**Forest Cover Types of Virginia - Background**

A forest is a type of terrestrial (land) biome where trees are the dominant plants. In a general classification, Virginia is in the temperate deciduous forest biome. In a more exact classification, Virginia has three major forest biomes: eastern deciduous forest, southeastern mixed/evergreen forest, and a smaller portion of eastern mixed forest. Those forests can be broken down further into specific forest cover types. The main tree species growing together in a forest determine the forest cover type. Some trees grow in nearly pure stands of just one species. Some trees grow with others that need similar environmental conditions. These conditions, such as climate, soil, and topography, influence which trees grow in an area.

The Virginia Forest Cover Types map was created from U.S. Forest Service data. To classify forest cover, researchers combine information from aerial and satellite photos with data collected “on the ground” to determine the kinds of trees in each area. The forest cover types shown on the map have been described and classified by many experts and published by the Society of American Foresters.

Any map of forest types represents a snapshot of one time period. Although some forest types stay the same over a long period of time, others continue to change as a result of disturbance, management, or natural succession. For example, over time, a pine forest may transition to a mixed oak-pine forest and later to an oak-hickory forest.  **\*This change may be the reason you find a hardwood forest where the map shows a pine forest, especially in eastern and central Virginia.\***

Some forest types are rare in Virginia because they require very specific environmental conditions. The spruce-fir type is one example. It only grows at high elevations (above 5000 feet), and so can be found only in a small section of southwestern Virginia. Other forest types are rare in the state because of past harvesting practices and changes in land use. Longleaf pine forests and Atlantic whitecedar forests are two examples.

Virginia is 62% forested. Besides forest, other land cover types include agricultural fields and pastures, cities and other built areas, marshes, and beaches.

**The following are descriptions of Virginia’s major forest types:**

**Coniferous Types**

**White Pine** – White pine (Pinus strobus) grows naturally in Virginia from the Blue Ridge west. Unlike Virginia’s other pines, white pine is a long-lived species. It may grow in almost pure stands, especially when planted for timber production, or it may grow with yellow-poplar, various oaks, hickories, hemlock, and pitch pine. In a pure stand, the understory is typically sparse, but shrubs such as blueberries, mountain-laurel, and wild azaleas can sometimes be found.

**Loblolly-Shortleaf Pine** - Loblolly pine (Pinus taeda) and shortleaf pine (Pinus echinata) occur in early successional stages throughout much of the coastal plain and piedmont. Pine seedlings need full sunlight to grow, so these species are often the first trees to colonize open lands, like abandoned fields. Loblolly pine is also extensively planted for timber and paper production. Over time, without disturbance or management, pines are replaced by upland oaks and other more shade-tolerant species. Mixed forests of pines and deciduous trees may be found at the intermediate stages. Soils vary widely in this forest type, with loblolly being more common on wetter sites and shortleaf on drier ones. Virginia pine is often present as well on drier, poorer soils. Herbaceous (soft-stemmed) plants are sparse in the understory, but woody plants include viburnums, greenbrier, dogwood, and young sweetgums, oaks, and hickories.

**Hardwood (Deciduous) Types**

**Oak-Hickory** – Oaks (Quercus species) and hickories (Carya species) make up the most extensive forest type in Virginia. Oak-hickory forests are late successional communities, sustaining themselves over time unless disturbance sets back the clock. In much of western Virginia, these forests were once primarily American chestnut mixed with oaks, until chestnut blight killed nearly all the chestnuts. Currently, the forests are dominated by various oaks – mainly white, northern red, southern red, black, chestnut, and scarlet – with hickories – mockernut, pignut, red, bitternut, and shagbark – being a lesser component. Other trees vary according to area of the state but can include beech, red or sugar maple, yellow-poplar, and black gum. Understory trees may include dogwood, sourwood, sassafras, redbud, and serviceberry. Shrubs include poison ivy, Virginia creeper, spicebush, mountain laurel, and rhododendrons. Many spring wildflowers grow on the forest floor.

**Maple-Beech-Birch** – Sugar maple (Acer saccharum), American beech (Fagus grandifolia) and yellow birch (Betula alleghaniensis) are often called “northern hardwoods.” In Virginia, this type is found mainly in the Allegheny Mountains, from Highland County northeast along the West Virginia border, as well as in parts of southwestern Virginia. The soils there are loamy and often fertile. This is a climax forest community, which means it will maintain itself over time unless disturbed. The forest floor may be covered with seedlings of the main tree species, as well as striped maple, viburnums, serviceberry, ferns and many spring wildflowers.

**Oak-Gum-Cypress** – The main components of this forest type are baldcypress (Taxodium distichum); water tupelo (Nyssa aquatica) or swamp tupelo (Nyssa sylvatica var. biflora), which are collectively called “gums;” and certain oak (Quercus) species: laurel, water, willow, and overcup oaks. This is a bottomland forest type, occurring in soils that range from moist to very wet. In fact, baldcypress and water tupelo can grow in completely flooded soils. Depending on the degree of moisture, other associated trees include red maple, sweetgum, black willow, water hickory, and several ash species. Understory plants may include buttonbush, swamp rose, possumhaw, Virginia sweetspire, greenbrier, and poison ivy, with mosses and lichens on lower tree trunks.

**Why Forest Types Occur Where They Do**

Whether land is forested and what kind of forest grows there, depends on many factors: climate, soil, hydrology, and even human land use choices.

