

ECOLOGICAL AND HISTORICAL BACKGROUND OF NORTHERN HARDWOODS.

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INTRODUCTION

The northern hardwood forest type in Pennsylvania and southern New York is a variation of the beech-birch-maple type that spans the northern portions of the Eastern United States. It is known locally as the Allegheny hardwood or cherry-maple type. Allegheny hardwoods occur on more than 10 million acres of the Allegheny Plateau and Allegheny Mountain sections of Pennsylvania, New York, and small portions of Maryland and West Virginia.

The area occupied by Allegheny hardwoods is a heavily forested region. It is one of the major contiguous blocks of commercial forest land in the northeast, and wood-using industries play an important role in the rural economy of the region. Yet these forests are surrounded on all sides by the Eastern megalopolis. Nearly one-third of the U.S. population lies within a day's drive of the region, providing a large and nearby market for forest products, and a demand for many other--sometimes conflicting--uses of the forest land.

Allegheny hardwood or cherry-maple forests are unique in that they produce nearly all of the world's supply of commercial black cherry timber. Cherry is a wood of exceptional beauty used in the production of fine furniture and veneer for cabinets and paneling.

No less important are the other Allegheny hardwood species such as white ash, the long-time favorite wood for products such as tool handles and baseball bats, and the maples, well known to everyone as sources of lumber for furniture and specialty products.

Allegheny forests yield many social and economic benefits other than timber products. Hunting is one major example. Pennsylvania ranks first in the Nation in the sale of hunting licenses, with big-game animals such as deer a leading attraction. Between 100,000 and 150,000 deer are harvested annually in Plateau forests, along with bear, turkey, and many kinds of small game. Water resources and many forms of outdoor recreation also must be added to the list of important benefits derived from Allegheny hardwood forests.

HISTORY AND ORIGIN OF PRESENT STANDS

To fully understand the range of options available and the ecological basis for silvicultural treatments in Allegheny hardwoods, it is important to know something of the history and origin of present stands.

When white settlers first came to northern Pennsylvania, they found vast expanses of forest land stretching as far as the eye could see. Many of these original northern hardwood forests were mature and overmature. Hemlock-beech stands were most abundant on moist sites along stream valleys and poorly drained upland areas. Beech, maple, and other associated hardwoods were more abundant on better drained sites. Beech, hemlock, and maple represented more than 70 percent of all trees observed during early land surveys of what is now the Allegheny National Forest. White pine was also a common--and extremely important species in the original forests. But stands with large proportions of white pine were relatively small, and occurred primarily on river flats and lower slopes.

However, not all stands were primeval in character. Disturbances such as wild

fires and windthrow were common, resulting in the presence of stands of different ages and sizes. Indians were also responsible for many forest disturbances. Indians in the Northeast lived in villages; they cleared land for agriculture, and often burned the woods to improve berry production, facilitate travel, and improve hunting. Indian villages were relocated rather frequently as soil and firewood were depleted; so, the total acreage affected was considerably larger than that actually occupied at any one time. Many white pine stands are thought to have originated on the sites of abandoned Indian villages and on Indian burned areas.

Whites began to settle northwestern Pennsylvania in the mid-1700's. Early settlers cleared some land for agriculture and cut a little timber for their cabins and barns. But settlement proceeded slowly until the early 1800's. For example, the population of Warren County was only 26 in 1810 and that of McKean County was only 142 that same year. Even the earliest settlers did some timber cutting for market. The first sawmill in Warren County was a water-powered mill built in 1800, and a raft of pine timbers from this mill was floated down the Allegheny River to Pittsburgh in 1801. In spite of this early start, timber cutting remained quite limited during the early 1800's.

Cutting began to accelerate after about 1840 or 1850 when portable steam power plants became available, making circular sawmills practical. Mills that could cut 10,000 board feet of lumber per day became common, and some much larger circular mills were built toward the end of the century. Tanneries that used hemlock bark as their source of tannin for curing leather were built in the late 1850's.

Settlement was proceeding more rapidly by 1850, and the demand for lumber to -build houses, stores, and furniture began increasing markedly. Major railroads began to reach into the Allegheny hardwood area about this time, opening up extensive and previously inaccessible timber, and providing convenient transportation for further development. For example, the first railroad reached Warren in 1859, and two others followed within the next 10 years.

During early years of this period, white pine was the major species cut, mainly along the drainages. It was floated down secondary streams to mills, and floated, rafted, or barged down the Susquehanna and Allegheny Rivers to major markets in Williamsport, Harrisburg, Philadelphia, Pittsburgh, and Cincinnati. As late as 1875, pine was the predominant species passing through the big boom at Williamsport. But as the limited supplies of pine were depleted and demands for construction lumber increased, more and more hemlock was cut. By 1890, nearly 8 times as much hemlock timber passed through the Williamsport boom as pine--a complete reversal within 15 years. Also, during this period, some large and especially valuable hardwoods were removed for furniture, paneling, and interior trim. Red oak and white ash were cut near the mills; elsewhere, species that would float well, such as yellow-poplar, cherry, chestnut, and basswood, also were cut.

