

800

Atlantic Coast

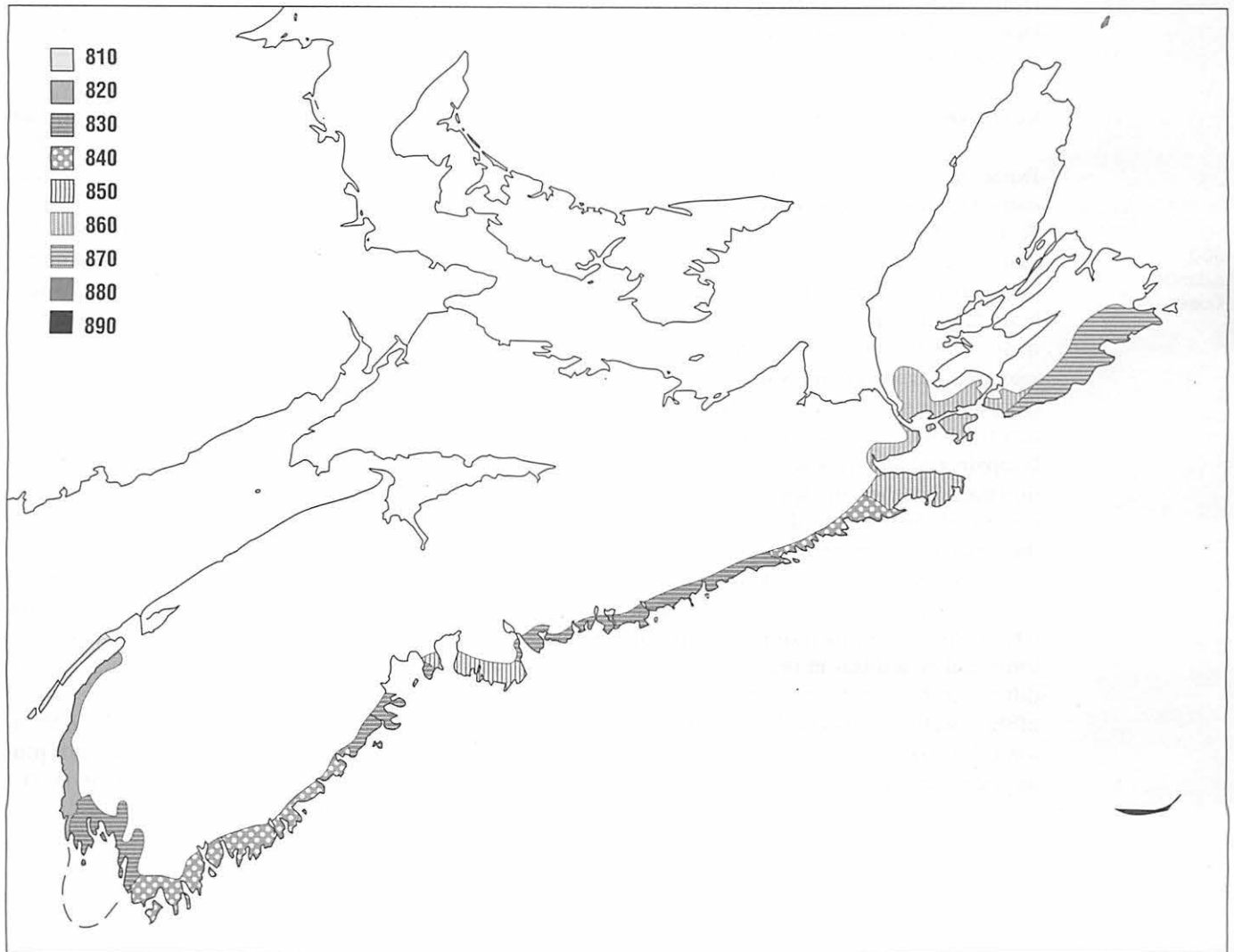


Figure 26: Region 800, Atlantic Coast, and its component Districts.

800 ATLANTIC COAST

The Atlantic Coast Region is divided into nine Districts based upon major geomorphological characteristics:

- 810 Basalt Peninsula
- 820 Cliffs and Beaches
- 830 Beaches and Islands
- 840 Quartzite Headlands
- 850 Granite Barrens
- 860 Sedimentary Lowland
- 870 Till Plain
- 880 Clifed Island
- 890 Sandy Island

Districts 830, 840, and 850 are further divided into Units based upon geomorphological, soil, and vegetation characteristics.

REGIONAL CHARACTERISTICS

Exposure to winds from the Atlantic Ocean dominates coastal environments from Digby Neck to Scatarie Island. The Region includes Isle Haute and St. Paul Island. The coastal forest is found throughout, and its inland extension marks the regional boundary. Headlands, especially in granite and quartzite areas, are frequently barren. Almost every major rock type in Nova Scotia is found in this region, but the soils are often dominated by hardpans that result from excessive moisture. Coastal erosion is rapidly reshaping coastal areas containing drumlins; there beaches, marshes, and waterfowl habitat are found. Seabird nesting colonies and marine mammals are common on coastal islands.

The Atlantic Coast Region is much influenced by the adjacent Offshore/Continental Shelf (Region 900). There is a transition zone where the marine and terrestrial conditions interact, and it is sometimes difficult to make a distinction between coastal and offshore waters. In general, Region 800 extends to the low tide mark, and marine conditions are described in Region 900. However, in some bays, such as St. Margarets and Mahone bays (District 460), the marine characteristics are more typically coastal and the District encompasses subtidal waters.

GEOLOGY

The Atlantic Coast Region of Nova Scotia cuts across a great variety of rock types.

The Western Shore, South Shore, and Eastern Shore (Districts 820, 830, and 840) are dominated by the old and generally very hard rocks of the Meguma Group. These are interfolded slates and greywackes, with local outcroppings of metamorphosed volcanic ash and lava (Yarmouth area). Areas of very resistant granite (District 850) also occur. In contrast, Chedabucto Bay has been eroded from weakly metamorphosed Carboniferous sandstones (District 860). Southeastern Cape Breton (District 870) is underlain by metamorphosed Precambrian volcanic ash deposits, sandstone, and granite.

At the entrance to the Bay of Fundy, Digby Neck (District 810) is a low-lying basalt ridge. St. Paul Island (District 880) consists of very ancient Precambrian rocks similar to those found in the Cape Breton massif.

The coastal bedrock is low-lying and exhibits low relief. Elevations rarely exceed 100 m, except on the granite promontories and knolls at Pennant Barrens (Unit 851) and Canso Barrens (Unit 852), where the maximum elevation is 250 m.

LANDSCAPE DEVELOPMENT

The coastline can be divided into two sections based upon classic features of emergence and submergence. Post-glacial readjustment north of a pivot line that lies parallel to the length of the province from Yarmouth to Truro resulted in the emergence of Bay of Fundy coasts. From Yarmouth to Scatarie Island, the Atlantic coast has been continuously submerged as sea levels have risen. The emergent shore has raised beaches, raised wave-cut platforms, and a smooth shoreline. The submerged shore is highly irregular, with drowned estuaries and headlands producing an indented coast fringed by islands. The post-glacial rise in sea levels recorded over the past 10,000 years or so has affected all coastal areas. Drowned forests, eroding headlands, tidal marshes, and beaches driven inland are all evidence of the continuing transgression of the sea.

The shape of the coastline is also strongly influenced by faults, especially along the Eastern Shore

and the southern boundary of Chedabucto Bay. Many of the long inlets in Guysborough County have formed along fault lines. The straight shore west of Cape Canso marks the position of the Chedabucto Fault. The smooth eastern shoreline of the Louisbourg lowlands (and Gabarus Bay) may also be fault-controlled. The orientation of St. Marys Bay, North Mountain, and the Parrsboro shore also owe much to fault movements within the Bay of Fundy area.

GLACIAL DEPOSITS

The last major flood of ice across Nova Scotia during the Wisconsin Period left a predominantly north-south to northwest-southeast imprint upon the landscape. Pre-existing drainage channels and any faults lying parallel to the flow were deepened. Interfolded strata oriented parallel to the direction of ice flow were differentially eroded, leaving ridges and valleys (Tusket area); ridges perpendicular to the ice flow were smoothed off. The whole area was then blanketed with glacial till derived mainly from local sources but also carried from one geological district to another and deposited as drumlins.

Along the coast the amount of sediment available for redistribution depends largely upon the nature of the glacial deposits. Areas with drumlin headlands and islands tend to have adequate sediment supply derived from coastal erosion. Another very limited source of coastal sediment, quartz sand, is washed from the surface of coastal granite bodies by sub-aerial erosion. A more important source of coastal sediment is silt and sand that was carried landward from glacial deposits on the Scotian Shelf by the sea as it rose during the post-glacial period. Many of the present sand beaches owe their origins to material driven landward in this manner.

CLIMATE

Although the Atlantic Coast Region is generally an exposed, high-energy environment, the many indentations along the coast provide sheltered bays and estuaries. The average tidal range is small: at Guysborough Harbour it is 1.4 m, at Halifax 1.4 m, at Lunenburg 1.6 m, and at Barrington Passage 1.9 m. In the Gulf of Maine, however, the tidal range increases sharply. At Woods Harbour, 10 km west of Barrington Passage, the average tidal range is 2.6 m, which becomes 3.7 m at Yarmouth and 4.7 m in St. Marys Bay. Ocean swells move in from the south and east, though their erosive power is somewhat reduced by refraction and by northerly offshore winds, particularly in winter.

The median extent of sea ice just reaches the eastern limit of this region. In heavier-than-average ice years, ice fields may extend as far southwest as Halifax County.

The background features of the ocean climate are controlled by the southwest-flowing Nova Scotia Current, which is relatively low in salinity; superimposed upon this are meteorological events which can bring large runoffs of fresh water or upwellings of saltier deeper waters. In general, the Region is a cool-water coast. In summer the coldest temperatures are found around Cape Sable and in the Bay of Fundy, as a result of a strong mixing of surface waters by tidal currents.

The ocean is the dominant influence on the Region's climate. The main features are moderated seasonal and daily temperatures, high precipitation and humidity, strong winds, fog, and salt spray.

The winters are comparatively mild, and the summers are short and cool. The mean annual temperature range is 15–20°C and is least in the southwest, increasing towards Cape Breton. This can be contrasted to a mean annual temperature range of 20–25°C throughout the rest of the province. Along the coast, spring starts early but is long and cool. Mean daily temperatures rise above the freezing point about the second week of March in the south, and about two to three weeks later along the Eastern Shore and in Cape Breton. Because of frequent fogs, and the cooling influence of ocean waters, the mean daily temperature in July stays below 15°C near the coast, increasing somewhat inland. Mean daily freezing temperatures return to northern inland areas before the end of November, but in the Atlantic Coast Region this does not usually happen until after the second week in December, or even as late as the end of December in the southwest. Mean daily January temperatures stay above –5°C and, in some areas, remain above 0°C.

Like most of the province, the Atlantic Coast Region receives fairly high total precipitation, generally between 1200 and 1400 mm, but between 1400 and 1600 mm in Queens and Lunenburg counties and in the northern half of Halifax County. Only about 15 per cent falls as snow because of the mild winter temperatures. Most of the Region receives less than 200 cm of snow annually, and Guysborough County and Cape Breton receive less than 150 cm. The snow-cover season starts late and finishes early, ranging from less than 100 days near Cape Sable to more than 130 days in Cape Breton. Snow accumulations are usually low.

Fog and high humidities are common along the Atlantic coast. Summer and fall are the main seasons

for fog, when warm, moist air moving in from the south comes into contact with cool Atlantic coastal waters. On average, fog occurs 15–25 per cent of the year. The southwestern section of the coast is the foggiest, with Yarmouth registering an average of 120 days in which fog occurs.

The main features of the bioclimate of the Atlantic coastal forest are the long frost-free period and long growing period, combined with cool summer temperatures, low evapotranspiration rates, and exposure to wind.

FRESH WATER

The Atlantic coast is dissected by many fault-controlled river and lake systems that drain into the ocean. At the mouths of most rivers, wetlands receive both tidal and freshwater influences. Surface waters tend to be soft and acidic. The brownwater lakes are shallow and often associated with bogs.

SOILS

The important factors that influence soil development in this Region are the high precipitation and shorter winters, which result in strong leaching action over a greater part of the year, resistant igneous or metamorphic bedrock, low relief, and slow decomposition of leaf and needle litter. In general, the soils are shallow, coarse podzols, usually sandy loams, acidic and strongly leached, alternating with areas of exposed bedrock and organic deposits. Gleyed podzols and gleysols are also common, particularly in southwestern Nova Scotia. Small areas of coarse soils that developed on glacial outwash sands and gravels are found throughout the Region. Mixtures of finer-textured Carboniferous material show up in drumlin areas. In eastern Cape Breton, heavy clays can be found on deeper, flat, poorly drained tills. All along the Atlantic coast extensive pan formations (ortstein) are common; these severely impede soil drainage, causing thick layers of surface humus to accumulate.

PLANTS

The Atlantic Coastal Forest Region lies within and is defined by Louck's Spruce, Fir Coast Zone. The major influences on the regional vegetation are the marine climate and extensive disturbances by fire and cutting. The cool, wet, acidic conditions favour conifers. Deciduous trees are usually restricted to higher, better-drained sites sheltered from coastal winds. On headlands and exposed ridges, trees are usually se-

verely stunted. Continuous high winds increase transpiration, and trees may actually become "desiccated" in spite of high rainfall. Salt spray can kill part or all of a tree, but its effects are limited to a fairly narrow band along the coast. White Spruce, which has a high tolerance to wind and salt spray, is the characteristic species closest to the sea.

In the southwestern part of the Region, White Spruce, Black Spruce, and Balsam Fir are accompanied by White Birch and Red Maple (H6.3). The reappearance of White Pine and Red Oak inland usually indicates less rigorous climatic conditions and can therefore mark an approximate inland boundary. In the northern part of the Region, where the winters are colder, White Spruce continues to be prominent along the shore but is less abundant away from the water. Dense stands of Balsam Fir, Black Spruce, and White Spruce are characteristic, along with a virtual absence of Red Spruce, White Pine, and most hardwood species. Jack Pine sometimes occurs on fire barrens, and larch is common on wetter soils, particularly in Cape Breton. Excessive stand density may be another factor besides wind exposure that limits tree growth in this part of the Region. Throughout the Region, barrens or semi-barrens are common, supporting mostly low, ericaceous (heath) vegetation. Sphagnum bogs are also common in depressions.

C.D. Howe's description of this "black" forest written in 1912 is still true today: "The numerous peninsulas formed by the long re-entrant bays and harbours are covered with an inferior black spruce-fir forest and exhibit abundant bogs. The softer places in the rock have been worn into little hollows and pockets, sometimes only a few feet and usually not many rods apart. These fill with water which cannot drain away freely because of the massive quartzite beneath. The loss by evaporation is replaced by frequent rains, but it is also very much retarded by the natural humidity of the air. The result is a sour soil composed of raw humus, and hence the stunted forest. The trees are about ten to fifteen feet high, and frequently not more than three or four feet high in the more boggy situations. A section of one of these trees, three-eighths of an inch in diameter, when placed under a compound microscope revealed 47 annual rings. On the drier portions where a little real soil is present, one finds sapling thickets and dense polewood stands of fir. Along the streams of normal rapidity the stand is mostly second growth yellow birch and red maple."

ANIMALS

The terrestrial habitats provided by the Atlantic Coast Region are mainly forests (mostly conifers), barrens, and bogs. The main faunal interest is provided by the extensive range of coastal and marine habitats, including rocky shores, sandy beaches, dune systems, mud flats, salt marshes, and islands. These habitats provide breeding and feeding areas for a wide range of resident and migratory birds.

The coastal strip from Halifax around to Meteghan and inland for 10–20 km has the least persistent winter snow cover of any area in the province. This creates severe microclimatic stress for small mammals during cold snaps, and in the case of the Deer Mouse this stress is at the limits of tolerance. Almost certainly because of this, deer mice are very rare there and usually absent from most areas in this zone at most times; White-footed Mouse is the dominant species of *Peromyscus* in the District.

Marine fauna is mostly cold-water boreal in character but is not homogenous along the coast. Sheltered inlets and pockets of warmer water support many species with a more southerly distribution. Productivity is high along the edge of the Scotian Shelf, and marine mammals are quite numerous. The Atlantic coast is often visited by unusual bird and marine species carried by winds and currents from other parts of the Atlantic Ocean.

