

USDA Ecoregion and Forest Type Descriptions

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ECOREGIONS

Appalachian Mountains Ecoregion (M221 Central Appalachian Broadleaf Forest--Coniferous Forest--Meadow Province)

Land-surface form.--This province is composed of subdued low mountains of crystalline rocks and open low mountains with valleys underlain by folded strong and weak strata. Some dissected plateaus with mountainous topography are also present. The relief is high (up to 3,000 ft [900 m]). Elevations range from 300 to 6,000 ft (90 to 1,800 m), and are higher to the south, reaching 6,684 ft (2,037 m) at Mount Mitchell, North Carolina.

Climate.--The climate is temperate, with distinct summer and winter, and all areas are subject to frost. Average annual temperatures range from below 50F (10C) in the north to about 64F (18C) at the south end of the highlands. The average length of the frost-free period is about 100 days in the northern mountains, and about 220 days in the low southern parts of the Appalachian Highlands. Average annual precipitation varies from 35 in (890 mm) in the valleys to up to 80 in (2,040 mm) on the highest peaks--the highest in the Eastern United States. Precipitation is fairly well distributed throughout the year (see Appendix 2, climate diagram for Boone, North Carolina). Snowfall is more than 24 in (610 mm) in Pennsylvania, increasing southward along the mountains to about 30 in (770 mm) in the Great Smoky Mountains. Southeast- and southfacing slopes are notably warmer and drier than northwest- and northfacing slopes, because they face the sun and are on the lee side of the ridges. One result is that forest fires are more frequent on southfacing slopes.

Vegetation.--Vertical zonation prevails, with the lower limits of each forest belt rising in elevation toward the south. The valleys of the southern Appalachian Mountains support a mixed oak-pine forest that resembles its counterpart on the coastal plains (described below for the Southeastern Mixed Forest Province). Above this zone lies the Appalachian oak forest, dominated by a dozen species each in the white oak and black oak groups. Chestnut was once abundant, but a blight has eliminated it as a canopy tree. Above this zone lies the northeastern hardwood forest, composed of birch, beech, maple, elm, red oak, and basswood, with an admixture of hemlock and white pine. Spruce-fir forest and meadows are found on the highest peaks of the Allegheny and Great Smoky Mountains. Mixed mesophytic forest extends into narrow valleys (coves) of the southern Appalachians, where oak vegetation predominates.

The pattern of vegetation is complicated by topography and substrate. For example, the forests of the Great Smoky Mountains range from open oak and southern pine stands on drier, warmer slopes at low elevations to northern coniferous forests of spruce and fir on cold, moist slopes higher up. But southern pine stands reach up along exposed ridges, and hemlock forest extends down into protected ravines where moisture and local temperature conditions resemble those found at higher elevations.

Soils.--Ultisols are found on ridge crests, in areas of gentle topography, and in intermountain basins. Soils on steeper landforms are Inceptisols.

Fauna.--The southern limit of distribution of many northern forest mammals coincides with the boundaries of this province. Species distribution maps show fingers of distribution for many species running southward along the crest of the Appalachians. But many species are being confined to scattered areas at higher elevations as forests are cleared or lost due to spruce-fir die-off. The black bear, widely distributed in other parts of North America, occurs quite commonly in the Appalachians and surrounding areas. The eastern cougar, once an important predator, is now thought to be extinct. Whitetail deer are very common.

At upper elevations in extensions of boreal forest, red-breasted nuthatches, black-throated green warblers, golden-crowned warblers, golden-crowned kinglets, and northern juncos forage in red spruce and Fraser fir trees. In the hardwood forests, there are crow-sized pileated woodpeckers, downy, hairy, and red-bellied woodpeckers, common flickers, and wild turkeys. The understory, especially in areas with rhododendrons and azaleas, hosts worm-eating warblers, and the brilliant hooded warbler is found in lush undergrowth. Louisiana waterthrush patrol the streamsides. The mixed mesophytic forest in coves supports a large variety of nesting birds, including the wood thrush, ovenbird, summer tanager, rose-breasted grosbeak, and all the other species already named. The passenger pigeon, once abundant, is now extinct.

Unique to the region is its great variety of salamanders: 27 species inhabit the southern Appalachians--more than any other part of North America.

Delta Ecoregion (234 Lower Mississippi Riverine Forest Province)

Land-surface form.--The province consists of flat to gently sloping broad floodplain and low terraces made up of alluvium and loess. From near sea level in the south, altitude increases gradually to about 660 ft (200 m) in the north. Most of the area is flat, with an average southward slope of less than 8 in/mi (127 mm/km). The only noticeable slopes are sharp terrace scarps and natural levees that rise sharply to several meters above adjacent bottom lands or stream channels. This is the land of oxbow lakes--the cutoff meanders. Swamps are significant in the extreme southern part of Louisiana.

