

Sometimes it takes a careful eye to detect the potential destruction of a forest. But problems become apparent when saplings are irreversibly damaged, like this one that was gnawed by deer in the Allegheny National Forest.



Maintaining Pennsylvania's forests involves more than allowing nature to run its course. Wildlife biologists and others are using science-based methods to manage deer populations and to prevent them from nibbling away at the state forests' future.

by Jeffery Fraser photography by Joshua Franzos

the wild things





Right: Deer have vegetation preferences, as forester Kenneth Kane knows. Kane, who works for Keith Horn Forestry, examines a sturdy, young beech tree, which is able to grow because deer do not like beech.

Below: To the casual observer, deer bounding through the Pennsylvania woods make an appealing scene. But for conservationists, such herds as these can indicate a potential threat to state forests.

crooked tulip poplar pokes through the carpet of snow that covers the floor of a hardwood forest in northwestern Pennsylvania, just below the New York line. It stands no taller than a yard and is as skinny as a man's pinky.

"How old do you think this is?" asks Ken Kane, a forester with the company that manages these woods. Guesses range from one to two years. Kane puts it at seven or eight. "This should be 15 feet tall."

The seedling fails to thrive, he says, because white-tailed deer love the succulent buds of the tulip poplar and eat them like candy. Each time they do, a ridge forms on the stem where the bud was "browsed" or eaten. Those ridges tell Kane that deer have fed on this seedling for nearly a decade. The good news is the terminal bud, the seedling's most recent, hasn't been browsed,



suggesting the intensive management and hunting strategies adopted to reduce the herd and repair the ecosystem of this forest, owned by the Bradford Water Authority, are paying off.

"Ten years ago, I would've gotten more excited over this seedling than a mature tree," says Kane, a forester with Keith Horn Forestry of Kane, Pa. "This shows how far we've come." A few steps away, he finds some raspberry plants, all badly browsed. "We still have a ways to go."

Scientific evidence suggests that the regeneration of trees, particularly species of highly valued hardwoods, is a problem across many of the 16.6 million acres of largely even-aged

public and private forests that cover 58 percent of Pennsylvania. Only half of the U.S. Forest Service study sites in the state have enough seedlings and saplings to replace the existing forest with similar tree composition. The consensus of research on the issue points to over-browsing by a deer herd grown too large for its habitat as the chief reason for a crisis that

threatens the health of forests and the safety of motorists in Pennsylvania, which leads the nation in deer-vehicle collisions. Over-browsing also is hurting the state's timber industry, birds, small mammals and the deer themselves.

While balancing deer populations with forest ecosystems by lengthening hunting seasons and increasing bag limits for antlerless deer may seem, on its face, a simple solution, it has been anything but. The Pennsylvania Game Commission's seven-year-old, science-based approach to deer management remains a subject of sharp controversy, and the results by most accounts have been mixed.



Wildlife biologists, foresters and others who support science-based management of the herd say progress has been made, but the job is not finished. And they voice concern that the game commission—a free-standing agency that depends on revenue from hunting licenses and fees for its survival—may buckle under pressure to increase deer numbers without scientific justification and, in recent months, has shown signs of doing just that.

Applying that pressure are some of the state's deer hunters, an aging population accustomed to spotting plenty of deer from their stands or on short hikes through woods and fields. They argue that the game commission has reduced the herd so drastically that many places they once hunted with success are no longer worth the trip.

“In some areas, they've gotten rid of all the deer,” insists Stephen Mohr, president of Unified Sportsmen of Pennsylvania, which opposes the deer management program with lobbying, petitions and lawsuits. “Some call it deer management, but it's blatantly a deer eradication program.”

Similar controversies have been played out before. Some 50 years ago, Roger Latham, while he was chief of the commission's Wildlife Research Division, warned of over-browsing and urged trimming the doe herd. He was eventually fired for pressing the issue.