Soil type has a major influence on forest type. Virginia’s five ecoregions have characteristic underlying rocks, which produce the soils upon which forests grow.

Soils in the Appalachian Plateau and Valley and Ridge regions formed from sedimentary rocks. Soils along the mountain ridges are often shallow and rocky, while those on lower slopes and in valleys tend to be a little deeper. Some of the valley soils originate from limestone; these are not as acidic as many Virginia soils, and they are good for farming. Floodplains often contain soils that were transported by water and may also be quite fertile.

Soils in the Blue Ridge region formed from sedimentary rocks on the western slopes, and igneous and metamorphic rocks on the eastern slopes. In general, most of the land is sloped and prone to erosion. The soils tend to be shallow and rocky, except south of Roanoke where they are deeper and more fertile.

Soils in the wide Piedmont region formed mostly from igneous and metamorphic rocks, which tend to form soils that are acidic and less fertile. Many years of farming left the Piedmont region’s soils highly eroded. As topsoil was lost, farming became less productive, and much of the land reverted back to forest.

Soils in the Coastal Plain originated in sedimentary rock deposited on the ocean floor, when the sea level was much higher. These soils tend to be acidic and not highly fertile. Often the surface soil is sandy and drought-prone, but there are clay soils in this area as well. Because the land is flatter, soils are less prone to erosion here than in other parts of the state. Closer to the coast, the water table tends to be closer to the surface. Saturated wetland soils are found in some areas.

Virginia also has five climatic regions, which do not always align with the ecoregions. The climatic regions are Tidewater, Piedmont, Northern Virginia, Western Mountains and Southwestern Mountains. Differences in elevation, proximity to the ocean and river systems, and overall weather patterns influence the climate in any location. These factors create rainfall and temperature variances among the regions, which in turn affect the forests that grow there.

Within any region, the presence or absence of water (hydrology) affects whether an area can support trees, and which kinds. For example, wetlands may have standing water all the time or for only part of the year. Riparian (streamside) areas occur near water and can sometimes flood. Both rocky mountain ridges and sandy coastal dunes have the opposite condition – soils that drain quickly rather than holding water. Despite these extreme conditions, even these areas can support some kinds of trees.

As Virginia’s population grows, so does the demand for land. Forest land is often converted to other uses. As noted earlier, the most productive lands are often used for growing crops or for livestock pasture. Other lands may be developed for home sites, shopping centers, industry, or other uses. Land may be flooded to build reservoirs, or paved over for highways and parking lots. All of these human land use choices affect the amount of forested land in Virginia.

The table below summarizes the different soils and topographies of Virginia’s ecoregions:

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| **Ecoregion** | **Topography** | **Soils** |
| Coastal Plain | Flat; elevation range 0-250 feet above sea level | Acid, low in fertility; formed from sedimentary rock; vary from sandy and drought-prone to clay-based to poorly drained (wetlands) |
| Piedmont | Hilly; elevation range 200-2500 feet above sea level | Acid, low in fertility; formed from igneous and metamorphic rock; highly eroded from past farming |
| Blue Ridge | Mostly sloped, prone to erosion; elevation range 1500 to 5700 feet above sea level | Shallow and rocky; formed from sedimentary rock on western slopes, igneous and metamorphic rock on eastern slopes |
| Valley & Ridge | Sloped on ridges to flat in valleys; elevation range 500-4500 feet above sea level | Shallow and rocky on ridges, deeper in valleys, formed from sedimentary rock, sometimes limestone which makes them less acidic |
| Appalachian Plateau | Mostly sloped, often steeply; elevation range 1000-4000 feet above sea level | Shallow and rocky on ridges, deeper in the narrow valleys, formed from sedimentary rock |

**References:**

*Eyre, F.H. 1980. Forest Cover Types of the United States and Canada. Society of American Foresters, Washington, DC.*

*Fleming, G.P., K.D. Patterson, K. Taverna, and P.P. Coulling. 2012. The natural communities of Virginia: classification of ecological community groups. Second approximation. Version 2.5. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, VA.*

*Smith, W.B., Vissage, J.S., Darr, D.R., and Sheffield, R.M., 2000.* [*Forest Resources of the United States*](http://www.treesearch.fs.fed.us/pubs/viewpub.jsp?index=10845)*, 1997. St. Paul, MN, U.S. Department of Agriculture Forest Service.*

*University of Virginia Climatology Office website:* [*http://climate.virginia.edu/description.htm*](http://climate.virginia.edu/description.htm)

*Agronomy Handbook from Virginia Cooperative Extension, 2000. Part VI. Soils of Virginia by James C. Baker, Extension Soils and Land Use Specialist:* [*http://pubs.ext.vt.edu/424/424-100/PDF\_part6.pdf*](http://pubs.ext.vt.edu/424/424-100/PDF_part6.pdf)

[*http://www.radford.edu/~swoodwar/CLASSES/GEOG202/physprov/physprov.html*](http://www.radford.edu/~swoodwar/CLASSES/GEOG202/physprov/physprov.html)

[*http://web.wm.edu/geology/virginia/provinces/phys\_regions.html?svr=www*](http://web.wm.edu/geology/virginia/provinces/phys_regions.html?svr=www)

[*http://www.virginiaplaces.org/regions/physio.html*](http://www.virginiaplaces.org/regions/physio.html)

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