

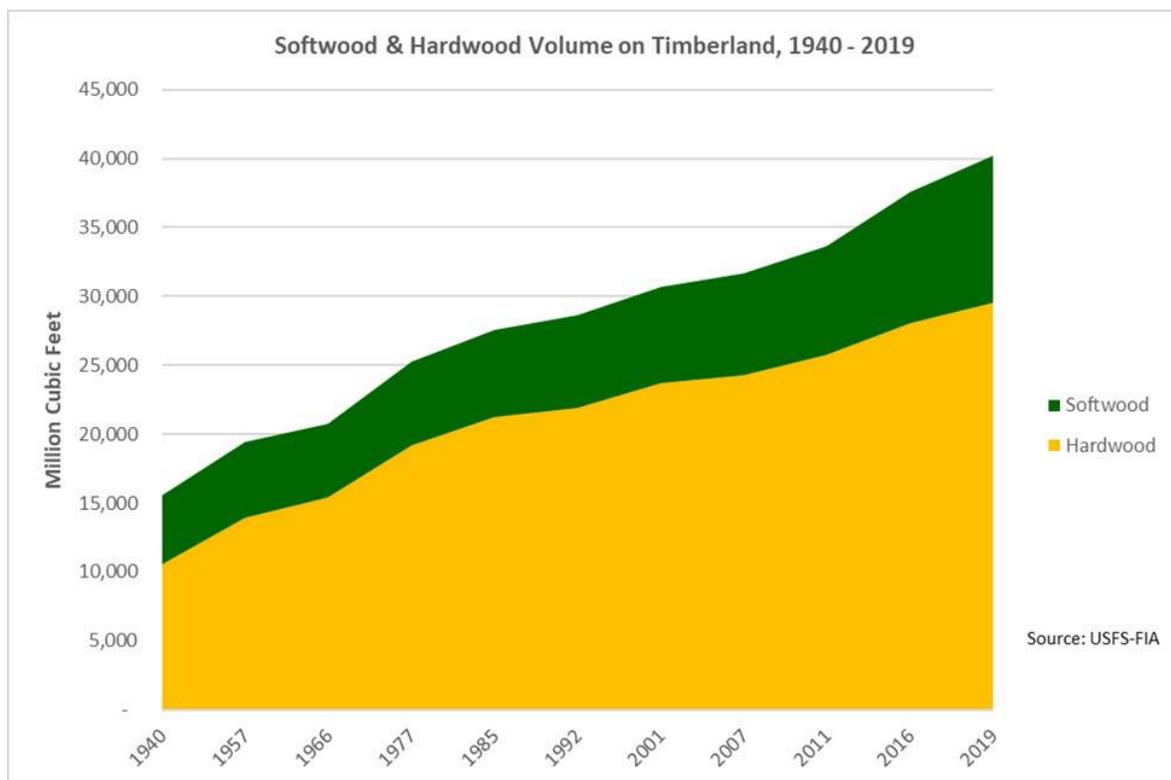
2022 The Year of the Hardwood

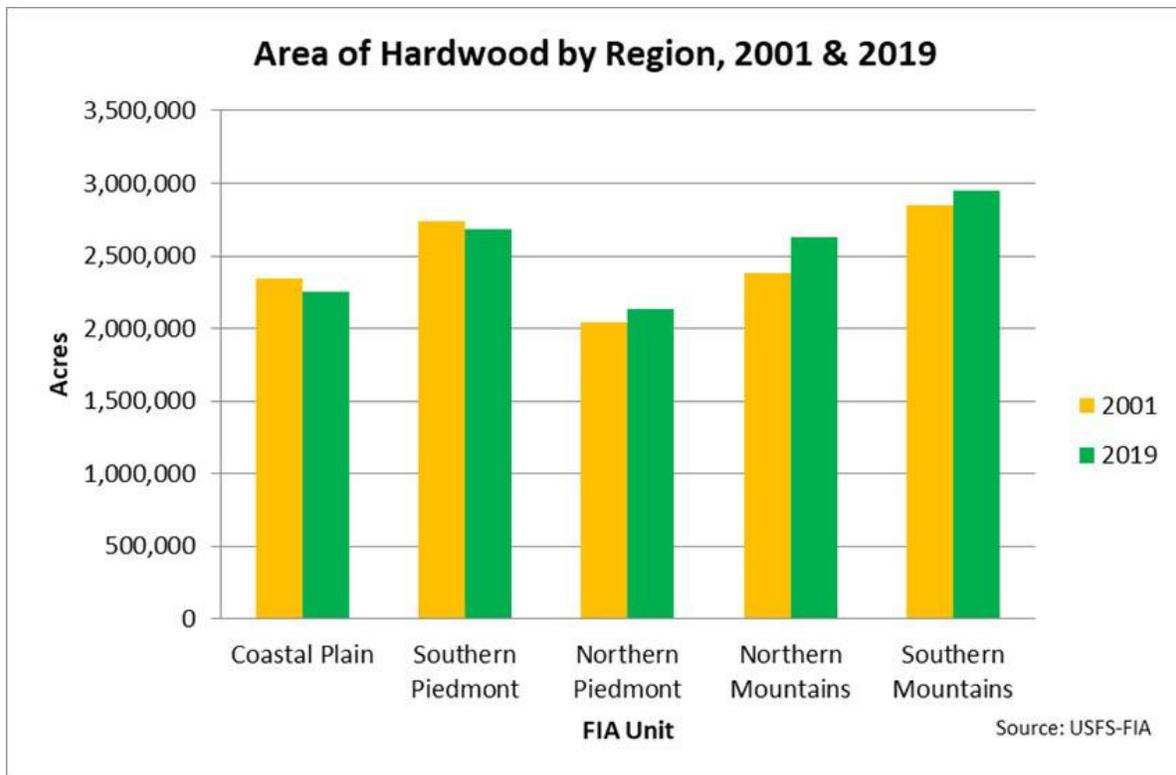
By: Michelle Stoll, Virginia Department of Forestry

ed. In 2022, we plan to feature one article per newsletter that relates to managing Virginia's hardwood forests. We'll start this winter with a discussion of the current status of our hardwood forests.

A common concern among Virginians is that all the hardwood forests are being harvested and replaced with planted pine. And while there is indeed plenty of planted pine in the commonwealth, there are actually more acres in hardwoods today than there were in the 1940s. In fact, total standing volume of hardwoods (what is growing in the woods) has increased from 10 billion cubic feet in 1940 to over 25 billion cubic feet in 2019. And the acreage of hardwoods across Virginia has remained stable in every region from 2001 to 2019. This is good news, because Virginia's hardwood forests provide high ecological, societal, and economic values.

From an ecological perspective, hardwood forests provide food, shelter, and nesting sites for a multitude of wildlife species. Additionally, they take up and store carbon from the atmosphere, stabilize stream banks, and reduce soil erosion. From a societal perspective, hardwood forests offer recreational opportunities, including hiking, hunting, fishing, and leaf peeping. And these recreational opportunities help stimulate local economies.





Total standing volume of hardwoods and softwoods in Virginia from 1940-2019 (top). A comparison of the acreage in hardwoods in the physiographic regions of Virginia in 2001 and 2019 (bottom). Data and graphs from the Virginia Department of Forestry.

Additional economic benefits are derived from harvesting hardwood timber. Hardwood forests provide high-quality lumber for furniture, flooring (what would all the home renovation shows do without hardwood flooring??), pallets, railroad ties, barrels for spirits, paper, and packaging.

