



Species Spotlight

American Beech

Fagus grandifolia

The 200-pound black bear shimmies its way up the smooth barked beech tree, leaving tell-tale claw marks that will persist for decades. It finds a sturdy nook between two trunks, settles in, and begins to bend beechnut laden branches towards itself, shaking and snapping them and sending the fat-rich nuts to the autumn-leaf blanketed forest floor for later collection. A passing Ruffed Grouse gobbles up a few nuts for itself, but minutes later the bear is filling its belly with hundreds of nuts that will help it put on essential pounds before settling into its den for the winter.

What is it?

The only beech species that is native to North America, the American beech is a hardwood tree that can be found in all NETN parks and throughout much of eastern North America, including such disparate places as Nova Scotia and Florida. Its wood is hard, heavy, and strong, and is valued as a good heat-producing firewood. It is also used in the crafting of fine furniture, flooring, and musical instruments. Featuring dark-green simple leaves and a zigzag twig/branch formation, they can live 300-400 years in ideal conditions and grow to over 100 feet tall. But what they are best known for is their steel-gray, smooth bark that reminds some of the skin of an elephant. This inviting surface can be irresistible to many hikers and sweethearts who carve their names into it for all posterity to see. A legendary beech tree



An opened
beechnut shell



One of the infamous Daniel Boone carvings in a beech tree. It died in 1916 at about 365 years old.

Along with many oak species, beeches are often easy to spot in winter because of their tendency to hold on to their golden orange-to-brown leaves throughout the season, a trait known as *marcescence* and a word you can use to impress your friends.

Why is it important?

American beech is one of a trio of hardwood species that make-up the classic northern hardwood forest: maple-beech-birch, though beech is the only nut producer of the northern hardwood

type. This happens when they reach about 40 years old, and begin “masting”, or producing small nuts about the size of a fingertip. The nuts ripen in late September and shed their spiky encasings when the first hard frost occurs. Bountiful beech seed crops are produced about every 2-to-8 years. With the demise of the American chestnut in eastern forests from blight, the beech became an even more important food source for many woodland creatures because of the thousands of beechnuts a tree can produce during a good mast year. Wild turkeys, black bears, grouse, raccoons, foxes, deer, rabbits, squirrels, porcupines and many other woodland creatures eat or cache beechnuts in the fall to prepare for a long, cold, winter. The beech’s shallow root system will sometimes “sucker”, especially when the trees are stressed, shooting up dense thickets of cloned trees that remain small and shrub-like. Beech are seldom severely browsed by white-tailed deer, especially

Leaving their mark

When large animals, such as black bears, climb a beech tree their claw marks can remain visible on the bark decades into the future. Ed Sharron photo.





A close-up look at beech bark disease on an infected tree. The white spots are the waxy coating the tiny scale insects exude that helps to protect them from weather and predators. Kent McFarland photo.

when other, more desirable tree species are available, making them important forest components where deer populations are high such as Morristown NHP in New Jersey. It is one of the few species regenerating there - though from the suckers, not seeds.

How does NETN monitor it?

Hundreds of long-term forest health monitoring plots throughout network park forests contain thousands of beech trees of many different ages and conditions. The monitoring program tracks the health of beeches and other trees through a number of measures on the plots. Overall tree condition, how fast they are growing, the soils they grow in, mortality rates, disease monitoring, and how many are coming up in the understory are recorded every 4 years in each plot.

How is it doing?

By the numbers, American beeches are common to prolific throughout NETN parks, but tree health varies greatly from park-to-park and even from tree-to-tree mainly because of the non-native beech bark disease complex (BBD). First appearing in Nova Scotia in 1890, it has since slowly spread southward to Pennsylvania, with pockets showing up farther south and west. The cause of the disease is two-fold. A very small, invasive insect called a beech scale bores into the beech's bark, allowing fungi to enter the tree through the hole the scale leaves behind and infecting the tree. This causes large cankers to grow around the infection, and the scabbing can crack the bark and eventually girdle the tree, killing it. As would make sense for the disease's spread pattern, very little if any damage from the disease is occurring in NETN's most southerly park - Morristown NHP, and damage

is most severe in NETN's northern parks, particularly Acadia NP (ME), Marsh-Billings-Rockefeller NHP (VT) and Saint-Gaudens NHS (NH). The latter two parks also have a high density of beech regeneration stemming from all the sucker trees that shoot-up around stressed trees. These dense thickets often do not reach mature stages and are genetically identical clones of the diseased parent tree, meaning they have little chance of developing resistance to the disease. The sucker thickets can also prevent other tree species from growing in the area because of the deep shade they create. There are even some anecdotal stories and contained studies that point to the possibility of beech leaf-litter having chemical properties that can suppress or kill the seedlings of other trees.

Highly infected parks are also seeing a shift in the sizes of beeches within them - few large, mature trees (though not healthy) and lots of small-sized trees or sucker trees. The reason being the invasive insects seem to only target beech trees of a certain minimum diameter. As larger trees die-off there will no-doubt be impacts on nut availability for wildlife if younger trees don't reach mature stages.

The good news is that some beech trees seem to not be affected by the disease at all, even in heavily infested areas. Recent studies have shown trees like these to be resistant to the scale, offering hope that future northern hardwood forests in the northeast may once again be graced by mature, un-scarred, nut-producing beeches.

Where BBD still hasn't taken a firm hold, there appear to be places in the eastern U.S. where beeches, along with maples, may be taking over oak-hickory dominated forests. The process, known as *mesophication* (open/dry oak-hickory forests transitioning into more dense/relatively moist beech-maple forests), looks especially active in the mid-Atlantic region and possibly also in Morristown NHP, the Roosevelt-Vanderbilt parks in New York, and Weir Farm NHS in Connecticut. There are likely many factors that contribute to this process. Current thoughts are that fire suppression, deer overabundance, and climate change are all playing a role. Many questions remain about the long-term effects the process may have on regional forest ecology, and whether this may just be the new face of a forested landscape that has undergone major changes in disturbance regimes since Native American times. Continued long-term studies of NETN and other I&M Network parks is needed to track this process to see if it continues into the future.

For more information

See NETN's forest health monitoring protocols, reports and resource briefs available from the Forest Health page of our website.

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