How Many Deer in West Virginia?
By William N. Grafton, Edwin D. Michael, Robert L. Smith, and Art Selders

The white-tailed deer has become the great adapter. Just a few decades ago, it was an animal of the forest, browsing on twigs and leaves or enjoying frequent bonanzas of acorns, beech nuts and fruits. Now the deer is as much at home eating alfalfa, corn, grapes, yard ornamentals, and grass on golf courses.

The deer population in West Virginia has increased dramatically despite expanded hunting seasons, big jumps in hunter success, and increased killings by vehicles on the highways.

<table>
<thead>
<tr>
<th>Year</th>
<th>Deer kill</th>
</tr>
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<tbody>
<tr>
<td>1950</td>
<td>6,559</td>
</tr>
<tr>
<td>1955</td>
<td>13,148</td>
</tr>
<tr>
<td>1960</td>
<td>15,928</td>
</tr>
<tr>
<td>1965</td>
<td>19,911</td>
</tr>
<tr>
<td>1970</td>
<td>13,988</td>
</tr>
<tr>
<td>1975</td>
<td>35,336</td>
</tr>
<tr>
<td>1980</td>
<td>54,166</td>
</tr>
<tr>
<td>1985</td>
<td>84,600</td>
</tr>
<tr>
<td>1990</td>
<td>169,948</td>
</tr>
<tr>
<td>1992</td>
<td>204,201</td>
</tr>
</tbody>
</table>

The above table and graph document the dramatic increases in hunter success. Hunting has been opened to those using bows and muzzleloaders and to nonresidents. Liberal hunting seasons for bucks and does have been instituted. However, the number of hunters nationwide has begun to decline and is increasing only slightly in West Virginia. Their numbers almost surely will begin to decline soon in West Virginia.
At the same time the deer population is growing rapidly. The nearly 300,000 deer hunters have never been happier nor had greater hunting success. Deer are also a popular attraction for West Virginia residents and the many tourists who come to enjoy the mountains.

Other West Virginians are sure that we have too many deer. Farmers are tired of feeding deer herds that eat half as much as the same number of cattle but provide no income. Some farmers have countered the deer with repellents and deer fences. These extra costs have been too much for other farmers, orchardists, nurserymen, and Christmas tree growers who have been forced out of business. All West Virginia drivers have had to pay higher vehicle insurance premiums and face a new risk on the roads.

Do we have too many deer in West Virginia? Very conservative estimates by some wildlife biologists place the population at 600,000. Others estimate that the herd could be as much as 1.25 million deer. West Virginia’s 15 million acres of land includes nearly 12 million acres of forests. These forests are blended with small, scattered farms and joined together by thousands of miles of roads and rights-of-way, creating nearly perfect deer habitat. One deer for each 10-20 acres is reasonable if deer is the only wildlife species being managed. However, most sportsmen want to see raccoon, bear, rabbits, grouse, songbirds, and box turtles, as well as deer.

In fact, West Virginia’s ecosystem probably could support an additional 500,000-1 million deer without major problems for the deer. There is little doubt that major negative changes in other game and nongame species would occur should the deer population increase above its present level. At some time, the deer herd will have health problems and experience local die-offs and epidemics.

How Many Deer (Carrying Capacity)

Do we have too many deer in West Virginia? To determine this we must decide whether we are looking at a biological, economical, or ethical carrying capacity.

The biological carrying capacity occurs when births equal deaths, and the population has reached the maximum number of animals the environment can support. West Virginia’s deer population has not reached the biological carrying capacity. There are plenty of hayfields, suburban areas, roadways, and cutover forests to support a much larger herd. However, overpopulation already has caused negative impacts on forest vegetation and forest wildlife as a whole. The deer population has exceeded the ecological carrying capacity, which is the level where deer do not adversely affect such associated forest species as ruffed grouse and rabbits.

