

Game Species of Hemlock Forests



Eastern hemlock tree, *Tsuga Canadensis*, is an evergreen tree that grows along the east coast of the United States and parts of Canada. It is a keystone species that provides numerous ecosystem services including erosion and temperature control. They also improve water and air quality in forests, and provide crucial food, shelter, and habitat for many species, including over 120 species of mammals and other vertebrates.

Hemlock trees are currently threatened by hemlock woolly adelgid, or HWA, an invasive insect with the potential to kill trees in less than a decade. With HWA spreading through the native range of hemlock trees, many of the species that rely on them could be in danger.

Game Species

Many of the animals that use hemlock trees are also important to the hunting industry, which generates more than 25 billion dollars in sales and more than 17 billion dollars in salaries and wages each year in the United States. New York and Pennsylvania make more than 5 billion and 1.6 billion dollars respectively each year from hunting, fishing, and related activities. This money goes to fund conservation programs, and provides more than 80 percent of the funding for most state fish and wildlife agencies. Without these species, local, state, and federal economies, as well as conservation efforts, would be negatively impacted, and ecosystems could be thrown out of balance.

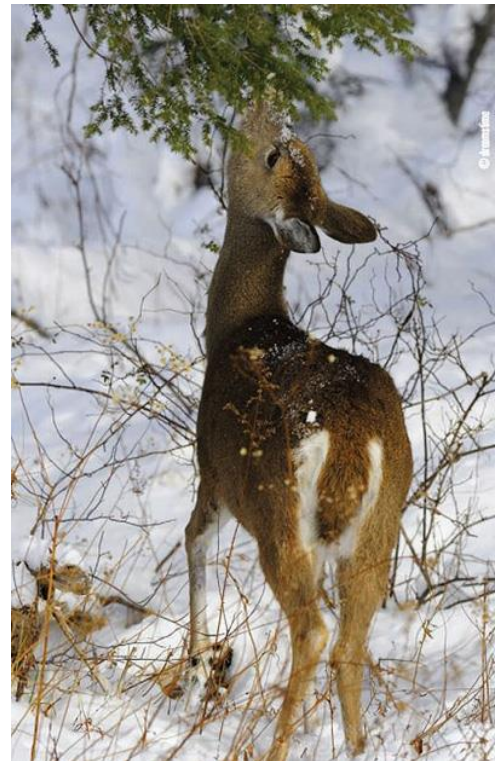


White-Tailed Deer

Deer are among the most popular big game species. Hunting takes place in the fall and winter, with several different seasons. In New York, deer hunting contributes nearly 1.5 billion dollars to the state economy and generates more than 35 million dollars to support the New York State Department of Environmental Conservation. Hundreds of thousands of deer are tagged each year in New York and Pennsylvania.

White-tailed deer are herbivorous mammals that are found in a variety of habitats across North America, including forest edges, fields, and the early successional stages of forests. They are browsers with a very diverse diet, but feed primarily on leaves and the shoots of woody plants, including apple, dogwood, and maple trees. Deer may also eat grass, agricultural crops, or even fungi. In addition to humans, deer are hunted by eastern coyotes, bobcats, black bears, and foxes, which may kill fawns in the spring. As long as the deer population does not become overabundant, this species plays an important role in the ecosystem as both a primary consumer and a prey species.

The eastern hemlock tree is very important to the survival of white-tailed deer over the winter. The leading cause of death for white-tailed deer in the winter time is malnutrition, as deep snow restricts their movement and makes it more difficult to find food. During this time, hemlock trees provide both food and shelter to deer. The dense canopy of hemlock trees, which creates important shade during the summer months, is also able to hold much more snow than other conifers, which makes them an ideal place to bed down under. Deer may also browse on hemlock branches if other food becomes unavailable. Because of this, hemlock trees are credited with maintaining deer populations through harsh winters.