Climate.--The climate is similar to that found in adjoining parts of the Subtropical Division. Winters are warm, with temperatures ranging from 50 to 60F (10 to 16C), and summers are hot, with temperatures ranging from 70 to 80F (21 to 27C). Rain falls throughout the year, with a minimum in autumn. Temperature and precipitation decrease as one moves northward. At Natches, Mississippi, average temperatures for January and August are about 50F (10C) and 75F (24C), respectively. Average annual precipitation is 55 in (1,400 mm). Snowfall is negligible. Farther north, at Cairo, Illinois, average temperatures for January and August are about 41F (5C) and 77F (25C), respectively. Average annual precipitation is 43 in (1,100 mm).

Vegetation.--Before cultivation, this area was covered by bottom-land deciduous forest with an abundance of green and Carolina ash, elm, cottonwood, sugarberry, sweetgum, and water tupelo, as well as oak and baldcypress. Pecan is also present, associated with eastern sycamore, American elm, and roughleaf dogwood. Vines are prolific along water courses.

Soils.--The soils are a mosaic of Inceptisols (in alluvial bottom land), Alfisols (in areas of loess), and Mollisols (in areas with swampy vegetation).

Fauna.--Among the numerous bird species found here are the prothonotary warbler, white-eyed vireo, wood duck, yellow-billed cuckoo, Louisiana waterthrush, and all the species found in the Southeastern Mixed Forest.

Eastern Broadleaf Ecoregion (222 Eastern Broadleaf Forest (Continental) Province)

Land-surface form.--Most of the area is rolling, but some parts are nearly flat and in the Ozark Highlands the relief is moderate (up to 1,000 ft [300 m]). Low rolling hills, dissected plateaus, and basins are found in Tennessee and Kentucky. The northern parts of the province have been glaciated, but not the southern. Elevations range from 80 to 1,650 ft (24 to 500 m).

Climate.--The climate has many characteristics in common with the oceanic broadleaf forest to the east, but precipitation decreases in quantity and effectiveness as one moves inland. Average annual temperatures range from 40F (4C) in the north to 65F (18C) in the south. Summers are hot, with frequent tornadoes. Precipitation varies from 20 in (510 mm) near the 95th meridian to 40 in (1,020 mm) in Ohio, and to 50 in (1,280 mm) in Tennessee. Most precipitation takes place during the growing season.

Vegetation.--Like its counterpart to the east, this province is dominated by broadleaf deciduous forest, but the smaller amounts of precipitation found here favor the drought-resistant oak-hickory association. Although other forests have oak and hickory, only this particular forest association has both species in abundance.

The oak-hickory forest is medium-tall to tall, becoming savannalike in its northern reaches from eastern Oklahoma to Minnesota, where it gradually turns into prairie (described below for the Prairie Parkland [Temperate] Province). From eastern Kansas to Indiana, it forms a mosaic pattern with prairie. Widespread dominants are white oak, red oak, black oak, bitternut hickory, and shagbark hickory. The understory is usually well developed, often with flowering dogwood. Other understory species include sassafras and hophornbeam. The shrub layer is distinct, with some evergreens. Many wildflower species occur. Wetter sites typically feature an abundance of American elm, tuliptree, and sweet gum.

Northern reaches of the oak-hickory forest contain increasing numbers of maple, beech, and basswood. The maple-basswood forest, dominated by sugar maple and American basswood, occurs from central Minnesota south through Wisconsin and northeastern Iowa. Glaciated areas of Ohio and Indiana feature a beech-maple forest defined by American beech and sugar maple. In these latter associations, oak and hickory occur on poor sites.

Soils.--As in the oceanic broadleaf forest, the soils change from Alfisols in the north to Ultisols in southerly latitudes. Toward the continental interior, calcification sets in as forest soils give way to the darker soils of the grasslands (Mollisols).

Fauna.--In the oak-hickory forest, acorns and hickory nuts provide abundant food for the ubiquitous gray squirrel. Fox squirrels are often found, as are eastern chipmunks.

Roving flocks of blue jays also feed on forest nuts. In summer, scarlet and/or summer tanagers, rose-breasted grosbeaks, and ovenbirds are common. The wild turkey is also found here. The cerulean warbler is common in the beech-maple forest, and occurs elsewhere as well.

Gulf Coastal Plain Ecoregion (232 Outer Coastal Plain Mixed Province)

Land-surface form.--This province comprises the flat and irregular Atlantic and Gulf Coastal Plains down to the sea. Well over 50 percent of the area is gently sloping. Local relief is less than 300 ft (90 m), although some areas are gently rolling. Most of the region's numerous streams are sluggish; marshes, swamps, and lakes are numerous.