Closely related to the biological carrying capacity is the ethical carrying capacity. From an ethics viewpoint, people are responsible for the welfare of all plants and animals since they are responsible for uses of the land, wildlife management practices, and the introduction of many exotic plants and animals. Simply put, how much damage to an ecosystem can be permitted whether it is caused by deer, multiflora rose, or humans? A well-defined browse line, lack of tree seedlings, greatly reduced numbers of wildflowers, reduced numbers of birds and small animals, and reduced biodiversity are all indications that deer have exceeded the ethical carrying capacity. Most of these indications are common in West Virginia.

Biological genocide can be as real as human genocide. Virtually all recent scientific studies conclude that many ground-dwelling or lower forest birds, mammals, amphibians, reptiles, and insects are gone or rapidly decreasing. Plant “genocide” is even more critical.

Before the deer population reaches the biological and ethical carrying capacities, it will have gone beyond the economic (societal) carrying capacity. This is the point at which deer become an economic liability: causing highway accidents, destroying crops and orchards, damaging gardens and ornamentals, etc. The general public is concerned about the increasing number of vehicle/deer collisions and the higher levels of damage to ornamentals and gardens. Deer have adapted to live with humans, but it is not always a harmonious relationship. The streets of Weirton, Wheeling, and Parkersburg are a test of wills between deer and automobile drivers. Why should homeowners in the towns and suburbs have to resort to using foul-smelling or unsightly repellents and building electrified fences? Farmers are equally incensed about these increased costs that can make the difference between profit or bankruptcy. Foresters equally incensed where the next trees will come from when the deer have eaten so many of the acorns, nuts, seeds, sprouts, and seedlings.
Who Wins; Who Loses?

Neither the negative nor positive impacts (biological, ethic, or economic) are well documented. However, most people are arguing that the deer herd is already above all carrying capacities and definitely needs reducing. The primary negative impacts from deer occur in the following industries:

- agriculture
- forestry
- Christmas trees
- gardening/landscaping
- transportation (car and trucks)
- health

Primary positive impacts occur in these industries:

- hunting
- tourism/outdoor recreation

Agriculture

Farmers have complained loudly and often about deer damage to crops and the spread of disease from deer to livestock. Surveys during the past decade indicate deer damage costs West Virginia’s agriculture about $35 million annually. Primary damages have occurred to orchards, alfalfa, and corn. Many farmers state that deer damage is a major factor forcing them to quit the farming business or to switch to lesser value crops of hay and pasture which deer do not like as much as corn, alfalfa, and apple trees. Hay and pastures may sustain larger deer damages than row crops and grain because they involve much greater acreages. It is difficult to place dollar values on deer damage, but the fact remains that a mature deer eats 5-7 pounds of plants or fruits per day. When this food comes from agricultural crops, farmers often face a critical situation. Severe damage occurs when deer browse young plants of apple, alfalfa, grape, and corn or eat the silk stage of corn ears. These damaged young plants can never reach full economic value despite the already-heavy economic investment in seed/seedlings, fertilizer, ground preparation, etc.

Forestry

During the past decade, West Virginia’s "second forest" (the trees that have grown up since the virgin forest was cut) has supplied lumber and wood materials for a rapidly expanding wood industry. The forest of the future (known as the "third forest") does not look as promising. Deer, mice, weevils, and other wildlife leave very few acorns to start oak seedlings, and deer heavily browse sprouts of most hardwoods. West Virginia’s third forest simply will not contain the same amounts of highly nutritious acorns, which are vital food for deer, turkey, squirrel, chipmunks, bluejays, and many prized wildlife species. Oaks account for nearly 80 percent of our wood value. Seedlings and sprouts of oaks, maples, and yellow-poplar are soon browsed by deer unless landowners use costly strategies, such as repellents, deer fences, and large clearcuts. Deer don’t seem to prefer species such as black locust, black gum, and black cherry. West Virginia’s third forest will include more of these lower value species rather than the high-value oaks.

