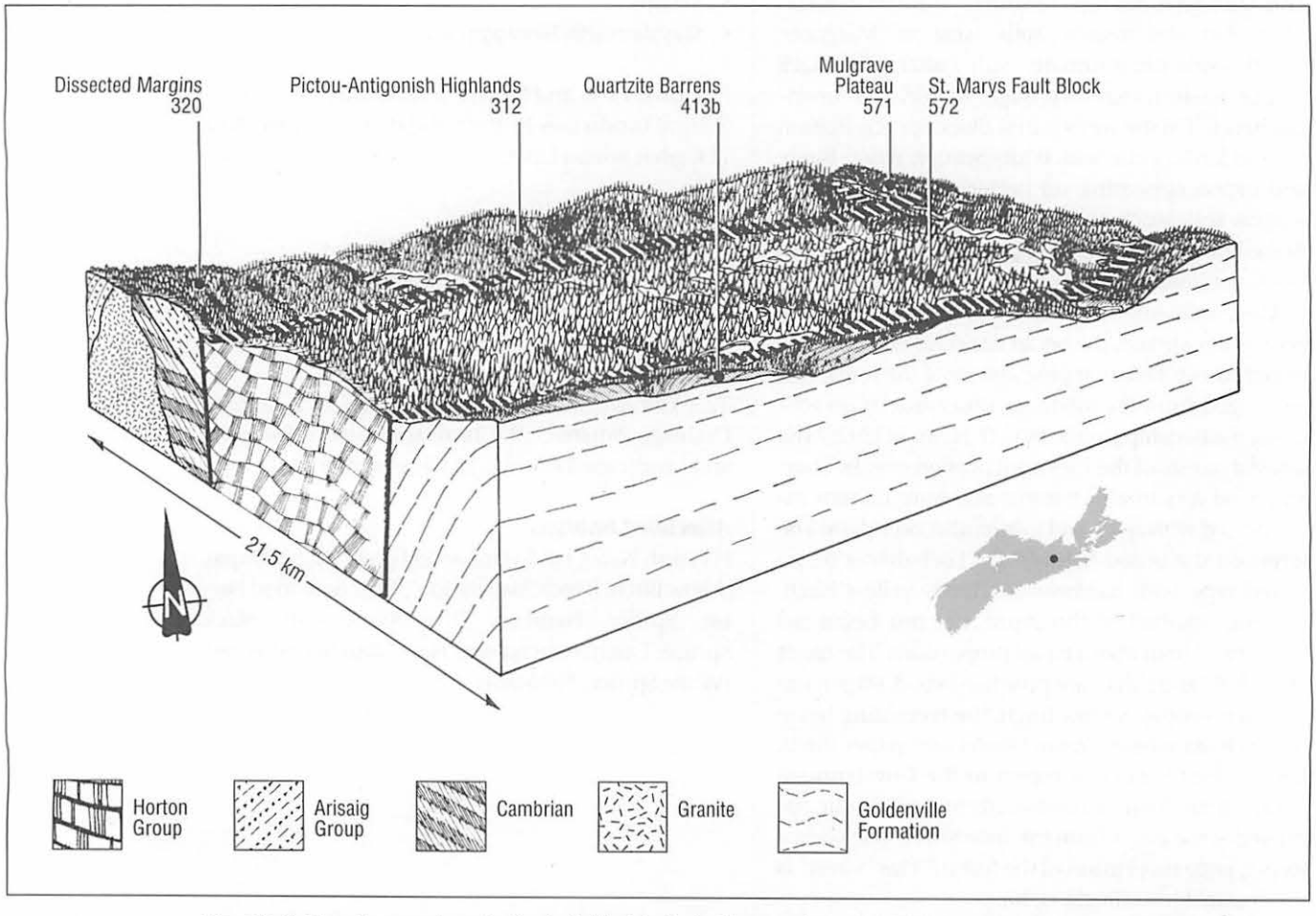

Figure 18: St. Marys River area. A massive downfaulted block (graben) of Horton sandstone (Unit 572) is bounded on the south by Goldenville Formation quartzite (Unit 413) and to the north by Avalon Zone rocks of the Pictou-Antigonish Highlands (Unit 312) and its Dissected Margins (District 320). The more-resistant rocks form prominent dissected scarp slopes. The St. Marys Fault has been excavated by the St. Marys River, while the Chedabucto Fault is followed by the East River of Pictou.

The western half of the St. Marys Fault Block is a uniform upland which runs along the southern side of the Cobequid Hills between the Cobequid Fault and the Portapique Fault. The Cobequid Fault forms the dividing line between the Avalon basement rocks of the Cobequid fault block to the north and the Carboniferous strata (Pictou and Riversdale) to the south. The Portapique Fault sets the Carboniferous rocks against the Triassic deposits which surround Cobequid Bay (see Figure 23).

FRESH WATER

Unit 572 falls within three main watersheds. The headwaters of the East, West, and Middle rivers occur in the middle northern portions and drain into the Northumberland Strait. Along the southern margin of the Cobequids the relief becomes hilly as the fault blocks become narrow and are crosscut by fast-flowing streams draining into Cobequid Bay. The headwaters of the Calvary River occur in the western portion where the North, Salmon, Folly, Debert, and Chiganois rivers flow down from the Cobequids into the head and north side of Cobequid Bay (Unit 913a). The southern middle portion is part of the large watershed that drains the Stewiacke River into Cobequid Bay, and the headwaters of the Stewiacke are located in this part of Unit 572. Drainage is typically trellised with many first-, second-, and third-order streams. Freshwater productivity and diversity are high, and pH is generally between 6.0 and 7.5. Conductivity is low.

SOILS

The tills derived from the hard grey sandstones of the Horton Group are midway between those derived from Halifax quartzites and those from the softer Shulie sandstones. Consequently, soils usually associated with both these bedrocks are found in this Unit. Halifax soils (well-drained sandy loams) occur with small areas of Aspotogan soil and peat. Shulie soils (gravelly silt loams to sandy loams) are more prevalent, with Springhill sandy loams and Millbrook gravelly clay loams. The western extension of this Unit south of the Cobequids has a complex mix of soils of all textures from gravels to clays.

PLANTS

The relatively flat, poorly drained topography and the extensive cutting in this Unit have favoured conifers such as Balsam Fir, White Spruce, White Pine, Red Spruce, and Eastern Hemlock. Scattered Red Oak is found throughout. Mixed hardwood stands occur on some better-drained sites. The more gently undulating areas with shallow soils are dominated by spruce and fir. Extensive barren lands, apparently originating from repeated burning, are dominated by Sheep Laurel and Bracken with scattered pine, maple, and Black Spruce. A recent extensive burn near Trafalgar is now being replanted. C.D. Howe made the following observations on soil-forest relationships in 1912: "South of the railway to the height-of-land ... the country is made up of low rounded ridges and depressions. The higher points are covered with hardwoods, while the bases of the slopes and the forested depressions support mixed stands in which the conifers are in the majority. As a whole, one-half of the forested areas is composed of red spruce, fir and hemlock."

Two small floodplains in this Unit, one at Kemptown (Salmon River) and one at Glencoe (East River of Pictou), are of particular botanical interest because they support a rich and rare intervale flora.