CULTURAL ENVIRONMENT

Shell middens found in coastal sites give evidence of former Mi'kmaq camps. Before European colonization, the Mi'kmaq frequented various river estuaries along the Atlantic coast, living primarily on abundant fish, clams, and other shellfish. European settlers were attracted to these same areas, drawn by the fisheries and the presence of deep harbours from which timber and fish could be shipped. Some Acadians settled on the French Shore, Germans settled around Lunenburg, and Loyalists along the southwestern coast at Shelburne, Liverpool, and Barrington. The remainder of the Atlantic coast was settled by Scots, Irish, and Loyalists. In the early 1500s, long before European settlement, the Canso area had been an important fisheries post because it was the nearest point of land in Nova Scotia to the great North Atlantic fishing grounds. The fisheries continue to be critical to the survival of many coastal communities, but the collapse of fish stocks in the early 1990s threatened this. Many infrastructure industries depend on the fisheries. Fish processing plants are common along the Atlantic coast, with the

largest in North America operating at Lunenburg. The construction of Cape Island boats has long been a shipbuilding tradition in southwestern Nova Scotia. In the 1920s, with the development of roads and car travel, Peggys Cove was made famous by tourists and urban artists and has become one of the central symbols of the Maritimes, representing a quintessential fishing village.

The islands along the Atlantic coast were used as fishing stations and for sheep grazing, and small seasonal fishing communities and flocks of sheep remain on some of them today.

Drumlins found along the Atlantic coast have been cleared and used as productive farmlands. Forestry exploitation occurs at various coastal sites and this wood, along with that from the interior, supplies newsprint and hardboard mills at Brooklyn, East River, and Point Tupper. In the nineteenth century, many Nova Scotian ports on the Atlantic coast shipped immense volumes of timber to Britain. The viability of several of Nova Scotia's resource industries (pulp and paper products, gypsum, aggregates) is closely tied to the accessibility of marine transportation. Deepwater harbours such as Halifax and Port Hawkesbury are an important resource and are among the largest ice-free deepwater ports in the world. Today, as in the past, the shipping industry and transport by water are very important to the provincial economy and ports along the Atlantic coast. Most of the coastline has rocky, shallow, and acidic soils and offers low agricultural capability except for subsistence gardening.



Associated Offshore Region

900 Offshore/Continental Shelf.

Associated Topics

T3.1 Development of the Ancient Landscape, T3.2 Ancient Drainage Patterns, T3.3 Glaciation, Deglaciation and Sea-level Changes, T3.4 Terrestrial Glacial Deposits and Landscape Features, T3.5 Offshore Bottom Characteristics, T4.1 Post-glacial Climatic Change, T6.3 Coastal Aquatic Environments, T6.4 Estuaries, T7.1 Modifying Forces, T7.2 Coastal Environments, T7.3 Coastal Landforms, T9.1 Soil-forming Factors, T10.4 Plant Communities in Nova Scotia, T11.5 Freshwater Wetland Birds and Waterfowl, T11.6 Shorebirds, T11.7 Seabirds and Birds of Marine Habitats, T11.12 Marine Mammals, T11.14 Marine Fishes, T11.17 Marine Invertebrates.

Associated Habitats

H1.1 Offshore Open Water, H1.2 Offshore Benthic, H2.1 Rocky Shore, H2.2 Boulder/Cobble Shore, H2.3 Sandy Shore, H2.5 Tidal Marsh, H2.6 Dune System, H4.4 Freshwater Marsh, H5.1 Barren, H5.3 Cliff and Bank, H6.3 Mixedwood Forest (White Spruce, Fir-Maple, Birch Association).

810 BASALT PENINSULA

A westerly extension of the North Mountain basalt ridge forms a double ridge with an intervening drainage catchment. Isle Haute is also part of this District. Topographic elevations decline westwards. The ridge is cut by parallel faults. Brier Island and Peter Island are important staging areas for birds, and Brier Island has rare plants. Offshore upwelling creates a rich plankton with abundant seabirds and whales.

GEOLOGY AND LANDSCAPE DEVELOPMENT

Digby Neck is formed from two thick lava flows with an intervening erodable layer. The flows dip to the northwest, forming twin ridges with a central valley along the spine. The elevation of the Digby Neck decreases westwards, reaching sea level at Brier Island and continuing as rock ledges beyond.

Digby Neck is cut by four parallel faults. Two of these have been eroded to below sea level and form the passages at the northern ends of Long Island and Brier Island. The other two have not been flooded and are manifest as coves and valleys crossing Digby Neck at Mink Cove and Gulliver Cove. Sandy Cove is a wind gap probably cut by an ancient predecessor of the Sissiboo River that flowed northwards before being "captured" by a river that flowed westwards in what is now St. Marys Bay.

FRESHWATER ENVIRONMENTS AND COASTAL WETLANDS

Relatively little surface water covers this District. The main drainage is along the central depression of Digby Neck where long streams interconnect occasional geologically controlled lakes and ponds. Freshwater wetlands in the central depression are associated with Little River and Long Island Brook. Tidal marshes occur in the northeast cove of St. Marys Bay.

SOILS

The soils of Digby Neck are similar to those on the rest of North Mountain (District 720). Rossway, a well-drained sandy loam, covers much of the area. Its imperfectly drained associate, Roxville, occurs in the central depression. Poorly drained Tiddville soils develop where organic material accumulates. Brier Is-

land has large areas of peat. In the coves, coarse Medway soils have developed from stratified quartzite or schist gravel.

PLANTS

Digby Neck is more exposed to marine influences, particularly storms moving in from the south and east, than is the Fundy Coast (Region 700). Therefore its coastal spruce-fir forest (H6.2) is dominant, and hardwoods are not found in pure stands. A series of bogs are found along the central depression. The sedge and sphagnum bogs on Brier Island contain rare and unusual plants such as Eastern Mountain Avens, Dwarf Birch, and Curly-grass Fern. The Brier Island orchid flora is diverse.

The rocky shores and low silt content of coastal waters provide a good substrate for seaweed, including well-developed *Laminaria* beds, and the economically important seaweeds dulse and Irish Moss.

ANIMALS

The fauna of this District is of great interest for two reasons: (1) Brier Island is the final westward staging point for migratory birds, insects, and bats, and (2) an area of upwelling and high productivity occurs just off the coast. In the summer and fall, large flocks of phalaropes gather off Brier Island prior to migration. In spring, Brant and Black Duck are frequently seen. In summer a wide variety of shorebirds collect, but by the fall their numbers will have diminished somewhat. Over the winter, Common Goldeneye and sea ducks will be present but not abundant. Purple Sandpipers winter along the rocky shores of the entire coast. Common and Arctic terns breed on Peter Island between Brier Island and Long Island, and this area also shelters moderate numbers of Black Duck and Common Eider in winter. Small numbers of breeding Turkey Vultures have recently become established on Long Island.

The upwelling off the coast makes Brier Island an important area for observing migratory whales.

Rocky shores show good zonation and have large tidepools, providing diverse fauna. Common Periwinkle grows to the largest size in Nova Scotia here. Subtidal molluscs may be found on the shore as a re-

sult of the emptying of lobster traps. Weir-fishing is carried out largely for herring.

SCENIC QUALITY

The sea is less apparent on this narrow peninsula than one might expect, because the paved road is mostly confined to the shallow central depression and its scattered abandoned fields. However, the road periodically skirts delightful coves on St. Marys Bay and is interrupted by the narrow passages between the islands. The land is much higher towards the east and faces the sea more steeply on the southern scarp face.

CULTURAL ENVIRONMENT

Various fisheries are important to this area, including shellfish, herring, lobster, and Digby scallops. Seaweeds are also commercially harvested. Brier Island, with its unique flora and bird populations, attracts outdoor enthusiasts for bird-watching and whale-watching trips.



Sites of Special Interest

- Brier Island (IBP Proposed Ecological Site 59)—two bogs with relict, rare plants, and orchid flora, stopover area for migrating birds, and wintering area for Common Eider
- Central Bog (IBP Proposed Ecological Site 60)—sphagnum bog with a nearly neutral humus layer; contains disjunct plants, especially skunk cabbage, and is a possible refugia for coastal-plain flora
- Lake Midway—relict aquatic fauna
- Sandy Cove—glacial gravels, kettle holes, and wind gap
- Brier Island—columnar basalt on south side, raised beach 45 m above high tide
- East Ferry—columnar basalt south of ferry landings
- Isle Haute—further up the Bay of Fundy from the main part of Unit 810 but included because of its geology, coastal climate, and vegetation; fauna poorly known but includes nesting Common Eider (see also Unit 710)
- Long Island—balancing rock—unique geological phenomenon

Provincial Parks and Park Reserves

- Central Grove
- Lake Midway

Proposed Parks and Protected Areas System includes Natural Landscape 1.

Scenic Viewpoints

- Central Grove Provincial Park
- Sandy Cove
- Gullivers Cove

Associated Offshore Unit

912 Outer Fundy.

Associated Topics

T2.6 The Triassic Basalts and Continental Rifting, T10.9 Algae, T10.12 Rare and Endangered Plants, T11.1 Factors Influencing Birds.

Associated Habitats

H1 Offshore, H2 Coastal, H4.1 Bog, H6.3 Mixedwood Forest (White Spruce, Fir-Maple, Birch Association).

820 CLIFFS AND BEACHES

This smooth coastline with raised beaches and wave-cut platforms emerged in the early post-glacial period and is now being submerged. It has many subglacial and glaciofluvial deposits. The cliffed coast has sheltered muddy areas with some salt marshes, sandy beaches, dune systems, and submerged forests. Coastal waters provide important wintering grounds for the Common Eider.

GEOLOGY AND LANDSCAPE DEVELOPMENT

This District encompasses a strip of coastline along the eastern shore of St. Marys Bay. The bedrock consists of metamorphosed, interfolded slates and greywacke of the Meguma Group which are highly eroded and have little relief. Overlying the bedrock is a ground moraine of varying thickness on which are good examples of subglacial and glaciofluvial deposits such as end moraines, deltas, and spits. Evidence of coastal rebound, and tilting following glacial withdrawal, is found in raised beaches and wave-cut platforms. The effects of the more recent coastal submergence are seen in beach erosion, retreating till cliffs, and submerged forests along the shore. Glaciomarine deposits can be found along St. Marys Bay.

Detailed analysis and description of the surficial geology was completed by the Geological Survey of Canada during the 1970s.

FRESHWATER ENVIRONMENTS AND COASTAL WETLANDS

Most surface-water coverage in this District occurs north of Yarmouth where many small to medium-sized irregularly shaped lakes are linked by small rivers and streams. A few freshwater wetlands are associated with Rivière Grosses Coques. Many small tidal marshes and barachois ponds are scattered along the coast in coves. Larger marshes can be found at the mouth of the Chegoggin and Salmon rivers and in Yarmouth Harbour.

SOILS

The soils in the northern part of this District derive from moderately coarse-textured quartzite till and are predominantly imperfectly drained Danesville with poorly drained Aspogtan. South of Meteghan

the tills are somewhat finer in texture and derived from slate. The three associated soils are well-drained Bridgewater, imperfectly drained Riverport, and poorly drained Middlewood. In Yarmouth County the soils are developed on drumlinoid mounds of till derived from schistose rocks. On the drumlins the soils are moderately well-drained sandy loams of the Yarmouth series, often cleared and farmed.

Between the drumlins, Deerfield soils are prevalent. Drainage is restricted by a compact, nearly impervious parent material, and seepage spots are common. Areas of peat, and Bridgewater, Mersey, and Halifax soils also occur. Digby soils can be found on raised beaches all along the coast; these are rapidly drained sandy loams over a gravelly till containing many shells of marine origin.

PLANTS

The vegetation of this District has been extensively disturbed by cutting. Poor drainage conditions over much of the area has given rise to large numbers of peat bogs. White Spruce and Balsam Fir are the most common species, together with shade-intolerant birches, maples and aspens. On the wetter areas, Black Spruce and larch are found. In this area, Bluejoint Grass meadows are common. Along the more sheltered, muddy coast, small salt marshes have developed, and unlike the Bay of Fundy, Eelgrass beds can be seen.

ANIMALS

This section of the coast has a mixture of intertidal muds, sandy beaches with some dunes, rocky shores, and some salt marshes. The south shore of St. Marys Bay is considered regionally important because large numbers of Common Eider overwinter there. Waterfowl are also present in moderate numbers in early spring and fall, but not in summer. The salt marshes and mud flats at Cape Cove also provide attractive habitat for Black Duck and shorebirds, although their numbers are not large. Because of the ample sediment, marine infauna is richer than the epifauna. Unusual offshore species are often washed up on the sandy beaches, which offer good shell collecting. In the warm, sheltered waters towards the

head of the bay, relict marine fauna may be found, for example, Quahog shells and marsh snails at Gilbert Cove. Typical freshwater fish species include White Sucker, Brown Bullhead, and White Perch.

SCENIC QUALITY

The coast north of Pointe à Tom differs from that to the south. The area to the north is a level till plain, while to the south is found a drumlinized landscape of rounded hills interspersed with marshes and lakes. The human element also differs; the northern plain has uninterrupted farmland, while the southern area has discontinuous farmland on drumlin tops. Both areas have moderately high scenic value, but the Acadian settlements of Clare district have certain unique features, for example, unusually large churches (e.g., St. Bernard, Church Point) and characteristic long-lot field patterns.

CULTURAL ENVIRONMENT

This area, known as the French Shore, was where the Acadians came to settle after making their way back to Nova Scotia following the 1755 deportation. Small-scale farming, hunting, and waterfowling were commonly practised along the French Shore. Today, fishing is an important economic base, particularly the lobster, clam, scallop, and herring fisheries. The village of Grosses Coques is so named because of the big clams common there. Fish scraps are used to feed the significant mink ranching operations. Forestry in backwoods areas provided timber for the extensive shipbuilding which took place here in the nineteenth century. A shipyard in Meteghan continues to build wooden boats. Acadian settlement patterns have shaped the human landscape along the French Shore, with homes stretching along a cleared, open coastal landscape in a linear fashion as one community blends into another. Yarmouth has a good harbour and is a commercial centre for this area. Speckled Trout is a popular recreational fishing species near Yarmouth.



Sites of Special Interest—Glaciation and Post-glacial Emergence (north to south)

- Bingays Brook (northeast of Barton)—evidence of oysters in interglacial deposits show high sea levels occurred between ice advances
- Church Brook (northeast of Gilbert Cove)—glaciomarine delta 22 m above high tide, now a gravel pit
- Belliveau Cove to Meteghan River—end-moraine complex forms prominent ridge fronting the coast for 20 km (best developed at Saulnierville)
- Meteghan—glaciomarine delta upraised 20 m above high tide
- Picnic park to south of Pointe à Tom—perfect fossil wave-cut platform forms a beach at 5 m, also a modern equivalent
- Mavillette—large fossil spit exploited for gravel
- Cape St. Marys—Pleistocene raised beaches and glacial till containing fossils of marine shells; one of several coastal exposures in southwestern Nova Scotia; similar occurrences found in Kings County and Cape Breton
- Cape Cove (south of Cape St. Marys)—complete sequence of glacial tills from last 120,000 years (see T3.4)
- Green Cove (north of Port Maitland)—marine terrace under campground
- Red Head (south of Port Maitland)—raised and tilted wave-cut platform, with a modern example; area provides the most southerly evidence of post-glacial coastal tilting and emergence; the pivot point for coastal rebound and tilting is close to Yarmouth

Recent Submergence (north to south)

- West of Church Point—a submerged forest 5,000 years old, 5 m below high tide
- Pointe des Maréchal—submerged forest, 3 m below high tide
- South of Overton—submerged forest, one metre below high tide
- Yarmouth Bar—eroding tombolo
- Cape St. Marys (IBP Proposed Ecological Site 55)—salt marsh and sand dune system of more than 120 hectares
- Grosses Coques (IBP Proposed Ecological Site 58)—salt marsh system; wintering ground for Common Eider

Provincial Parks and Park Reserves

- Savary
- Smugglers Cove
- Mavillette Beach
- Port Maitland Beach
- Bluff Head
- Pembroke
- Sand Hills Beach
- Cape Fourchu
- Kellys Cove

Proposed Parks and Protected Areas System includes Natural Landscape 4.

Scenic Viewpoints

- Weymouth Harbour
- Smugglers Cove Provincial Park
- Cape St. Marys
- Cape Fourchu

Associated Offshore Unit

911 Atlantic.

Associated Topics

T2.2 The Avalon and Meguma Zones, T3.1 Development of the Ancient Landscape, T3.3 Glaciation, Deglaciation and Sea-level Changes, T7 The Coast.