Future forests will not contain the rich biodiversity that currently exists. Deer will eat the plants and seedlings they prefer and leave other species to grow and produce seed. Many annual plants already have been replaced by longer lived perennials or aggressive weed species. As the richness of plant diversity decreases, so also does the diversity of mammals, birds, amphibians, and insects whose welfare depends greatly on food and shelter supplied by a wide variety of plants.

Christmas Trees

West Virginia’s soils, geographical location, land use, and labor force are well suited to an expanded Christmas tree industry. About 400 West Virginia growers sell around $2 million worth of Christmas trees each year. However, deer cause major problems.

(a) They eat or pull up newly planted seedlings.

(b) They eat needles and buds of the previous year’s growth during late winter and early spring.

(c) Bucks rub antlers on stems and limbs in autumn.

Thus, Christmas tree growers are frustrated in their opportunities to expand and meet their full economic potential without expensive deer abatement measures.
Gardening/Landscaping

Many people are surprised by the damage deer do to gardens and ornamental plants. Deer that formerly lived only in forests have adapted to humans and their pets. They no longer fear humans and find well-watered and fertilized lawns, vegetables, flowers, and shrubs to be quite delectable.

Health

Perhaps the biggest fears with deer overpopulation will be Lyme disease and vehicular collisions.

Lyme disease in humans can be contracted from the deer tick, which commonly lives on deer during its adult stage. Deer ticks in the larval and nymphal stages depend on white-footed mice. Because deer are a vital link in the life of the deer tick, the threat of Lyme disease will cause many people to prefer lower deer populations.

Transportation

The same attitude will prevail regarding deer/vehicle collisions. In 1991, insurance companies reported nearly 11,000 such collisions in West Virginia. A conservative damage estimate is $2,000 per collision. This costs motorists an estimated $22 million annually. No doubt many minor collisions are not reported.

Hunting

The focus of this paper so far has been damage and negative impacts. Two large and important segments of West Virginia's citizens and economy receive substantial benefits and pleasure from deer. These groups are hunters and tourists/outdoor recreationists.

In 1991, 265,000 West Virginia hunters bought 880,000 licenses, tags, permits, and stamps which cost $7.9 million. Money from these sales and excise taxes on guns and ammunition help fund the Division of Natural Resources - Wildlife Resources personnel, management practices, and research. Expenditures for food, lodging, transportation, and supplies by hunters add an estimated $154.3 million to the state's economy. Hunters find the outdoor experience to be worthwhile and enjoy intangible values that cannot be measured in money. Successful hunters are rewarded with an average of 75-100 pounds of venison per deer.

Hunting deer is very important to West Virginia's economy and offers one of the most popular recreational pursuits. Exact figures exist for total hunting impacts, and deer hunting comprises an estimated 80 percent of those totals. The following statistics are based on national and state surveys of hunters during 1985-1991 and reveal the magnitude of deer hunting in West Virginia.

<table>
<thead>
<tr>
<th></th>
<th>Total Hunting</th>
<th>Deer Hunting</th>
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<tbody>
<tr>
<td>Total economic impact</td>
<td>$199,600,000</td>
<td>$159,680,000</td>
</tr>
<tr>
<td>(&quot;multiplier effect&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hunting-assoclated</td>
<td>$154,300,000</td>
<td>$123,440,000</td>
</tr>
<tr>
<td>retail sales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hunting licenses sales</td>
<td>$7,900,000</td>
<td>$6,320,000</td>
</tr>
<tr>
<td>State revenues</td>
<td>$17,000,000</td>
<td>$13,600,000</td>
</tr>
<tr>
<td>Paid hunting license holders (1991)</td>
<td>265,000</td>
<td>212,000</td>
</tr>
<tr>
<td>Jobs related to hunting</td>
<td>4,100</td>
<td>3,260</td>
</tr>
</tbody>
</table>

In addition, West Virginia receives $1.2 million reimbursement annually from the federal government from excise taxes on hunting equipment. Forty percent of this money ($489,000) is designated for wildlife use.

