

## Acadian Temperate Forest



### General Description

The *Acadian Temperate Forest* zone covers an area of approximately 133,000 km<sup>2</sup>, including the Maritime Provinces and a small portion of Quebec adjacent to the New Brunswick border. The Atlantic Ocean generates a pronounced maritime influence on the cool temperate climate. Contemporary landcover is dominated by forests, agriculture and numerous water bodies, but settlements and industrial activities are significant contributors to the landscape mosaic.

### Vegetation

Productive closed forests dominate most upland sites, although open forests and woodlands are sometimes associated with rock outcrops and very dry soils. Forest canopies can be dominated by evergreen coniferous, cold-deciduous broad-leaved or a mixture of conifer – broad-leaved species. Stand structure is typically multi-storied and uneven-aged, but can be single-storied after stand-replacing disturbance. Depending on overstory composition and site conditions, understory shrub and herb layers vary from dense to sparse. Understories are generally rich in cold-deciduous broad-leaved shrubs, perennial herbs, tree regeneration and bryophytes.

Anthropogenic disturbance, including industrial forestry, is a dominant factor in contemporary forest dynamics, influencing forest composition and age structure. Windthrow, ice loading and insect infestations are the most widespread forms of natural disturbance; wildfire is generally not a factor.

The main tree species include balsam fir (*Abies balsamea*), red maple (*Acer rubrum*), paper birch (*Betula papyrifera*), yellow birch (*B. alleghaniensis*), red spruce (*Picea rubens*), sugar maple (*Acer saccharum*) and white spruce (*P. glauca*). Black spruce (*P. mariana*) often dominates stands on nutrient-limited sites. Eastern white cedar (*Thuja occidentalis*) is a common companion species, except in Nova Scotia. Eastern white pine (*Pinus strobus*), eastern hemlock (*Tsuga canadensis*), red oak (*Quercus rubra*) and American beech (*Fagus grandifolia*) are occasional canopy dominants or associates in the southern part of the zone, and at lower elevations in the north. Alluvial forests dominated by silver maple (*Acer saccharinum*), white ash (*F. americana*), red maple, sugar maple, white elm (*Ulmus americana*), white spruce and/ or yellow birch occur on stable floodplain terraces. Black ash (*Fraxinus nigra*) and balsam poplar (*Populus balsamifera*) are common floodplain dominants in cooler portions of the zone.

In addition to regenerating trees, common understory species include striped maple (*Acer pensylvanicum*), velvet-leaved blueberry (*Vaccinium myrtilloides*), Canada fly-honeysuckle (*Lonicera canadensis*), wild lily-of-the-valley (*Maianthemum canadense*), northern starflower (*Lysimachia borealis*), yellow clintonia (*Clintonia borealis*), bunchberry (*Cornus canadensis*), wild sarsaparilla (*Aralia nudicaulis*), common wood-sorrel (*Oxalis montana*), rose twisted-stalk (*Streptopus lanceolatus*), sedges (e.g., drooping woodland sedge [*Carex arctata*], New England sedge [*C. novae-*

*angliae*], fibrous-root sedge [*C. communis*]) and wood ferns (i.e., evergreen wood fern [*Dryopteris intermedia*], spinulose wood fern [*D. carthusiana*], mountain wood fern [*D. campyloptera*]). Bryophytes and epiphytic lichens can be particularly abundant, especially in older stands and in areas with a very humid climate. The most common bryophyte species include red-stemmed feathermoss (*Pleurozium schreberi*), stairstep moss (*Hylocomium splendens*) and three-lobed whipwort (*Bazzania triolobata*).

Wetlands are common throughout mainland Nova Scotia, the lowlands of New Brunswick, and localized areas of Quebec, Cape Breton Island and Prince Edward Island. All wetland classes (swamps, marshes, fens and bogs) occur, including both freshwater and saltwater/brackish marshes and fens. Bedrock basins, poorly-drained flats, sheltered coastal areas, and the margins of rivers and other freshwater bodies are typical wetland sites.

