



How can you tell if deer exceed the carrying capacity of your habitat?
With a browse impact survey.

the Limit?

By John Donoughe and Mike Wolf

In the February 2007 issue of Quality Whitetails, we described how pellet count surveys can be used to get a handle on local deer densities. Members of one Pennsylvania club, the Brush Mountain Sportsmen's Association, attended a Deer Density and Carrying Capacity Workshop developed by the Society of American Foresters' Pennsylvania Deer, Farm and Forest Committee and Penn State Cooperative Extension. That workshop also detailed a second component of annual surveys. In this article, we will teach you how to add a new component to your pellet count survey: the browse impact survey.

For decades traditional hunters have resisted the message of wildlife biologists: when habitat condition is poor, the number of deer often needs to be reduced and maintained at a low level. Only after the habitat improves should deer populations be permitted to rebound.

Pennsylvania has been the front line in the "deer war," and one club, the Brush Mountain Sportsmen's Association (BMSA), has been the scene of many skirmishes. When the deer harvest in a given year was low, traditional hunters would demand a ban on doe harvests the following year. The argument in favor of such measures seemed logical – if you want more deer spare the breeders – and resistance was met with considerable angst. In 2007, attitudes turned 180 degrees. The BMSA applied for, received, and will attempt to fill 12 DMAP (Deer Management Assistance Program) antlerless tags on its 600-plus acres. The aim is to attempt to bring some balance to a sex ratio skewed heavily in favor of females. Just a few years ago this would have been labeled sacrilege at the club. How did the turnaround come about? Through the hands-on education of hunters who sought training to turn a critical eye to indicators

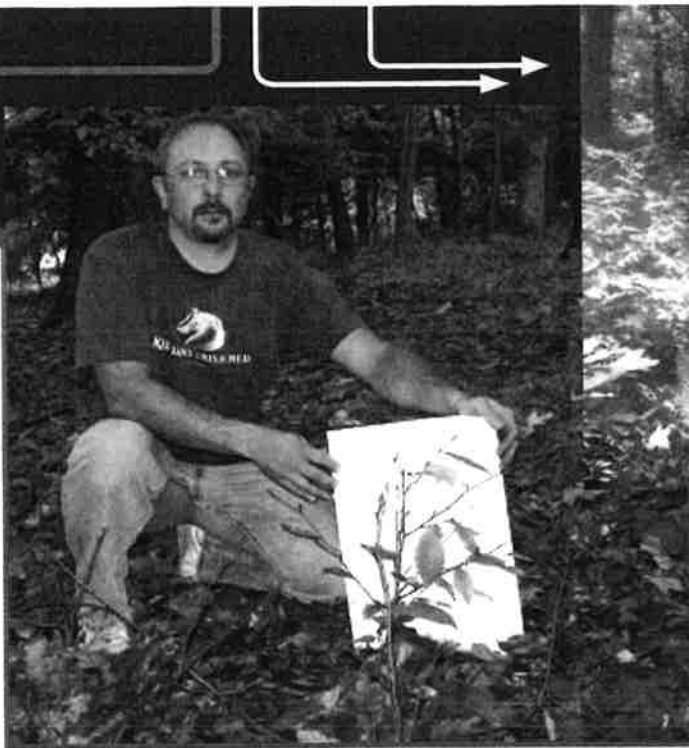
This witch hazel seedling has been "hedged" – repeatedly browsed by deer until it is only a gnarled stump. When even low-preference foods are heavily browsed, it is a red flag for the deer and the habitat.

of habitat health.

A core group of eight BMSA members took the initiative to learn the fundamentals of Quality Deer Management, including quality forest management. They attended seminars offered by the Laurel Highlands Branch of the QDMA, Penn State Cooperative Extension, and the Pennsylvania Game Commission. They also invited other foresters and biologists to tour club property. The message of the experts was clear: In areas of medium to high deer density, deer management and forest management are so inextricably linked that one cannot be considered without the other. Browse impact surveys would become the BMSA's primary tool of habitat assessment.

Steve Lantz, John Donoughe and Randy Geiner, all members of the Brush Mountain Sportsmen's Association, study browse patterns on deer forages. Conducted in the spring in conjunction with their pellet-count surveys, their browse impact surveys have helped document the need for better herd and habitat management.





Above: BMSA habitat committee chairman John Steinbugl (right) examines habitat with exceptional regeneration and abundant browse on a tour led by wildlife biologist Jeff Krause of the U.S. Army Corps of Engineers. Left: In great contrast to the above photo, in a severely overbrowsed habitat only the least-preferred seedlings survive. Ken Smithmyer of the BMSA habitat committee points out a low-preference American beech that has been severely browsed.