CULTURAL ENVIRONMENT

Forestry is the main land use for much of this area. On bottomland river intervales, small farms are established, with pastureland sometimes climbing the base of surrounding hills. Former mining activity included the extraction of manganese in small quantities from Manganese Mines near Truro. Between 1849 and 1906, iron ore was mined almost continuously at Londonderry.

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Sites of Special Interest

- Kemptown intervale (IBP Proposed Ecological Site 9)—Carolinian flora such as Wild Leek, Canada Lily and Blue Cohosh
- Glencoe intervale (IBP Proposed Ecological Site 10)—Carolinian flora such as Bloodroot and Horse-gentian
- Economy River (IBP Proposed Ecological Site 8)—old Red Spruce forest

Ecological Reserves

- Indian Man Lake

Provincial Parks and Park Reserves

- Two Mile Lake
- Guysborough Railway (part)

Proposed Parks and Protected Areas System includes Natural Landscapes 24, 26, 40, and 41.

Scenic Viewpoints
- Eden Lake (Highway 347)

Associated Topics
T2.4 The Carboniferous Basin, T8.1 Freshwater Hydrology.

Associated Habitats
H3 Fresh Water, H5.1 Barren, H6.1 Hardwood Forest (Sugar Maple, Elm Association).

580 HILLS AND VALLEYS

The Units within this District are:

581 Cumberland Hills
582 Pictou Valleys
583 Antigonish Uplands
584 Ainslie Uplands
585 Iona Uplands

GEOLOGY AND LANDSCAPE DEVELOPMENT

This District includes two areas of Carboniferous strata that have the characteristics of foothills. They are adjacent to faulted upland blocks which have moved vertically upwards in the landscape. The close interrelationship of resistant Horton Group strata and the overlying, less-resistant Windsor Group limestone, salts, and shales is strongly reflected in the eastern sections of this District (Units 583, 584, and 585).

Some areas are lowland, others are upland, reflecting both the position of these strata on the tilted planation surface and the relative proportions of Horton and Windsor deposits. Except in the Pictou Valleys Unit, these strata have been compressed into folds which lie parallel to the axis of the province. Typically, erosion has removed Horton strata in the centre of anticlines (upfolds) and left the Windsor strata in the synclinal hollows in between. In some locations Windsor strata have also been protected from erosion by downfaulting, as in the Pictou Valleys. Where resistant Horton grits are exposed, they stand as ridges and as shoulders on the flanks of highland blocks. The Windsor deposits form low areas and valleys in which salt springs and brackish lakes are common.

SCENIC QUALITY

These landscapes generally lie below 200 m but, owing to river erosion, exhibit varied relief. The exception is the southern portion of the Ainslie Uplands (Unit 584), which tends to be both higher and less dissected. The latter area also possesses less settlement than the norm; elsewhere there are lines of sparse settlement along the valley floors. The dendritic drainage patterns preclude lakes, so water features are seldom present. Lake Ainslie and the shorelines of the Grand Narrows (Unit 585a) are the major exceptions. Scenic value is high to very high around the lakes, on the edge of the Mabou highland, and at Mabou Harbour. Elsewhere it is typically in the medium range. The Pictou and Springhill coalfields possess urban-industrial landscapes which, though hardly attractive, have much of human interest.

581 CUMBERLAND HILLS

GEOLOGY AND LANDSCAPE DEVELOPMENT

North of the Cobequid Hills, between Wentworth and West Apple River, lies a hilly, dissected terrain underlain by Cumberland Group sandstones and conglomerates (see Figure 5). The strata dip northwards away from the Cobequid Hills and proceed through folds of increasing wavelength down to the Northumberland Plain (Unit 521).

Following the retreat of ice across the Cobequids at the end of the ice age, permafrost conditions may have existed, because associated soil structures are found in this area.

FRESH WATER

This Unit is dissected by a primary watershed boundary. The Black River is the major river in the eastern portion and drains north into the Northumberland Strait (Unit 914). In most of the western portion, many second- and third-order streams feed into the Maccan River, which drains into Cumberland Basin. Tributaries in the most western tip feed into the Apple River, which drains into Chignecto Bay (sub-Unit 913b).

Bogs and marginal fens are associated with the stream systems. There is a large concentration of meromictic freshwater marsh on the north side of the Maccan River inlet (associated with Unit 523) and up the Nappan River.

Conductivity is relatively low, and pH levels average 6.5.

SOILS

Soils in this Unit are either relatively coarse-textured, well-drained, and derived from sandstones and conglomerates, or finer textured clay loams developed from shale and mudstone. In the former category are the gravelly sandy loams of the Rodney and Westbrook series. In the latter category are Queens, Kingsville, Joggins, and Diligence soils. In the river valleys, Hebert soils have developed on outwash deposits. Throughout the Unit, small areas of Economy soils, which are strongly acid and saturated for much of the year, occur on poorly drained or gently sloping sites. Commenting on the slow recovery of forests after fire on the conglomerate areas, C.D. Howe wrote in 1912: "To the westward the conglomerate belt has been severely burnt. From the effects of burning, the conglomerate recovers nearly as slowly as does the quartzite. On the conglomerate at the headwaters of Apple river, there is a fairly good forest in which spruce prevails, although interrupted by frequent barrens and bogs."

PLANTS

Conifers and mixed stands predominate, with Red Spruce, Balsam Fir, Red Maple, and birch being abundant. On the well-drained upper slopes of the high rolling hills, Sugar Maple, Yellow Birch, and American Beech are common. White Pine and Jack Pine are common on old burns.

ANIMALS

Moose occur, particularly near Shulie Lake and the Little Forks watershed. There are some deer, and various locations are important for deer wintering, such as the Thundering Hill–West Brook area. Bird breeding distributions group either with sub-Unit 521a or Unit 311. One apparent exception is the Vesper Sparrow, which is more widespread in Unit 581, where more of its habitat is present than anywhere else in Nova Scotia. Wetlands near Newville Lake are significant for waterfowl. Freshwater fishes include White Sucker, White Perch, Yellow Perch, and Banded Killifish.

CULTURAL ENVIRONMENT

Coal mining at Springhill took place from the mid-nineteenth century until 1970, when the mine was closed. Now the heat from former mining tunnels is harnessed to generate geothermal energy for the town of Springhill. Areas of coal-mine tailings near Chignecto and Springhill are sparsely vegetated decades after the mines were abandoned.

The deeper, less sandy soils and less extensive fires of the past combine with the greater distance from Fundy influence to make this Unit more productive for forestry and agriculture than most other Units in Region 500. Farmland replaced former floodplain forests along the Maccan River, West Brook, and River Phillip valleys. Not all the small

farms higher up the slopes have been abandoned, and much of the farmland in this Unit is cultivated for lowbush blueberry. Sand and gravel deposits are found throughout this area, and sites of former quarry operations are used recreationally at Wentworth Station.

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Sites of Special Interest

- Fenwick (IBP Proposed Ecological Site 5)—deciduous forest, primarily Sugar Maple, with a Sugar Maple camp

Provincial Parks and Park Reserves

- Fenwick
- Newville Lake

Proposed Parks and Protected Areas System includes Natural Landscapes 18 and 20.

