

# PART SEVEN: Habitat Management for Game Species



## 18. WHITE-TAILED DEER

*Odocoileus virginianus*

### SUMMARY

White-tailed deer are one of the most popular game species in Vermont. They occupy a wide variety of habitats, from lowland farm fields to upland forests. Protecting wintering habitat is crucial for deer. Deer survive the winter by seeking the shelter of large areas of multi-aged softwood forests to protect them from deep snow and cold temperatures. When humans or dogs move into their wintering areas, deer are forced to expend valuable winter energy. Feeding deer in winter is illegal in Vermont and frequently kills the animal because deer have evolved to eat coarse woody browse in winter. In other seasons, deer feed on shoots and leaves, agricultural crops, and mast crops such as beech nuts, acorns, apples, and other fruits.

### NATURAL HISTORY

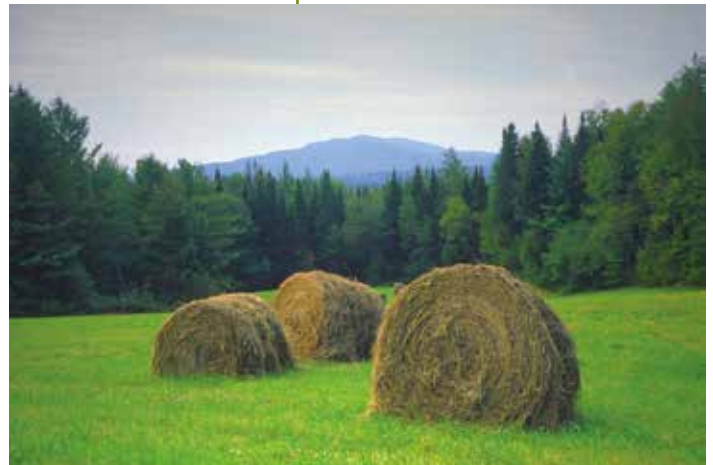
The white-tailed deer is one of five members of the deer family (*Cervidae*) found in North America, the others include mule deer, elk, caribou, and moose. The white-tailed deer is widely distributed with more than 30 described subspecies found from Venezuela to southern Canada. The subspecies found in Vermont is known as the Northern white-tailed deer (*Odocoileus virginianus borealis*).

Generally speaking, white-tails are very adaptable and occupy a wide variety of habitat types. The deer of Vermont thrive as a forest edge species. Habitats which feature a mosaic of large woodlots and agricultural openings provide ideal living conditions for deer. Because they are so adaptable, deer are found in the forest land of the Green Mountains, the Northeast Highlands, the farmlands of the Champlain Valley, and the Connecticut River valley.

Deer are ruminant herbivores meaning that they are plant eaters with a four-chambered stomach like a cow. Deer are more selective than cows and require more easily digested plant matter. The chambered stomach allows deer to eat a large variety of woody and succulent plant types. Deer are also known to occasionally eat protein-rich items like bone, dead fish, and bird eggs.

More than 600 different foods have been identified as deer food. Forbs (herbaceous plants), leaves, twigs, and agricultural crops like alfalfa and oats make up the bulk of the deer's spring and summer diet. Deer build reserves of body fat to survive the winter months by replacing some of the green forage in their diet with foods high in fat and protein in the fall, such as acorns, nuts, mushrooms, apples, and other fruits.

Maintaining the functional cover and safety properties of deer yards is important for long-term sustainability of Vermont's deer herd.



**Figure 18.1**  
Deer habitat components consist of large woodlots and agricultural openings.

During the critical wintering period when snows are deep, potentially from December 1 through April 15, it is essential that deer stay in wintering areas; forested areas containing stands of mature softwood trees with large contiguous crowns.

During the winter (which can last up to five months in Vermont), food is either scarce or difficult to obtain because of deep snow. Until snow conditions become too restrictive, deer will also paw the ground in search of the forbs, nuts, and apples remaining from the previous autumn.

