

## Eastern Temperate Deciduous Forest



### General Description

The *Eastern Temperate Deciduous Forest* zone occupies the southernmost portions of Ontario and Quebec, covering approximately 98,000 km<sup>2</sup>. This zone represents the northern extent of temperate deciduous forests that are widespread in the eastern United States. The temperate climate is humid and continental. Over half of Canada's population lives in this zone, including the metropolitan areas of Toronto and Montreal. Much of the area has been converted to agriculture and urban infrastructure, but the contemporary landscape still includes moderate cover by forest patches.

### Vegetation

The natural vegetation for this zone is productive upland forest with closed, multi-storied canopies characterized by temperate, cold-deciduous broad-leaved tree species. Woodlands occur on very dry and very moist sites. Tree species diversity can be high within stands, including many species that are long-lived. Composition is usually of multiple broad-leaved species, but conifer – broad-leaved mixes and pure conifer stands can occur, especially on dry nutrient-poor sites and toward the northern limit of the zone. Understory structure varies from dense to sparse, and is usually dominated by cold-deciduous broad-leaved shrubs, perennial herbs and broad-leaved tree regeneration. Bryophytes are typically confined to dead wood, rocks and tree boles.

Stands have the potential to be hundreds of years old, but few old forests remain on the landscape. Anthropogenic disturbance is the dominant factor in forest dynamics, influencing forest composition. Windthrow, ice loading and insect outbreaks are the most widespread forms of natural disturbance; wildfire is not a factor.

The overwhelmingly dominant tree species in contemporary forests is sugar maple (*Acer saccharum*). Red maple (*A. rubrum*), white ash (*Fraxinus americana*), basswood (*Tilia americana*), American beech (*Fagus grandifolia*), hop-hornbeam (*Ostrya virginiana*), black cherry (*Prunus serotina*) and red oak (*Quercus rubra*) are common canopy associates. Eastern hemlock (*Tsuga canadensis*), eastern white pine (*Pinus strobus*), American elm (*Ulmus americana*) and large-toothed aspen (*Populus grandidentata*) occur occasionally. Balsam fir (*Abies balsamea*), yellow birch (*Betula alleghaniensis*), paper birch (*B. papyrifera*), eastern white cedar (*Thuja occidentalis*), white spruce (*Picea glauca*) and trembling aspen (*Populus tremuloides*) are more common in the northern portion of the zone. Hickories (*Carya* spp.), red ash (*Fraxinus pennsylvanica*), white oak (*Quercus alba*) and blue-beech (*Carpinus caroliniana*) are more common in the southern portion. Some trees of deciduous forests in the eastern United States, such as eastern flowering dogwood (*Cornus florida*), common hackberry (*Celtis occidentalis*), black walnut (*Juglans nigra*), sassafras (*Sassafras albidum*), black oak (*Quercus velutina*) and tulip tree (*Liriodendron tulipifera*), reach their northern range limits in southernmost Ontario and are occasionally present

in contemporary forests; many of these species are rare and at risk of extirpation in Canada. Alluvial forests dominated by black ash (*Fraxinus nigra*), red ash (*F. pennsylvanica*), white ash, balsam poplar (*Populus balsamifera*), eastern white cedar, red maple, sugar maple, silver maple (*Acer saccharinum*), white elm (*Ulmus americana*) or Manitoba maple (*A. negundo*) occur on stable floodplain terraces.

Forest understories are typically dominated by regenerating broad-leaved tree species, led by sugar maple. Shrub species include maple-leaved viburnum (*Viburnum acerifolium*), alternate-leaved dogwood (*Cornus alternifolia*), eastern prickly gooseberry (*Ribes cynosbati*), northern spicebush (*Lindera benzoin*) and, in the northern portion of the zone, striped maple (*Acer pensylvanicum*), mountain maple (*A. spicatum*), hobblebush (*V. lantanoides*), beaked hazelnut (*Corylus cornuta*) and Canada fly-honeysuckle (*Lonicera canadensis*). Typical herb/dwarf shrub species include trilliums (especially white trillium [*Trillium grandiflorum*], red trillium [*T. erectum*], painted trillium [*T. undulatum*]), hairy Solomon's seal (*Polygonatum pubescens*), large false Solomon's seal (*Maianthemum racemosum*), Jack-in-the-pulpit (*Arisaema triphyllum*), herbaceous carrionflower (*Smilax herbacea*), bristly greenbrier (*S. tamnoides*), May-apple (*Podophyllum peltatum*), heart-leaved foamflower (*Tiarella cordifolia*) and blue cohosh (*Caulophyllum thalictroides*). Vernal ephemeral forbs like spring beauties (*Claytonia* spp.), trout lily (*Erythronium americanum*), toothworts (*Cardamine* spp.), Dutchman's breeches (*Dicentra cucullaria*) and squirrel-corn (*D. canadensis*) are characteristic of these densely shaded understories.

Wetlands are common on the landscape, but rarely extensive. Most have been altered or converted by agriculture, urbanisation or shoreline development. Swamps, marshes and fens are the predominant wetland classes; bogs are uncommon.