Scenic Viewpoints

- Newville Lake (Highway 2)

Associated Topics

T2.4 The Carboniferous Basin, T8.1 Freshwater Hydrology, T9.1 Soil-forming Factors, T10.1 Vegetation Change, T11.13 Freshwater Fishes, T12.3 Geology and Resources, T12.10 Plants and Resources, T12.11 Animals and Resources.

Associated Habitats

H3.1, H3.3, H3.5 Freshwater Lotic, H4.1 Bog, H4.4 Freshwater Marsh, H5.1 Barren, H6.1 Hardwood Forest (Sugar Maple, Yellow Birch, Beech Association), H6.2 Softwood Forest (Pine Association).

582 PICTOU VALLEYS

Unit 582 is divided into two sub-Units:

(a) Pictou Rivers
(b) McArras Brook

GEOLOGY AND LANDSCAPE DEVELOPMENT

This hilly area between the Cobequid Hills and the Pictou-Antigonish Highlands is underlain by Late Carboniferous Canso and Pictou strata, which are interrupted on the southeastern margin by triangular upfaulted blocks of Windsor strata. A separate part of this Unit (sub-Unit 582b) lies east of central Pictou between McArras Brook and Doctors Brook.

The Windsor Group strata are predominantly composed of sandstone and siltstone with minor amounts of gypsum and anhydrite. The landscape reflects the dominance of these relatively more-resistant rocks, and although it is well dissected by streams, elevations exceed 200 m in places and reach 225 m at Hopewell and Lorne.

Part of the East River north of Sunnybrae is a fossil valley that became filled with Windsor deposits and is now being re-exposed. In the central part of the Unit is the Pictou coalfield. The basin in which the coalfield sits developed as a physiographic feature during the Acadian Orogeny when it was downfaulted. Since then it has acted as a sedimentary sink, and during the Late Carboniferous it provided a suitable environment for the development of coal seams.

The coalfield underlies an area about 5 km by 16 km beneath New Glasgow, Stellarton, and Trenton.

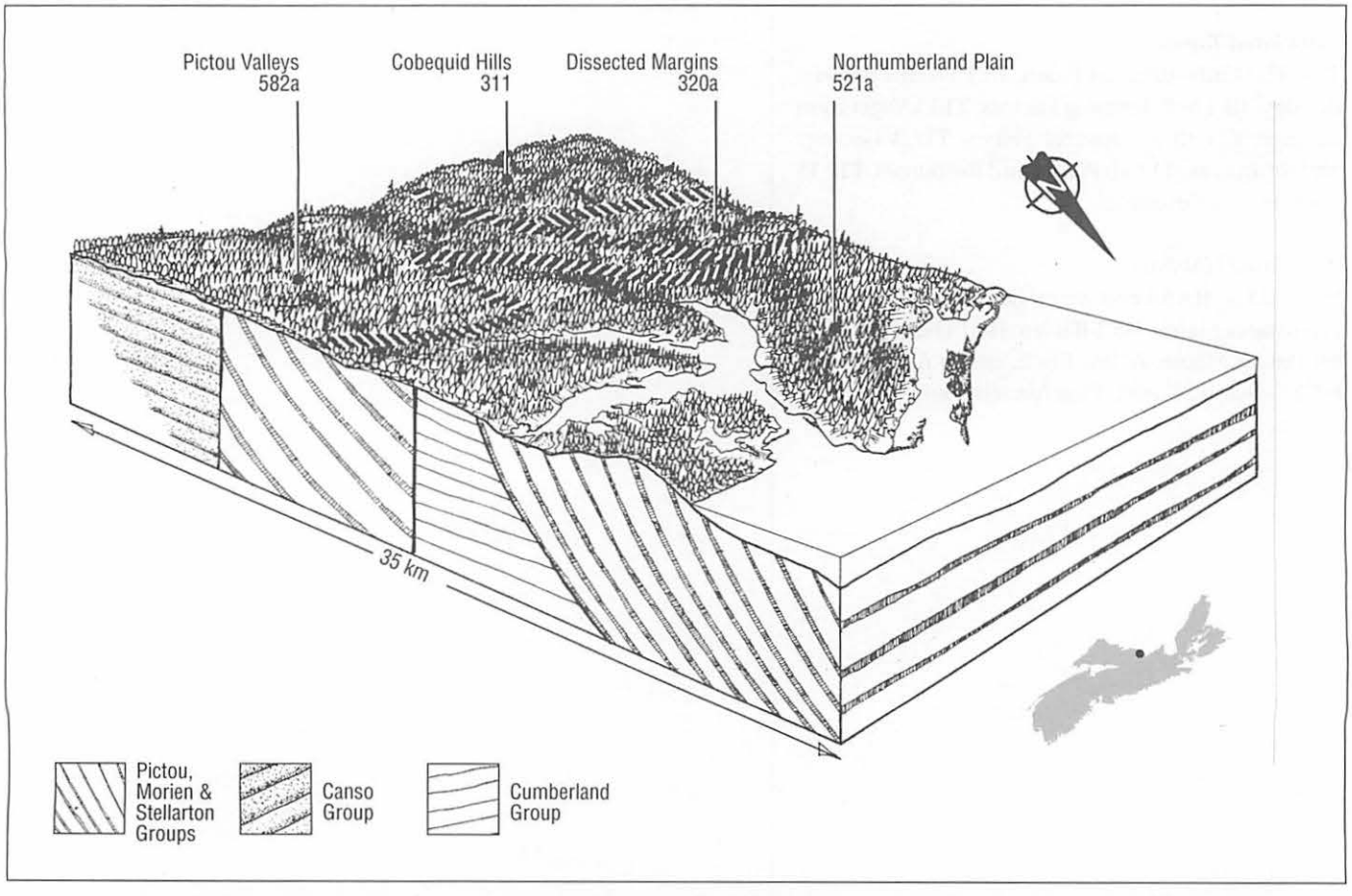

Figure 19: Pictou Basin area. The three rivers (West, East, and Middle) of Pictou drain the Northumberland Plain (Unit 521) through the drowned estuary of Pictou Harbour. The three valleys are deeply eroded into the Carboniferous rocks (Unit 582) which are bounded to the west by the Cobequid Hills (Unit 311) and their Dissected Margins (District 320).

The coal seams lie in grey shales, which are open folds dipping to the east. The total thickness of the coalfield is about 2,600 m and bears up to 45 seams, 11 of which have been mined. The coal seams were formed in a tectonically unstable area in which periods of quiet plant growth were separated by subsidence and inundation by muds. The seams, therefore, grade vertically and laterally into shaly coal and coaly shale.

FRESH WATER

Most of the Pictou Rivers sub-Unit (582a) falls within three tertiary watersheds, draining the East River, Middle River, and West River north into Pictou Harbour (see Figure 19). Drainage patterns are rectangular, and surface water is slightly acidic to neutral. Extensive floodplains occur along the East River in sub-Unit 582a.

SOILS

The soils in this Unit have been derived from shales and sandstones.

Pictou Rivers (sub-Unit 582a)
Well-drained Woodbourne soils (gravelly clay loams) are found associated with imperfectly drained Millbrook clay loams, with small amounts of gravelly Hebert soils formed on glaciofluvial deposits. Clay soils of the Queens and Joggins series are found around Stellarton.