Climate.--The climate regime is equable, with a small to moderate annual temperature range. Average annual temperature is 60 to 70F (16 to 21C). Rainfall is abundant and well distributed throughout the year; precipitation ranges from 40 to 60 in (1,020 to 1,530 mm) per year.

Vegetation.--Temperate rainforest, also called temperate evergreen forest or laurel forest, is typical in this province. Temperate rainforest has fewer species of trees than its equatorial or tropical counterparts, and hence larger populations of individual species. Trees are not as tall here as in low-latitude rainforests; leaves are usually smaller and more leathery, and the leaf canopy less dense. Common species include evergreen oaks and members of the laurel and magnolia families. There is usually a well-developed lower stratum of vegetation that may variously include tree ferns, small palms, shrubs, and herbaceous plants. Lianas and epiphytes are abundant. At higher elevations, where fog and clouds persist, the trunks and branches of trees are often sheathed in moss. A striking example of epiphyte accumulation at lower elevations is the Spanish "moss" that festoons the Evangeline oak, baldcypress, and other trees of the eastern Gulf coast.

Along the Atlantic coast, the extensive coastal marshes and interior swamps are dominated by gum and cypress. Most upland areas are covered by subclimax pine forest, which has an understory of grasses and sedges called savannas. Undrained shallow depressions in savannas form upland bogs or pocosins, in which evergreen shrubs predominate.

A word about the vegetation of the coastal Southeastern United States may prevent some misunderstanding. On forest maps of the United States and on numerous maps of world vegetation, this coastal zone is shown as having needleleaf evergreen or coniferous forest. It is true that sandy uplands have forests of loblolly and slash pine, and that baldcypress is a dominant tree in swamps; but such vegetation represents either xerophytic and hydrophytic forms in excessively dry or wet habitats, or second-growth forest following fire and deforestation. The climax vegetation of mesophytic habitats is the evergreen-oak and magnolia forest.

Soils.--Soils are mainly Ultisols, Spodosols, and Entisols. Temperate rainforest grows on a wide variety of upland soils, but most tend to be wet, acidic, and low in major plant nutrients. The soils are derived mainly from coastal plain sediments ranging from heavy clay to gravel, with sandy materials predominant. Silty soils occur mainly on level expanses. Sands are prevalent in hilly areas, but they also cover broad flats in central Florida.

Fauna.--This region provides habitat for a wide variety of animals. Except for a few isolated areas where black bear or the endangered Florida panther are found in small numbers, the whitetail deer is the only large indigenous mammal. Common small mammals include raccoons, opossums, flying squirrels, rabbits, and numerous species of ground-dwelling rodents.

Bobwhite and wild turkey are the principal game birds. Migratory nongame bird species are numerous, as are migratory waterfowl. Winter birds are diverse and numerous. The red-cockaded woodpecker is an endangered species.

Of the numerous species of reptiles found in this province, the American alligator is the largest.

Lake States Ecoregion (212 Laurentian Mixed Forest Province)

Land-surface form.--Most of this province has low relief, but rolling hills occur in many places. Lakes, poorly drained depressions, morainic hills, drumlins, eskers, outwash plains, and other glacial features are typical of the area, which was entirely covered by glaciers during parts of the Pleistocene. Elevations range from sea level to 2,400 ft (730 m).

Climate.--Winters are moderately long and somewhat severe, but more than 120 days have temperatures above 50F (10C). Average annual temperatures range from 35 to 50F (2 to 10C). A short growing season imposes severe restrictions on agriculture; the frost-free season lasts from 100 to 140 days. Snow usually stays on the ground all winter. During winter, the province lies north of the main cyclonic belt; but during summer it lies within this belt, and the weather is changeable. Average annual precipitation is moderate, ranging from 24 to 45 in (610 to 1,150 mm); maximum precipitation comes in summer.

Vegetation.--This province lies between the boreal forest and the broadleaf deciduous forest zones and is therefore transitional. Part of it consists of mixed stands of a few coniferous species (mainly pine) and a few deciduous species (mainly yellow birch, sugar maple, and American beech); the rest is a macromosaic of pure deciduous forest in favorable habitats with good soils and pure coniferous forest in less favorable habitats with poor soils. Mixed stands have several species of conifer, mainly northern white pine in the Great Lakes region, with an admixture of eastern hemlock. Eastern redcedar is found in the southeast. Pine trees are often the pioneer woody species that flourish in burned-over areas or on abandoned arable land. Because they grow more rapidly than deciduous species where soils are poor, they quickly form a forest canopy; but where deciduous undergrowth is dense, they have trouble regenerating, and remain successful only where fire recurs. Fires started by lightning are common in this province, particularly where soils are sandy and there is a layer of dry litter in summer.