Associated Habitats

H1 Offshore, H2 Coastal, H4.1 Bog, H5.3 Cliff and Bank, H6.3 Mixedwood Forest (White Spruce, Fir-Maple, Birch Association).

830 BEACHES AND ISLANDS

District 830 is divided into four Units based upon coastal morphology, soils, and vegetation:

- 831 Tusket Islands
- 832 LaHave Drumlins
- 833 Eastern Shore Beaches
- 834 Bay of Islands

GEOLOGY AND LANDSCAPE DEVELOPMENT

This District is found in the exposed southeast-facing central portion of the Atlantic Coast Region and the southwest-facing portion south of Yarmouth. It is generally underlain by slate bedrock but also includes outcrops of greywacke/quartzite and granite. The slate and greywacke bands are interfolded and the fold axes are either perpendicular to (Tusket Islands) or, more commonly, parallel to the coast. Differential erosion of softer slate and harder greywacke has created a ridge and valley topography which is distinctive in places. The best example occurs where glacial north-south scouring was parallel to fold axes (Tusket Islands).

The shoreline is submergent and exhibits drowned headlands and estuaries; it is irregular and very indented.

Sediment Sources

The major sediment sources are:

1. offshore deposits—sand carried landward during the post-glacial marine transgression over glacial deposits on the Scotian Shelf; the volume of sand reflects the nature of these deposits, i.e., whether they were unsorted till (less sand) or sorted glaciofluvial deposits (more sand)
2. eroding headlands—thick till deposits that form cliffs on exposed shores
3. drumlin islands—clay, sand, and cobblestone material dumped offshore and directly exposed to wave attack
4. glaciofluvial deposits—sands and gravels in river valleys now being redistributed by fluvial action
5. quartz from granite—white sand of only local significance

Deposition

The pattern of deposition depends upon the size distribution of the material, the morphology of the coastline, and the exposure to and direction of wave attack. Coarse material is found in exposed localities around headlands, where the proportion of sand is small and an oblique wave front carries fine material along the shore. Sand is found in sheltered coves and inlets, on the lee side of headlands and islands, and where a change in direction of the coastline provides a sink for sediment transported along the shore. Depending upon the location, sediments form bay and barrier beaches, spits, bars, tidal marshes, and dune systems.

PLANTS

Coastal forest vegetation is typically White Spruce and Balsam Fir, with Red Maple, birch, and poplar on better soil. Further inland these give way to spruce, fir, and pine. Drier sites have more pine and oak, and wet sites have Black Spruce and larch. The coastline has barren headlands with krummholz White Spruce, salt marshes, sand dunes, and Eelgrass beds. Southwestern (coastal-plain) plant species are found along the edges of streams and lakes and in bogs. Areas of better soil, particularly on drumlins, have been cleared for agriculture. Pure stands of White Spruce are regenerating on oldfields.

ANIMALS

The indented coastlines and abundant sediment supply result in a wide diversity of coastal habitats in this District, including rocky shores, sand and cobble beaches, mud flats, and tidal marshes, resulting in the presence of a large variety, and sometimes large numbers, of waterfowl and shorebirds that shelter in the inlets and estuaries and feed in the mud flats and tidal marshes.

SCENIC QUALITY

Though possessing little relief, all four Units have high scenic value, owing to indented coastlines and many offshore islands. The three more westerly Units are most similar because their coastal drumlin fields produce similar erosional and depositional features

(till headlands, egg-shaped islands, tombolos, spits, sandbanks, and salt marshes). The drumlins also allowed scattered farming, the marginal viability of which is reflected by many abandoned fields. The easterly Unit (Bay of Islands) lacks drumlins and farming and has a rocky coast with few beaches. All Units except the Eastern Shore Beaches (Unit 833) provide their best scenery to the offshore boater.



Associated Offshore Unit

911 Atlantic.

Associated Topics

T2.2 The Avalon and Meguma Zones, T7 The Coast.

Associated Habitats

H1 Offshore, H2 Coastal, H5.1 Barren, H5.2 Oldfield, H6.3 Mixedwood Forest (White Spruce, Fir-Maple, Birch Association).

831 TUSKET ISLANDS

A submerged coastline with long promontories and inlets characterizes this Unit. The abundant sediment supply allows extensive tidal marsh development. Mild winter conditions permit the survival of relict coastal-plain flora species. Relatively ice-free conditions provide important wintering habitat for waterfowl. Upwelling and tidal mixing create nutrient-rich waters that support a diverse marine fauna.

GEOLOGY AND LANDSCAPE DEVELOPMENT

In this part of southwestern Nova Scotia the geological structures intersect the coastline more or less at right angles. As the glacial ice flowed north-south, more or less parallel to these structures, it exploited weaker bands and left a series of long, parallel ridges and valleys. These have become progressively submerged as sea levels have risen during the last 12,000 years, creating a highly indented coastline with many elongated islands oriented north-south.

Drumlins occur onshore and as offshore islands. Glaciofluvial deposits are common, especially eskers. Glacial deposits provide an ample sediment supply.

FRESHWATER ENVIRONMENTS AND COASTAL WETLANDS

Many medium-sized, elongated lakes are found in the Tusket area. The surface waters tend to be dystrophic and associated with bogs. The mouths of the Tusket and Chebogue rivers occur in this Unit, and many small freshwater wetlands are associated with the streams and rivers. Long Savannah and Spinneys Heath are large wetlands considered significant for wildlife. Large peat areas occur around Pubnico Harbour. The coastal inlets are predominantly lined with salt marshes, which are extensive upriver on the Chebogue and in Little River Harbour and Goose Bay.

SOILS

The dominant feature of this Unit is its extensive areas of salt marsh. These are a uniform silt loam in texture and occupy more than 3,200 ha. Upland soils have generally developed from schistose slate or quartzite on drumlinoid land forms, but the central strip from Dunn Lake to Comeau Hill is an exception, being relatively flat with shallow soils. Better-drained

soils are Yarmouth and Mersey, derived from schist and quartzite, and Medway soils derived from outwash sands and gravels. Imperfectly or poorly drained soils (which are often mottled, indicating saturation for considerable periods of time) include Deerfield, Riverport, Liverpool, Danesville, Aspotogan, and Pitman. Large peat areas have developed near Pubnico Harbour. The islands are nearly all either Mersey (drumlins) or Liverpool soils.

PLANTS

Areas of Yarmouth, Deerfield, Medway, and Mersey soils are often cleared for agriculture. Otherwise they normally support good growths of White Spruce and Balsam Fir, with Red Maple, birch, and poplar. Better drained, more sheltered sites may have some pine or oak. Black Spruce and larch swamps are common. Because of the fairly high rate of erosion, the transition from salt marsh to spruce woods is often quite abrupt. A fringe of grey, dead trees is usually found at the rear of the salt marshes, where the rising sea level drowns their root systems. The Southwestern floral element is well represented in this Unit, particularly along river and lake margins and in bogs. Examples include a bladderwort and Curly-grass Fern (see Figure 13).

ANIMALS

The mild winter temperatures, the many islands and sheltered inlets, and the extensive areas of salt marsh and intertidal sands and muds produce a very important wintering area for waterfowl and certain other species such as the Bald Eagle. Present in the greatest numbers are the Black Duck, Canada Goose, scaups, and the Common Goldeneye. Less common birds include the Red-breasted Merganser and Oldsquaw. Shorebird numbers as the birds begin to arrive in spring are small, then peak in early to mid-August, and sharply decline in September. Osprey breed along this shore and Leach's Storm-petrel breeds on the Tusket Islands.

A rich marine fauna is associated with this Unit. The warmer inshore waters support a number of invertebrate species with a more southerly distribution. An area of upwelling offshore, combined with tidal mixing, provides nutrient-rich waters which

support abundant algae, crustaceans, and open-sea fish. The Tusket supports a large run of Gaspereau in the spring. The introduced Chain Pickerel has had a major impact on species in this Unit. It is a predator of both migratory and exotic freshwater fish, and is thought to have played a critical role in the extirpation of the Atlantic Whitefish in the Unit. Two anadromous species, Rainbow Smelt and Striped Bass, are also found here.

The more fertile soils derived from schists result in more productive inland waters and a fairly diverse freshwater fauna, particularly molluscs. The fauna also includes a southwestern element, the best known example being the Atlantic Whitefish.

CULTURAL ENVIRONMENT

Acadian settlement in this area was based around the tidal marshes. Pubnico is derived from the Mi'kmaq word "Pogomkook," meaning "cleared land," a landscape favoured by the Acadians. The productive herding, lobster, clam, and scallop fisheries continue to provide an important economic base. Rockweed and Irish Moss are commercially harvested. Hydroelectric power has been harnessed by a generating station at Tusket Falls. Large sand and gravel deposits have been commercially exploited. Mi'kmaq shell middens have been found in the Tusket Islands area. In the early 1990s, exercise of aboriginal hunting and fishing rights led to confrontations over unregulated native fishing practices. The name Tusket is derived from the Mi'kmaq word "Neketaouksit" meaning "the great forked tidal river." Migratory bird populations of Seal Island attract bird-watchers to this Unit. Sheep were left to graze year-round on the Tusket Islands.

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Sites of Special Interest

- Spinney Heath (IBP Proposed Ecological Site 52)—large undisturbed bog near Central Argyle
- Chebogue Lake (IBP Proposed Ecological Site 53)—large inland salt lake, also known as Melbourne Lake, with rich beds of Eelgrass, is a provincial sanctuary for waterfowl
- Moses Lake (IBP Proposed Ecological Site 51)—old-growth deciduous forest
- Road from Arcadia to Pinkney Point—follows an esker
- Tusket River shore—water-deposited debris

Provincial Parks and Park Reserves

- Glenwood
- Upper West Pubnico

Proposed Parks and Protected Areas System includes Natural Landscape 10.

Scenic Viewpoints

- Chebogue River
- Surettes Island
- Ste. Anne du Ruisseau
- Pubnico Harbour (various points)

Associated Offshore Unit

911 Atlantic.

Associated Topics

T4.2 Post-glacial Colonization by Plants, T10.12 Rare and Endangered Plants, T11.4 Birds of Prey, T11.7 Seabirds, T11.13 Freshwater Fishes, T11.16 Land and Freshwater Invertebrates.

Associated Habitats

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).

832 LAHAVE DRUMLINS

This Unit is dominated by swarms of drumlins on land, in shoals, and on islands offshore. Slate forms promontories and bedrock islands. An ample sediment supply and varied coastline provide a rich diversity of coastal habitats that support a mixture of southern and northern fauna, and significant numbers of waterfowl and seabirds (see Figure 14).

GEOLOGY AND LANDSCAPE DEVELOPMENT

Between Voglers Cove (at the mouth of Voglers Brook) and Aspotogan, the South Shore of Nova Scotia is characterized by the presence of many drumlins with a predominantly northwest-southeast alignment. They occur inland, where they are cleared and farmed, and offshore, where they form wooded islands with rounded profiles. In the southern part of the area, promontories and islands of slate bedrock are found.

The drumlins are the coastal and offshore equivalents of the Kejimikujik Drumlins (Unit 433) and Lunenburg Drumlins (Unit 434). The former are composed of grey-brown clay till derived from local slate, and the latter of red-brown sandy till from Carboniferous and Triassic deposits more than 100 km to the north. The slate-till drumlins are characteristically not found far beyond the slate belts. The red Lunenburg Drumlins commonly form islands, especially north and east of Cape LaHave.

The variable quantity and texture of the coastal sediment supply has built up a range of shoreline deposits which vary from extensive sandy beaches to small shale beaches to cobble beaches. Most of the sediment appears to be of local origin and comes from glacial tills. Crescent Beach is a sand bar connecting some of the Cape LaHave islands to the mainland.

COASTAL WETLANDS

There are few lakes or streams, and most of the wetlands are tidal. The LaHave estuary is very wide when it crosses into this coastal Unit. There are many small, scattered tidal marshes.

SOILS

Drumlin soil parent materials are of two main types. To the west of the LaHave River, drumlins are derived from slate on which shale loam soils of the Bridgewater series have developed. Soils between the drumlins are derived from the same material but are shallow and often poorly drained. To the east the drumlin materials are finer-textured, reddish, sandy clay loams. These Wolfville soils are similar to those found throughout District 430, east of the LaHave River. They may have originated in New Brunswick. Most of the islands have Wolfville soils, the main exception being Cape LaHave Island, which is mostly Rockland.

PLANTS

White Spruce and Balsam Fir are the dominant species along the coast, with some maple and birch intermixed in more sheltered locations. Pure stands of White Spruce are found on some drumlins and on oldfields. Further inland, spruce, fir, and pine forest occurs. Salt marshes and Eelgrass beds are common.

ANIMALS

This Unit provides a diversity of coastal habitats: rocky shores, cobble beaches, extensive sand beaches, tidal flats, and salt marshes. The area around Cape LaHave Island to Rose Bay, and the western shore of Mahone Bay at Blue Rocks, are locally important as waterfowl and shorebird habitat. In spring, fall, and early winter, waterfowl numbers are low. Black Duck, Common Goldeneye, and Oldsquaw may occur, and Scoter are sometimes present in significant numbers. The Red-necked Grebe overwinters in this area. From early August through September, shorebirds congregate at Crescent and Cherry Hill beaches in moderate numbers. Piping Plovers breed at Cherry Hill and Kingsburg beaches, and at East Iron-bound Island. Pearl Island (a provincial wildlife management area) is regionally important because it provides breeding habitat for the Atlantic Puffin, Leach's Storm-petrel, Razorbill, and Black Guillemot. Gulls, cormorants, terns, and the Great Blue Heron breed on other islands along the coast.

Sheltered inlets support a southern mix of marine fauna, while exposed rocky shores support a more northern fauna. The major rivers provide distinct estuarine conditions for brackish water species. Periodic slope-water incursions bring in warm-water species such as seahorses, Blue Crabs, and sharks.

CULTURAL ENVIRONMENT

Small farms are found on many of the LaHave Drumlins. In the early 1600s an Acadian settlement was established at LaHave but was later abandoned. The Lunenburg area was favoured by the Mi'kmaq and there were several confrontations between the Mi'kmaq and the Germans who settled here in the 1750s. Lunenburg was built on a peninsula with a front and back harbour ideal for fishing and seafaring. Fishing dominates most of this coastline, and access to offshore fishing banks results in prosperous fishing industries. Lunenburg has been one of the most important fishing communities in the province, with large offshore fishing fleets and local processing plants. Drumlin forests were exploited to supply timber for the flourishing nineteenth-century shipbuilding industry. Built in Lunenburg, the Bluenose schooner is a symbol of the province's seafaring tradition. A whaling station once operated out of Blandford but closed in the early 1970s when opposition to whaling led to a Canadian ban. The LaHave Drumlins area is a popular tourist and recreational destination. The Fisheries Museum in Lunenburg documents aspects of the area's fishing history.



Sites of Special Interest

- Blue Rocks—blue-grey slates and sandstones of the Halifax Formation
- Ovens Natural Park—gold has been mined from steeply inclined sandstones and slate strata; sea caves have developed through erosion of the softer layers
- Kingsburg—coastal exposures of Goldenville Formation sandstones and siltstones; Piping Plovers
- Pearl Island—provincial wildlife management area
- Tancook Island—metamorphosed Ordovician Meguma slate with rare trilobite fossils; graptolites also occur rarely in the Meguma

Provincial Parks and Park Reserves

- Rissers Beach
- Bush Island
- Feltzen South
- Upper Blandford
- Bayswater Beach

Proposed Parks and Protected Areas System includes Natural Landscape 14.

Scenic Viewpoints

- Crescent Beach
- Ovens Point (private park)
- Lunenburg Harbour (both sides)

Associated Offshore Unit

911 Atlantic.

Associated Topics

T3.3 Glaciation, Deglaciation and Sea-level Changes, T3.4 Terrestrial Glacial Deposits and Landscape Features, T11.4 Birds of Prey, T11.6 Shorebirds, T11.7 Seabirds.

Associated Habitats

H2 Coastal, H5.2 Oldfield, H6.2 Softwood Forest (Spruce, Fir, Pine Association; White Spruce Association).

833 EASTERN SHORE BEACHES

This is an indented drowned coastline with headlands, long inlets, and drumlin islands. An active reworking of ample coastal sediment is building spits and barrier beaches between headlands and islands. The inlets provide migration and overwintering habitat for waterfowl.