Tourism

Tourists bring vital, new dollars into an economy. While no specific data exist, many tourists do list watching deer and photographing wildlife as a major reason for visiting West Virginia. In addition, many West Virginia citizens go for scenic and wildlife drives for their recreation and relaxation. It is difficult to put a dollar value on these activities, but recreation experts place important economic values on the deer herd. Deer are a major reason tourists visit Pipestem, Twin Falls, North Bend, Blackwater Falls, Canaan Valley, and Cacapon state parks.
Reducing Deer Damage

What are the options for keeping deer damages to a minimum while reaping the benefits for hunters and tourists/recreationists?

One obvious answer has been deer fencing. Nonelectric, woven wire fences up to 10 feet in height are literally deer proof. They work well for agricultural crops and along highways but are very expensive to build and maintain. Many other types of electrified fences have been designed. Vertical 6-strand fence is the most commonly recommended for such high-value crops as alfalfa, corn, and strawberries. Lightweight high tensile 4- or 5-strand electric fence costs less and can successfully protect small acreages of various crops. Single polywire electrified fences are the least expensive to construct and have been very successful with peppers, ornamentals, home gardens, and small orchards where the deer population is low to moderate.

Generally, fencing is the best option to prevent or reduce deer damage, but it is expensive and must be maintained regularly.

Many repellents have been used but have given mixed results. Repellents are also expensive.

Damage permits issued to farmers suffering agricultural crop damage have helped eliminate problems for some individuals. However, disposal of deer carcasses and utilization of meat during warmer weather are difficult. Additional problems with damage permits are as follows:

- Farmers must utilize the system annually because deer reproduce so rapidly.
- Application of permits is inconsistent from county to county as administered by conservation officers.
- Many farmers feel DNR-Wildlife Resources created the overpopulation and thus should solve it.
- Many damage permits are used to kill bucks rather than does.

Many West Virginians feel that hunting (killing) deer is the only cost-effective, long-term solution. Hunting seasons have been lengthened and expanded to include various weapons (rifles, muzzleloaders, and bows) to permit more deer to be harvested. Hunting regulations must place greater emphasis on harvesting does. After all, deer are polygamous (one buck will mate with many does).

Reducing the number of does is the only way to reduce the deer population. Despite these liberal changes, many problems persist and damages are increasing in proportion to the benefits.

Searching for Answers

A new program initiated in 1992 permitted hunters to donate their deer to charitable food banks (Hunters Helping the Hungry). In this proactive strategy, the DNR-Wildlife Resources will pay the meat cutting charges if a hunter donates the entire field-dressed carcass. This program operated in 24 northern counties during the first week of the gun season and the three-day antlerless season. Certified meatcutters in 24 counties agreed to participate. First year results indicate that a good idea to wildlife biologists is not necessarily a good idea to hunters. Fewer than 500 deer were donated.

Another positive strategy has been to initiate dialogue among the many diverse groups having a vested interest in West Virginia’s deer herd. A “Deer and the Environment Round Table” was held at West Virginia University in April 1992 to air concerns, search for areas of agreement, and make recommendations to the governor, the legislature, and pertinent government agencies. Participating were 57 people representing most groups who benefit from or are damaged by the size of the deer herd. The following recommendations were agreed upon by consensus and were forwarded to appropriate public officials.

1. Expand existing research efforts to determine the extent and location of deer damage to commercial crops and forest ecosystems.
2. Expand the availability of technical assistance to farmers and others to reduce deer damage costs.
3. Offer low- or no-interest loans to farmers and others to purchase deer damage abatement equipment.
4. Adopt legislation that provides limited liability protection to landowners who may wish to charge hunters for hunting on their land.
5. Change hunting licenses from a calendar year basis to a fiscal year basis. For the first year only, the license would be for 18 months and the fees should be prorated to ensure no revenue loss.
6. Extend the antlerless deer hunting season to a total of seven days, not necessarily consecutive, with the possibility of a later season in January or February when appropriate.
7. Open buck hunting season on a Saturday instead of a Monday.