Treed swamps with moderate to rich nutrient status are typically dominated by eastern white cedar, white and/or black ash, tamarack (*Larix laricina*), red maple, balsam fir, yellow birch or, less often, red spruce and eastern hemlock. Black spruce is particularly characteristic of nutrient-poor wetlands. Shrub swamps are characterized by speckled alder (*Alnus incana* ssp. *rugosa*), mountain holly (*Ilex mucronata*), common winterberry (*I. verticillata*), sweet gale (*Myrica gale*), wild raisin (*Viburnum nudum*), white meadowsweet (*Spiraea alba*) and a variety of willows (e.g., balsam willow [*Salix pyrifolia*], shining willow [*S. lucida*]), sedges (e.g., retrorse sedge [*Carex retrorsa*], sallow sedge [*C. lurida*]) and forbs (e.g., white-panicked aster [*Symphotrichum lanceolatum*], Virginia St. John's-wort [*Hypericum virginicum*], giant goldenrod [*Solidago gigantea*]).

Moist to wet heaths are characterized by rhodora (*Rhododendron canadense*), black huckleberry (*Gaylussacia baccata*), bog huckleberry (*G. bigeloviana*), common juniper (*Juniperus communis*), common Labrador tea (*Rhododendron groenlandicum*), sheep laurel (*Kalmia angustifolia*) and cinnamon fern (*Osmunda cinnamomea*).

Deeper freshwater marshes usually occur on the margins of water bodies. They can be dominated by

broad-leaved cattail (*Typha latifolia*), bulrushes (*Schoenoplectus* spp.), common spikerush (*Eleocharis palustris*), American sweetflag (*Acorus americanus*), Canada rush (*Juncus canadensis*) and/or knotted rush (*J. nodosus*). Wet meadows form along slow-moving streams; they usually contain bluejoint reedgrass (*Calamagrostis canadensis*), reed canarygrass (*Phalaris arundinacea*), and/or prairie cordgrass (*Sporobolus michauxianus*). In deeper quiet waters, aquatic vegetation often includes fragrant water lily (*Nymphaea odorata*) and pond lilies (*Nuphar* spp.).

Shallow marshes and wetter fens are characterized by sedges (e.g., water sedge [*Carex aquatilis*], lake sedge [*Carex lacustris*], Michaux's sedge [*C. michauxiana*], smooth twig-rush [*Cladium mariscoides*]), cottongrasses (*Eriophorum* spp.), bog buckbean (*Menyanthes trifoliata*) and mannagrasses (*Glyceria* spp.). Where water tables fluctuate and some root zone drying occurs during the growing season, fens may include shrubs such as sweet gale, leatherleaf (*Chamaedaphne calyculata*), bog willow (*Salix pedicellaris*), as well as stunted red maple, tamarack and other tree species.

Rich open fens are localized to areas of calcareous bedrock. On these sites, alder-leaved buckthorn (*Rhamnus alnifolia*), shrubby cinquefoil (*Dasiphora fruticosa*), green-keeled cottongrass (*Eriophorum viridicarinatum*), spike muhly (*Muhlenbergia glomerata*), yellow sedge (*Carex flava*), Kalm's lobelia (*Lobelia kalmii*) and several rare orchids are characteristic. Brown mosses such as ribbed bog moss (*Aulacomnium palustre*), golden fuzzy fen moss (*Tomentypnum nitens*) and hook mosses (*Drepanocladus* spp.) usually dominate between peat moss (*Sphagnum* spp.) hummocks.

Nutrient-poor bogs and fens include stunted black spruce and tamarack, as well as common Labrador tea, leatherleaf, velvet-leaved blueberry, early lowbush blueberry (*Vaccinium angustifolium*), cranberries (*Vaccinium oxycoccus*, *V. macrocarpon*), pale bog laurel (*Kalmia polifolia*), glaucous-leaved bog rosemary (*Andromeda polifolia* var. *latifolia*), few-seeded sedge (*Carex oligosperma*), coastal sedge (*C. exilis*) and tufted clubrush (*Trichophorum cespitosum*).

Upland grasslands and shrublands are uncommon throughout much of the landscape except on abandoned fields, very dry sites and in coastal areas.

Temperate and boreal heathlands are relatively conspicuous on larger dunes in Prince Edward Island, and within the western interior and along the Atlantic coast of Nova Scotia. They are usually dominated by huckleberries, black crowberry (*Empetrum nigrum*), pink crowberry (*E. eamesii*), broom crowberry (*Corema conradii*), common juniper or sometimes sheep laurel. Most coastal grasslands have been disturbed by domestic grazing and past settlement, but American beachgrass (*Ammophila breviligulata*) and, in wet areas, smooth black sedge (*Carex nigra*) form natural stands in some locations.