GEOLOGY AND LANDSCAPE DEVELOPMENT

This Unit extends from Halifax to Owls Head, near Clam Harbour, along an indented submergent coastline. The bedrock is dominated by greywacke, with bands of slate, folded parallel to the coastline. The coast is divided into headlands separated by long inlets. Most inlets are drowned river estuaries and do

not appear to be fault-controlled. Porters Lake, which stretches inland from Terminal Beach, is an exception, as it occupies a fault zone.

Loose cobbly quartzite till forms the ground moraine and is overlain in two areas by drumlins composed of red-brown Lawrencetown Till. The drumlins are concentrated in the Chezzetcook to Lawrencetown and Clam Bay areas. They rarely form islands but are more usually seen as eroding coastal bluffs, such as Hartlen Point. Three of the islands within Chezzetcook Inlet are drumlins.

The irregular character of a youthful submergent coastline is being smoothed off here as sediment is redistributed (see Figure 27). Sand and gravel are supplied from the erosion of deep glacial tills and

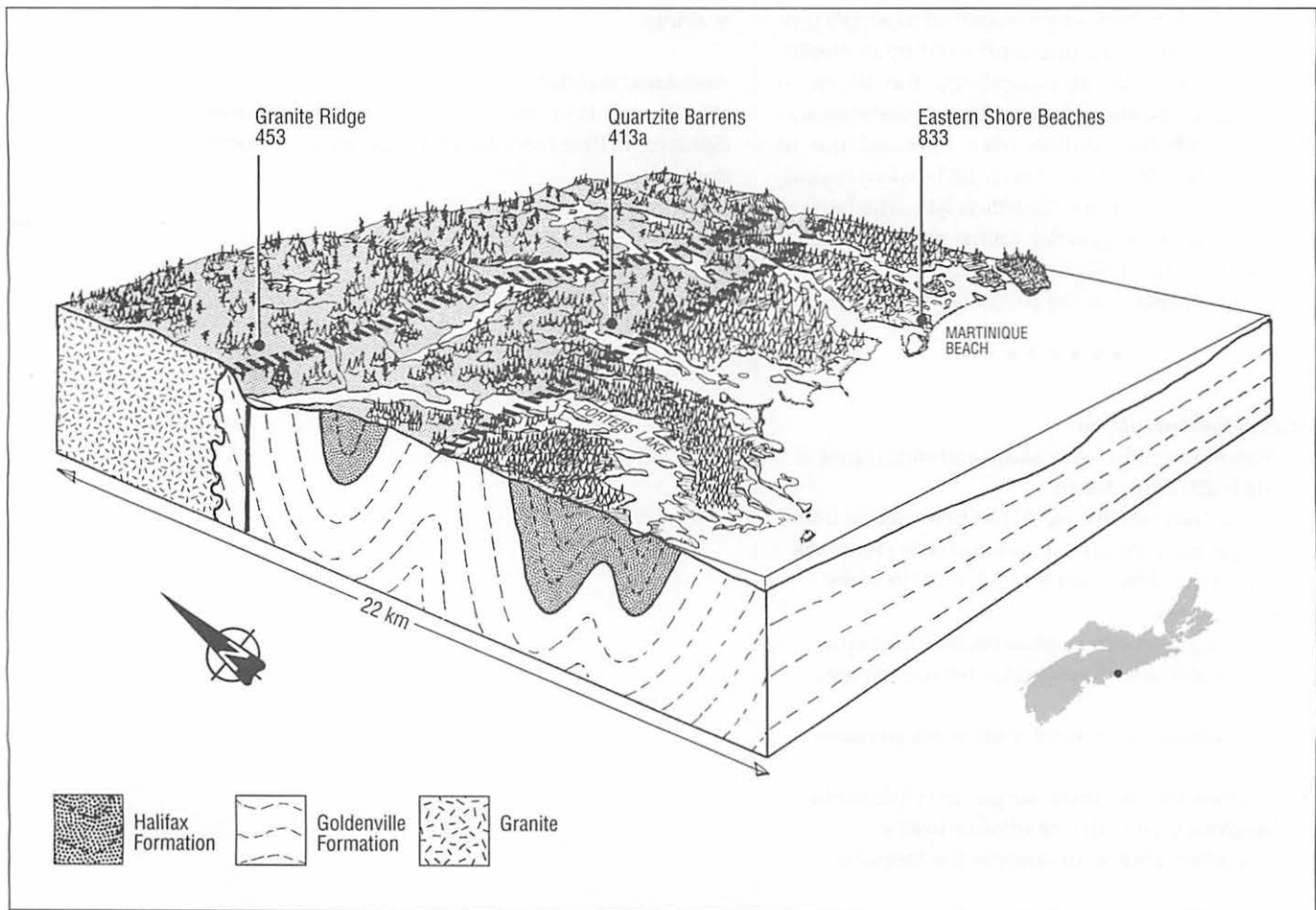


Figure 27: Eastern Shore Beaches area. The severe environment created by Meguma Group rocks is tempered by the presence of drumlins between Cow Bay and Clam Bay. Long, drowned estuaries, tidal marshes, and sand beaches are found in this coastal forest zone (Unit 833). Inland, the Quartzite Barrens (Unit 413) give way to a significantly higher granite upland (Unit 453) on which many lakes are found.

glacial outwash deposits along the coast. Spits and barrier beaches, connecting promontories and islands, protect the large, shallow estuaries from ocean waves, allowing salt marshes to develop.

FRESHWATER ENVIRONMENTS AND COASTAL WETLANDS

The many small and medium-sized lakes in this Unit exhibit pH levels of 5.5–7.3. Several lakes around Dartmouth, including Morris and Bisset lakes, have high levels of turbidity and nutrients. A few scattered freshwater wetlands occur inland, usually associated with lakes or small streams. There are many large areas of tidal marsh in barachois ponds and inlets.

SOILS

Well-drained Halifax gravelly sandy loams derived from quartzite cover much of this Unit. On areas with less relief, imperfectly drained Danesville soil is common, with peat, Rockland, and some small areas of poorly drained, mottled Aspotogan soil. Some areas of shaly loam Bridgewater soil have developed from parent materials derived from slate. Finer textured Hantsport soils (imperfectly drained, sandy clay loam) which have developed from Carboniferous parent materials are found around Eastern Passage. Wolfville drumlin soils are common, especially in Cole Harbour, Three Fathom Harbour, and Clam Harbour. The Halifax peninsula, which is underlain by slate except in the extreme north end, has mostly Bridgewater soils.

PLANTS

The coastal White Spruce and Balsam Fir forest with maple and birch predominates. On old farmlands and drumlins, pure stands of White Spruce are common. Further back from the coast are spruce, fir, and pine stands. Salt-marsh and sand-dune plant communities and large beds of Eelgrass are common.

ANIMALS

The mix of coastal habitats is similar to that found in Unit 832 (LaHave Drumlins), where sheltered inlets favour a more southerly marine fauna; exposed rocky shores support more northerly species. Periodic incursions of warmer slope water bring in warm-water fish and invertebrates in the summer.

Cole Harbour, Chezzetcook Inlet, Petpeswick Inlet, and Musquodoboit Harbour provide important migration and winter habitat for waterfowl. In spring,

particularly mid-March to mid-April, these areas are a stopover for several thousand Black Ducks and Canada Geese. The numbers peak again in October. Black Ducks breed in the coastal barrier beach, estuary, and coastal marsh habitats. More Black Ducks and Canada Geese come here than anywhere else in the province. Other overwintering birds are the Common Goldeneye, which occurs in moderate numbers, and an occasional scaup. Great Blue Heron and Osprey nest on McNabs Island and elsewhere. Piping Plovers nest at Lawrencetown and Clam Bay. This coast also provides feeding areas and some scattered nesting habitat for the Bald Eagle. Freshwater fishes include White Sucker, shiners, sticklebacks, perch, Banded Killifish, and Brook Trout.

CULTURAL ENVIRONMENT

The drumlin fields at Cole Harbour and Lawrencetown caused the British to single out this area in the mid-1700s for farming. Small-scale farming on the Eastern Shore drumlins has taken place since then. After the deportation of 1755, a group of Acadians settled in Chezzetcook. For many people in this area, earning a living from the land necessitated fishing in the summer, subsistence farming, hunting, waterfowling, and winter work in the woods—a pattern prevalent in many areas of the province and in some ways similar to Mi'kmaq subsistence patterns. The commercial centres of Halifax and Dartmouth have affected settlement along the Eastern Shore Beaches, and many inhabitants now commute to work in the cities. Fishing continues to be an important economic activity for some communities along the Eastern Shore, and includes clams, lobsters, cod, and haddock. Some of the recreational uses for the land are bird-watching at important migratory bird stops, hiking, camping, swimming, and enjoying the beach. Government administration, shipping, and the military continue to be economically important to Halifax and Dartmouth. Dartmouth is the Atlantic end of the Shubenacadie Canal. Numerous quarries around the Halifax area supply crushed rock to the construction industry. The Fisherman's Life Museum at Jeddore Oyster Ponds, the Fairbanks Centre, and the Dartmouth Heritage Museum present aspects of this Unit's history.



Sites of Special Interest

- Hartlen Point—eroding coastal bluff
- Cole Harbour—migration and overwintering of waterfowl
- Conrods Beach (IBP Proposed Ecological Site 36)—barrier sand dunes
- West Lawrencetown Marsh—Piping Plover
- Three Fathom Harbour—drumlins
- Chezzetcook Inlet—drumlins, waterfowl
- Petpeswick Inlet—waterfowl
- Martinique Game Sanctuary

Provincial Parks and Park Reserves

- South East Passage
- McCormacks Beach
- Cow Bay
- Cole Harbour
- Lawrencetown Beach
- Porters Lake
- East Chezzetcook
- Martinique Beach
- Clam Harbour Beach

Proposed Parks and Protected Areas System includes Natural Landscape 33.

Scenic Viewpoints

- McNabs Island
- Lawrencetown Beach and headlands
- Clam Harbour Beach

Associated Offshore Unit

911 Atlantic.

Associated Topics

T2.2 The Avalon and Meguma Zones, T3.4 Terrestrial Glacial Deposits and Landscape Features, T7.1 Modifying Forces, T11.4 Birds of Prey, T11.5 Freshwater Wetland Birds and Waterfowl, T11.6 Shorebirds, T11.7 Seabirds.

Associated Habitats

H2.5 Tidal Marsh, H2.6 Dune System, H6.2 Softwood Forest (Spruce, Fir, Pine Association), H6.3 Mixedwood Forest (White Spruce, Fir-Maple, Birch Association).

834 BAY OF ISLANDS

In this Unit, a submerged, rocky coastline with parallel geological structure gives a series of elongated offshore islands. Variable sediment accumulation produces a variety of coastal habitats, from rocky shore with extensive seaweed growth to salt marsh. The islands provide important breeding habitat for seabirds.

GEOLOGY AND LANDSCAPE DEVELOPMENT

This Unit extends from the headlands of Little Harbour (southwest of Ship Harbour) to Liscomb Harbour and north to the head of major inlets. The axes of folds within the greywacke bedrock are parallel to the coastline, forming a ridge-and-valley topography. This orientation is reflected in the shape and alignment of the offshore islands, which formed as the low, eroded headlands were drowned during recent coastal submergence. The islands tend to be elongated east-west and have average elevations of less than 15 m. They are divided into groups by bays and inlets. Drumlins occur in scattered groups and form headlands all along the Eastern Shore but are rarely found as islands in this area.

Sedimentary structures that illustrate how the Meguma bedrock has been built up from the accumulation of gravity slide deposits are found at Taylors Head.

FRESHWATER ENVIRONMENTS AND COASTAL WETLANDS

Surface-water coverage is relatively low, with small scattered lakes and streams, and small wetlands associated with the streams. Most freshwater wetlands are concentrated east of Sheet Harbour. Levels of pH in the lakes average 6.1. Tidal marshes are small and scattered.

SOILS

On the flatter areas close to the coast around Ecum Secum, Moose Hill, Quoddy, and Sheet Harbour, imperfectly drained Danesville sandy loams have developed from the underlying quartzite. Drainage is impeded by bedrock and topography. Elsewhere the soils are mostly rapidly drained Halifax sandy loams with poorly drained Aspotogan and peat areas. Some

Wolfville drumlins (sandy clay loam) are found around Quoddy, Beaver Harbour, Popes Harbour, and Ship Harbour. Coarse, rapidly drained Hebert soils are found near Moser River. The islands are usually either Rockland or covered by a thin layer of Halifax soils, but a few have Wolfville or Danesville soils. Iron pans are common throughout this Unit.

PLANTS

The coastal White Spruce, Balsam Fir forest predominates, with some maple and birch mixed in on less exposed sites. On the wetter soils, Black Spruce, larch, and Balsam Fir are found.

Barrens cover many of the headlands, and krummholz vegetation is conspicuous. The parallel quartzite ridge topography gives rise to a fairly regular pattern of White Spruce on the ridge top, and Black Spruce and small bog areas in the depressions. Many of the islands have been deforested by the combined effects of exposure and cormorant guano and may not regain a tree cover.

ANIMALS

Coastal habitats in this Unit are mostly low-lying rocky shores with some small beach and salt-marsh areas. The firm substrate and low sediment supply results in excellent seaweed growth, especially along the rocky quartzite shoals that stretch into the water. Of major interest are the islands, which provide important breeding habitats for many kinds of waterfowl and seabirds. Together with Unit 842, this Unit provides a major portion of the Common Eider breeding habitat for Nova Scotia. Other breeding birds include cormorants, gulls, Arctic and Common terns, Black Guillemot, and Leach's Storm-petrel. Considerable numbers of waterfowl migrate through in spring and fall, including scoters, Black Duck, Oldsquaw, and Canada Goose. Some Oldsquaw, Black Duck, and Common Goldeneye remain during the winter. Seals are common on the islands and rocky shoals. Anadromous fishes include Gaspereau and Banded Killifish, and White Sucker is a typical freshwater species.

CULTURAL ENVIRONMENT

Fishing provides an economic base for many communities on this part of the Eastern Shore. The forest hinterland is heavily exploited, and the community of Sheet Harbour, with its deep, well-protected harbour, has become a centre for the processing of forest products and the shipment of pulpwood. Distinctive recreational use of the land includes kayaking, with enterprises operating out of Tangier. In the 1860s, when a gold-mining frenzy swept across Nova Scotia, gold was discovered at Tangier, resulting in the development of numerous mining operations, which were exploited until the 1940s.



Sites of Special Interest

- Eastern Shore Islands Wildlife Management Area—extends from Ecum Secum (Little White Island) to Sheet Harbour Passage (Round Island)
- Little White Island (IBP Proposed Ecological Site 30)—dense nesting colonies of cormorant and Common Eider
- Brokenback Island (IBP Proposed Ecological Site 32)—one of the few breeding sites for the Fox Sparrow in Nova Scotia; Osprey nests
- Long Island (IBP Proposed Ecological Site 33)—eider and cormorant nesting site and locality for rare Beach Senecio
- Pumpkin Island (IBP Proposed Ecological Site 34)—important nesting site for Leach's Storm-petrel and Black Guillemot
- Horse Island (IBP Proposed Ecological Site 35)—one of the few islands in the local area not deforested by cormorant nesting
- Taylors Head—sand volcanoes and slump structures

Provincial Parks and Park Reserves

- Taylors Head
- Popes Harbour
- Spry Bay
- Ecum Secum
- Marie Joseph

Proposed Parks and Protected Areas System includes Natural Landscape 37.

Scenic Viewpoints

- Taylors Head trail

Associated Offshore Unit

911 Atlantic.

Associated Topics

T2.2 The Avalon and Meguma Zones, T9.3 Biological Environment.

Associated Habitats

H2 Coastal, H5.1 Barren, H6.2 Softwood Forest (Black Spruce, Larch Association), H6.3 Mixedwood Forest (White Spruce, Fir-Maple, Birch Association).

840 QUARTZITE HEADLANDS

The District is divided into two Units:

841 Capes and Bays

842 Guysborough Harbours

GEOLOGY AND LANDSCAPE DEVELOPMENT

This District is dominated by greywacke/quartzite and granite. Till deposits are relatively thin and there are few drumlins. Large areas of exposed bedrock occur.

The coastline is submerged and indented with headlands and long inlets but has few islands. The thin till deposits provide little sediment through coastal erosion, so coastal fringe deposits tend to be limited in volume and composed of coarse material. Sand beaches are found only where the rising sea level has eroded sand from now submerged glacial deposits and carried it shorewards. Very limited amounts of sand collect locally to form occasional white sand beaches.