McArras Brook (sub-Unit 582b)
Woodbourne soils also occur together with Barney soils south of Arisaig (well-drained shaly loams).

PLANTS

White Spruce and Balsam Fir grow on old fields and pastures. Sugar Maple, Yellow Birch, and American Beech grow on slopes, with shade-intolerant birches, Red Maple and aspen. Some remnants of intervale old growth forest remain along the West Branch of the East River of Pictou.

ANIMALS

The East, Middle and West Rivers support significant salmonid habitat.

CULTURAL ENVIRONMENT

Soils in this Unit are productive, and much of the area is farmed. For the Scottish settlers coming to this area in the late 1700s, the Pictou Valleys provided reasonably good farmlands once the trees were cleared. Forestry exploitation in this area was very extensive in the 1800s, supplying timber exports to Britain. The forestry industry continues to be important here, as is mining around the Pictou Rivers (sub-Unit 582a).

Coal was discovered in the Pictou coalfield in 1798 on McCullochs Brook and was worked in the early 1800s; mining continued sporadically into the 1900s, with most operations ceasing by 1960. The three main coal-producing districts are Thorburn, Albion, and Westville. Most recently, coal mining took place at Westville. The coal from these mines was a major factor in the industrial development of this area. At McArras Brook (sub-Unit 582b) the economies of small communities are based on fishing, farming, and lumbering. Arisaig has a prosperous fishery.

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Sites of Special Interest
- Arisaig (sub-Unit 582b)—a 5-km-long section of the shoreline has the best continuous exposure of Silurian and Devonian sediments in North America; a wide variety of tropical marine fossils occurs, including graptolites, brachiopods, bryozoa, trilobites, crinoids, and cephalopods
- Hopewell—intervale forest with rare plants

Provincial Parks and Park Reserves
- Salt Springs
- Green Hill
- Guysborough Railway (part)
- Arisaig

Proposed Parks and Protected Areas System includes Natural Landscape 42.

Associated Offshore Unit
Sub-Unit 582b: 914 Northumberland Strait.

Associated Topics
T2.1 Introduction to the Geological History of Nova Scotia, T2.4 The Carboniferous Basin, T8.1 Freshwater Hydrology, T10.1 Vegetation Change, T12.3 Geology and Resources, T12.10 Plants and Resources.

Associated Habitats
H5.2 Oldfield, H6.1 Hardwood Forest (Sugar Maple, Yellow Birch, Beech Association).

583 ANTIGONISH UPLANDS

Unit 530 is divided into two sub-Units:

(a) South River
(b) Lakevale

GEOLOGY AND LANDSCAPE DEVELOPMENT

South and north of the town of Antigonish are two areas of upland underlain by Devonian to Middle Carboniferous strata of varying character. They include resistant Horton strata, easily eroded Windsor deposits, and slightly more resistant Canso and Riversdale strata. Some volcanic rocks also occur. The areas are cut by faults and are elevated and dissected. They represent a transitional zone between the coastal lowland and the uplands to the west and south.

In the South River area, a valley extends southwards through Lochaber Lake across the southern uplands to the St. Marys River estuary. This may have been the course of an ancestral river that flowed northwards from the Scotian Shelf and was superimposed upon the resistant rocks that the valley now crosscuts.

FRESH WATER

This Unit is divided into a number of tertiary watersheds, most of which drain into St. Georges Bay (see Figure 17). Surface water is dominated by tributaries that flow in a modified trellis pattern into first-order streams draining either into the harbours or directly into the bay. Floodplains occur along many of the Antigonish area streams and rivers in sub-Unit 583a.

SOILS

South River (sub-Unit 583a)
To the west of this sub-Unit, Millbrook soils predominate. These soils have developed from gravelly clay loam tills of mixed origin—sandstones, shales, and metamorphic rocks. In the centre, well-drained Woodbourne soils have developed from shales and sandstones of the Windsor Formation. Woodbourne soils are stony to shaly loams. Stewiacke and Hebert soils are common on water-deposited materials along stream and river valleys, the former having developed from alluvium and the latter from glaciofluvial deposits.

Lakevale (sub-Unit 583b)
The soils in this sub-Unit tend to be imperfectly drained, either because of fine-textured impermeable subsoil, or because they are underlain by flat-lying bedrock. The finest textured soils are Queens (sandy clay loam) and Millbrook (gravelly clay loam). Hansford soils are coarser but also imperfectly drained. The better-drained Thom soils are derived from a mixture of sandstones and metamorphic rocks. Westbrook soils are found on tills derived from conglomerate.

PLANTS

This Unit falls within Loucks' Sugar Maple–Hemlock, Pine Zone, at the boundary between two ecoregions: a northerly one in which conifers predominate among scattered deciduous stands, and a more southerly one in which shade-tolerant species are found on a wider range of sites. In the western part of the Unit, Sugar Maple, Yellow Birch, and American Beech are common, with spruce, Eastern Hemlock, pine, Red Maple, and birch on less well-drained sites. Oldfields regenerating in White Spruce are common. As one approaches Cape Breton, softwoods became more prevalent.

ANIMALS

This Unit provides mainly forested habitats, with cliffs along St. Georges Bay. There is virtually no information on small mammals in this Unit, but diversity is probably moderately high. Typical freshwater fish species include White Suckers, perch, shiners, Brown Bullhead, Brook Trout, American Eel and Gaspereau. Three isolated populations of Yellow Perch exist in Lochaber Lake.

CULTURAL ENVIRONMENT

Forestry exploitation and small farming in valley intervales characterize much of the land use in this area. In the South River area (sub-Unit 583a), limestone is quarried at Antigonish. The Fraser Mills Fish Hatchery raises small fish for lake stocking programs throughout the province and an exhibition centre at the operation provides information on the hatchery and local angling. At Lakevale (sub-Unit 583b), commercial fishing provides an economic base.

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Provincial Parks and Park Reserves
- Linwood

Proposed Parks and Protected Areas System includes Natural Landscape 45.

Associated Offshore Unit
Sub-Unit 583b: 914 Northumberland Strait.

Associated Topics
T2.4 The Carboniferous Basin, T3.2 Ancient Drainage Patterns, T8.1 Freshwater Hydrology, T9.1 Soil-forming Factors, T11.13 Freshwater Fishes, T12.11 Animals and Resources.

Associated Habitats
H3.1 Freshwater Open-Water Lotic, H3.3 Freshwater Bottom Lotic, H3.5 Freshwater Water's Edge Lotic, H5.2 Oldfield, H6.1 Hardwood Forest (Sugar Maple, Yellow Birch, Beech Association), H6.2 Softwood Forest (White Spruce Association), H6.3 Mixedwood Forest (Spruce, Fir, Pine–Maple, Birch Association).

584 AINSLIE UPLANDS

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Ainslie Uplands cover a large area of southwestern Cape Breton from St. Georges Bay to Lake Ainslie. The geology is dominated by Horton Group deposits which have been thrown into broad folds trending northeast to southwest.