More recently, an independent forest certification team found deer over-browsing to be a threat to the future of the

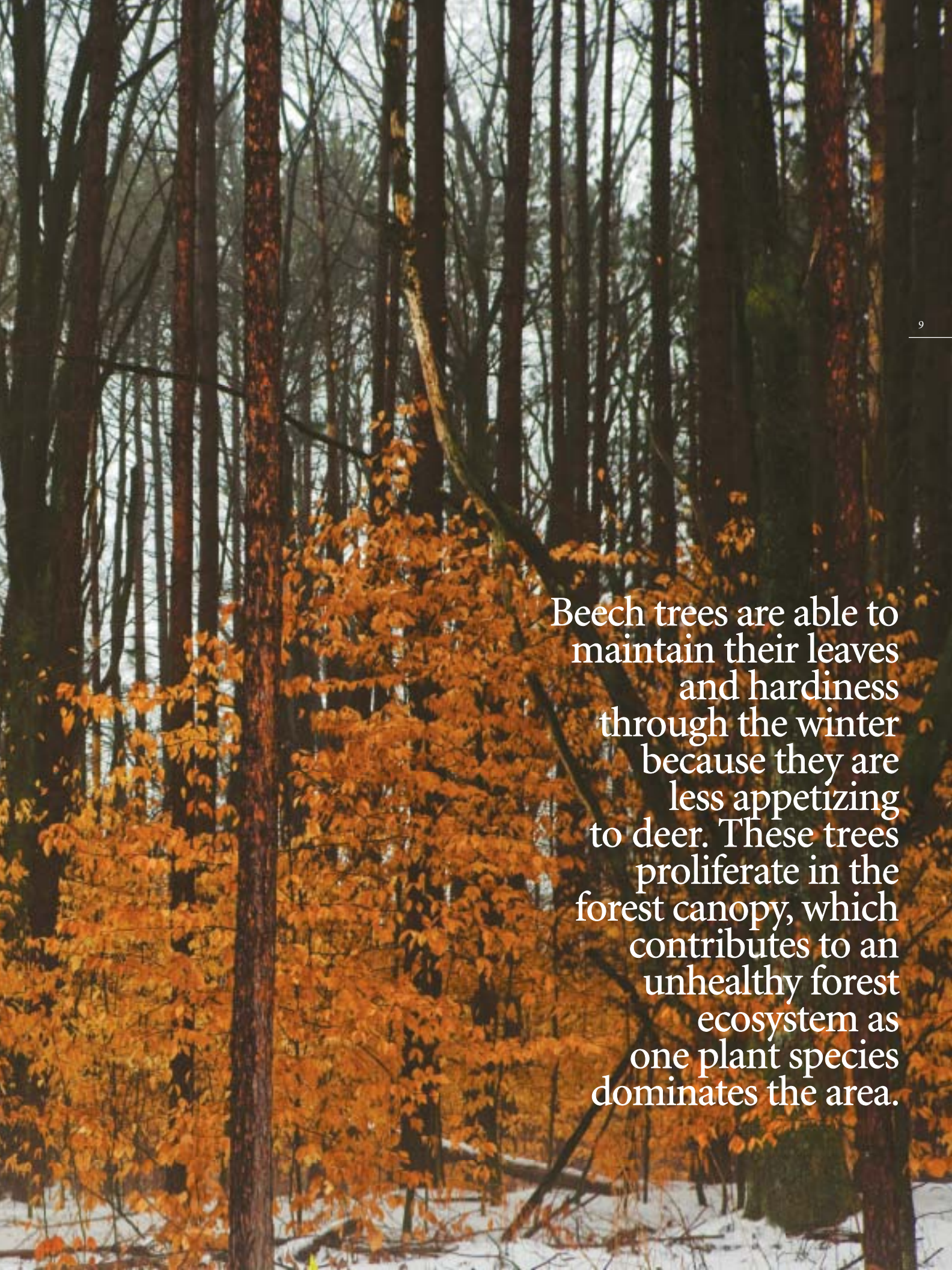
state's 2.5 million acres of public forest and parks. In 2000, with support from The Heinz Endowments, the state forest system was certified as meeting the sustainable forestry standards of the Forest Stewardship Council. But certification came with a warning that immediate steps needed to be taken to reduce deer impacts.