SOILS

Shallow soils, low relief, extensive burning, and the widespread occurrence of impenetrable ortstein layers have all combined to produce a predominantly bog and barren landscape in this District.

SCENIC QUALITY

Where the ocean is in view, this District has moderately high scenic value. Unit 841 has greater coastal variety, in the form of salt marshes and tidal flats, but suffers from excessive coastal fog. Away from the shore, the low relief and poor forest of both Units is uninviting, but it is relieved in Unit 842 by deeper fault-aligned river valleys (Indian Harbour, Country Harbour, Isaacs Harbour, and New Harbour) which are drowned in their lower reaches. Bogs and barrens are more prevalent in Unit 841.

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Associated Offshore Unit

911 Atlantic.

Associated Topics

T2.2 The Avalon and Meguma Zones, T9.3 Biological Environment.

Associated Habitat

H4.1 Bog.

841 CAPES AND BAYS

Granite and greywacke bedrock give a hummocky terrain with little relief. The till cover is variable but often thin. Shallow bedrock and ortstein development impedes drainage, creating bogs. Exposed bedrock and burning has led to the development of barrens. Long, sheltered inlets and relatively mild, ice-free winters provide wintering habitat for waterfowl.

GEOLOGY AND LANDSCAPE DEVELOPMENT

This Unit extends from Lower Woods Harbour in the west to Medway Harbour in the east. The bedrock geology is dominated by greywacke into which several bodies of granite have been intruded. The heat from the largest granite bodies baked the surrounding Meguma sediments and enabled minerals of a high metamorphic grade to form.

Throughout this area, granite and greywacke form a hummocky, rather uninteresting terrain with little relief. The coastline is very indented and divided into well-developed capes and long narrow bays. The bays are drowned river estuaries.

Glacial till deposits are variable in thickness but are generally less than 3 m deep; bedrock is exposed in fairly large areas, especially on the granite. Typically, very few drumlins are found on this granite and greywacke bedrock. Three have been mapped around Lockeport Harbour, but otherwise they are absent. Other glacial deposits include a series of outwash fans along the Medway River and around Medway Harbour.

Little coastal sediment is currently derived from local glacial till deposits. Sand is abundant locally, but since it was carried landward from offshore glacial material during the post-glacial marine transgression, it is now no longer replaced from the same source. The coastal area is a high-energy wave environment and experiences strong winds. Barrier beaches and dune systems are subject to periodic destruction during storms. The sand is carried either seawards into deep water or over the beach into lagoons as overwash. The wide expanse of flat beach created is subject to wind erosion, eventually leading to the re-creation of dunes further inland.

FRESHWATER ENVIRONMENTS AND COASTAL WETLANDS

Many of Nova Scotia's most extensive river and chain-lake systems drain into the Atlantic through the many estuaries and inlets in this Unit. Small and medium-sized lakes and ponds are scattered throughout, and pH levels average 6.0. Concentrations of wetlands are associated with the river and lake systems. The freshwater wetlands are largest in the western areas, with large concentrations in the middle of Cape Sable Island. Tidal marshes are scattered all along the coast in the inlets and barchois ponds.

SOILS

Soils in this area have mostly developed from coarse-textured parent materials: granite, quartzite, and schist. The principal soils are Port Hebert (well-drained sandy loam) and Lydgate, its imperfectly drained associate; both often develop subsurface cemented layers. Well-drained Halifax soils are found between Medway Harbour and Port Mouton, together with imperfectly drained and usually mottled Danesville soils. Lydgate and Port Hebert soils, together with areas of Rockland, are also found on the granite headlands near Port Mouton. South of Port Hebert, Lydgate soils predominate with extensive areas of Roseway (imperfectly drained sandy loam with organic layers of greasy "mor") and large organic deposits. Well-drained Medway soils (gravelly sandy loam) have also developed in a number of areas from quartzite and schist outwash gravel.

PLANTS

The low relief, the effects of fire, and the ready formation of ortstein layers have resulted in large areas of bog and barren. Labrador Tea, Lambkill, and blueberries provide the main vegetative cover on the barrens. Elsewhere the forest is chiefly White Spruce and Balsam Fir with maple, birch, and poplar. Some pine and Red Oak can be found on better-drained sites further inland. In wet, peaty areas, Black Spruce, larch, and alders are found.

ANIMALS

Coastal habitats include many sand beaches, salt marshes, intertidal muds and sands at the heads of the longer inlets, and cobble beaches. Rocky shores are mostly confined to the shoreline between Liverpool and Port Medway. This section of the coast is on the route for migratory waterfowl and shorebirds. The relatively mild winters and ice-free waters also make this Unit a prime wintering area for many species.

Clarks Harbour and Cape Sable are important staging areas for shorebirds, with highest concentrations in August. Barrington Bay has extensive mud flats which also attract many shorebirds. Moderate numbers of waterfowl, including Black Duck, scaups, and Common Goldeneye, are found there between October and March. During January and February, moderate numbers can also be seen at the heads of Jordan Bay and Green Bay. The coast from Lockeport to Port Mouton is very important for wintering waterfowl, particularly Canada Goose and Black Duck. Also present are scaups, Common Goldeneye, Oldsquaw, Common Eider, loons, scoters, and Red-breasted Merganser. Wintering Harlequin Duck is found in the Port Joli area. St. Catherines River Bay (Cadden Bay) also has the densest breeding concentration of Piping Plover in the Maritimes (up to 35 pairs). Birds breeding on the scattered offshore islands include gulls, cormorants, Black Guillemot, Arctic and Common terns, Leach's Storm-petrel, Osprey, and Great Blue Heron.

Offshore, nutrient-rich waters provide food for overwintering pelagic seabirds and whales. In the summer, warm-water incursions from the Gulf Stream often bring exotic tropical species to the beaches and inlets in this area.

The area immediately around Barrington Passage is unique in that its population of Red-backed Vole exhibits an exceptionally high incidence of melanism (an excess of black pigment which is genetically controlled). The incidence has been calculated at 18.4 percent, compared to 0.01 percent elsewhere in Nova Scotia. Brook Trout and Yellow Perch are typical freshwater fish species.

CULTURAL ENVIRONMENT

Land grant settlements in this Unit during the mid-1700s were based on deep harbours at Liverpool, Barrington, and Shelburne. This coastline, primarily settled by Loyalists, has always had a marine orientation and focused on fishing, shipbuilding, and forestry exports. Wood from backland areas supplies the

Brooklyn newsprint mill. Sand and gravel deposits are commercially exploited by large producers at several coastal locations. The tradition of building Cape Island boats originated along this shoreline and continues today. Farming operations are small-scale, and sheep-rearing takes place on isolated islands with no predators. Aspects of the wool trade in this area are presented at the Barrington Woollen Mill Museum. Like most mills of its time, the Barrington mill was water powered.



Sites of Special Interest

- Port Joli Federal Migratory Bird Sanctuary—chiefly for protection of Canada Goose habitat
- Carters Beach at South West Port Mouton (IBP Proposed Ecological Site 46)—illustrates a classic sand-dune successional sequence and has the highest dunes in the Atlantic Coast Region; Pearlwort is found in the depressions
- Sandhills Beach in Barrington Bay (IBP Proposed Ecological Site 49)—combines a sand dune with a Cord Grass-Rockweed salt marsh community
- Port l'Hebert Pocket Wilderness Trail—access to forest and coastal habitats
- Kejimkujik National Park has a Seaside Adjunct in the Port Joli area at Mouton Head and Cadden Bay

Provincial Parks and Park Reserves

- Port Joli
- Broad River
- Summerville Beach
- Summerville Centre
- Western Head
- Liverpool

Proposed Parks and Protected Areas System includes Natural Landscape 11.

Scenic Viewpoints

- Shelburne Harbour (both sides)
- Lockeport town (unusual site)
- Port Medway (road and trail to Medway Head)

Associated Offshore Unit

911 Atlantic.

Associated Topics

T2.2 The Avalon and Meguma Zones, T6.4 Estuaries, T7.1 Modifying Forces, T7.3 Coastal Landforms, T9.3 Biological Environment, T10.1 Vegetation Change, T11.5 Freshwater Wetland Birds and Waterfowl, T11.6 Shorebirds, T11.7 Seabirds.

Associated Habitats

H2 Coastal, H4.1 Bog, H6.2 Softwood Forest (Black Spruce, Larch Association), H6.3 Mixedwood (White Spruce, Fir-Maple, Birch Association).

841
Capes
and Bays

842 GUYSBOROUGH HARBOURS

A submerged coastline with faults perpendicular to the coast gives long, drowned parallel estuaries separated by greywacke headlands. Thick glacial outwash deposits block the upper reaches of some valleys. Shallow soils give extensive bog and barren development. Light winter snowfall results in important wintering habitat for deer. Sheltered inlets and islands provide important habitat for waterfowl, shorebirds, and seabirds. The cold-water coast allows little diversity in marine fauna.

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Guysborough Harbours Unit extends from Marie Joseph to New Harbour Cove.

The bedrock is predominantly greywacke with interfolded slates. The fold axes intersect the coastline at about 45°. Slip movements along the Chedabucto Fault caused a series of parallel faults to develop, dividing the bedrock into a number of blocks. These blocks have moved slightly northwards in a step pattern (en echelon). Weaknesses in the fault zones have been exploited by rivers, producing relatively straight valleys. These have been inundated by the sea and now form very long, narrow inlets. Sheet Harbour, Indian Harbour, Country Harbour, Isaacs Harbour, and New Harbour are examples of these drowned, fault-controlled river valleys. The valleys tend to be narrow and steep-sided, providing interesting variety in an otherwise uniform terrain with little relief.

Liscomb Harbour and Fishermans Harbour (near Port Bickerton) have been formed by erosion of the relatively weak slate bedrock. The east-west orientation of these two harbours contrasts with the north-west-southeast orientation of all other harbours. The only comparable feature in the Atlantic Coast Region is Yarmouth Sound.

The Unit is mantled with a thin quartzite till derived from the underlying greywacke. A single group of drumlins made up of red-brown till from the Carboniferous strata to the north crosses the area parallel to Indian Harbour River. The drumlins reach the coast between Holland Harbour and St. Marys Bay (Guysborough), where they form coastal bluffs.

There are several large areas of exposed bedrock. Glaciofluvial deposits are well developed along the valleys of the Indian Harbour and Country Harbour

rivers, and along the shore of New Harbour. Thick sand and gravel deposits choke the valleys and impede drainage. New Harbour Lake is impounded by a gravel barrier across the valley at Port Hilford.

The coastal sediment supply is limited and there are few sand beaches. Coastal fringe deposits tend to be rocky or cobbly.

FRESHWATER ENVIRONMENTS AND COASTAL WETLANDS

Many oligotrophic lakes are scattered throughout this Unit, as are a few small freshwater wetlands and tidal marshes. A classic example of a freshwater tidal marsh occurs in the St. Marys River estuary.

SOILS

Most of the soils have developed from *medium to moderately coarse textured tills* derived from the underlying quartzite. Because quartzite does not weather easily, there is only a thin mantle of stony soil over bedrock; where the relief is more pronounced, rapidly drained sandy loams of the Halifax series are found. On flatter areas, imperfectly to poorly drained Danesville and Aspotogan soils predominate. This Unit includes large areas of organic deposits and Rockland. On the drumlins scattered between Cape St. Marys and Holland Harbour, finer-textured Wolfville soils (sandy clay loam with moderately slow drainage) have formed. Hebert soils (excessively drained sandy loams) are found along a number of the valleys, formed on glacial outwash sands and gravels.

PLANTS

On better-drained soils the forest is mixed, but predominantly softwood—White Spruce and Balsam Fir with maple and birch. On wetter soils the main species are Black Spruce, larch, and Balsam Fir. Huckleberry is common on the extensive barren and semi-barren areas.

Few tidal marshes occur along this coast because so little sediment is available, but some Eelgrass beds are found.

ANIMALS

Because snowfall is considerably lower here than elsewhere on the coast, this Unit is an important wintering area for deer. Together with adjacent Units, the highly indented coastline with its many islands provides breeding and feeding habitats for a wide range of waterfowl and shorebirds, both resident and migratory. Like Unit 834, the area is regionally important since it provides a major portion of the breeding and brood-raising habitat for the Common Eider in Nova Scotia. Other breeding species in this area are the Great Black-backed Gull, Herring Gull, Double-crested Cormorant, Black Guillemot, Common Tern, Arctic Tern, and Great Blue Heron.

In the spring, substantial numbers of Black Duck, scoters, Common Goldeneye, Canada Goose, Oldsquaw, and Red-breasted Merganser migrate through the area. A number of species are winter residents but are thinly distributed. Oldsquaw, Black Duck, and Common Goldeneye are fairly common.

Along this cold-water coast, marine species diversity diminishes from west to east. Freshwater runoff strongly influences coastal water conditions and the distribution of brackish water species. The Banded Killifish, the Mummichog and their hybrids are found in the St. Marys River.

CULTURAL ENVIRONMENT

This area is more sparsely settled because of its lower resource potential. Limited fishing and forest exploitation occur here. Gold mining once took place at Goldboro. Peat resources in this area are now being exploited.



Sites of Special Interest

- Bickerton Island (IBP Proposed Ecological Site 28)—typical coastal island nesting area for many species
- Tobacco Island (IBP Proposed Ecological Site 29)—one of the few known nesting areas for Fox Sparrow
- Eastern Shore Islands Wildlife Management Area—provincial area extending from Ecum Secum Inlet (Little White Island) to Beaver Point (Round Island), Halifax County
- Goldenville gold mine
- New Harbour Lake—impounded by gravel barrier

Provincial Parks and Park Reserves

- Liscomb Mills

Proposed Parks and Protected Areas System includes Natural Landscape 38.

Scenic Viewpoints

- Indian Harbour Lake
- Country Harbour (ferry)
- Isaacs Harbour (both sides)

Associated Offshore Unit

911 Atlantic.

Associated Topics

T2.2 The Avalon and Meguma Zones, T3.4 Terrestrial Glacial Deposits and Landscape Features, T11.7 Seabirds, T11.10 Ungulates.

Associated Habitats

H2.1 Rocky Shore, H2.2 Boulder/Cobble Shore, H4.1 Bog, H5.1 Barren, H6.2 Softwood Forest (Black Spruce, Larch Association), H6.3 Mixedwood Forest (White Spruce, Fir-Maple, Birch Association).

850 GRANITE BARRENS

District 850 has two Units:

- 851 Pennant Barrens
- 852 Canso Barrens

GEOLOGY AND LANDSCAPE DEVELOPMENT

Within this District the bedrock is dominated by granite, which forms headlands and knolls well above the upland surface and provides some of the most significant relief in the Atlantic Coast Region. The hills are rounded and tend to have a very thin till cover with many large boulders. There is much exposed bedrock. Although the thin granite till is a source of quartz grains for occasional white, sandy pocket beaches, in general the sediment supply is very poor. The shallow impermeable bedrock allows little infiltration and consequently the surface is covered by streams, lakes, and bogs.

PLANTS

Thin acidic soils and frequent rock outcrops restrict tree growth even more than the rest of the coastal forest. Barrens with ericaceous and stunted krummholz vegetation are widespread.

SCENIC QUALITY

Some may regard these areas as bleak and forbidding, but others are enchanted by the strange landscapes and seascapes. Along the coast, smooth rock headlands and boulder-strewn barrens provide wide and scenic vistas. Small fishing villages nestling within tiny coves (typified by Peggys Cove) contrast markedly with their raw surroundings and add considerable charm. Relief is strong along the Chedabucto Bay fault-scarp (Dorts Cove to Queensport), but this advantage is offset by the straightness of the coastline. Inland, the variety of barrens, hills, and lakes is interesting but hardly attractive.



Associated Offshore Unit

911 Atlantic.

Associated Topics

T2.3 Granite in Nova Scotia, T10.1 Vegetation Change, T10.12 Rare and Endangered Plants.

Associated Habitats

H3 Freshwater, H4.1 Bog, H5.1 Barren, H6.3 Mixedwood Forest (White Spruce, Fir-Maple, Birch Association)

851 PENNANT BARRENS

This granite promontory, elevated above the surrounding upland surface, with thin rocky tills and exposed bedrock, gives extensive coastal barrens with bogs. Exposed conditions provide habitat for rare arctic-alpine flora. Generally the shoreline is rocky; in places it has been swept clear of all sediment and is bordered by a boulder and cobble shore.