Deer mostly rely on fat accumulated in late summer and early autumn to survive winter. They also grow a winter coat to minimize heat exchange with the environment. Deer conserve energy during winter by seeking shelter from cold winds and deep snow in softwood forests. Deer also restrict their daily movements to those absolutely necessary and reduce their feeding in winter, entering a state of semi-hibernation. When they do eat, their food is primarily the buds of small trees and woody shrubs and the needles of evergreen trees such as cedar and hemlock, and fir to a lesser extent. These winter foods, referred to as 'browse,' are high in fiber and low in energy and do not fully meet a deer's daily winter energy demands. Wind-storms often bring nutritious tree litter and lichens down to within the reach of deer. However, deer are very dependent on their fat reserves to survive the winter. Even captive deer fed an unlimited nutritious diet reduce their forage intake and lose weight during severe winter weather. This is a natural adaptation allowing a large herbivore to survive the long annual dormant period for vegetative growth. When spring approaches, deer's metabolism increases and they must find emergent vegetation to meet this increased energy demand.

Deer mate in the fall (early November to mid-December in Vermont). Gestation is just beyond 200 days with fawns born from mid-May to early July. Doe fawns can occasionally conceive offspring under optimal habitat conditions but breed and give birth later than mature does. Reproductive potential is highest at 2 years of age, and does frequently produce twins or even triplets when deer densities are not too high. Bucks in good habitat become sexually mature as yearlings, and they begin to challenge older bucks for breeding rights. About half of yearling bucks produce more than two antler points in Vermont. In Vermont, does can live 15 years, but bucks usually do not survive more than 5 years.

A healthy deer herd has tremendous reproductive potential. When determining the annual harvestable surplus, deer managers subtract adult mortalities from the rate of fawn survivorship to 1-year-old (called recruitment). Starting in 1979, the Vermont Fish and Wildlife Department decided to reduce a chronically overabundant deer herd through antlerless deer harvests. While the deer herd is now in better condition, it still has the potential to grow and become overabundant. Landowner actions to improve deer habitats need to be coupled with the willingness to harvest antlerless deer in order to prevent deer overabundance. Deer overabundance has many costs that include degraded habitats and lack of forest regeneration, unhealthy deer, increased incidents of deer-vehicle collisions, crop and garden losses, and Lyme disease.

## **HABITAT REQUIREMENTS**

Optimum deer habitat is a landscape mosaic of fields and forests. The average home range of a deer is approximately one square mile (640 acres) and this area must contain these various habitat conditions to best meet the needs of deer. During the critical wintering period when snows are deep, potentially from December 1 through April 15, it is essential that deer stay in wintering areas; forested areas containing stands of mature softwood trees with large contiguous crowns. Wintering areas range in size from about 10 acres to several thousand acres. They comprise less than 10 percent of the total forested area in the state. Even though the wintering area occupies such a minor component of the deer's home



range, it is by far the single most important habitat type. The best tree species are, in descending order of value, eastern hemlock, northern white cedar, red and white spruce, balsam fir, and white pine. Spruce and fir trees comprise the most common softwood tree that make up deer winter habitat in Vermont.

Preferred trees range in height from 35 to more than 75 feet, and from 6 to 20 inches in diameter at chest height.

Typically, the best deer winter habitat does not provide much food for deer because the low level of sunlight reaching the forest floor restricts the growth of young forest plants. Although deer rely greatly on their fat reserves to endure the winter, they still must eat throughout this stressful period if they are to survive until spring. Some mixture of hardwoods (deciduous trees) along with the softwoods (evergreen trees) provides some food along with cover. Optimum wintering areas have large softwood canopies interspersed with small (less than 1 acre) openings. Within these forest openings, succulent plants such as forbs and sedges, woody shrubs such as hobblebush, dogwood, witch-hazel, and striped maple, and young trees such as yellow birch, ash, maple, and hemlock provide deer with food in winter.

The amount of softwood required in wintering areas decreases in southern Vermont due to shorter winters. In southern parts of the state, deer often winter on steep south-facing slopes scattered with small groups of large softwoods.

Outside of the wintering period, deer can be found just about anywhere that shrubs and young trees interspersed with small grassy openings or forest edges next to fields and farm crops can be found. Unlike the winter period, deer tend to be adaptable to a wide variety of habitat conditions. In addition to an abundance of food resources, deer also need fawning habitat. This is typically areas of tall grass or shrubby cover that provides protection for fawns from predators.