Dunes and sand beaches are particularly well developed on Prince Edward Island, the Northumberland coasts of New Brunswick and Nova Scotia, and on Sable Island. Dune species include American beachgrass, sea lymegrass (*Leymus mollis*), seabeach sedge (*Carex silicea*), beach pea (*Lathyrus japonicus*), woolly beach-heather (*Hudsonia tomentosa*) and northern bayberry (*Morella pennsylvanica*). Common sand beach species include American sea rocket (*Cakile edentula*), seabeach sandwort (*Honckenya peploides*) and rough cocklebur (*Xanthium strumarium*); oysterleaf (*Mertensia maritima*), saltbushes (*Atriplex* spp.) and Scotch lovage (*Ligusticum scoticum*) are more common on gravel and cobble beaches.

## Climate

The *Acadian Temperate Forest* zone occupies the easternmost extent of the humid continental, cool temperate macroclimate of Canada. The zone is surrounded by the Atlantic Ocean on three sides, creating a broad oceanic gradient from more continental areas in Quebec and northern New Brunswick to the Atlantic coast of Nova Scotia, where the climate is hypermaritime. Increasing proximity to the ocean results in significant effects on insolation, fog, precipitation, seasonal temperatures, frost-free days and atmospheric humidity. In general terms, winters are cool and summers are warm.

Mean annual temperatures vary from approximately 3.5°C in northern New Brunswick to 7°C in the Annapolis Valley, Nova Scotia. Growing degree days above 5°C vary between approximately 1300 and 1800. Mean annual precipitation varies from 1000

mm in west-central New Brunswick to >1650 mm along the outer Atlantic coast of Nova Scotia. Rainfall significantly exceeds snowfall.

## Physiography, Geology, Topography, Soils and Land Cover

This zone occurs in the eastern mainland portion of the Appalachian physiographic region. It occupies most of the Chaleur Uplands, the New Brunswick and Atlantic Highlands, the Maritime Plain, the Annapolis Lowland, all but the highest Cape Breton elevations of the Nova Scotia Highlands, and a small part of the lower elevations of the Notre Dame Mountains in Quebec.

Higher elevations are most notable in northern New Brunswick and the Gaspé Peninsula, as well as on Cape Breton Island. Most highland landforms are characterized by erosion resistant rocks, derived from early Paleozoic mountain forming events. In northern New Brunswick and Quebec, the geology includes igneous and older sedimentary formations, while the highlands of Cape Breton are mostly metamorphic and plutonic. Lowlands are associated with river valleys eroded into upland bedrock or extensive areas of gentle relief underlain by softer Paleozoic or Mesozoic sedimentary rocks. A general topographic gradient, marked by a series of parallel peneplains, tilts toward the Atlantic Ocean with elevations ranging from just over 800 mASL in northern New Brunswick to sea level. Much of the zone is below 200 mASL and, while relief is generally not pronounced, topographic changes can be abrupt. The terrain varies from gently rolling plains with little relief to rugged, often deeply dissected, plateaux with steep slopes.

The entire zone was affected by late Pleistocene glaciation, and surficial landscape expression is dominated by glacial features and bedrock-controlled terrain. The predominant parent material is glacial till, often occurring as shallow veneers overlying bedrock on upland sites while deeper deposits fill landscape depressions. Glaciofluvial, fluvial, marine and aeolian deposits occur in river valleys and coastal areas. Mineral soils are typically Podzols and Luvisols, with Gleysols occurring on moist, poorly drained sites. Folisols develop in very humid areas along the Atlantic Coast and on the

Cape Breton Highlands. Deeper peat deposits containing Organic soils occur in bedrock basins and depressions where water tables remain near the surface throughout the year. Numerous lakes are a characteristic of the landscape in all provinces, but large rivers are only prominent in New Brunswick.

including the Gulf of St. Lawrence and the Bay of Fundy. To the northwest, it adjoins the *Eastern Temperate Mixed Forest*. At higher elevations in Quebec and Cape Breton Island, it borders the *Eastern Boreal Forest*. To the south and west, it continues into the United States.

### Notes

At low elevations, the *Acadian Temperate Forest* zone is mostly bounded by the Atlantic Ocean,

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