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Pennant Barrens include the promontory between Halifax Harbour and St. Margarets Bay and part of the Aspotogan Peninsula. The area is underlain entirely by granite which forms knolls elevated up to 150 m, well above the planation surface.

Joints within the granite divide it into large blocks. At the shoreline these can be loosened and moved by storms, providing dramatic coastal topography as at Peggys Cove. There are also steep cliffs which were probably formed in the Early Carboniferous and later buried by younger deposits. Now that the sedimentary cover has been eroded away, they are exposed once again, for example, Chebucto Head. Granite islands and shoals formed as the headlands became submerged. Similarly, the lower reaches of rivers have been drowned and form long inlets (e.g., Shad Bay).

The surface of the granite has a patchy, thin covering of granite till. On the many areas of exposed bedrock, glacial striations can be seen. The till contains



Plate 8: Region 800. Typical view of the coastal landscape along the Atlantic shoreline showing exposed rock-weed beds at low tide and coastal spruce forest in the background (Unit 833). Photo: O. Maass.

many boulders of varying size (erratics) which have been dumped randomly across the landscape, giving it a bulldozed appearance. The sediment supply is very limited and only the accumulation of sediment carried inland by the transgressing sea has provided enough sand for beaches such as Crystal Crescent (see Plate 8).

FRESH WATER

The surface of the granite has a deranged drainage pattern, with many lakes interconnected by wandering, slow-moving streams. Many small wetlands are associated with the streams and headwaters. Many wetlands are also found in depressions isolated from other surface-water features. Fresh water tends to be slightly acidic, ranging between 5.0 and 6.5, and conductivity is low.

SOILS

The main soil found in this area is Gibraltar (well-drained sandy loam), with small areas of poorly drained Aspotogan and peat. A strip of Bridgewater soil (well-drained, shaly loam derived principally from slate) is followed by the road through Hatchet Lake. A number of small drumlins with Wolfville soils occur, particularly between Spryfield and Pennant.

PLANTS

Much of the area is covered by coastal barrens, with Reindeer Moss, other lichens, and Broom-Crowberry interspersed with small sphagnum and sedge bogs. Where exposure to wind and spray is most severe, stunted White Spruce is usually found. Black Spruce, larch, and Balsam Fir occur on more sheltered sites with maple and birch. Stands of post-fire maple, oak, and birch occur on well-drained sites further inland. Jack Pine can also be seen. Some arctic-alpine species are present (see T4.2, Post-glacial Colonization by Plants).

Commenting on this enormous fire barren in 1912, C.D. Howe wrote: "The largest fire barren in Halifax county lies between St. Margaret bay and Halifax harbour ... [and] is chiefly barren of commercial trees, the forest being composed ... of wire birch, red maple, alder and poplar, and frequently it has scattered white pine of polewood size reaching up above them. The soil is sandy and is filled with pebbles and boulders. In many places the bare rock is exposed, and the surface strewn with granite boulders. The tops of the sandy knolls where the soil is deep frequently support young red oak. On the more

moist, deeper soil of the slopes one finds scattered patches of thrifty hardwoods from twenty to forty years old. In one of these patches the composition of the stand was as follows: fir 24 percent, black spruce 16 percent, yellow birch 21 percent, shad tree seven percent, red maple 19 percent, mountain ash two percent, paper birch one percent."

ANIMALS

The shoreline is mainly rocky with low cliffs, some islands, and a few sand beaches; it does not provide much suitable habitat for shorebirds or waterfowl. Breeding birds include gulls, cormorants, Osprey, and Great Blue Heron. There are a few Bald Eagle breeding sites and Double-crested Cormorant colonies. Slope-water influence often results in productive plankton areas and the presence of whales, particularly in the late summer. Small-mammal diversity in the vegetation on the barrens is low (three or four species). Populations also appear to be low, except in close proximity to fresh water. Brook Trout is a typical freshwater species.

CULTURAL ENVIRONMENT

Writers, artists, and photographers who spent summer vacations at Peggys Cove in the 1920s drew attention to its allure, and Peggys Cove is now famous as a symbol of Nova Scotia and a tourist destination.



Sites of Special Interest

- Bear Cove (IBP Proposed Ecological Site 38)—example of a small coastal bog
- Duncans Cove (IBP Proposed Ecological Site 39)—large area of coastal barrens with rare plants
- West Dover (IBP Proposed Ecological Site 40)—example of a lichen-dominated, virtually treeless barren
- Portuguese Cove—contact between granite and Meguma sediments; loose blocks of country rock can be seen "floating" in the granite
- Chebucto Head—large white crystals of feldspar, showing flow patterns within the granite
- Crystal Crescent—relict white sandy beach

Provincial Parks and Park Reserves

- Hollahan Lake
- West Dover
- Blind Bay
- Terence Bay
- Crystal Crescent Beach
- Herring Cove

Proposed Parks and Protected Areas System includes Natural Landscape 32 and Candidate Protected Area 23 Terence Bay.

Scenic Viewpoints

- Peggys Cove—village and headland
- Crystal Crescent Beach—white beaches
- Herring Cove—cliff-top trail off Highway 253

Associated Topics

T2.3 Granite in Nova Scotia, T3.4 Terrestrial Glacial Deposits and Landscape Features, T4.2 Post-glacial Colonization by Plants, T10.12 Rare and Endangered Plants.

Associated Habitats

H2.1 Rocky Shore, H2.2 Boulder/Cobble Shore, H2.3 Sandy Shore, H3 Freshwater, H4.1 Bog, H5.1 Barren, H6.1 Hardwood Forest (Maple, Oak, Birch Association), H6.2 Softwood Forest (White Spruce Association), H6.3 Mixedwood Forest (White Spruce, Fir-Maple, Birch Association).

852 CANSO BARRENS

Granite knolls rise prominently above the surrounding upland surface. The straight northern coastline is fault-controlled, in contrast to the indented southeastern coastline, which has many bays and bedrock islands. Extensive areas of exposed rock give these barrens the appearance of a moonscape (see Figure 28). Seabirds breed on some islands.

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Canso Barrens extend northeastwards from New Harbour to Cape Canso. The area is composed of rounded bodies of granite intruded into Meguma Group slates and greywacke. The Meguma greywacke and slates have been extensively metamorphosed to form schists. All bedrock components have been affected by shearing movements along the Chedabucto Fault. The granite appears as knolls in the landscape, rising up to 200 m above sea level.

Thin deposits of granite, schist, and slate tills cover about 50 per cent of the surface, but the remainder is exposed bedrock, giving the area a bleak, moonscape appearance. A few drumlins composed of red-brown till derived from Carboniferous deposits are found on the northeast side of Tor Bay and south of Canso Harbour. The supply of coastal sediment is very limited.

The shape of the coastline reflects two influences: the presence of the Chedabucto Fault on the straight northern coast and submergence on the southern shore. New Harbour is a long, narrow inlet formed by the inundation of a fault-controlled river valley. Glacial outwash deposits are found along a 7-km section of the valley and block the drainage at two points, creating two ribbon lakes.

FRESH WATER

The many different-sized lakes and ponds are fed by complex patterns of streams and tributaries. Surface water tends to be slightly acidic, with pH levels generally below 6.0.

SOILS

Over much of the area, soils are very thin or non-existent. Over the granite, where soil cover has developed, is mostly Gibraltar soil (well-drained sandy

loam). On flatter areas near the coast, Danesville gleyed podzol (imperfectly drained sandy loam) is common. In the middle of the Canso peninsula, Bridgewater soils (well-drained, shaly silt loams) have developed on the slate, interspersed with many boggy areas. Small, finer-textured Wolfville drumlins are strung out along the road to Canso and near Port Felix. Around Larrys River is an area of excessively drained Nictaux soil on outwash sands and gravel.

PLANTS

Where enough soil is present for trees to become established, the trees are mostly Black Spruce and Balsam Fir in dense stands with some White Spruce, maple, and birch (H6.3). On wetter areas, Black Spruce and larch predominate. The presence of Jack Pine on the Canso peninsula indicates that extensive fires have occurred. Vegetation on the barrens includes Sheep Laurel, Huckleberry, Labrador Tea, scrubby Black Spruce, Bracken Fern, and alders.

C.D. Howe's 1912 comments on the "forests" of this unproductive area are: "The bare rock is largely exposed and is strewn with boulders. The soil cover in the drier portions is not over two inches deep and is composed of raw humus. The deeper soils are of the same nature and both are covered with small herbs and shrubs. The crevices of the rock and the depressions are filled with alder and stunted black spruce and fir."

Rocky shores provide good substrate for rockweed and kelp growth.

ANIMALS

The large areas of barren do not provide productive wildlife habitats. The rocky southeastern coast provides breeding grounds for gulls, the Double-crested Cormorant, Great Blue Heron, Arctic Tern, Common Tern, and Common Eider (see Unit 842). The cobble beaches and cliffs, and the lack of inlets and islands, make the presence of the waterfowl around the Chedabucto Bay coast much less interesting. A cold-water shore with little slope-water influence means that marine productivity is diminished and marine fauna impoverished. An arctic indicator species *Mysis gaspensis*, a crustacean, occurs here. Typical

fish include Rainbow Trout, Brook Trout, Banded Killifish, and sticklebacks.

CULTURAL ENVIRONMENT

Since the 1500s, Canso has been a strategically important fishery base. Situated at the entrance of Chedabucto Bay, it is the nearest point on the mainland of North America to the great Atlantic fishing banks. It is said that the harbour of Canso was frequented by European fur traders and fishermen within a dozen years of the arrival of Columbus in America, and an attempt at settlement was made here as early as 1518. The name “Canso” is derived from the Mi’kmaq word “Kamsok,” meaning “opposite the lofty cliffs.” With the closure of a major fish-processing plant in the early 1990s and the collapse of fish stocks, Canso’s long history as an important fishery centre was threatened.

Sites of Special Interest

- Along Highway 16—fault-scarp of Chedabucto Fault
- Grassy Islands National Historic Site—commemorates the role of the Canso fishery in the early eighteenth century

Provincial Parks and Park Reserves

- Cape Ann Island
- St. Andrews Island
- Third Lake
- Harbour Head
- Tor Bay

Proposed Parks and Protected Areas System includes Natural Landscape 39 and Candidate

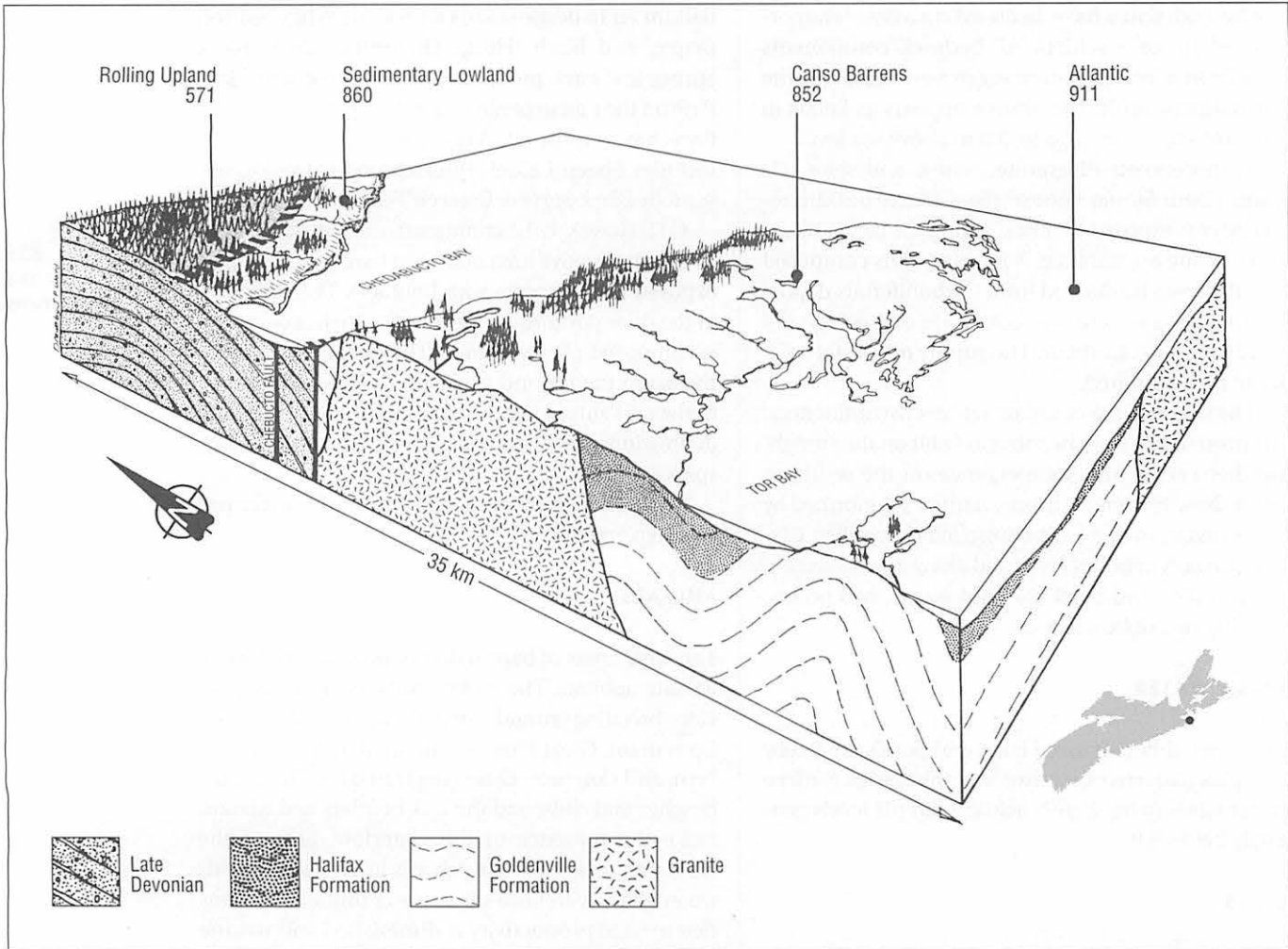


Figure 28: Canso Barrens area. The predominantly granite peninsula (Unit 852) is, for the most part, barren of trees because of its extreme exposure and impoverished soils. Very old sandstones (Unit 571) north of the Chedabucto Fault also support thin soils. The wind- and spray-influenced coastal forest extends to the Sedimentary Lowland (District 860) on the north side of Chedabucto Bay.

Protected Area 13 Bonnet Lake Barrens and 14 Canso Coastal Barrens.

Associated Offshore Unit

911 Atlantic.

Associated Topics

T2.2 The Avalon And Meguma Zones, T2.3 Granite in Nova Scotia, T3.4 Terrestrial Glacial Deposits and Landscape Features, T9.1 Soil-forming Factors.

Associated Habitats

H2.1 Rocky Shore, H2.2 Boulder/Cobble Shore, H4.1 Bog, H5.1 Barren, H5.3 Cliff and Bank, H6.2 Softwood Forest (Black Spruce, Larch Association), H6.3 Mixedwood Forest (White Spruce, Fir-Maple, Birch Association).

860 SEDIMENTARY LOWLAND

Chedabucto Bay is the largest bay on the Atlantic Coast and was formed by the drowning of part of an ancient river system. The river developed on the erodable Carboniferous sediments, which can now be seen on the lowland margins of the bay. Various soils have developed on deep tills and include extensive clay areas. This part of the Atlantic Coast Region is more sheltered, but the coastal forest still dominates. Freshwater habitats are more productive than elsewhere in the Region. Water temperatures are warmer in the summer than on more exposed coasts and support some southern marine fauna species.

GEOLOGY AND LANDSCAPE DEVELOPMENT

Chedabucto Bay lies immediately to the east of the Horton sandstone Rolling Upland (District 570) of the Carboniferous Lowlands. It is dominated by sedimentary rocks deposited during and after the formation of Pangaea in the late Devonian and Carboniferous periods.

Apart from slices of Precambrian Fourchu volcanics, which have been faulted up against younger rocks on Isle Madame, the oldest deposits in the District are coarse conglomerates, including some volcanics. These were deposited during the unsettled period from Late Devonian to Early Carboniferous when major crustal movement and adjustment was taking place in Nova Scotia. These conglomerates and related deposits are extensively exposed in eastern Guysborough County, on Isle Madame, and between L'Ardoise and Loch Lomond.

The succeeding deposits are salts (Windsor Group), reddish siltstones (Canso Group), and fine sandstones (Riversdale Group). All these rocks are relatively soft and erodable, and they have formed a rolling lowland which slopes towards Chedabucto Bay and the Strait of Canso.