In seeking professional guidance, the main objective of the BMSA members was to plan timber harvests that would improve deer and wildlife habitat and produce sustainable income over decades and generations. What they learned has been invaluable in planning long-term management strategies and has increased the membership's appreciation for their forest resources. More specifically, the club has learned to recognize the impact of browsing when deer populations exceed carrying capacity.

You may not need to change attitudes; you probably already practice QDM, but if you are unskilled at evaluating levels of browse impact, you may be missing one of the most valuable deer and forest management tools available.

What Browse Impact Surveys Can Tell Us

According to Dr. Tim Pierson, a senior educator with Penn State Cooperative Extension and a driving force behind pellet count and browse survey usage in Pennsylvania, hunting clubs like the BMSA are in good company. Browse impact surveys are also used by the Pennsylvania DCNR-Bureau of Forestry, the Allegheny National Forest, and numerous private cooperatives and clubs.

"The New York Department of Environmental Conservation received training this year and will be adapting the survey techniques to assist them on lands they manage," Tim said. The annual surveys, which include both pellet counting and browse impact assessment provide:

- An additional tool to estimate overwintering deer densities (as described in the article "Happiness is a Large Pellet Pile," *Quality Whitetails*, February 2007).
- An annual measurement of deer impact upon available browse.
- An annual measurement of the quality of forest regeneration.

How are the results used by the pros? According to Tim, "Typically, organizations, hunt clubs and landowners utilize the deer density and habitat impact survey results to help them understand the present condition and relationship between the deer herd and the habitat. Understanding the make up of your deer herd and its impact on the habitat is actually an essential

component of any QDM program."

The results of browse impact surveys can help land and deer managers determine if the deer population needs to be reduced based upon the ability of the forest to produce deer food (browse) as well as trees to replace those that will eventually die or be harvested. Next, managers can keep tabs on the quality and relative quantity of browse as its availability changes from year to year. Finally, managers can determine if regeneration of tree species is of sufficient quantity and of the desirable species to conduct timber harvests.

Browse and Browsing Defined

The whitetail's diet changes with the seasons and with availability of items like mast, forbs, tender leaves, agricultural crops and supplemental food plots. Woody browse, however, plays a large role in a deer's diet regardless of season. Browse can be thought of simply as buds and/or small branches of woody plants. The term browse can also be used as a verb – describing a deer's act of eating woody plant buds.

If you've ever watched unspooked deer browse (verb!) in good forested habitat, you've witnessed one of nature's most delicate dances. Deer will feed along slowly, typically into the wind. Their heads bob as they snip off the end buds of trees and shrubs. Their near-constant forward movement distributes browse impact over the landscape. As a deer moves along, nipping an end bud here and there, the impact on individual trees is negligible. Here in Pennsylvania, an average deer will eat as much as 8 pounds of browse in a day. This browsing intensity occurs over a period of up to seven months. In degraded habitats, available browse is nearly nonexistent. When a deer finds a morsel within reach, the hungry deer stops and eats every available bud. The result to the tree can be death or "hedging" – a disfiguring result of repeated browsing. In such conditions the habitat can get locked in a downward spiral unless managers take corrective action. This may include intensive forest management and providing supplemental forage in addition to judicious antlerless harvests.

Continued.



How Overbrowsing Slowly Degrades Habitat Quality

Carrying capacity is the number of animals a habitat can support while maintaining the health of the animals and the habitat. In general, when deer densities are lower than carrying capacity, food is abundant. As deer numbers climb over carrying capacity, both the deer and the habitat are stressed. No one can pin an exact number on the carrying capacity for a given piece of habitat. Truth is, there's no glass ceiling. Even if we knew that a given habitat could support 22 deer per square mile, a 23rd or 24th deer would not spell instant disaster. Even an experienced biologist would have trouble seeing indications of overpopulation for many years. Overpopulation can be a gradual process, and indicators of habitat degradation are sometimes subtle. Also, knowing today's exact carrying capacity is of little value because carrying capacity changes annually, seasonally and sometimes daily.

At the BMSA the condition of the habitat is abysmal. In four years of sampling, using 60 sample points each year, club members have recorded a grand total of less than a half dozen seedlings in their sample plots. Outside the sample plots, only a few scattered and severely hedged American beech seedlings have been found. In the April 2004 survey, club members also found seven winter-killed deer carcasses. Those results, indicating a forest health emergency, helped spur the club to take the actions described in the introduction.

Forest health can diminish for many reasons ranging from insect pests and plant diseases to invasive species and poorly conducted timber harvests, but one cause of forest decline, overbrowsing, is common and easily diagnosed. Better yet, the primary method of control is something we all enjoy – deer hunting.