Black Bear

Bear hunting also takes place during the fall and winter months for a total of 82 days in Pennsylvania and 85 days in the southern zone of New York. Bear may be hunted for their skin and meat, and their fat is often used as oil for cooking and baking, or to waterproof leather. Thousands of bears are tagged annually in both states, which helps to manage growing bear populations, especially in Pennsylvania.

Black bears can live in a variety of habitats, and are found across most of North America with the exception of the Great Plains. Despite being part of Order Carnivora, bears are omnivores, and nearly 85 percent of their diet consists of plant material, including grasses, leaf buds, seeds, nuts, and skunk cabbage. During the summer, bears primarily feed on berries. Since berry seeds are able to pass through the bear's digestive system intact, bears are considered to be seed dispersers and nutrient providers, since their manure helps the seeds germinate. Bears may also hunt and kill the calves of elk and deer, which helps to control herbivore populations in forests.



Bears sometimes strip the bark from conifers in the spring to eat the tree's sapwood, or mark the trees during mating season to communicate with other bears. One of the preferred trees for these activities is the eastern hemlock, which has a high sugar concentration and can grow large enough to facilitate frequent marking. Additionally, large hemlock trees, such as those found in old growth forests, can be climbed by bears and their cubs to escape from predators, such as bobcats, coyotes, or even other bears. They may also climb hemlocks to forage for food, or to sleep in. During the winter, the cavities of hemlock trees can be used as dens to hibernate in.

Wild Turkey

Wild turkeys have reclaimed much of their range across the continent after habitat loss and overharvesting in the nineteenth and twentieth centuries caused local populations to decline. They are now found in every state except Alaska, and are hunted during the spring and fall in New York and Pennsylvania. It is estimated that 47,000 turkeys in Pennsylvania and 19,000 turkeys in New York were tagged during the 2018-19 seasons.

Wild turkeys live year-round in mature forests, as well as forest edges and fields, all across the United States. They are foragers that travel in flocks and feed on acorns and other nuts, wild black cherries, and other seeds and berries. Occasionally, turkeys are the predators of small rodents, and may also eat snails, ground beetles, and other insects. Turkeys are also a food source for numerous predators, including raccoons, bobcats, coyotes, foxes, fishers, opossums, and even birds of prey, such as hawks and eagles.

Although turkeys are able to survive without eastern hemlock trees, they prefer this tree over other conifers in the winter. In the absence of other food sources, wild turkeys feed on the buds of hemlock trees, and often roost in these and other conifers. Turkeys may also weather out storms in hemlock trees, as the canopy offers protection from the elements. Young hemlock trees can also provide cover that protects turkeys from predators.



Small Game

Small game species, such as rabbits, squirrels, and ruffed grouse, also use eastern hemlock trees for food, shelter, and cover. Hunting for most species takes place in the fall and winter, from October to December and, although it is not as popular as big game hunting, brings in money to fund conservation efforts as well as state fish and wildlife programs.

Cottontail Rabbit



The eastern cottontail rabbit is the most common subspecies of rabbit, and ranges from the east coast of the United States and the Great Plains. They are solitary animals that are found mostly along forest edges and open areas like meadows and orchards. Much of the diet of cottontail rabbits is made up of grasses, clover, and wild strawberries. They are preyed upon by hawks, owls, foxes, and coyotes.

During the winter, cottontail rabbits may feed on the twigs and bark of conifers, including eastern hemlock trees. They also use the lower branches of these trees for protection from the elements and cover from predators.

Ruffed Grouse

Ruffed grouse are the state bird of Pennsylvania, and are found primarily in the northeastern United States and much of Canada. They prefer dim, quiet forests and are rarely found in open areas. Their diet is made up of mostly seeds and fruit, such as thorn apples, blueberries, and strawberries. Since young ruffed grouse are insectivorous, they help to control insect populations. They are preyed upon by hawks, owls, foxes, and bobcats.



The cool conditions in hemlock forests created by the dense canopy make hemlock stands attractive to ruffed grouse. These birds also use hemlock trees for roosting and cover, and hemlocks are often planted as part of management guidelines for ruffed grouse.

