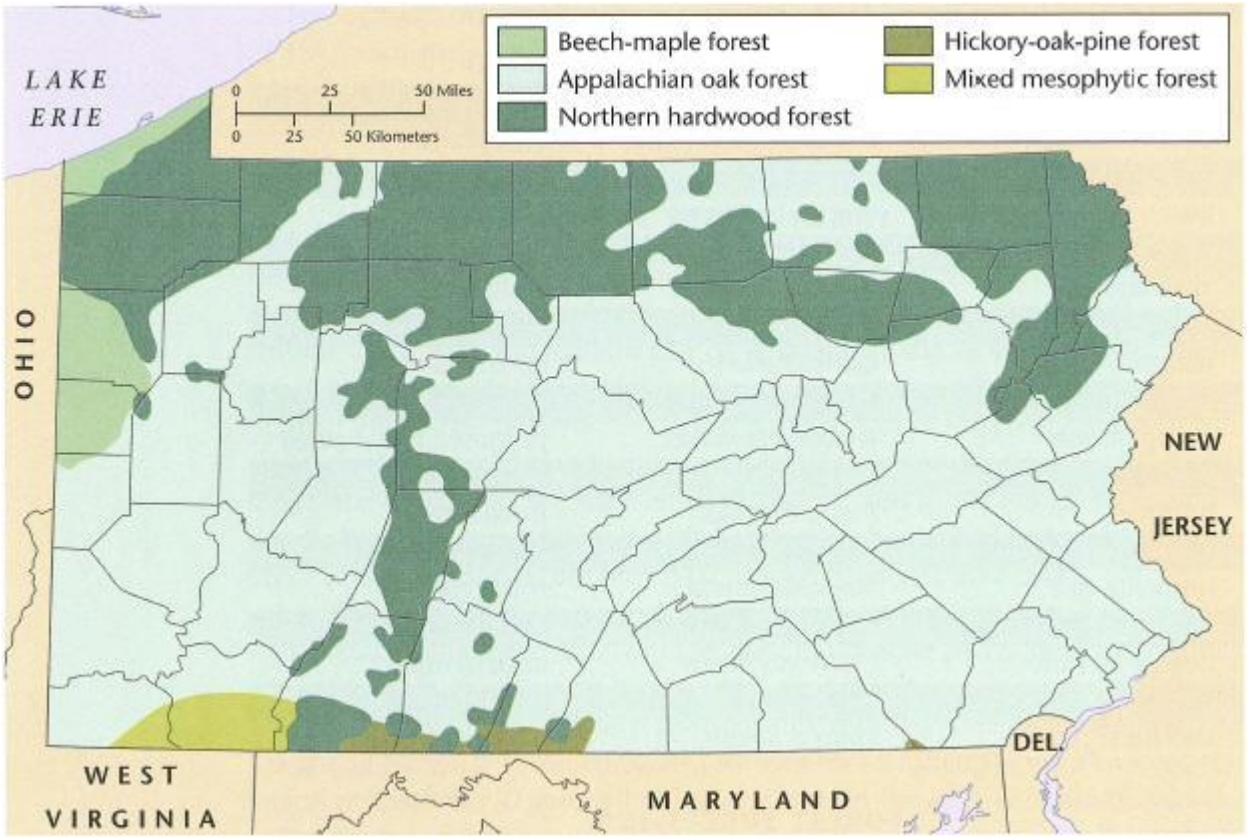
Major Forest Types of Pennsylvania

An excerpt from Trees of Pennsylvania: a complete reference guide by Ann Fowler Rhoads and Timothy A. Block. Published by The University of Pennsylvania Press, 2005.

Pennsylvania's climate, rainfall and soil fertility support forest growth throughout most of the state with the exception of areas that are too wet or too rocky. The major forest types are northern hardwood forest, oak-hickory forest, Great Lakes beech-maple forest, and mixed mesophytic forest.



The northern hardwood forest occupies the northern third of the state and extends south at high elevations along the Allegheny Front. It also occurs farther south on north-facing slopes and cool, moist ravines. This forest type is characterized by a mixture of hardwoods and conifers and usually contains beech, birch, sugar maple, Canadian hemlock and white pine in the canopy. Wild black cherry reaches its best development in this zone, especially in the northwestern part of the state. Understory trees typically include moosewood, witch-hazel, mountain holly and shadbush.