8. Allow the taking of up to two deer per day.

9. Create a micromanagement plan that allows extra deer to be taken by hunters in particular areas when appropriate.

10. As part of this micromanagement plan, a list of landowners willing to allow hunters access to their property should be compiled and kept up-to-date and, when considered appropriate, hunters should be allowed to take more than one doe.

11. State parks should be opened to controlled deer hunting when appropriate.

12. Deer hunting should be allowed on Sundays.

13. R and RR gun permits should be sold between buck and antlerless hunting seasons.

14. Hunters should be allowed to donate deer meat to public institutions and charitable organizations.

Round table participants heard ideas and recommendations from five recognized experts. Listed below are several recommendations generated by the experts and participants. Although they did not receive a consensus, these recommendations may be useful for future deliberations.

1. Determine the feasibility of implementing a combination of micromanagement strategies (management on a countywide or smaller area):
   a. implement a "youth hunt" to kill a doe;
   b. initiate emergency shooting permits after the regular season to kill a doe if bad weather, fewer hunters than expected, etc., do not accomplish the desired deer kill in an area (bucks would still be identifiable by their antlers); and
   c. use sharpshooters in high-damage, high-risk or park "hot spots" to remove problem deer.

2. Institute hunter’s choice (buck or doe) season for the first day of the gun season or later for a one- to three-day period.

3. Require that a doe must be killed before a buck can be killed with a gun.

4. Compensate landowners for fair market price or a percentage thereof for deer damages.

5. Provide automatic damage permits to landowners with orchards, alfalfa, Christmas trees, etc., who are operating certified fences or have taken proper abatement measures.

6. Reform liability laws to permit landowners to charge hunting fees equal to deer damage while not increasing landowner liability.

7. Permit commercialization of deer hunting by certified and licensed persons to remove excess deer in specified areas.

8. Permit landowners to sell damage and hunting permits within limitations of state laws.

9. Increased agriculture and forestry representation on the Division of Natural Resources Commissioners.

10. Form a West Virginia and 55 county Animal Damage Control Councils. The state council would provide guidelines, parameters, and limitations for county councils. County councils would then recommend percentage increases or decreases in each county or county district. The statewide and county councils must have wide representation to include all who have an interest in the deer herd.

11. Provide incentives to all landowners to reduce "deer refuges" where deer can concentrate in safety and then move to surrounding properties where they cause excessive damage.

12. Sterilize problem deer through use of pills, food additives, darts, etc.

13. Change laws to permit deer in parks, urban areas, and roadsides to be treated as nuisance animals rather than game animals.

14. Implement highway/roadside management through deer fences, reflectors, and vegetation that deer do not prefer.
Summary

Does West Virginia have too many deer? Opinions depend on who answers the question. If the herd is allowed to increase, West Virginia will remain a paradise for deer hunters and tourists. The price paid for having an overpopulated deer herd will be borne by motorists, turkey and ruffed grouse hunters, and the many groups attempting to grow or enjoy herbs, crops, shrubs, and trees. If the deer herd is to be decreased, battle lines will be rapidly drawn by deer hunters, tourists, and animal welfare interests versus agriculture, forestry, and transportation interests. Many citizens will be caught in personal tugs-of-war. For example, many farmers are motorists and enjoy deer hunting. Likewise, many avid hunters attempt to grow gardens and nice shrubbery in their yards.

Whether the deer herd is maintained at some "preferred" level or set of levels established by legislative policy (laws), by hunting pressure (regulations), or by biological carrying capacity, there will be about as many unhappy citizens as happy ones. Until West Virginia's ecosystem changes, the deer population controversy will demand constant and creative management strategies to meet biological, ethical, and economic needs.

Acknowledgements

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