## MANAGEMENT PRACTICES

Habitat management activities that provide food, escape cover, or winter shelter are recommended for landowners wishing to provide deer habitat. Because deer inhabit an area of more than 600 acres, most landowners shouldn't feel they must provide for every aspect of the deer's needs. If deer habitat management is a priority, most landowners should consider coordinating efforts with neighboring landowners.

### ***Winter Habitat***

Before you begin your management plan for deer, you should first determine if deer winter habitat (a.k.a. deer yards) exists on your property. Winter habitat is the cornerstone of the deer's annual life cycle in Vermont. Because deer return to the same wintering areas each year, often traveling many miles to access these important areas, evidence of their continued presence is recognizable to the trained eye. Look for the browsed twigs of young trees, indicated by the presence of compressed and bushy stems, as well as scarring on the stems of young trees, and concentrations of deer pellets. After a few weeks with more than 18 inches of snow, winter trails, concentrated deer pellets, and deer beds become evident in deer yards.

Deer yard maps are available from town clerks, regional planning commissions, and from the Vermont Fish and Wildlife Department. In addition, digital GIS maps of deer wintering areas are available on the Vermont Agency of Natural Resources Atlas; see **Resources** for links to more information. However, deer use of winter habitats may change



**Figures 18.2**

Looking up at mature hemlock cover illustrating 70 percent crown closure

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**Figures 18.3a,b,c**  
Deer browse; bark stripping; trails  
and beds in snow

over time for various reasons, so inspect forest habitats after an extended period of deep snow depths to determine current deer usage. Contact your local Vermont Fish and Wildlife Department office for more information on assessing deer winter habitat. (For more information on managing deer wintering areas, refer to **Chapter 8, “Deer Wintering Area Management.”**)

The primary goal of deer wintering area management is the promotion of softwoods. To improve deer wintering areas on your land, you should pursue two basic objectives. First, strive to retain and enhance mature softwood trees with large, vigorous crowns with winter canopy closure of 70 to 90 percent. These trees will be the ones that are most effective in reducing snow accumulation and wind chill. Second, provide a source of food by making small, selective patch cuts. Alternatively, you may want to clear-cut small strips of hardwoods adjacent to softwood cover which will promote tree and shrub regeneration and other herbaceous growth.

Without a deliberate approach to deer yard management, softwood stands can become too mature and overgrown. Overly mature, single-aged stands are more susceptible to disease and being blow down during storms. You should seek additional information from county foresters, private consulting foresters or state biologists in addition to reviewing the detailed management guide provided by the Vermont Fish and Wildlife Department. The link to download this document is in **Resources**.

Spruce, white cedar, and hemlock are optimal tree species due to their thick canopy and longevity. Fir and white pine are also acceptable and provide useful cover and capture sufficient snow to minimize snow depth within the wintering area. You may cut tall, dominant trees of these species if it releases a smaller tree of the same species. When selectively harvesting trees in a deer yard, take care not to damage non-target softwood trees. You may choose to harvest during the winter when regenerating trees are protected under deep snow cover.

### ***Uneven-Age Stand Management***

Maintaining functional cover in a deer yard usually requires uneven-age stand management with group selection cuts that range from .25 to 2 acres. Your goal should be to maintain at least 50 percent functional cover in a deer yard at all times. Stand entry should occur every 10 to 20 years, with stand maturity ages ranging from 60 years for predominantly fir stands, 80 to 100 years for predominantly spruce stands, and more than 100 years for hemlock stands. The amount of area to be regenerated is equal to the cutting interval divided by rotation age. For instance, in a stand on an 80-year rotation and treatment scheduled every 15 years, 15/80 (19 percent) of the stand should be regenerated during each treatment. Thus, only 38 percent of the stand would be 30 years old or less at any one time.

Even-age stand management with clearcuts, or preferably shelterwood cuts, larger than 1 acre may be acceptable in deer yards greater than 200 acres, but maintaining 50 percent cover at all times in the yard should still be your primary goal. For even-age management, shelterwood systems are a more reliable regeneration method than clearcutting.