Oak forests dominate the southern two-thirds of the state. Oak forests include red oak-mixed hardwood type on lower slopes where red and white oaks occur mixed with tuliptree, red maple, and hickories. On drier upper slopes and ridge tops throughout the central Pennsylvania, oak forests dominated by white, black, and chestnut oak are common. These forests often have a dense layer of shrubs such as mountain laurel and black huckleberry. Before 1910, American chestnut was an important component of Pennsylvania's dry oak forests, but the accidental introduction of chestnut blight in New York City in 1904 resulted in chestnut's shift from widespread canopy dominant to minor status within just a few decades.

The Great Lakes beech-sugar maple forest is represented at the western end of the state. The mixed mesophytic forests, which reach their greatest development in the Smoky Mountains, just reach southern Pennsylvania. These forests contain tuliptree, sugar maple, beech, basswood, red

oak, cucumber-tree, yellow buckeye, Ohio buckeye, white ash, and black cherry. Understory trees include flowering dogwood, pawpaw, umbrella-tree, redbud, and witch-hazel. The herbaceous layer is very rich and diverse.

In the southeastern corner of the state, in a narrow sliver of the Atlantic Coastal Plain physiographic province that parallels the Delaware River, coastal plain forests contain sweetgum, willow oak, southern red oak, and sweetbay magnolia. In the northeastern and northwestern corers of the state, in areas covered by ice during the most recent glaciation, peat deposits support forests with a northern character dominated by black spruce and tamarack.

Serpentinite rock, which occurs in a band of outcrops stretching across southern Delaware, Chester and Lancaster counties, supports forests of pitch pine or Virginia pine, coupled with eastern red-cedar, scrub oak, blackjack oak, and sassafras. Shale barrens and limestone barrens of the Ridge and Valley physiographic province contain drought-tolerant species including eastern red-cedar, Virginia pine, Table Mountain pine, yellow oak, post oak, hackberry and sumac.

Riparian areas throughout the state, where periodic flooding ins a limiting factor are characterized by sycamore, silver maple, box-elder, American elm, slippery elm, black willow, green ash, black ash, black walnut, and red maple. River birch is common along rivers and streams in the eastern part of the state but rare in the west. Swamp forests along Lake Erie are the only locations where pumpkin ash occurs.

Sixty-two distinct tree-dominated natural community types have been described for Pennsylvania.

Additional notes on Pennsylvania forests

The United States Department of Agriculture-Forest Service uses a slightly different set of forest types. This graph from *Pennsylvania Forests 2009* shows acreages of five major forest types in Pennsylvania. The USFS “Mixed oak” type is equivalent to Rhoad’s “Appalachian Oak Forest”