These early cuttings for white pine, hemlock, and selected hardwoods did not result in extensive clearcutting. Hardwoods and hemlock of the quality desired were scattered. And white pine rarely occurred in pure stands over extensive areas; it usually grew as small groups of trees intermingled in stands of other species. Furthermore, the technology required to move large volumes of logs was not advanced enough to permit clearcutting of major portions of the virgin forest. Most of the cutting was confined to areas where streams could be used to transport the logs to the mill.

Numerous attempts were made to tap the timber resources away from streams. Horse-pulled wagons were used to haul both bark and logs over dirt or sometimes even plank roads. But road construction was difficult and expensive and hence little used. Log slides often were built to extend the distance that logs could be moved. And splash dams often were built to permit logs to be driven down even very small streams. With high water during the spring runoff, these dams filled up quickly. When the gates were opened, a rush of water carried the logs down otherwise shallow streambeds.

Because of the dependence on water transport, and the markets limited to only the larger trees of selected species, the major portion of the virgin forest lying on the uplands remained intact through about 1880. The cuttings for pine, hemlock, and selected hardwoods tended to be scattered and patchy partial cuttings that left considerable amounts of residual overstory in most places. But these cuttings did create openings in the extensive forests and resulted in considerable amounts of advance hardwood reproduction.

During the last half of the 19th century, the industrial revolution began to change the methods used to accomplish nearly everything, everywhere. By about 1880, major advances in logging, transportation, and milling methods combined to set the stage for drastic changes in timber harvesting on the Allegheny Plateau. Band saws came into use after 1880, making possible the construction of huge mills capable of sawing 100,000 feet or more of lumber per day.

Perhaps the most important change for timber production was the development of railroad locomotives designed especially for logging. Logging railroads were built up nearly every valley to reach the timber on the high ground above. And log trains daily brought previously undreamed of quantities of logs to the mills on a year-round basis. There was no longer any need to rely on access to streams--railroads could reach anywhere--and they did.

A major driving force behind the ensuing forest exploitation was the tanning industry. Tanneries used tremendous quantities of hemlock bark from which they extracted the tannin used to cure leather. The ready and dependable supply of logs and markets, plus development of the band saw, led to a large sawmill industry, which was often associated with the tanning industry. The combination of the two products, bark and sawlogs, made it possible to finance the expense of building railroads into the forests and turning good profits besides.

This combination also led to a third major forest industry: the wood chemical plants which produced charcoal, wood alcohol, acetic acid, acetate of lime, and similar products. Tanneries provided dependable markets for many of the chemicals produced, while the already established logging railroads made transport economical enough to permit bulk recovery of these small wood products. Chemical wood plants provided a market for virtually every size and species of tree growing on the Plateau, and pulp and paper mills played a similar role in many areas.

Between 1890 and 1930, the virgin and partially cut forests were almost completely removed in what must have been the highest degree of forest utilization that the world has ever seen. The period of heavy cutting--the railroad logging era--began between 1880 and 1890, reached a peak about 1910, and ended about 1930 when the forests of the Allegheny Plateau were completely liquidated.

In a few areas, the heavy slash left after railroad logging, particularly in the coniferous stands, resulted in severe forest fires. When this occurred on poorly drained soils, especially in areas where deer browsing or frost damage was heavy, orchard or open stands resulted that have persisted without much tree cover to the present time. Typically, these areas are located in the valley bottoms or occasionally on the poorly drained soils of the broad, flat Plateau tops. They are now dominated by such plants as aster, goldenrod, grass, and fern with only a few widely spaced trees of black cherry or red maple.

But over most of the Allegheny Plateau, on the well-drained side hills and unburned areas, fine new second-growth stands containing valuable species such as black cherry, white ash, yellow-poplar, red maple, and sugar maple have developed.

During these turn of the century cuttings, the deer population was extremely low. Market hunting was legal at that time. Deer could be hunted at any time, in any numbers, using salt licks and dogs to improve success. As a result, deer were slaughtered to provide venison and hides for the logging camps. So, deer were nearly exterminated by the turn of the century. Eventually, strict hunting laws came into effect about the time

that the railroad era clearcuts were providing tremendous quantities of deer food. The population erupted, and by the late 1930's, Pennsylvania had developed one of the largest deer herds in the Nation. But in most instances, our present forests had been established before the eruption.