In a two-stage shelterwood system, the first cut should be in late summer to prepare a seedbed for spruce regeneration and reduce residual stand damage during this bark-tight period. The second cut should be during winter to protect regeneration that has reached 6 inches to 3 feet in height, depending on brush competition. A three-stage shelterwood system is preferred when risk of wind-throw is high. Clearcutting is the least preferred strategy for deer yard management but you may find it necessary to quickly regenerate a nearly pure stand of fir or when dealing with *Armillaria* in certain situations. Regeneration should already be present, and logging should occur in winter with greater than 15 inches of snow depth to protect the seedlings.

With any harvest strategy, over-mature, diseased and insect-damaged trees should be cut first, but care should be taken not to spread disease. Wind-blown stands can also be salvaged. When converting an even-age stand to an uneven-age stand, remove the biggest fir first and leave spruce until the final cut of the first rotation because it lives longer, is more wind-firm, and is more resistant to spruce budworm.

### ***Deer Yards***

Hemlocks provide superior cover and can live up to 600 years; they are difficult to regenerate from seedlings in deer yards so landowners are advised not to harvest hemlock stands. However, there may be very little forage for deer under pure hemlock stands, so browse management in adjacent hardwoods should be a priority. You should release advanced hemlock regeneration where it exists, but avoid releasing hemlock regeneration prematurely as it is susceptible to sunscald and can cause die-back of the regeneration.

Narrow deer yards should not be fragmented, and yards should have corridors of cover that connect larger patches of cover. Such travel lanes are best if at least 200 feet wide. Permanent travel lanes, such as those along stream corridors, should be regarded as separate stands and managed very lightly so as to maintain maximum shelter value at all times.

Pre-commercial thinning may be done before a stand is 20 years old or 15 feet tall to encourage rapid tree growth and prevent stand stagnation. Aspen may be left uncut because it will eventually succumb to late-succession trees. Other hardwoods may be cut more frequently than softwoods to produce browse, but mature mast-producing trees (mast is nuts and fruits) such as beech, oak, and apple are desirable. Hardwood stumps cut low to the ground sprout more vigorously than those that are 1.5 to 2 feet tall.

Perhaps the simplest management practice you can follow to help deer survive winter is to not allow domestic dogs to roam free through deer yards and report such incidences of dogs chasing deer to the game wardens. Chasing deer throughout winter causes fat reserves to be expended prematurely, which leads to death before spring.

Maintaining the functional cover and safety properties of deer yards is important for long-term sustainability of Vermont's deer herd. Maintaining healthy habitats and healthy deer should help minimize the historical boom and bust cycle of the deer population. Deer yards are maintained on state lands by protection from development and with carefully planned timber harvests. Through the Act 250 review process, between 1,000 and 2,000 acres of deer wintering areas are protected every year by working

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with developers to mitigate adverse impacts on deer yards. However, most development and timber harvesting occurs on private lands with operations exempt from Act 250 review. It is largely up to private landowners and town planning boards to determine how the bulk of Vermont's deer wintering habitats are managed.

### ***Winter Feeding***

Artificial feeding of white-tailed deer is currently illegal in Vermont. While well-intentioned, this practice can actually reduce the animals' ability to survive the winter by making them more vulnerable to starvation, predation, disease, and vehicle collisions. Attracting deer away from wintering habitats can cause them to burn valuable energy and put them at greater risk of conflict with dogs, coyotes, and automobiles. Changing a deer's diet suddenly is a quick way to kill it. Deer have evolved to eat coarse browse with low digestibility in winter. Feeding deer corn or other high-carbohydrate foods can kill the microorganisms in their stomachs needed for proper winter digestion. Deer have been known to starve to death in winter with stomachs full of corn. When fed in winter, deer are often killed by humans with the best of intentions. The proper way to help deer forage in winter is by increasing availability of palatable woody browse from sucker-growth or tree-tops that result from pruning, apple-tree release, or logging operations.

### ***Non-winter Habitat***

Habitat management for deer outside wintering areas should meet the needs of the various life cycle activities. Manage small forest stands of less than 1 acre with trees less than 10 years of age through small clearcuts. Larger hardwood or mixed-wood clearcuts and shelterwood (understory) cuts are best for deer if irregularly shaped and less than 200 feet wide to provide deer with residual escape cover.