Red Squirrels

Red squirrels are found in cool, coniferous forests in the northeastern United States and the Great Lakes region, as well as the Rocky Mountains. They feed on the seeds of conifers and other trees, as well as fungi, and are dispersers of both of these. They are prey for snakes, birds of prey, and many carnivorous mammals.



Red squirrels eat the seeds in hemlock cones, as well as the buds of these trees during the winter. Cavities in hemlock trees can be used by squirrels for building nests, and their food stores, or middens, may also be built against the trunks of hemlock trees.

Hemlock Woolly Adelgid



Hemlock woolly adelgid, or HWA, is an invasive insect native to Japan. First discovered in the eastern United States in Richmond, VA, in 1950, HWA is now found in 18 states including New York and Pennsylvania, and covers nearly half of the native range of the eastern hemlock tree. HWA feeds on the sap of the hemlock tree, which disrupts the flow of nutrients to twigs and branches and causes the needles to dry, turn grey and fall off.

Eventually, the tree's limbs will begin to die back, and if left untreated, the tree could die within 4 to 10 years of infestation, leaving pale, skeletal trees dubbed "grey ghosts" behind. Less severe infestations are also dangerous, as they can weaken the trees, leaving them susceptible to disease and other issues. The death of hemlocks, especially in old growth forests, can be devastating to the ecosystem and to the species that live there.

HWA's Impact on Forests

Some parks in the eastern U.S. have already experienced the loss of hemlock trees from HWA, including the Great Smoky Mountains National Park, or the Smokies. There are more than 800 acres of old growth hemlock forest in this park, more than anywhere else in the United States. An additional 90,000 acres contain younger hemlock trees. First discovered in the Smokies in 2002, HWA has now spread throughout these hemlock forests, killing many of the trees there. Although pesticides can be used to treat infestations, they are only able to reach about 15% of the hemlock trees, leaving the rest to slowly die off.



Grey ghosts in the Smokies

What Can We Do?

Consider your favorite hunting spots. What would they look like without hemlock trees? How would the loss of this tree affect the species there?



An HWA infestation does not have to be a death sentence for hemlock trees. While it may be too late to act in some areas of the Smokies where entire stands have been wiped out, there is still hope of managing HWA in other forests, like the Allegheny National Forest and Cook Forest in Pennsylvania, as well as the Adirondacks in New York. Insecticides and biological

controls are being used by national parks and forest managers in many states to successfully treat trees and protect those that are at risk of future infestations. However, hemlock trees must be consistently surveyed to determine where the insect has spread and to assess which trees are the highest priority.

Early detection of HWA is vital to save the tree. While you are out in the forest, please keep an eye out for HWA, and help protect hemlock forests for future generations to enjoy!

Identifying HWA

Anyone can survey for HWA! From November to April, HWA is visible as woolly masses, about ¼ the size of cotton swabs, on the underside of hemlock branches. Spider sacs, spittle bugs, and pine sap are sometimes mistaken for HWA, but while these are generally found in only one spot of a branch, HWA is spread over the entire branch, specifically at the base of needles.



Reporting

If you suspect you have found HWA, report your findings! Contact the NYSDEC or the DCNR. In your report, make sure to include detailed information about the site so that it can be easily found again. GPS coordinates and photographs are also encouraged.

- NYSDEC HWA Survey Form: https://www.dec.ny.gov/docs/lands_forests_pdf/hwasurvey.pdf
- DCNR Bureau of Forestry: <https://www.dcnr.pa.gov/about/Pages/Forestry.aspx>

Alternatively, you may use the iMapInvasives app or website to record your findings in New York or Pennsylvania.

- PA homepage: www.paimapinvasives.org
- NY homepage: www.nyimapinvasives.org

For more information about HWA and other invasive species in New York and Pennsylvania, visit:

- <https://www.dec.ny.gov/animals/265.html>
- <https://www.dcnr.pa.gov/Conservation/ForestsAndTrees/InsectsAndDiseases/Pages/default.a>