The area is on the uptilted side of the planation surface and has been deeply eroded. Almost all strata younger than Windsor age have been stripped off. The remaining Windsor Group strata, which still attain a total thickness of 750 m, are preserved in long synclines and fault blocks southwest of Lake Ainslie and east of the Mabou Highlands (Unit 314). In this area, on the southern end of the highlands, volcanic rocks of Devonian to Carboniferous age are found.

The Ainslie Uplands are hilly and fairly rugged, with the hills forming a visual continuum from the Creignish Hills to Lake Ainslie. All the major rivers—the Mabou, Southwest Mabou, Mull, and Black—exploit the bands of Windsor strata lying between the long ridges of Horton rocks and form a roughly rectangular drainage pattern. The Mabou River flows in a faulted block of Windsor strata and reaches the Northumberland Strait through a drowned estuary.

Glacial deposits brought down from the Cape Breton highlands by glaciers and glacial streams mantle the area. Lake Ainslie has been dammed by glacial gravels, which can be seen as ridges near Strathlorne. The westward extension of the lake, Loch Ban, is shallow and bordered with peat deposits, which can be found far up Black River along a flat, low belt of Windsor strata. Coarse glacial gravels can be seen on the lower slopes of the Mabou Hills. Inland, fine sandy deposits in a valley between Loch Ban and the sea ascend to more than 150 m above sea level.

FRESH WATER

The northeastern portion of this Unit is dominated by Lake Ainslie, the largest lake in Cape Breton, draining north through the Margaree into the Northumberland Strait. The southern portions are dominated by the trellised drainage patterns of the Mabou River and its many tributaries. The headwaters of the Skye River occur in this Unit. Most of the streams are shallow and fast-flowing, with pH levels averaging 6.0. Lake Ainslie has a pH of 7.8, and conductivity is 105 micromhos/cm.

SOILS

On the higher elevations—up to 200 m—Diligence, Woodbourne, and Westbrook soils predominate. Diligence soils have developed from grey shales, and Woodbourne soils have developed from reddish-brown sandstones and conglomerates. Falmouth and Queens soils are chiefly found on low-lying areas below 30 m and overlying or adjacent to gypsum deposits. All of these soils, with the exception of Westbrook, are imperfectly drained loams or clay loams over relatively impermeable clay loam tills. The large area of sand between Lake Ainslie and the sea is an interesting feature. Coarse, well-drained Canning soils have developed on this sand plug.

PLANTS

As the highest and one of the most northerly units in the Carboniferous Lowlands Region, the Ainslie Uplands are part of the Sugar Maple, Yellow Birch–Fir Zone which encompasses many of the uplands in Nova Scotia (Region 300). This zone is distinguished by predominantly hardwood forest, in which Sugar Maple, American Beech, Yellow Birch, and Mountain Maple occupy the upper slopes and high ridges. Balsam Fir and White Spruce cover the upland flats and valley slopes. Black Spruce and Larch are found on the extensive clay soils throughout this area. Oldfields regenerating in White Spruce are common.

ANIMALS

Small-mammal diversity is relatively high. Brook Trout and White Perch are typical freshwater species. Lake Ainslie has a rich and diverse aquatic fauna. Snails carry the larvae of the trematode parasites that affect people as "swimmers' itch."

CULTURAL ENVIRONMENT

Farming and forestry characterize land use. Coal was once mined at Mabou Mines. Barite was formerly mined at Lake Ainslie and continues to be extracted at other sites in this area.

Sites of Special Interest
- Strathlorne (Route 19)—a hummocky ridge of sand that dammed a river formerly flowing to Inverness and thus created Lake Ainslie; the lake now drains northward into the Margaree River
- Mabou Harbour mouth to West Mabou Harbour—gypsum area
- Black River (IBP Proposed Ecological Site 12)—alkaline sphagnum bog, including a number of rare plants such as *Rhynchospora capillacea; Carex gynocrates; Eleocharis pauciflora,* var. *fernaldii; Salix candida;* and *Galium tinctorium*

Ecological Reserves
- McFarlane Woods—old deciduous forest

Provincial Parks and Park Reserves
- North Ainslie
- Long Point
- Mabou
- Ainslie Point

Proposed Parks and Protected Areas System includes Natural Landscape 58.

Scenic Viewpoints
- Highway 395 (east shore of Lake Ainslie)
- Skye River valley (Highway 252)

Associated Offshore Unit
914 Northumberland Strait.

Associated Topics
T2.4 The Carboniferous Basin, T3.1 Development of the Ancient Landscape, T3.3 Glaciation, Deglaciation and Sea-level Changes, T3.4 Terrestrial Glacial Deposits and Landscape Features, T8.1 Freshwater Hydrology, T11.11 Small Mammals, T12.3 Geology and Resources.

Associated Habitats
H3.1 Freshwater Open-Water Lotic, H3.3 Freshwater Bottom Lotic, H5.2 Oldfield, H6.1 Hardwood Forest (Sugar Maple, Yellow Birch, Beech Association), H6.2 Softwood Forest (Spruce, Fir Association; Black Spruce, Larch Association).

585 IONA UPLANDS

Unit 585 is divided into two sub-Units:

(a) Grand Narrows
(b) Sydney River

GEOLOGY AND LANDSCAPE DEVELOPMENT

In Cape Breton, Horton strata are not found east of the Great Bras d'Or Channel. In eastern Cape Breton the earliest Carboniferous deposits are represented by the Grantmire Formation. These strata are probably the same age as the Horton Group but are made up of coarser materials: conglomerates, grit, and coarse sandstone. The Iona Uplands are predominantly underlain by Grantmire strata deposited as alluvial fans directly onto the ancient granites and schists of the Boisdale Hills when they stood on the side of the intermontane basin (see Figure 20).

The Iona Uplands Unit is divided into Grand Narrows (sub-Unit 585a) and Sydney River (sub-Unit 585b). In both areas the Grantmire rocks form resistant shoulders on the upland block of the Boisdale Hills and give steep slopes rising directly from the