“That's what triggered it for us—that if we don't do something about deer management, we won't continue to have sustainably certified forests and, ultimately, we won't have forests at all,” says Caren Glotfelty, Environment Program director for the Endowments.

Since 2000, the foundation has awarded grants totaling nearly \$500,000 to advance sound deer policy and nurse forest ecosystems back to health. This support included grants to Audubon Pennsylvania to develop deer-management strategies, analyze deer impact and report its findings. A grant to the Wisconsin-based Sand County Foundation lent support to the Kinzua Quality Deer Cooperative, a 74,000-acre deer-management experiment that includes the Bradford Water Authority forest managed by Kane. Other grants supported efforts to increase public understanding of deer, their impact and the need to manage them wisely.

“It's a complex ecological issue,” says Glotfelty. “The questions have been: How do you get people to understand it? How do you get people with polarized points of view to appreciate the idea of the hunter as a problem-solver in ecosystem management?”





Beech trees are able to maintain their leaves and hardiness through the winter because they are less appetizing to deer. These trees proliferate in the forest canopy, which contributes to an unhealthy forest ecosystem as one plant species dominates the area.



A lack of tree seedlings prevents forests from regenerating. Deer over-browsing, competition from other plants, disease and acid deposited in the soil from air

pollution all play a role. Most studies put much of the blame on deer that eat plant species they find tasty, such as tulip poplar and oak, but not species such as striped maple, American beech and fern. When deer herds are too large, few preferred seedlings survive, forest diversity is crippled and the understory is changed in ways that discourage the regrowth of many kinds of trees.

“Where deer impact is sustained at very high levels, plants that are not preferred by deer take a dominant place in the landscape,” says Susan Stout, a researcher at the U.S. Forest Service northeastern station. “In some areas, you can drive for miles and see through the forest for a great distance, and there is this lovely carpet of hay-scented fern. Deer won’t touch hay-scented fern. But so little light penetrates that ground-layer fern canopy that many seedlings won’t grow through it.”

If the lack of regeneration among half of the high-canopy tree species across Pennsylvania isn’t alarming enough, U.S. Forest Service research paints a more troubling picture for the state’s \$5.5 billion-a-year timber industry. Only one-third of the forests are showing conditions adequate to replace commercially desirable timber species. And if state forests lose their Forest Stewardship Council certification, it would rob the industry of rapidly growing markets for environmentally friendly products, particularly in Europe.

“The certifiers were clear,” says Blaine Puller, forest manager of Kane Hardwood. “They said something has to be done about the deer problem to say forests in Pennsylvania are sustainably managed.”

Several bird species also are in trouble because of the lack of food and cover. In fact, over-browsing is the largest single threat to bird habitat after urban sprawl, says Timothy Schaeffer, executive director of Audubon Pennsylvania. Wood thrush, which nest in the scrubby forest understory, have declined 67 percent in Pennsylvania since 1967. The golden-winged warbler, which prefers dense shrubs and saplings, is down 98 percent.

Over-browsed habitat is blamed for contributing to a 22 percent decline in ruffed grouse, the official state bird.

A high-density deer population has human impacts as well. Surveys by State Farm Insurance routinely have Pennsylvania leading the nation in deer-vehicle collisions, based on industry claims data. Last year, Pennsylvania topped State Farm’s survey with 98,313 deer-related collisions reported.

And Lyme disease, caused by the bite of blacklegged ticks that prefer deer as hosts, is a growing problem in the state. Rates increased from 22.2 cases per 100,000 people in 2001 to 34.5 cases per 100,000 people in 2005, according to the Centers for Disease Control.

One challenge deer managers face is that Pennsylvania’s estimated 1.5 million deer are not equally distributed across the state. High-density areas today include cities and suburbs, where deer thrive on food in parks and gardens, are protected by laws that prohibit hunting, and have become a nuisance and a health and safety problem.

High numbers of deer in Pittsburgh’s Mount Washington neighborhood and complaints of illegal hunting have for the first time raised deer management as an issue for city government. With deer-motorist collisions at record highs, Mt. Lebanon last year joined a growing list of suburban communities with deer-management plans by hiring U.S. Department of Agriculture marksmen to harvest deer at night. The first shoot killed 69 deer, and officials authorized more hunts to harvest another 150.