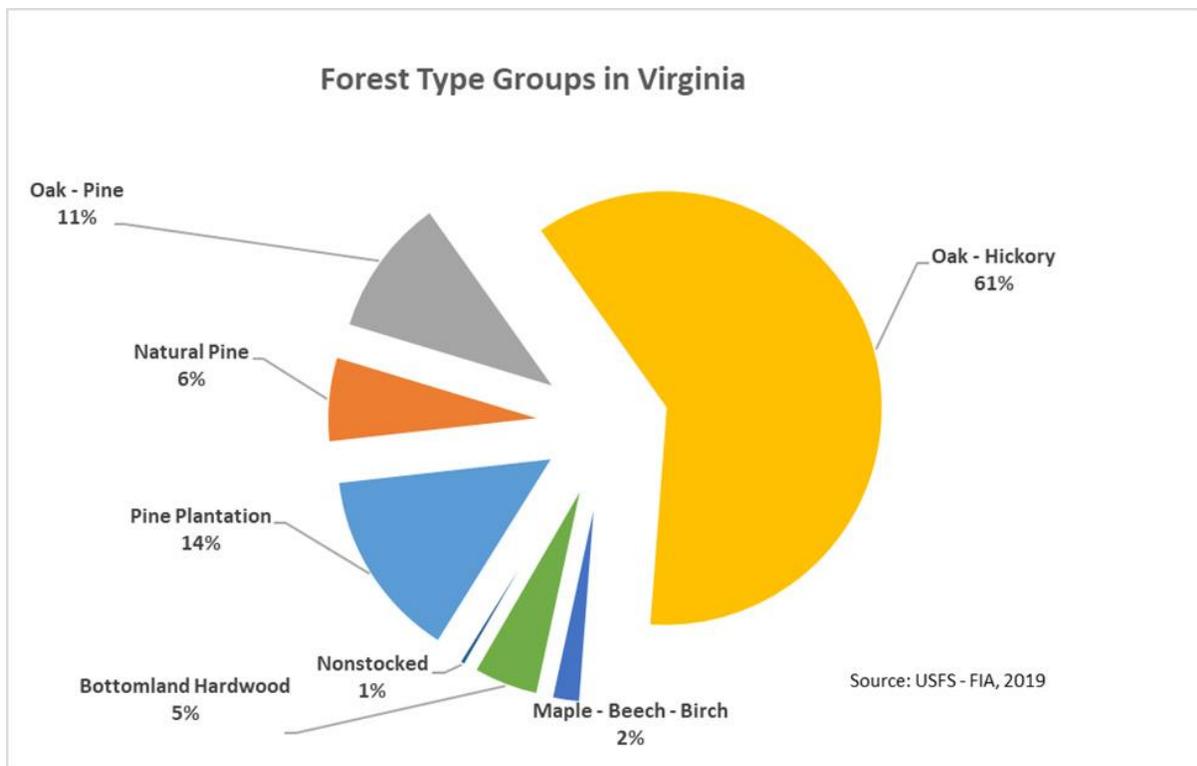
The 12.6 million acres of hardwood forests currently make up 79% of Virginia’s 16.1 million acres of forest. Over 100 different hardwood species are found in the commonwealth, so these are diverse forests. The exact mix of species will depend on climate, elevation, aspect, soils, and past land use. Yet, these hardwood forests can be classified into several main types.

Over 61% of Virginia forests are in the oak-hickory forest type. In general, oak-hickory forests in Virginia have a mix of white oak and northern red oak on more productive soils, scarlet and chestnut oak on drier, less productive soils, and mockernut, pignut, and shagbark hickories, along with a wide variety of other species. Oak-hickory forests provide valuable habitat and hard mast for wildlife and contain valuable timber species.

Approximately 11% of Virginia’s forests fall into the oak-pine category. These forests are characterized by having a mix of hardwoods and pines. These are extremely important for wildlife. The hardwoods provide both soft and hard mast for food, while the pines provide thermal cover over the winter. This forest type needs periodic disturbance such as fire or timber harvesting to be maintained. Otherwise, it will go through the natural process of succession, with the short-lived pines slowly dying off and the hardwoods becoming dominant, resulting in an oak-hickory forest.

Bottomland hardwood forests comprise about 5% of Virginia’s forests. Species composition in these valuable forest types vary, depending on where they are in Virginia. Typically, they are a mixture of ash (rapidly disappearing), gums, and maples. These forests help maintain cooler water temperatures, provide high-quality wildlife habitat, and stabilize stream banks.