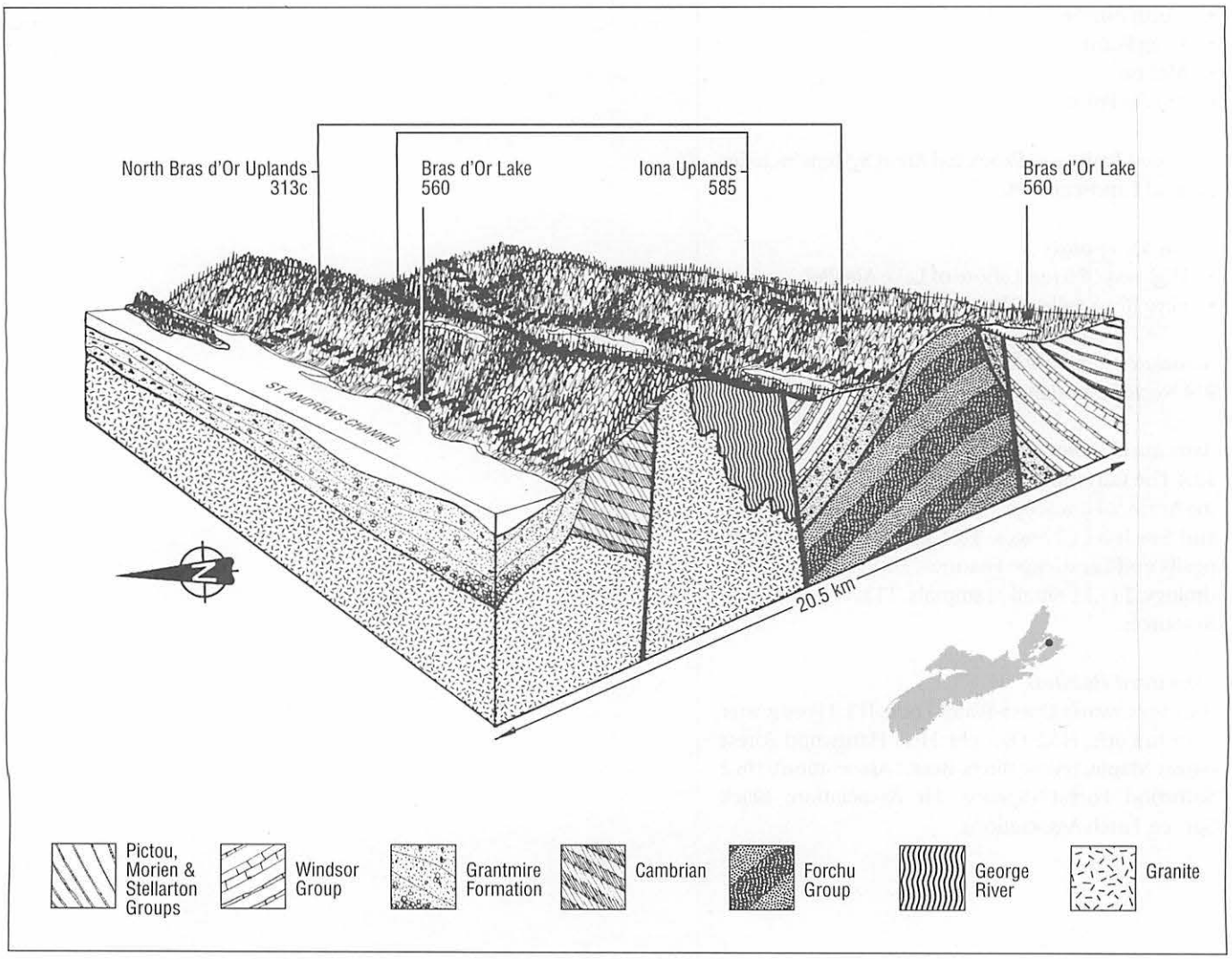

Figure 20: St. Andrews Channel area. The Iona Uplands (Unit 585) are a transitional, hilly area of Carboniferous rocks between the upland fault blocks of ancient metamorphic rocks (Unit 313) and the easily eroded Windsor Group rocks which fringe the Bras d'Or Lake Submerged Lowland (District 560).

Bras d'Or lowland. The elevations reach a maximum of 200 m, in keeping with the location of this area on the tilted planation surface.

Grand Narrows (sub-Unit 585a)
This area includes a section of upland between St. Patricks Channel and the Great Bras d'Or made up of Horton and Grantmire strata. This upland is extensively crosscut by faults and stands as a hill with a fault scarp on the east and a more gradual descent to the Submerged (Bras d'Or) Lowland on the west.

Sydney River (sub-Unit 585b)
This area is mantled by thick glacial deposits, kames, eskers, and outwash gravels which partly fill the river valley and create a series of shallow lakes connected by narrow channels. These deposits are evidence of an ancient lobe of ice in East Bay which extended from the Submerged Lowland during the late stages of the Wisconsinan glaciation. As the ice melted, streams carried outwash material towards the Cabot Strait.

FRESH WATER

There is very little surface-water coverage in sub-Unit 585a. In sub-Unit 585b, several isolated brooks drain into Sydney Harbour, and a few lakes are found in the northern portions. The water is alkaline, with pH levels averaging 7.5.

SOILS

Grand Narrows (sub-Unit 585a)
In this area, soils are mostly well-drained Westbrook sandy loams developed from conglomerates, with imperfectly drained Millbrook clay loams. Small areas of Woodbourne silt loams also occur.

Sydney River (sub-Unit 585b)
Westbrook soils are dominant, with areas of imperfectly drained Debert silt loam (often with a cemented layer). Queens soils, a clay loam, are found at Point Edward. Some areas of coarse Hebert soils occur on outwash sands and gravels.

PLANTS

(See District 560, Submerged Lowland.)

CULTURAL ENVIRONMENT

The Sydney coal mines provide the foundation of much of the industrial base in the Sydney River area (sub-Unit 585b). In certain areas of the Iona Uplands, small farming occurs.

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Sites of Special Interest
- Blacketts Lake to Sydney River—kames, eskers, and outwash gravels along the river valley; rare aquatic fauna
- Nova Scotia Highland Village Museum, Iona—Scottish heritage of Cape Breton

Provincial Parks and Park Reserves
- Barra Forest
- Iona

Proposed Parks and Protected Areas System includes Natural Landscape 48.

Scenic Viewpoints
- Unit 585a: Barra Strait (Iona–Grand Narrows)

Associated Offshore Units
915 Sydney Bight, 916 Bras d'Or Lake.

Associated Topics
T2.4 The Carboniferous Basin, T3.1 Development of the Ancient Landscape, T3.4 Terrestrial Glacial Deposits and Landscape Features, T9.1 Soil-forming Factors, T11.16 Land and Freshwater Invertebrates, T12.3 Geology and Resources.

Associated Habitats
(See District 560, Submerged Lowland.)

590 DISSECTED PLATEAU

The District is divided into two Units on the basis of morphology:

591 Margaree Plateau
592 St. Lawrence Slopes

GEOLOGY

District 590 is underlain by resistant early Carboniferous strata that flank the Highlands Region in Cape Breton. The rocks are predominantly coarse early Horton deposits, but in many places along the western side of the Highlands, Early Carboniferous lava flows are found; some reach 300 m in thickness.

These Early Carboniferous deposits are in some places in fault contact with the Highlands Region and in others have been deposited directly onto the surface. Immediately at the contact, the Carboniferous strata are often tilted up or domed, indicating that the highland block moved up vertically through them. In some places away from the contact, domed hills of Early Carboniferous strata occur. These domed hills may conceal blocks of the ancient rocks underneath them. Examples of these hills are Hunters Mountain and Salt Mountain. Elsewhere, these resistant strata form shoulders high on the slopes of the Highlands. The Highlands may once have been covered by many thousands of feet of Carboniferous rocks, which have been stripped away, leaving these resistant remnants. Occasionally pockets of Middle Carboniferous strata remain, such as those of the Riversdale Group around Chimney Corner, but these have generally been preserved in downfaulted blocks. Similarly, the Windsor strata that are found here and there around the margins of the Highlands lie almost entirely in faulted valleys.

LANDSCAPE DEVELOPMENT

The District is dissected by faults which lie predominantly northeast to southwest, parallel to the fold direction typical of the Carboniferous Basin, and parallel to the general structural trend in Cape Breton. These faults are usually followed by river valleys. The terrain is generally elevated and rugged, reaching 300–350 m in places along the slopes of the Highlands.