Nutrient-rich treed swamps are dominated by black ash, red ash, eastern white cedar or red maple; silver maple and Manitoba maple are common associates. Several wetland oak species reach their northern range limits in southern parts of the zone, including pin oak (*Quercus palustris*), Shumard oak (*Q.*

*shumardii*) and swamp white oak (*Q. bicolor*). Black spruce (*Picea mariana*) and tamarack (*Larix laricina*) are the prevalent trees in nutrient-poor swamps.

Shrub swamps, annually active floodplains and hummocky fens include speckled alder (*Alnus incana* ssp. *rugosa*), mountain holly (*Ilex mucronata*), common winterberry (*I. verticillata*), sweet gale (*Myrica gale*), black chokeberry (*Aronia melanocarpa*), red-osier dogwood (*Cornus sericea*) and a variety of willows (e.g., sandbar willow [*Salix interior*], tea-leaved willow [*S. planifolia*]) and graminoids (e.g., tall mannagrass [*Glyceria grandis*]). Eastern skunk cabbage (*Symplocarpus foetidus*) is a common constituent of rich mineral swamps.

Marshes dominated by broad-leaved cattail (*Typha latifolia*), common reed (*Phragmites australis*), hard-stemmed bulrush (*Schoenoplectus acutus*) or burreeds (*Sparganium* spp.) occur on the margins of water bodies. In deeper quiet waters, aquatic vegetation often includes fragrant water-lily (*Nymphaea odorata*). Shallow marshes and wetter fens are dominated by sedges (e.g., water sedge [*Carex aquatilis*], woolly-fruit sedge [*C. lasiocarpa*], tussock sedge [*C. stricta*], eastern narrow-leaved sedge [*C. amphibola*], grey sedge [*C. grisea*]), water horsetail (*Equisetum fluviatile*), bluejoint reedgrass (*Calamagrostis canadensis*) or mannagrasses (*Glyceria* spp.). Where water tables fluctuate and some root zone drying occurs during the growing season, fens include bog birch (*Betula pumila*), willows (e.g., bog willow [*Salix pedicellaris*]) and stunted tamarack or eastern white cedar. On these sites, brown mosses such as ribbed bog moss (*Aulacomnium palustre*), golden fuzzy fen moss (*Tomentypnum nitens*) and hook mosses (*Drepanocladus* spp.) usually dominate between *Sphagnum* hummocks.

Upland grasslands and shrublands are common occurrences on the landscape, mostly following anthropogenic disturbance or agricultural abandonment. Along Great Lakes shorelines, beaches and sand dunes are populated by specialist species like American beachgrass (*Ammophila breviligulata*), American sea rocket (*Cakile edentula*), Great Lakes sandreed (*Sporobolus rigidus* var. *magnus*) and tall wormwood (*Artemisia campestris* ssp. *caudata*). On shallow limestone bedrock, alvar communities include junipers (*Juniperus* spp.), dropseed grasses (e.g. prairie dropseed [*Sporobolus*

*heterolepis*]), little bluestem (*Schizachyrium scoparium* var. *scoparium*) and tufted hairgrass (*Deschampsia cespitosa* ssp. *cespitosa*). Remnants of tallgrass grasslands occur in localised pockets, including species such as big bluestem (*Andropogon gerardi*) and blazing-stars (*Liatris* spp.). Along the Niagara Escarpment, cliff and talus communities include some of the oldest (>1000 years) trees in Canada, cliff-face eastern white cedars, as well as numerous calciphiles like purple-stemmed cliffbrake (*Pellaea atropurpurea*), walking fern (*Asplenium rhizophyllum*) and white-flowered leafcup (*Polymnia canadensis*).

## Climate

The *Eastern Temperate Deciduous Forest* zone occurs within the humid, continental cool temperate macroclimate of eastern Canada, generally characterized by cool winters and warm to hot summers. Temperatures are moderated by three of the Great Lakes (Lakes Huron, Erie, Ontario), which surround the western portion of the zone.

Mean annual temperatures vary from approximately 5°C at the northernmost edge of the zone to >9°C at the southernmost point. Growing degree days above 5°C average between approximately 1850 and 2500, with the longest growing season occurring at Windsor in southwestern Ontario. Mean annual precipitation averages >900 mm throughout the zone. Rainfall significantly exceeds snowfall.

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

This zone occurs in the West and Central divisions of the St. Lawrence Lowlands physiographic region. With the exception of the Niagara Escarpment, which traverses the west-central part of the zone, the terrain is essentially a level, undulating plain with low relief. The geology consists of calcareous Paleozoic rocks, except in southeastern Ontario where acidic Precambrian bedrock occurs on the Frontenac Axis.

The entire zone was affected by late Pleistocene glaciation, and surficial landscape expression is dominated by glacial features, such as moraines and drumlins; generally, till deposits overlie bedrock. Significant areas are covered by glaciolacustrine materials from a series of pro-glacial lakes that predated the contemporary Great Lakes. Mineral soils are typically Luvisols or Brunisols, with Gleysols and some shallow peat deposits in moist, poorly drained locations.

## Notes

The *Eastern Temperate Deciduous Forest* zone borders the *Eastern Temperate Mixed Forest* to the north and east. To the south and west, it continues into the United States.