Finally, about 2% of Virginia’s forests are classified as the maple-beech-birch type. These forests are dominated by shade-tolerant species that thrive under low light conditions and are maintained by management strategies that involve little disturbance. This forest type does not produce valuable timber species but does provide some wildlife benefits.



Virginia’s main forest types. Data and graph from the Virginia Department of Forestry.

Despite having over 12 million acres of beneficial hardwood forests, much less effort has been dedicated to managing them well when compared to the amount of effort that has been allocated to managing loblolly pine. Some of this is simply due to the fact that pines are managed on shorter rotations, are easier to genetically improve, and are planted; hardwoods are managed on much longer rotations, and regenerate naturally. But as a result, the health and productivity of Virginia's hardwood forests face challenges.

One long-term issue with Virginia's hardwood forests is a history of poor management practices. One example is high-grading. High-grading, also known as diameter-limit cutting or selective harvesting, is the removal of the best or highest-grade trees from a forest, generally larger than a certain diameter, e.g. 14". Over time, the selective removal of the best trees leaves genetically inferior and unhealthy trees to regenerate the forest and ultimately results in an unhealthy and slow-growing forest. Unfortunately, high-grading remains common practice in the southern Appalachians and has led to an overall decline in hardwood forest health throughout the region.

Another issue all Virginia's forests face is the introduction of nonnative invasive species. These can include plants, animals, diseases, and insects. An extreme example of how a nonnative invasive disease has impacted our forests is the chestnut blight. This pathogen, introduced in the early 1900s, resulted in the loss of American chestnut throughout its range in the Appalachians. Once the dominant species in the region, now only occasional blight-tolerant trees and small stump sprouts are found. But the loss of American chestnut opened up a niche for oaks, which are now the dominant species in most of the southern Appalachians.

Unfortunately, the oaks that came in after the loss of American chestnut are old, with many close to 100 years. Like humans, as trees age, they become less resilient. In the face of other damaging factors, such as drought, insects, and diseases, they are more likely to die, a phenomenon known as oak decline.

Another challenge with oaks is regeneration. Partial harvests, like those conducted in high-grades, may not allow enough sunlight to reach oak seedlings on the forest floor. Too much shade prevents oak seedlings from thriving. On the other end of the spectrum, management practices like clearcutting allow too much sunlight to reach the forest floor. Full sunlight allows species such as yellow-poplar to out-compete oaks. High deer populations in many areas of the state also have a negative impact on oak regeneration as deer browse heavily on small oaks.

And lastly, affordable management options are limited by a lack of markets for low-quality trees that dominate Virginia's hardwood forests. Without markets, landowners must pay out-of-pocket for management activities that improve forest health, such as thinning and removal of unhealthy or undesirable trees. These costs are often prohibitive and no management is able to be conducted. Strong markets for low-quality products incentivize landowners to manage their forests.

But it's not all gloom and doom. There is hope for improving hardwood management and improving the quality of Virginia's hardwood forests. First, demand for bourbon is at an all-time high. White oak is used to make barrels for bourbon. In fact, spirits can only be labeled as bourbon if they are aged in a brand-new white oak barrel. While the current supply of mature white oak is good, future supply may be difficult to come by. As such, the bourbon industry has a vested interest in helping landowners improve the management of their forests to encourage the regeneration and growth of white oak.

Additionally, the forestry community in Virginia recognizes the importance of the hardwood resource. To this end, the Hardwood Forest Habitat Initiative is being developed to help give landowners the tools they need to practice sustainable forest management in their hardwood forests. More information will be available in late 2022.

Finally, Virginia Tech is developing an interactive tool to help landowners conduct crop tree release on their property. Crop tree release is an easy way to improve the quality of desirable trees in a hardwood forest. The tool should be ready late in 2022.

In future editions of the Virginia Forest Landowner Update, we will have articles focused on different aspects of hardwood management – management practices landowners can do to improve their hardwood forests.

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