The District is heavily mantled with glacial deposits that were washed down during deglaciation of the Highlands. These are thickest close to the Highlands slopes, particularly where the ice followed fault valleys, such as those of the Margaree and Middle rivers.

A wave-cut notch 6–10 m above the high tide mark is prominent around Cape St. Lawrence from Chéticamp to Cape North and beyond to Cape Smokey. In places it is overlain by peat of early Wisconsinan age.

SCENIC QUALITY

Because much of this plateau flanks the Highlands Region and is deeply dissected, there is considerable relative relief, with many fine views from the valley floors. Indeed, a considerable stretch of the scenic Cabot Trail traverses Unit 591, following the broad valleys of the Middle River and the Margaree River system. Other valleys of high scenic quality have been cut by the Baddeck and North rivers. In all cases, the flat river valley floors are enhanced by livestock farms and contain ocean inlets at their mouths. The northern areas (sub-Units 592b and 592c) exhibit fine coastal scenery.

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Associated Topics

T2.1 Introduction to the Geological History of Nova Scotia, T3.3 Glaciation, Deglaciation and Sea-level Changes.

591 MARGAREE PLATEAU

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Margaree Plateau is dissected upland that sweeps southward from the Highlands to Lake Ainslie in the southwest and to the Submerged Lowland (District 560) in the southeast (see Figure 21).

Downfaulted blocks of Windsor Group rocks are found within the folds of resistant Horton strata in several areas. The valleys of the Northeast Margaree, Middle, and Baddeck rivers have all been eroded from Windsor strata (see Figure 8).

The escarpment on the west side of the Northeast Margaree valley is straight for more than 15 km. It is in line with other valleys across the Highlands and with the Aspy Fault valley at Cape North.

When it reaches the Windsor strata, the Northeast Margaree valley widens out, flowing between high hills. The floor of the valley is covered with glacial sands and gravels, and a floodplain with oxbow ponds and terraces has developed. At Emerald the river turns 90° to the west, cuts through a band of Horton strata, and flows to Margaree Forks. Originally it probably flowed southwards to the Middle River and St. Patricks Channel, but this exit was blocked by glacial drift. The old river valley is now occupied by a string of lakes: Harvard Lake, First

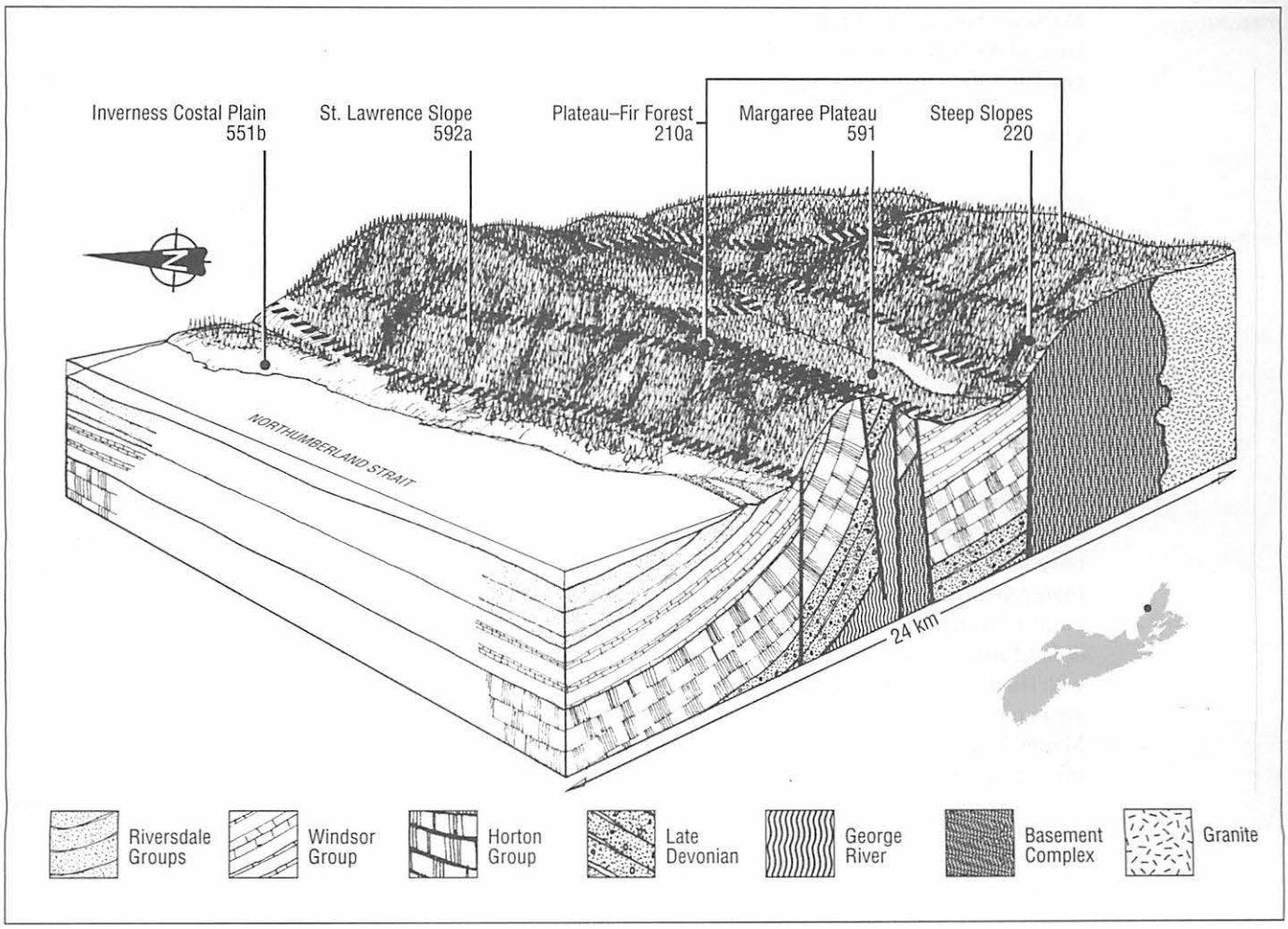

Figure 21: Margaree Valley area. Windsor Group rocks, including gypsum, are preserved in downfaulted sections now occupied by the Margaree River and the Inverness Coastal Plain (Unit 551). Horton conglomerate and sandstone compose the deeply dissected Margaree Plateau (Unit 591) and the St. Lawrence Slopes (Unit 592), which form a shoulder to the Plateau–Fir Forest (District 210). These slopes are the soft rock equivalent of the hard rock of the Steep Slopes (District 220).

Lake O'Law, and Second Lake O'Law. Beyond Margaree Forks the river flows through another strip of Windsor strata before entering its drowned estuary at Margaree Harbour.

The hilly terrain continues to the Baddeck area. There it is intersected by the Windsor lowland through which the Baddeck River flows to its drowned estuary at Nyanza Bay. Glacial deposits are found along most of the major rivers. At Middle River and Skye River (further south) the gravels contain mastodon teeth and bones.

FRESH WATER

Much of this Unit falls within a secondary watershed that drains Lake Ainslie into the Margaree Harbour. The Southwest Margaree River dissects the northern portions and is fed by many smaller-order tributaries. There are large grassy fens and wet meadows along the Margaree where it broadens out north of Margaree Forks. Solution lakes occur in the broader areas of the Margaree Valley. This valley also has several large aquifers in the Carboniferous formations.