LANDSCAPE DEVELOPMENT

Chedabucto Bay owes its origin and shape to a number of factors. Its southern boundary marks the position of the Chedabucto Fault, which extends across central Nova Scotia from the Bay of Fundy to the Canso peninsula. This fault line, the Strait of Canso, and Chedabucto Bay itself were probably part of a major river system which rose on the continental

shelf and flowed northwards into the Gulf of St. Lawrence during the Triassic and Cretaceous periods. Later tilting and submergence drowned the valley, creating both the bay and the strait.

Glacial ice moving into Chedabucto Bay from the northwest and from local ice caps deposited a locally derived red-brown sandy till across the Carboniferous rocks. Drumlins are entirely absent on the northwest side of the bay but are common in the eastern part where they have an east-west (Isle Madame) or northwest-southeast orientation. Consequently, rivers rising in the uplands flow southwards across the Carboniferous Lowland into Chedabucto Bay. River Inhabitants, the largest in the District, rises in the Maple Brook area south of the Creignish Hills and empties into the bay through a drowned valley. Marine erosion provides abundant coastal sediment for numerous small gravel beaches. The beaches often enclose small lagoons or salt marshes.

FRESH WATER

Many small to medium-sized lakes are scattered throughout the District, and pH ranges between 6.0 and 7.0. Bogs are particularly common on Isle Madame, and large wetland areas can be found along the Inhabitants River.

SOILS

The soils in this area have developed for the most part from sandstones, slates, and shales, giving tills ranging in texture from sandy loam to shaly clay loam. In Guysborough County, mottled, imperfectly drained clay loam Millbrook soils are common. The better-drained Westbrook sandy loam is found around the town of Guysborough. Riverport (imperfectly drained shaly loam) and Kirkhill (sandy loam) soils have both developed from shales. On Cape Breton Island the western section of this District has more Millbrook soils, imperfectly drained Diligence and Queens clay loams, and poorly drained Kingsville soils. Further east, including much of Isle Madame, soils have developed from stony tills derived from hard sandstones and angular metamorphic rocks. They are the same as those found in the Louisbourg area; i.e., Thom and Arichat soils, with extensive peat deposits.

Along the River Inhabitants the soils are a complex mix of peat; alluvial fine sandy loams known as Kingsville, Cumberland, and Bridgeville soils; and the coarse Hebert series which has developed on outwash gravels.

PLANTS

Although this part of the Atlantic coast is more sheltered, the coastal forest is still manifest, with the predominant forest association being White Spruce and Balsam Fir with maple and birch. On the clay Queens soils of Cape Breton sections of this District, Balsam Fir and Black Spruce are the dominant species, with scattered shade-intolerant hardwoods. Some aspen also occur, especially in disturbed areas. Barren and bog vegetation are common, particularly on Isle Madame. Old farmland is found mainly on the clay soils and is mostly regenerating in pure White Spruce. The low coastal relief and abundance of sediment give areas of salt marsh, but significant local winter ice action restricts the growth of seaweeds.

ANIMALS

Chedabucto Bay is not a productive area for waterfowl or seabirds because there are few undisturbed islands, and winter sea ice restricts feeding from open water. However, salt marsh and estuary areas do provide some wading bird habitat (herons and shorebirds).

Warm water temperatures in summer permit the reproduction and survival of some more southerly marine species. Many of them are also found in the Gulf of St. Lawrence but are no longer able to interact freely with those in Chedabucto Bay because of the presence of the Canso Causeway. The diversity and populations of epifauna are restricted by ice action. Whales are sometimes seen in Chedabucto Bay.

The River Inhabitants provides rich aquatic habitat and is important for nesting Wood Turtles. Freshwater lakes on Isle Madame contain interesting relict fauna with a more continental distribution, including a species of freshwater clam.

SCENIC QUALITY

Scenically, this District is dominated by Chedabucto Bay and its extension into the Strait of Canso. Localities adjacent to both higher relief and the ocean (i.e., around Guysborough Harbour and the eastern end of Canso Strait) are of high scenic quality, particularly where farming adds a human element to the landscape. Isle Madame, though flat, has salt marshes

and much of human interest, with characteristic Acadian village forms. Inland, scenic values are generally low to medium because there is little settlement or relief, and only a few lakes (almost none in Inverness County). There is added scenic value, however, where this lowland abuts the Avalon Uplands (Region 300), notably along the upper reaches of River Inhabitants.

CULTURAL ENVIRONMENT

Nicholas Denys established a fur trading and fishing post at St. Peters in 1636. During the eighteenth century, Isle Madame was an important Acadian settlement in close communication with Louisbourg. In general, small-scale farming, fishing, and forestry have been the resource use of the land and sea in this area. Shipbuilding was once common and, today, shipbuilding and maintenance industries continue. An industrial base established along the Strait of Canso is strategically located to make use of the shipping lane connecting the Gulf of St. Lawrence with the Atlantic Ocean.

Forestry exploitation yields pulpwood, which supplies a sulphite mill and a newsprint mill at Point Tupper. A coal-fired, steam-turbine electrical plant is also located at Point Tupper. St. Peters Canal is an important link to the Bras d'Or Lake, facilitating recreational boating. Prior to the completion of the canal, small vessels were pulled by oxen over the narrow strip of land on skids, and thus the area was referred to on Admiralty charts of the time as "Haulover Isthmus." In 1970 the Greek tanker *Arrow*, carrying 16,200 tons of bunker C oil to a pulp mill at Point Tupper struck Cerberus Rock in Chedabucto Bay, creating a massive oil spill which polluted half of the bay's 600-km coastline. Twenty years later, Bedford Institute of Oceanography scientists studying Chedabucto Bay concluded that little evidence of this oil spill remained.



Sites of Special Interest

- Loch Lomond—exposed conglomerates and deposits
- Janvrin Island—exposed red and purplish strata

Provincial Parks and Park Reserves

- Mast Cove
- Boylston
- Ragged Head
- Dorts Cove
- Kempt Road
- Louisdale
- Lennox Passage
- Cap La Ronde
- Pondville Beach
- Arichat
- Cove Road

Proposed Parks and Protected Areas System includes Natural Landscape 47.

Scenic Viewpoints

- Guysborough Harbour (both sides)
- River Inhabitants (tidal reaches)
- Salt marshes between Isle Madame and Janvrin Island
- Arichat Provincial Park (Arichat Harbour)
- St. Peters Canal

Associated Offshore Units

911 Atlantic, 916 Bras d'Or Lake.

Associated Topics

T2.4 The Carboniferous Basin, T4.3 Post-glacial Colonization by Animals, T11.15 Amphibians and Reptiles, T11.16 Land and Freshwater Invertebrates.

Associated Habitats

H2 Coastal, H4.1 Bog, H3.2 Freshwater Open-Water Lentic, H3.4 Freshwater Bottom Lentic, H3.6 Freshwater Water's Edge Lentic, H5.1 Barren, H5.2 Oldfield, H6.3 Mixed Forest (White Spruce, Fir-Maple, Birch Association).

870 TILL PLAIN

This is a low-lying, almost flat District with a highly eroded bedrock surface thickly covered with glacial till, sands, and gravel. The poorly drained surface gives numerous bogs, swamps, lakes, and slow-moving, wandering streams. A rocky coastline in the east gives way to a coast dominated by barrier beaches in the west. Balsam Fir is the dominant tree species, with Black Spruce and larch in wetter areas. Limited snow cover provides good wintering habitat for deer. Abundant offshore marine life thrives on plankton-rich, cool, upwelling coastal waters.

GEOLOGY AND LANDSCAPE DEVELOPMENT

The Till Plain lies on the southeastern side of Cape Breton, on the lower part of the tilted planation surface (see Figure 29). The bedrock is dominated by Precambrian Fourchu volcanics with large outcrops of Cambrian granite and metamorphic sediments of varied composition. The bedrock is highly eroded and is presumed to be almost flat under the glacial deposits. This is difficult to verify because the whole District is covered by a thick layer of glacial till, sands, and gravels, with the bedrock exposed only along the coast.

The bedrock is cut by many parallel, northeast-southwest faults along which vertical movement has taken place. Gabarus Bay is believed to be the product of downfaulting along another set of faults oriented northwest to southeast.

Surficial Deposits and Landscape Development

Glacial ice from the exposed Scotian Shelf flowed onshore and then northeast during the Wisconsin glacial period, depositing a thick mantle of sands and gravels across the entire area. The thickness is variable but commonly achieves 30 m, with 12 m representing an average depth. Drumlins are common. The glacial deposits have completely altered the original drainage pattern. The surface is now covered with irregular lakes and wandering streams.

Inland the terrain is low-lying and rolling, rising across a series of ridges to about 125 m in the northwest. A dominant landscape feature is the Mira River valley, which extends from Framboise Cove northwards to about Marion Bridge and then sweeps eastwards to exit at Mira Bay. Its preglacial flow, which may have been to the south, was redirected by small

changes in elevation and blockage of the original exit by glacial deposits. The lower reaches of the river have been dammed by glacial gravels to form a long lake. At Mira Bay the river funnels through a very narrow valley, in places only 50 m wide, with steep banks 20 m high.

The coastline of the Till Plain is relatively even and dips gently into the sea. Gabarus Bay is the only stretch of coast where sea cliffs are found. Sediment supply along the coast is variable. North of Gabarus, rocky shorelines, boulders, and cobble beaches are most common; south of Gabarus, the coast is indented with protected bays. Sand and gravel beaches are numerous. Between Point Michaud and Fourchu Bay an extensive series of cobble barrier beaches enclose large barachois ponds (see Figure 29). These beaches may have originally formed offshore and moved landward as sea levels rose.

FRESH WATER

The many small lakes and freshwater wetlands are associated with streams scattered throughout this District. The pH levels tend to be neutral, ranging between 6.5 and 7.5.

SOILS

The soils in this District illustrate how a strong podzol development associated with the climate along the Atlantic coast can override the effects of different parent materials. The soils have developed from sandstones, quartzites, and shales. The most common soil series is Thom, a well-drained sandy loam podzol usually associated with cooler and wetter highland areas such as the Cobequids. A feature of Thom soils is the accumulation of organic matter on the surface and "B" horizon. Closer to the coast, the imperfectly to poorly drained Mira and Arichat associate soils are more common.

On the granites around Lower St. Esprit, Gibraltar and Aspotogan soils are found. Shulie sandy loams occur between Loch Lomond and the Mira River. These are similar to soils in Unit 532 to the north. To the east of the Mira River, well-drained Kirkhill soils occur; these have a shaly loam texture and are relatively deep and free of stone. Ortstein layers are common in this District, and large areas of peat have built up.

PLANTS

The main controlling factors in this District are the cool, wet soils, the marine exposures, widespread disturbance, and insect damage. Along the coast, White Spruce is common, but inland Balsam Fir grows much better and is the dominant species. Some shade-intolerant species with fewer shade-tolerant species are found on better-drained soils inland. Black Spruce and larch are common in wet depressions. Hemlock was once common but is now rare, presumably having been removed through selective logging by early settlers. Spruce Budworm is rampant here.

Large bogs are a prominent feature. Considerable quantities of Bakeapple are found in the bogs on Scatarie Island, exposed headlands, and other coastal bogs and barrens. Heath vegetation, particularly Crowberry, is found on exposed headlands.

Sand-dune and tidal-marsh communities with some beds of Eelgrass are found along the coast. Limited warm-water influence in summer has permitted the penetration of some marine plant species from the Gulf of St. Lawrence, such as Serrated Wrack, but marine flora is restricted by the cold water and ice action.

ANIMALS

Low snowfall provides good deer-wintering habitat in this District. Staging areas for migratory waterfowl and shorebirds are found along this coast between Fourchu Bay and Framboise Cove. The islands provide important breeding habitat for seabirds. Green Island has the most southerly nesting colony of Black-legged Kittiwakes and is the only one known in the Maritimes. Elsewhere breeding populations of gulls, cormorants, Black Guillemot, and Common Ei-

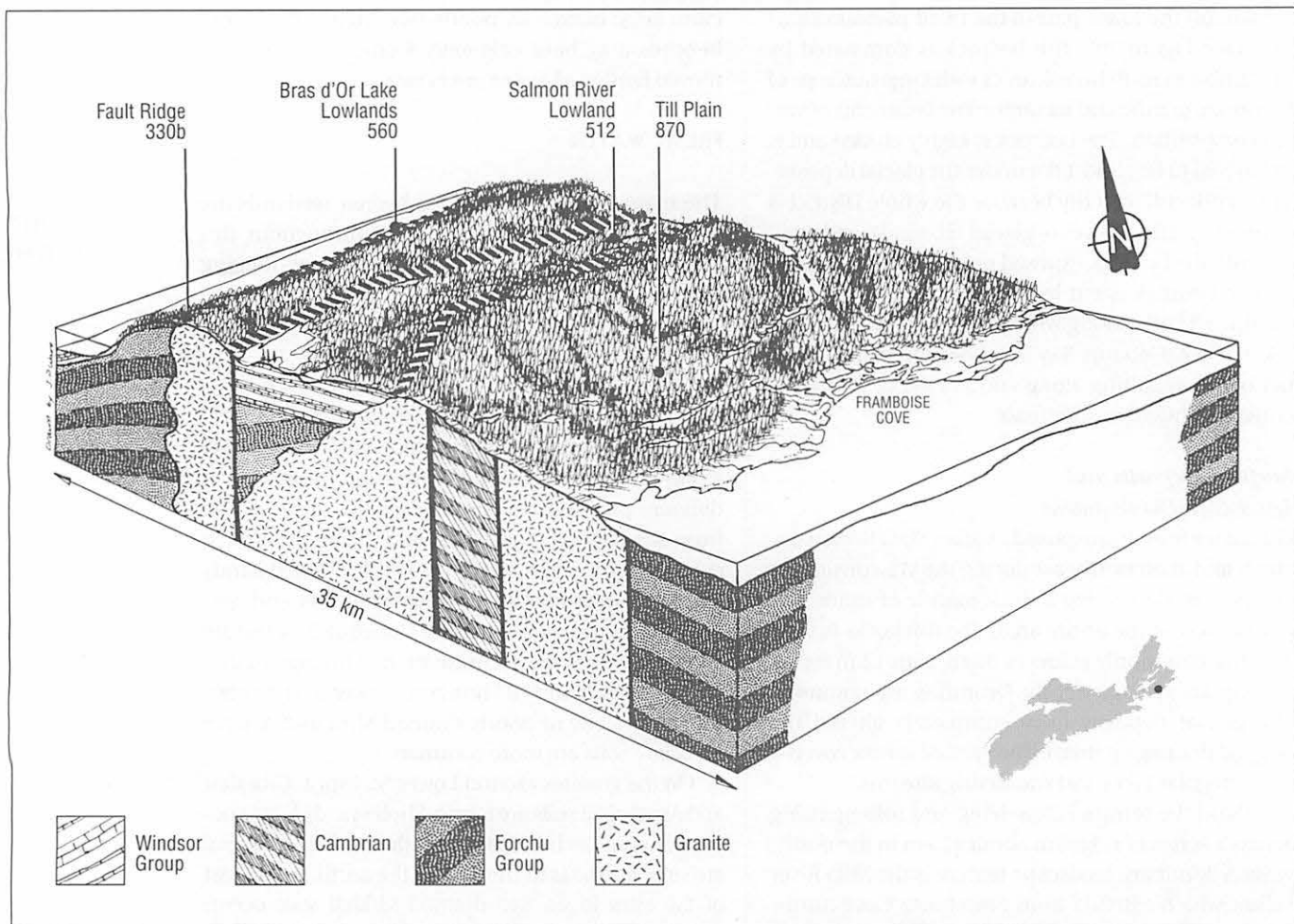


Figure 29: Louisbourg lowland area. Glacial deposits mask the very old rocks of this Till Plain (District 870). At the coast, the reworking of these sediments has created an extensive system of barrier beaches and coastal lagoons. Inland, softer rocks are preserved in the downfaulted Salmon River lowland. Windsor Group rocks are also found on the lowland fringe (District 560) of Bras d'Or Lake abutting the resistant upland known as the East Bay Hills (District 330).

der can be seen. Pelagic seabird concentrations occur off Louisbourg and are probably associated with an area of deepwater upwelling. Ptarmigan and Arctic Hare have been introduced on Scatarie Island.