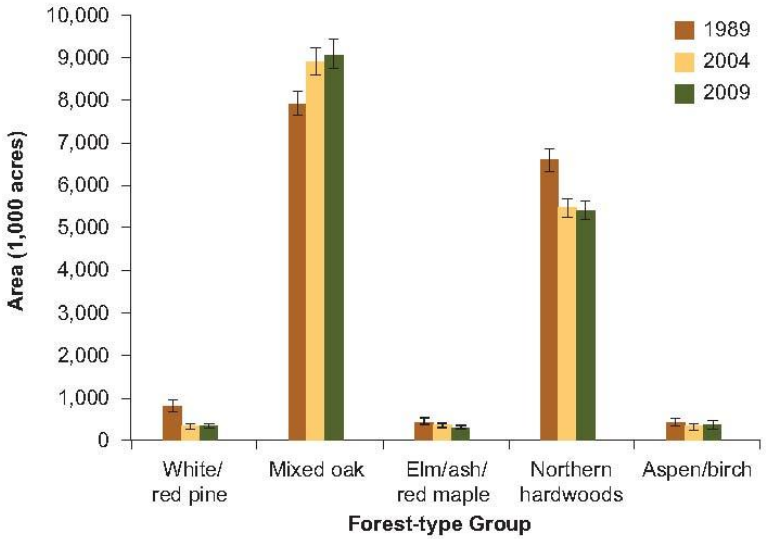


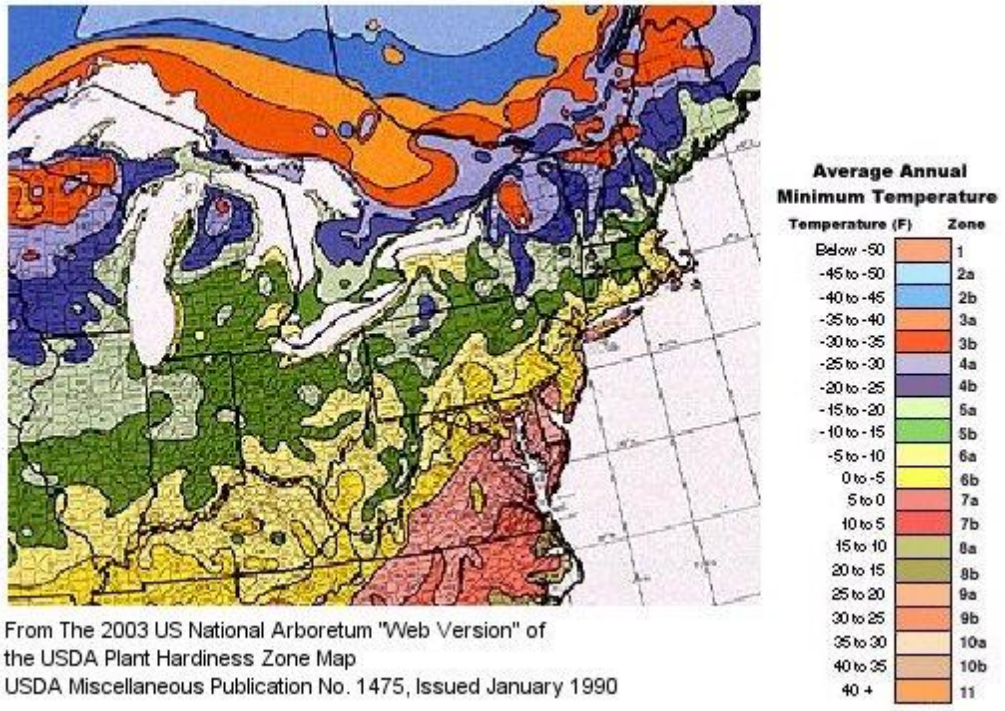
Figure 8.—Area of timberland by forest-type group, Pennsylvania, 1989, 2004, and 2009. Sampling error bars are for 68-percent confidence level.

described above.

Factors that determine forest types: Temperature, Rainfall and Topography

The interaction of three major factors determines the type of forest cover that develops on any particular site.

Temperature. For plant communities the most important temperature factors are the minimum winter temperatures and the length of the growing season between the last spring freezes and the first frosts of autumn. Plant biologists combine these factors into indices called “plant hardiness zones”. An example from the USDA Plant Hardiness Zones map is shown.



From The 2003 US National Arboretum "Web Version" of
the USDA Plant Hardiness Zone Map
USDA Miscellaneous Publication No. 1475, Issued January 1990

Note that conditions in the plant hardiness zones become harsher as one progresses further north in latitude or higher in elevation. Latitude and elevation combine to determine the extent of the various zones in Pennsylvania.

Rainfall. Pennsylvania averages about 42 inches of rain each year which promotes forest growth statewide. The prairie states of the Midwest average less than 35 inches per year. The interaction of precipitation with soil and topography determines which species of trees dominate a site.

Topography. Elevation, slope and the direction a slope faces all effect the microclimate for plants on any site. As discussed above, the height above sea-level will affect the temperature. Growing conditions also vary from the top of a hillside to the valleys surrounding it. The ridge top is exposed to drying winds and the soils are typically thinner and drier. Water and eroding soil both move down slope with gravity, so that soils will be deeper and moister at the base of the slope than further up. South facing slopes receive more direct sunlight than north facing ones and so are warmer and drier. As a result, chestnut oaks that are adapted to drier conditions are more common on the upper slopes and south facing hillsides. Eastern hemlocks and birches require more moisture and are more typical of valley bottoms. In the valleys, depressions in the topography collect water leading to the formation of wetlands and the growth of trees typical of swamp forests.