SOILS

Soils are mapped only as Rough Mountainland. However, the soils are, for the most part, surprisingly deep, with some smooth, compressed silts, supporting the theory that the area was not extensively glaciated. The soils probably share at least some of the characteristics of those described in Unit 584, Ainslie Uplands.

PLANTS

This Unit forms part of Loucks' Sugar Maple, Yellow Birch–Fir Zone. However, while the Ainslie Uplands have a rolling, hilly terrain, the Margaree Plateau is more level. White Spruce is common in old fields and pastures which have been recolonized. On the flatter upland areas, Balsam Fir and Black Spruce are mixed with shade-intolerant species. Better-drained rolling areas have more shade-tolerant hardwoods: Sugar Maple, Yellow Birch, and American Beech, with a mixture of Balsam Fir.

ANIMALS

This Unit provides eagle-nesting habitat and an important post-breeding concentration area. Atlantic Salmon and American Eel are found in the Margaree River. Freshwater fish such as White Sucker, sticklebacks, and Brook Trout are found in streams further inland. The Middle River supports four species of salmonids.

CULTURAL ENVIRONMENT

Along the Margaree River valley, small mixed farming is the predominant land use. Forestry occurs on the Margaree Plateau. The Margaree is designated as a heritage river and has long been important for salmon fishing. Wildlife and angling attract tourism and recreational use of the area.

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Sites of Special Interest

- Northeast Margaree Valley—fault scarp on the west side of the valley, sinkholes in areas of karst topography, river terraces, intervale plants
- Baddeck River (west side, north of Melford)—fossil valley containing Windsor strata
- St. Anns Harbour—gravel and sand bars nearly block the harbour entrance; the narrow gap is crossed by a cable ferry; from Kellys Mountain lookoff (District 220) the old positions of the sand bar can be seen as ridges
- Piper Glen (IBP Proposed Ecological Site 13)—spectacular waterfall, mature mixed forest
- Lake O'Law (IBP Proposed Ecological Site 14)—old growth mixed deciduous forest habitats

Provincial Parks and Park Reserves

- St. Anns
- Whycocomagh
- Scotsville
- South West Margaree
- Doyles Bridge
- Lake O'Law

Proposed Parks and Protected Areas System includes Natural Landscape 63 and Candidate Protected Area 8 Trout Brook.

Scenic Viewpoints

- Cabot Trail (all sections)
- Northeast Margaree valley
- Southwest Margaree valley
- summit of Salt Mountain (views over St. Patricks Channel)

Associated Topics
T2.4 The Carboniferous Basin, T3.2 Ancient Drainage Patterns, T8.2 Freshwater Environments, T11.4 Birds of Prey, T11.13 Freshwater Fishes, T12.11 Animals and Resources.

Associated Habitats
H3.1 Freshwater Open-Water Lotic, H3.2 Freshwater Open-Water Lentic, H3.4 Freshwater Bottom Lentic, H3.6 Freshwater Water's Edge Lentic, H4.2 Fen, H6.1 Hardwood Forest (Sugar Maple, Yellow Birch, Beech Association), H6.2 Softwood Forest (Balsam Fir Association).

592 ST. LAWRENCE SLOPES

The St. Lawrence Slopes is physically separated into three sub-Units:

(a) Squirrel Mountain
(b) Polletts Cove
(c) Meat Cove

GEOLOGY AND LANDSCAPE DEVELOPMENT

St. Lawrence Slopes is a narrow band of resistant Early Carboniferous rocks which shoulder the Highlands Region massif along its west side from Margaree Harbour to Cape North (see Figure 21).

Squirrel Mountain (sub-Unit 592a)
In the Squirrel Mountain area the strata are dominated by Early Carboniferous volcanic lavas. These are very resistant, and the slope from the Highlands plateau drops steeply to the coast where it meets a narrow coastal plain (sub-Unit 551b). At Corney Brook, all the main rock groups in this part of Cape Breton are exposed within a short distance of one another. The Horton strata contain angular pieces of the basement rock.

Polletts Cove (sub-Unit 592b)
The Polletts Cove area lies beside Pleasant Bay and presents unremittingly steep slopes which form a continuum with the underlying Highlands block. Pleasant River flows along a fault and across a small triangle of Windsor Group rocks before reaching the Northumberland Strait.

Meat Cove (sub-Unit 592c)
A larger area of Early Carboniferous strata is found at Meat Cove, but because these rocks are almost as resistant as the granites and gneisses, the landscape remains steep and rugged, with high cliffs bordering Bay St. Lawrence.

FRESHWATER AND COASTAL AQUATIC ENVIRONMENTS

Surface water in all three sub-Units consists mainly of steep, straight streams that originate in the surrounding highlands and drain into the Northumberland and Cabot straits. Many of the streams in sub-Units 592a and 592c are isolated first-order streams that drain in a parallel pattern.

Fresh water is alkaline; for example, Grand Lake in sub-Unit 592a has a pH of 8.0 and a conductivity reading of 200 micromhos/cm. There are colluvial deposits in stream ravines in sub-Units 592b and 592c, as well as several seep and spring zones. A number of barachois ponds and several small salt marshes are found along the coast.

PLANTS

Softwoods predominate: spruce, hemlock, pine, and fir, with maple and birch. Pure stands of White Spruce occur on oldfields, with better stands of shade-tolerant Sugar Maple, Yellow Birch and American Beech on better-drained slopes and rich intervale soils.

ANIMALS

Freshwater habitats support a diverse aquatic fauna. The unit also provides some scattered eagle-breeding habitat. A moderate number of Black Guillemot are believed to breed in part of Bay St. Lawrence.

CULTURAL ENVIRONMENT

A Snow Crab fishery predominates at Pleasant Bay (sub-Unit 592b). Meat Cove was so named because of the smell of the rotting flesh of hundreds of moose slaughtered by a nineteenth-century hunting expedition.

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Sites of Special Interest
- Corney Brook—a complete section of local Carboniferous strata
- North Aspy River (IBP Proposed Ecological Site 21)—old deciduous forest

Provincial Parks and Park Reserves
Proposed Parks and Protected Areas System includes Natural Landscapes 75a and 75b and Candidate Protected Area 1 Pollet Cove–Aspy Fault.

Scenic Viewpoints

- Sub-Unit 592b: Pleasant Bay (viewed from Cabot Trail on west side)
- Sub-Unit 592c: North of Capstick (view towards Cape North)

Associated Offshore Unit

914 Northumberland Strait.

Associated Topic

T2.4 The Carboniferous Basin, T7.3 Coastal Landforms, T11.7 Seabirds and Other Birds of Marine Habitats, T12.11 Animals and Resources.

Associated Habitats

H2.1 Rocky Shore, H5.3 Cliff and Bank, H3.1 Freshwater Open-Water Lotic, H6.1 Hardwood Forest (Sugar Maple, Yellow Birch, Beech Association), H6.2 Softwood Forest (White Spruce Association; Spruce, Hemlock, Pine Association), H6.3 Mixedwood Forest (Spruce, Fir, Pine–Maple, Birch Association).