The Louisbourg lowland is a cold-water coast with extensive sea ice, resulting in an impoverished marine fauna of an exposed boreal character. Harbour Seals are common; Grey Seals used to breed on the Basque Islands.

Typical freshwater fish species include White Perch, Banded Killifish, sticklebacks and Brook Trout. The Mira River supports a unique population of Lake Whitefish.

SCENIC QUALITY

This District contains a variety of landscapes and coastal scenery, the only constant being low relief—the area is almost flat except for Gillis Mountain and the hills around Gabarus Bay. Coastal scenery varies from rocks to cliffs to beaches, with the most impressive views being in Gabarus Bay. Inland, scenic ratings are typically low to medium, though lake sections of Mira River provide many delightful scenes from boats. Despite the presence of drumlins, there is very little settlement, except for a scattering of fishing villages and long lines of summer homes (“bungalows”) along the Mira.

CULTURAL ENVIRONMENT

This is a rugged coastline, sparsely populated, with scattered fishing villages. The French were drawn to Louisbourg by its ideal harbour and strategic location on Cape Breton Island. Today the Fortress of Louisbourg National Historic Site is the largest historical reconstruction in North America and presents the fascinating story of the French fort. The first recorded coal mining in the province was undertaken here in 1720. Small farms originally settled by Acadians who planted apple and plum trees can be found along the Mira River. Salmon and trout fishing have a long history on the river, beginning with the Mi'kmaq. Mira shores have yielded harvests of sand and gravel, but this industry has declined. A small coal mine operated at Broughton. Fireclay, found on both sides of the river, was used as early as 1727 by the French to create bricks for the construction of Fort Louisbourg. The French brickyard was later operated by the British for many years. Large quantities of stones have been quarried from the cliffs along the Mira.

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Sites of Special Interest

- Point Michaud (IBP Proposed Ecological Site 26)—beach and sand dune system showing succession from bare sand to White Spruce forest
- Scatarie Island—provincial wildlife management area with bogs and barrens
- Little Lorraine to Big Lorraine—barren, rocky headlands with interesting flora
- Gooseberry Cove—a hanging bog, nesting sites
- Baleine—arctic-alpine flora
- South Head—bog contains Grass-pink
- Louisbourg National Historic Park—bogs, barrens, and forest; Precambrian volcanic ash, vent deposits, and dykes
- Green Island—nesting site for Black-legged Kittiwakes
- Main-à-Dieu—exposed cobble beach
- Hilliards Lake, Winging Point Lake, Belfry Lake, Marcoche Lake—barachois ponds enclosed by barrier beaches
- Mira River—a rare outcrop of fossiliferous Cambrian sandstone and shale on the south side of Mira River on the road between Marion Bridge and Albert Bridge

Provincial Parks and Park Reserves

- Point Michaud Beach
- St. Esprit
- Belfry
- Main-à-Dieu

Proposed Parks and Protected Areas System includes Natural Landscapes 51, 52, 53, and 55, and Candidate Protected Areas 9 Middle River Framboise, 10 Gabarus, and 11 Scatarie Island.

Scenic Viewpoints

- Fortress of Louisbourg—restored eighteenth-century fortress
- Louisbourg Harbour (east side)
- Gabarus Bay (Oceanview and Deep Cove)

Associated Offshore Units

911 Atlantic, 915 Sydney Bight.

Associated Topics

T2.2 The Avalon and Meguma Zones, T9.3 Biological Environment, T10.9 Algae, T11.12 Marine Mammals.

Associated Habitats

H2 Coastal, H4.1 Bog, H5.1 Barren, H6.3 Mixed Forest (White Spruce, Fir-Maple, Birch Association).

880 CLIFFED ISLAND

GEOLOGY AND LANDSCAPE DEVELOPMENT

St. Paul Island is 25 km northeast of Cape North in Cape Breton. It is 5 km long and peaks at 121 m high on Corgan Mountain. It is accompanied by a much smaller island, The Tickle, which is only 300 m long. Geologically the island is part of the Cape Breton highlands. Most of the gneiss and schist that forms the island belongs to the Precambrian George River Group, although some slightly younger Fourchu Group rocks are found on the northeast coast.

Almost vertical sea cliffs surround St. Paul Island, except on the southwestern side. A sloping plateau surface, reminiscent of the Cape Breton highlands, occupies most of the island; but it has an average elevation of 100 m above sea level, much lower than the highlands' 500 m. There is no sheltered anchorage; the shoreline is scoured by sea ice moving out of the Gulf of St. Lawrence in spring. Storm waves attack the cliffs at all times of year.

FRESH WATER

Two distinct freshwater ponds on the central plateau drain into the Cabot Strait. Several streams and small bogs provide the remaining surface-water coverage.

PLANTS

Despite its lower altitude, the plateau surface is exposed to winds comparable to those in the Plateau-Taiga (Region 100). The response of the vegetation is similar, with stunted spruce-fir coastal forest (H6.2) dominating the island. The barrens, bogs, and exposed cliffs are home to a number of northerly species not normally found in Nova Scotia, as follows:

- barrens: Bearberry Willow and Alpine Whortleberry, both of which have widespread boreal distributions but are rare in Nova Scotia
- bogs: the sedge *Carex gynocrates*, the orchid Grass-pink, and the bog birch are all found in bogs and wet depressions; all are widespread but rarely find the right habitat in Nova Scotia
- cliffs: *Oxytropis johannensis*, one of the pea family of flowering plants, is found here and on other exposed cliffs, particularly around the Bay of Fundy

- shorelines of ponds and streams: Butterwort and Bird's-eye Primrose, although the latter has a more southerly distribution

ANIMALS

Little information is recorded on the terrestrial and aquatic fauna of St. Paul Island. Avifauna records confirm that eight species of birds breed in this Unit: Leach's Storm-petrel, Black Guillemot, Common Raven, Mourning Warbler, Blackpoll Warbler, Tennessee Warbler, Grey-cheeked Thrush, and Bald Eagle.

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Scenic Quality

Inaccessible, flat-topped St. Paul Island is visible only from vessels in the Cabot Strait or, distantly, from northern Cape Breton Island.

Cultural Environment

St. Paul Island and its lighthouse have long been used as navigational aids. Shipwrecks found in nearby waters have attracted recreational divers to the island.

Associated Offshore Units

915 Sydney Bight, 923 Valleys and Plains.

Associated Topics

T7 Coast, T10.12 Rare Plants, T11.1 Factors Influencing Birds, T11.3 Open Habitat Birds, T11.4 Birds of Prey.

Associated Habitats

H2 Coastal, H4.1 Bog, H5.1 Barren, H5.3 Cliff and Bank, H6.3 Mixedwood Forest (White Spruce, Fir-Maple, Birch Association).

890 SANDY ISLAND

Sable Island is composed almost entirely of sand. Constant winds, salt spray, and blowing sand limit the growth of trees and shrubs. Climatic winter and summer extremes are modified by the ocean's influence. The island is a breeding ground for seals and is home to Sable Island horses.

GEOLOGY

Sable Island is an elongated sand island which lies 300 km east of Halifax. It is oriented east-west and measures 42 km by 1.4 km at low tide. Shallow bars extending underwater at either end give it an overall length of 80 km. The island is the emergent part of a very large sand deposit on Sable Island Bank which occupies an area measuring 250 km by 115 km on the Scotian Shelf. Beneath the sand is a wedge of Cretaceous and Tertiary sediments which thickens seaward and is being actively surveyed and drilled for hydrocarbon deposits.

The sand was deposited in a sand and gravel mixture as an outwash fan from a late Wisconsinan ice front which approached but never covered Sable Island Bank. As glacial ice melted and sea levels rose, the sand was winnowed out. Tides and wind-driven currents now keep it in continuous motion within a circulating "sand cell." The sand moves around the island, removing and replacing sand on the emergent part of Sable Island.

LANDSCAPE DEVELOPMENT

Sable Island has the shape of a shallow crescent which is concave northwards. It consists of two lines of high dunes which were originally separated by a tidal gap. The southern range has now disappeared, leaving a wide beach area. The form of the island changes constantly as strong winds and frequent storms shift the sand around the island and back and forth from offshore. The beach profile undergoes normal seasonal changes; it is steeply inclined in winter and gently inclined in summer.

Records and maps for the past 200 years or so show that though the island has changed its form, it has more or less maintained the same position and overall size. The eastern half, though more stable than the western half, has decreased in altitude from

50 m to 24 m at its highest elevation. The violent storms which have caused considerable changes in morphology on the island seem to be counterbalanced by a slow rebuilding process during quieter periods when sand is added from offshore.

CLIMATE

The climate of Sable Island is characteristically maritime with a narrow range of temperature and high winds. Sable Island is warmer in winter and cooler in summer than the neighbouring mainland. Fogs are frequent during the summer.

Mean daily temperatures in January hover around 0°C, in April they rise to approximately 4°C, and by July mean daily temperatures are around 15°C. In comparison to the mainland, the temperature regime on Sable Island shows a slightly lower annual mean maximum and a much higher annual mean minimum.

The total annual precipitation is similar to that of Halifax. Only a very small proportion falls as snow because of the mild winter temperatures. The snow that does fall does not linger.

Cloud or fog cover over Sable Island is frequent; the mean number of hours of sunshine is substantially lower than on the mainland. The incidence of foggy days increases between April and August. July is the foggiest month; fog occurs on average 21 days of the month. Average monthly windspeeds are significantly higher, as strong winds blow more of the time and Sable Island is more exposed than the mainland.

The main features of the climate are mild temperatures, constant high winds, and high humidity.

FRESH WATER

Several small freshwater ponds are located within the dunes in the vegetated areas, and some larger brackish ponds and lakes are found on the southern beach. Rainwater filtering through the sand collects to form a freshwater lens which, by displacing seawater, appears as pools in depressions. The pH of most of these freshwater pools varies from 5.0–5.7. Brackish ponds receive seawater during storm surges, and both their size and water chemistry can

change dramatically. The major brackish pond is Wallace Lake, which can vary in size throughout the year from two or three small ponds to an area up to 14 km long.

The physical and chemical characteristics of pools on Sable Island may be influenced by fluctuating water levels, the grazing and trampling of horses, and nutrient enrichment from colonies of gulls and terns.

SOILS

On the beaches, there is no soil development (i.e., no identifiable soil horizon) because of the constant shifting of the sandy substrate. In more sheltered areas in the central part of the island some peat has formed. But the soil is of poor nutritive quality and contains only small amounts of organic material. Podzolization occurred in the past when the sands were more stable, but only remnants remain.

PLANTS

The main influences on the regional vegetation are the high winds, salt spray, sandblasting, lack of nutrients, and effects of grazing by the Sable Island horses. The variety of plants found on the island has been increased by numerous introductions, both deliberate and accidental. A total of 154 native and 69 introduced vascular plants have been recorded.

Trees cannot survive the effects of wind and salt damage. In 1901, in a massive attempt to stabilize the dunes, over 80,000 trees were transplanted. Almost all died immediately, and by 1981 only one, a maple, could be found. Two pine trees planted in the early 1970s are barely surviving.

In a botanical study completed in 1981, plant communities were divided into several categories: Sandwort, Dense Marram, Sparse Marram, Marram-Fescue, Shrub Heath, Cranberry Heath, and Pond-edge Herbaceous. The first three communities are marked by a relatively low species diversity, which increases through the remaining communities. The greatest diversity is found at the edges of the freshwater ponds.

In the Sandwort community, nearly all the cover is provided by Sea-beach Sandwort. The most important species in the Dense Marram community are American Beach-grass, Beach-pea, and Yarrow. American Beach-grass is the most important species in the Sparse Marram community, with Beach-pea and Seaside Goldenrod. In the Marram-Fescue community, American Beach-grass is joined by Red Fescue and a number of other species.

In the Shrub Heath community, Black Crowberry, Common Juniper, Bayberry, Wild Rose, blueberry, and Heather (in one area) are common plants. In the Cranberry Heath community, cranberries grow with such plants as Baltic Rush, Bayberry, and aster.

Freshwater pools are usually fringed by a wide variety of plants, such as bulrushes, irises, Spike-rush, Baltic Rush, and Lance-leaved Violet, usually grading into the Cranberry Heath. In the brackish ponds, Ditch-grass and Sago Pondweed grow, surrounded either by bare sandy margins or salt-tolerant plants. The only vascular plant to grow in very brackish water is Eelgrass.

ANIMALS

Sable Island provides sand-beach, sand-dune, and heathland habitats, with a number of fresh and brackish pools. The fact that the island is the only landfall for 160 km also ensures that it receives many migratory and marine visitors. The only terrestrial mammal now found on the island is the horse. The Sable Island horses were probably deliberately introduced in the eighteenth century. The horse population fluctuates and in recent years has varied between 150 and 350. At one time 500 cattle lived on the island, and pigs roamed wild. Both Grey and Harbour seals whelp on the island, and whales and dolphins are quite regularly washed up on the beaches. A number of other mammals have at one time been introduced to the island, including rats, cats, rabbits, and foxes, but all are now extirpated.

A total of 489 species of insects have been recorded on the island. The pattern of their distribution in North America has given rise to theories that Sable Island may have acted as a coastal-plain refugium during the Pleistocene glaciation. Insects have also been introduced with livestock, vegetation, and shipwrecks. A number of rare and unusual insects occur on Sable Island, and numerous moths appear, different enough to warrant the status of sub-species. More than 100 other invertebrates have been recorded, including the freshwater sponge *Heteromyenia macouni*.

Five species of fish—Mummichog, American Eel, Black-spotted Stickleback, Ninespine Stickleback, and Fourspine Stickleback—are found in the freshwater and brackish pools. All five species are capable of crossing salt water to reach the island.

Of the 12 species of birds that regularly breed on Sable Island, the most famous is the Ipswich Sparrow, which is an endemic sub-species of the Savannah Sparrow. Other birds include the European Starling, Great Black Back Gull, Herring Gull, Arctic Tern,

Common Tern, Roseate Tern, Spotted Sandpiper, Least Sandpiper, Semipalmated Plover, Black Duck, and Red-breasted Merganser. Up to 312 other birds have been recorded as vagrants, strays, or migrants.

SCENIC QUALITY

For those lucky enough to visit, Sable Island presents unique vistas from the higher dunes, which allow the island's shape and size to be seen. Elsewhere the sand beaches and dune systems are notable for their number and size. Sheltered hollows around the interior ponds provide visual relief from the surrounding ocean.

CULTURAL ENVIRONMENT

For years, Sable Island was the bane of sailing ships, and many were wrecked on its shores. A series of stations here, including a lighthouse, have long been lifesaving navigational aids to ships. In 1901 the Canadian government attempted to forest Sable Island to control shifting sands. More than 80,000 trees and shrubs were planted, and 30 pounds of pine seed were scattered over some parts of the island. Several years later, 2,000 willow transplants from sandy soil in France were sent to Sable Island. The first planting was made with no fencing, and the Sable Island horses soon consumed the entire plantation. A second attempt with this willow was made the next year by planting and fencing about a half acre. But these transplants did not survive either, because the wind-driven sand blasted the young trees. By the 1920s, nothing was left of these efforts except for some fence posts.

Most of the ecological damage on Sable Island resulted from disturbances to the vegetation, leaving loose sand exposed to the wind. Small holes in the sand soon blow out to become big holes and gullies. In the 1970s, snow fences were erected at strategic points, causing the wind to drop sand leeward of the fences and marram grass colonized the dunes. Government approval must be gained to visit the island, which is off limits to most people. Oil exploration has been conducted on the island and current production wells are located offshore. Sable Island has considerable scientific value as a unique ecological environment. It is one of the most intensively studied areas in the province (Catling, 1984; Wright, 1989).

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Provincial Parks and Park Reserves

Proposed Parks and Protected Areas System includes Natural Landscape 77.

Associated Offshore Unit

931e Sable Island Bank.

Associated Topics

T2.7 Offshore Geology, T3.4 Terrestrial Glacial Deposits and Landscape Features, T3.5 Offshore Bottom Characteristics, T4.1 Post-glacial Climatic Change, T6.1 Ocean Currents, T7.1 Modifying Forces, T7.3 Coastal Landforms, T11.1 Factors Influencing Birds, T11.8 Land Mammals, T11.12 Marine Mammals, T11.14 Marine Fishes, T11.16 Land and Freshwater Invertebrates, T11.18 Rare and Endangered Animals.

Associated Habitats

H1.1 Offshore Open Water, H1.2 Offshore Benthic, H2.3 Sandy Shore, H2.5 Tidal Marsh, H2.6 Dune System.

