Introduction

Pennsylvania's forests: importance, history, and description

Nearly 60 percent of the 28 million acres within Pennsylvania borders is covered with forests. Forests provide benefits we simply cannot live without. These benefits can be grouped into three categories: economic, environmental, and aesthetic.

Economic: Nearly 30 percent of Pennsylvania's economy is based on the forest. Our state's forest products are in demand worldwide. More than 100,000 people are employed in our $4.5 billion forest products industry, the fourth largest industry in the state. Each year, we produce more than one billion *board feet* of hardwood lumber and use approximately three-quarters of a million *cords* of *pulpwood* to produce paper and building board products. Approximately 20 percent of our private households supplement their winter heating with 250,000 cords of firewood—higher wood fuel usage than in any other state. Our forests are home to abundant populations of nongame and game animals. Wildlife watchers willingly spend money to feed, house, and otherwise care for the animals that dwell in or near the forest. Fishing and hunting licenses add more than $25 million to Pennsylvania's average annual state revenue. Other forms of recreation and tourism add to the high economic contribution from our forests.

Environmental: Forests protect soils from erosion, provide high-quality water (Pennsylvania has 25,000 miles of forested waterways), and improve air quality. (For every ton of new wood that grows, about 1.47 tons of carbon dioxide are removed from the air, and 1.07 tons of life-giving oxygen are produced.) The diversity of plants and animals that inhabit our forest lands across the state represent a wealth of cultural, medicinal, and environmental resources that we are just beginning to discover. The health of our forests is a prime indicator of the health of our total environment.

Aesthetic: There are few who venture into the forest who do not recognize the human need for the natural beauty and peace of mind that the forest provides. As the pace of our lives and the demands on our time seem only to increase, the value of time spent in the forest—whether we camp, hunt, hike, watch wildlife, or simply collect our thoughts—becomes more important. The forest also fulfills the aesthetic needs of those who simply enjoy viewing the wooded landscape from afar, as well as those who feel good just knowing the forest is "there," even if they never venture into it.

Several hundred years ago, Pennsylvania forests stretched from border to border. From the Piedmont region in southern Pennsylvania to the Northern Tier, a variety of hardwood species were intermingled with *stands* of Eastern white pine and hemlock. As settlers came in droves from Europe, the forests of Pennsylvania began to fall in their path. Farmers cleared forestland for agriculture. Lumber towns sprang up as Pennsylvania led the race to supply the growing nation with timber. By the early 1900s very little of the state's original forest remained. In the haste to harvest timber, other forest resources often were ignored. Steep hillsides were left bare, soil

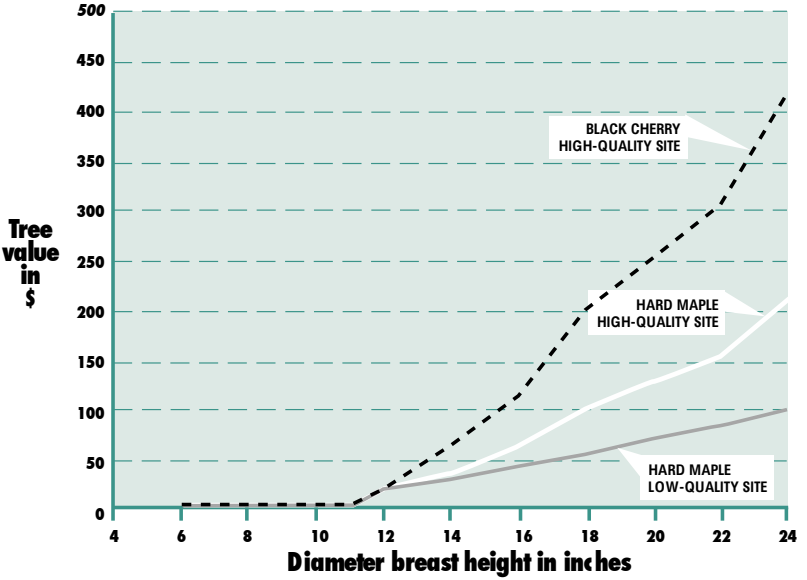
washed into streams and rivers, fires burned out of control, and wildlife habitats were drastically altered.

In all but a few small patches, the forests we have today grew on their own; vigorous fire control and prevention and low deer populations allowed *natural regeneration* to occur on abandoned farm fields and cut-over forests following several decades of widespread disturbance around the turn of the century. Consequently, most of the forests in the state are roughly the same age, give or take 25 years. A walk in a typical Pennsylvania woodland reveals that, in most areas, Eastern white pine and hemlock have become subordinate to a variety of mixed hardwoods—oak, cherry, hickory, maple, yellow poplar, and other species. Blight has reduced the once plentiful American chestnut to a shrub. White and red oaks and cherry have been joined by red maple as the *dominant* species in the *overstory*. In some areas of Pennsylvania, naturally induced mortality in the *deciduous canopy* is allowing Eastern white pine to make a comeback.

Economics and sustainable forestry

The promise of economic gain is a powerful lure. More significantly, economic gain, in the great majority of cases, provides the means to implement other management practices that can maintain and improve our forests for wildlife, recreation, *biological diversity*, and future woodland health and productivity. In realizing economic gain from the use of forest resources, we need to recognize that what we consume today can affect the resources available to our children. Ongoing management practices demonstrate that managing and using our forests wisely can provide at least as much as we need to sustain us now without jeopardizing the future resource, economically (Figure 1) and environmentally.

Figure 1. In some cases, the value of a tree will increase dramatically if it is allowed to grow for several more years.



Forest management basics

Ecological principles and processes

Forest *ecology* is the study of the forest as a biological community, with emphasis on the interrelationships among the various trees and other organisms constituting the entire community, and on the interrelationships between these organisms and the physical environment in which they exist. These interrelationships define or describe a forest *ecosystem*.

The forest ecosystem is dynamic—as in all living systems, change is inevitable (Figure 2). We can, to a degree, predict what will happen during the *successional* stages of a forest, and we are increasing our knowledge of the patterns of natural disturbances, such as winds, fires, damaging ice and snow, and outbreaks of native insects or diseases. We are less able to predict invasion by unexpected plant and animal species. Even for those disturbances whose patterns we can describe, it is difficult to predict their impact on a particular place at a particular time. What is certain is that no ecosystem remains forever the same. The domain of natural science has come to realize that management plans and techniques should try to work with, rather than prevent, changes in ecosystems.

The development of a forest is influenced by many factors—soil types and depths; groundwater patterns; the steepness and directional slope of the terrain; various microbial populations; the presence and fluctuating population sizes of numerous species of fungi, plants, and animals; the

Figure 2. Even without human intervention, the number of trees per acre decreases overtime.