Soils.--The greatly varying soils include peat, muck, marl, clay, silt, sand, gravel, and boulders, in various combinations. Spodosols are dominant in New England and along the Great Lakes coast; Inceptisols and Alfisols dominate farther inland. The Alfisols are medium to high in bases and have gray to brown surface horizons and subsurface horizons of clay accumulation.

Fauna.--In winter, the shorttail weasel (ermine) and snowshoe hare turn white, as they do in polar provinces. The black bear, striped skunk, marmot, chipmunk, and two genera of jumping mice all pass the winter in hibernation. So do badger and the striped ground squirrel that live in

the western parts of the province. Beaver and muskrat remain active all winter, working beneath the ice that covers the lakes and streams.

Ptarmigan also turn white in winter. Many other birds, especially insectivorous species, migrate south. Common summer resident birds include the white-throated sparrow, northern junco, and yellow-bellied sapsucker.

Northeast Ecoregion (M212 Adirondack-New England Mixed Forest--Coniferous Forest--Alpine Meadow Province)

Land-surface form.--This province is composed of subdued glaciated mountains and maturely dissected plateaus of mountainous topography. The mountains and plateaus are underlain by granite and metamorphic rocks and thinly mantled by glacial till. Many glacially broadened valleys have glacial outwash deposits and contain numerous swamps and lakes. The relief is between 1,000 and 3,000 ft (300 and 900 m). Elevations range from 500 to 4,000 ft (150 to 1,220 m); a few isolated peaks are higher than 5,000 ft (1,500 m).

Climate.--The climate, a continental forest type, is characterized by warm summers. Because maritime air masses have year-round access to the eastern seaboard, precipitation is evenly distributed throughout the year, distinguishing this climate from that of the Laurentian Mixed Forest Province. To the west and north, well-defined summer maximum and winter minimum temperatures reflect the predominance of tropical air masses in summer and continental-polar air masses in winter. Winter can be severely cold, as in Wisconsin, but is less so closer to the ocean. Average annual temperatures range from 37 to 52F (3 to 11C). The average length of the frost-free period is about 100 days. Precipitation in Albany, New York, averages 35 in (890 mm) per year. Average annual snowfall is more than 100 in (2,550 mm).

Vegetation.--This mountainous region is in the transition zone between the boreal spruce-fir forest to the north and the deciduous forest to the south. Growth form and species are very similar to those found to the north, but red spruce tends to replace white spruce. Vertical vegetational zonation is present. Valleys contain a hardwood forest where the principal trees are sugar maple, yellow birch, and beech, with an admixture of hemlock. Low mountain slopes support a mixed forest of spruce, fir, maple, beech, and birch. The compensating effect of latitude is apparent in the altitudinal limits of zonation, which rise in elevation as one moves south: the approximate lower limit of spruce and fir on Mt. Katahdin is 500 ft (150 m); in the White Mountains, about 2,500 ft (800 m); in the Adirondack Mountains, 3,000 ft (900 m); and in the Catskills, 3,500 ft (1,100 m). Above the mixed-forest zone lie pure stands of balsam fir and red spruce, which devolve into krummholz at higher elevations. Above timberline on Mount Washington, there is tundra-like growth called alpine meadow.

Soils.--Most soils are Spodosols that are stony, cool, and moist.

Fauna.--This community shares some species with both the Laurentian Mixed Forest and boreal forest, but some species are unique to its alpine tundra, such as longtail shrew, boreal (southern) redback vole, gray-cheeked thrush, spruce grouse, and gray jay.

FOREST TYPES

Upland hardwood

Stands that have at least 10 percent stocking and classed as an oak-hickory or maple-beech-birch forest type.

Lowland hardwood

Stands that have at least 10 percent stocking with a forest type of oak-gum-cypress or elm-ash-cottonwood.

Natural Softwood (a.k.a. Natural Pine)

Stands that (a) have not been artificially regenerated, (b) are classed as a pine or other softwood forest type, and (c) have at least 10 percent stocking.

Mixed Natural Softwood and Hardwood

Stands in which hardwoods constitute a plurality of the stocking but in which pines account for 25 to 50 percent of the stocking.

Pine Plantation

Stands that (a) have been artificially regenerated by planting or direct seeding, (b) are classed as a pine or other softwood forest type, and (c) have at least 10 percent stocking.

CITATIONS

Ecoregions:

Bailey, R.G. 1995. Description of the ecoregions of the United States. Miscel. Pub. 1391. Washington, DC: U.S. Department of Agriculture, Forest Service. 108 p.

Forest Types:

Various forest resource bulletins published by the U.S. Forest Service, Forest Inventory and Analysis unit of the Southern Research Station, Asheville, NC