You should also maintain additional small herbaceous openings by mowing or brush hogging every 3 years. Log landings, permanent skid roads, wastewater leach fields, and other small openings can be seeded with legumes (such as alfalfa, clover, peas, and beans) and brassicas (cabbage and turnip type plants such as kale and rapeseed) as food-plots for deer. Such food sources provide protein and fat energy for lactating does and buck antler growth in the spring. Plant on south-facing slopes to encourage early snowmelt following severe winters when access to emergent vegetation may be critical for deer. Autumn brassicas will help deer build fat reserves for the upcoming winter; autumn body condition is essential for winter survival. Also, many brassica species become palatable after one or two frosts, which usually coincide with archery season. Such food-plots can enhance bowhunters' success, particularly where localized deer overabundance is an issue for garden, crop, or forestland damage. When localized population reduction is the objective, antlerless deer should be targeted by bowhunters.

Active farmland within deer home range is one of the best complements to their natural habitat. While agricultural crops such as alfalfa, oats, and corn promote poor health in a deer's winter diet, they are perfect supplements to a deer's spring and summer diet. During autumn, beech and oak trees become an important source of food. The nuts, called hard mast, make a vital contribution to deer's fat reserves and their chances of surviving the winter.



Beech and oak trees begin producing nuts at about age 50, and continue to do so at regular 3- to 5-year intervals for up to 150 years. In most regions of the state, beech and oak are found sparingly; oak is more common in the river valleys while beech is found in the upland forests. Both species often grow in small homogeneous groups within the forest. You should practice selection harvests that maintain and enhance the crowns of mature trees and promote the regeneration of future mast producers, removing trees with bark disease evident on the stems first.



Apples, blueberries, and other soft mast-producing plant species can be managed to provide fruits to supplement the deer's fall diet. Remove trees that shade these plants; most soft mast producers require full or nearly full sunlight to remain vigorous and productive. While existing plants are easiest to enhance, apple, blueberry, and other fruit plants can be purchased from local nurseries and raised to provide food for deer. Some types of apple trees will hold apples well into winter.

The Natural Resources Conservation Service may in some cases provide landowners with financial assistance for habitat management through Farm Bill Conservation Programs. Deer habitat improvements are easily combined and complementary with other direct managements for other species of greater conservation concern.

In areas where deer have become overabundant, successful regeneration of desirable tree species such as white ash, red oak, and maples may become uncommon or nonexistent. Large clearcuts in such areas can help establish desirable regeneration of species that are palatable to deer by overwhelming deer with enough browse and ensuring that some seedlings escape consumption by reducing browsing pressure on seedlings that grow through the remaining slash.



## RESOURCES

Vermont Agency of Natural Resources Atlas. <http://anrmaps.vermont.gov/websites/anra/>

Vermont Fish and Wildlife Department. "Management Guide for Deer Wintering Areas in Vermont." [http://www.vtfishandwildlife.com/library/Reports\\_and\\_Documents/Fish\\_and\\_Wildlife/Management%20Guide%20for%20Deer%20Wintering%20Areas%20in%20Vermont.pdf](http://www.vtfishandwildlife.com/library/Reports_and_Documents/Fish_and_Wildlife/Management%20Guide%20for%20Deer%20Wintering%20Areas%20in%20Vermont.pdf)

—. "Guidelines for the Review and Mitigation of Impacts to White-tailed Deer Winter Habitat in Vermont." [http://www.vtfishandwildlife.com/library/Reports\\_and\\_Documents/Fish\\_and\\_Wildlife/Guidelines\\_for\\_the\\_Review\\_and\\_Mitigation\\_of%20Impacts\\_to\\_White-Tailed\\_Deer\\_Winter\\_Habitat.pdf](http://www.vtfishandwildlife.com/library/Reports_and_Documents/Fish_and_Wildlife/Guidelines_for_the_Review_and_Mitigation_of%20Impacts_to_White-Tailed_Deer_Winter_Habitat.pdf)

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