How Browse Impact Surveys Work

As with pellet counts, the scientific technique used in browse impact surveys is known as the point-sampling method. Point-sampling is a time-tested method for collecting field data. Basically, data collectors use small areas called sample plots that are randomly selected and spread across all habitat types. At each site data is collected and results are assumed to be representative of the entire study area, with some acceptable margin of error. A very thorough explanation of point sampling is given in Part 1 of this two-part series in the February 2007 *Quality Whitetails*. If you don't have that issue, you can find the text of that article at www.QDMA.com, under "Featured Articles" on the home page.

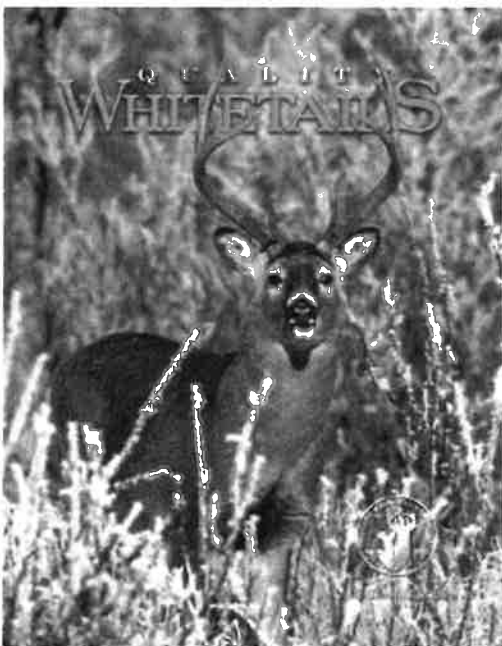
Conducting the Survey

First, it's important to note that the browse impact survey method is usually taught as a full-day seminar with hands-on experience. The following has been condensed and adapted for *Quality Whitetails* by the authors. For an in-depth look at the information presented in the day-long course, refer to the website for the Kinzua Quality Deer Cooperative (KQDC) – a 74,000 acre public hunting area in northwestern Pennsylvania – at www.kqdc.com. A host of wildlife and forestry professionals work with the KQDC and willingly make their knowledge and research results available. You may also contact Penn State Extension's Dr. Tim Pierson who has co-developed the course and supplemental materials at tgp2@psu.edu.

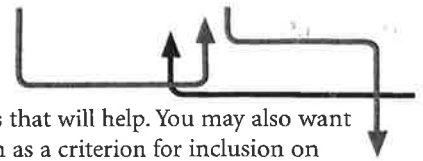
Step One: Develop a Plan

A browse impact survey is set up in exactly the same way as

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a pellet count survey. You will first obtain an aerial photo or map of the property, mark transects on the map that cross all habitat types in roughly representative proportions, and decide how many sample plots will be examined. Remember, larger sample size (more plots) equates to greater accuracy, but sampling a large number is less critical here than with pellet counting. When pellet counts and browse surveys are conducted simultaneously, browse impact data is recorded only at every other sample plot.

Step Two: Select Indicator Species

You will need to compile a list of six indicator tree species. These species should be common trees in your area, and ideally they are well-represented in the forest canopy. Two of these species will fit into each of the following categories: high, medium, and low-preference deer browse. Where this protocol was developed in northwestern Pennsylvania, red maple and sugar maple are the highly preferred browse. Hemlock and black cherry are medium preference, and beech and striped maple are least preferred.

To develop its own tally sheets, the BMSA compiled a list of the most common trees in the forest overstory and compared that to lists of deer browse preferences provided by local biologists. Due to an abundance of oak and a lack of sugar maple, oak replaced sugar maple as the most highly-preferred browse on the BMSA tally sheet.

We recommend that you take a similar approach. Meet with a professional to tour your property. Examine the tree species present in the canopy. Have a professional give you pointers in identifying indicator seedlings in leafless condition. He or she can point

out bark and bud characteristics that will help. You may also want to consider ease of identification as a criterion for inclusion on your list of indicator trees.

Step Three: Assign Teams

Divide your crew into teams of two or more. At least one member of each team needs to be proficient in identifying the indicator trees. Assign each team to a transect. The required equipment is the same as for pellet count surveys. Each team should have a blank tally form (sample on page 56), clipboard, pencil, compass or GPS, and 4-foot string or stick to measure the radius of each sample plot. You may also want to take along tree identification “cheat sheets” for the six selected indicator species. Radios also help so that all teams can stay in contact with the survey chief. Real-time “coaching” is often necessary during the first year a browse impact survey is conducted.

Step Four: Collect Data

Each team walks its transect, using a compass or GPS to maintain a straight line, and stops at regular intervals that become sample plots. The interval will vary with property size and available manpower. Browse impact research calls for 200 feet between plots. The BMSA has settled on 300 feet as best suited for their annual work. Pacing will suffice for estimating distances between sample points. Each sample plot is a circle with a radius of 4 feet.

What are we looking for? At each sample point the survey team will examine indicator tree seedlings between 6 inches and 6 feet in height. The goal is to determine what degree of browse

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