The most significant step taken to address deer abundance throughout the state was the shift in game commission management strategy to a science-based approach that manipulates hunting opportunities, including seasons and bag limits. The goal is to balance the herd across 22 wildlife management units based on evidence of forest health, deer health and deer-human conflict in each. A two-week concurrent buck and antlerless season was initiated to promote the harvesting of doe—a key to



Far left: Like a diligent detective, Susan Stout, a research project leader with the U.S. Department of Agriculture Forest Service, points to evidence of deer browsing.

Left: Deer also find food to their liking in the parks and gardens of Pennsylvania's cities and suburbs. This buck wandered through a residential section of Bethel Park, a suburb south of Pittsburgh.

reducing herds. And the Deer Management Assistance Program was created to allow landowners with over-

browsing problems to receive additional antlerless permits so that hunters can kill more doe on their property.

This was a seismic change for a commission born in the wake of widespread clear-cutting that left much of the forest land barren of trees and unrestrained market hunting that decimated the deer population to a few hundred head a century ago. For much of its history, the commission managed deer to achieve high population densities by curbing or prohibiting doe hunting, offering bounties for natural predators and other methods.

Progress under the new approach, adopted around 2000, is difficult to measure at the moment, says Christopher Rosenberry, supervisor of the game commission's Deer Management Section. Much of the data needed to assess its impact on habitat health is still being developed. "I don't expect we'll see tremendous changes in a relatively short period of time. Some people might not like that, but forest habitat health and deer health don't change on our schedules."

Pennsylvania hunters are divided on the issue.

The Pennsylvania Federation of Sportsmen's Clubs, the largest in the state, "strongly supports scientific deer management," says Rocco Ali, its president. "To have deer, you have to take care of their habitat."

The Unified Sportsmen of Pennsylvania, however, has gone to court to challenge the science behind the deer program. "If we had to label it right now, we'd have to say the Pennsylvania deer management program is based on voodoo science—there's no factual science supporting it," contends Mohr. And in Harrisburg, state Sen. Mike Folmer, R-Lebanon, recently called for an audit of the program, saying he constantly hears hunters complain that the deer herd is too thin.

Wildlife biologist Bryon Shissler says hunters may not see deer because there are fewer deer in some areas; deer may retreat deeper into the woods; and some hunters fail to adapt to the challenges of hunting a more balanced population. Hunter and deer behavior studies suggest Pennsylvania hunters, on average,

venture less than three-tenths of a mile from a road, and deer that range beyond that have little chance of being harvested.

"Those of us who grew up when deer were managed at very high densities grew up with a skill set that said you go into the woods, sit down and the deer will come to you," Shissler says. "Under these new conditions, being locked into those old expectations and that old skill set doesn't serve you well."

But there's a risk that steady complaints of deer shortages might influence a game commission that relies on hunters for more than half of its non-tax revenue, he adds, and one example may be last year's decision to reduce doe season in four wildlife units from 12 to 7 days and to include forests where the habitat is among the poorest.

Rosenberry says that recommendation "was not one that originated with the deer section. It's no secret we prefer to keep things as stable and consistent as possible."

Further complicating the process, the Game Commission reported in March that hunters killed 323,070 deer statewide during the 2007–08 season—11 percent fewer than in 2006–07. The reasons for the decline and the impact it might have on the deer management program had not been determined.

Meanwhile, up in Ken Kane's neck of the woods, the Kinzua Quality Deer Cooperative is showing what science, the right tools, and foresters and hunters working in partnership can do to turn around a habitat.

The deer herd was cut in half in seven years using hunter outreach, education, thousands of the Deer Management Assistance Program's antlerless permits and other measures. Browsing is down. Vegetation growth and forest diversity are up. More food and cover are available for deer, grouse, songbirds and other wildlife.

Seedlings are surviving, including preferred species such as red maple and hemlock. The average weight of buck and doe is markedly higher. Antler spread and the number of points are up. Hunters report seeing 10 to 12 deer per outing.

And even last year, when the deer herd was at its leanest, 94 percent of hunters said they'll be back next season. *h*