It’s the middle of July, but I’ve got winter on my mind. And, just to be clear, I do love summer. It’s not the sweltering heat or the black flies that have me thinking of cooler days. No, I owe my wintry thoughts to other reasons altogether.

Supplemental feeding discourages deer from using ideal winter habitat

by Andrew Moe
I'm deep in the North Woods of New Hampshire under the dense canopy of a spruce-fir stand, looking for raggedly torn ends of twigs and scanning the ground for pellet groups — two tell-tale signs of the forest dweller that interests me. This is prime winter habitat for white-tailed deer.

I want to find out the extent to which deer are using this habitat, but I am not relying upon direct observation of the animals, which is why I am here in the summer. By assessing evidence of deer browsing, counting pellet groups from the previous winter, and taking some basic measurements of the forest structure and composition, I am collecting information that will better inform ongoing management and conservation planning efforts directed toward this critically important species.

Gimme Shelter

Winter is a challenging time for many animals. In northern populations of deer, like those here in New Hampshire, severe winter conditions are considered a limiting factor of population growth. Anyone who has ever tried running through deep snow knows how exhausting it can be to run even a short distance. For deer it's no different; when snow depths reach 18 inches or more, deer have a difficult time moving without using a tremendous amount of energy. Consequently, in order to minimize their energy expenditure, deer strategically seek out wintering areas, known as deer yards — forested shelter that allows them to better cope with winter conditions.

Although the specific composition of deer yards varies somewhat throughout the state (think hemlock stands in southern New Hampshire, spruce-fir stands in the North Country), all deer yards provide two basic habitat components: mature conifer or mixed-conifer stands that provide cover and increased mobility, and interspersed or adjacent foraging habitat.

The importance of protecting deer yards was first recognized in the 1950s, a time when unregulated timber harvesting led to widespread loss of regional deer yards. Many state and provincial agencies have since taken measures to protect these areas, including the development of specific regulatory guidelines for their protection and management. Yet, despite more attentive management, the number and condition of deer yards remains in flux as a consequence of human activity and development, forest harvesting and natural ecological processes.
A New Approach

Fish and Game biologists have monitored deer yards for more than 40 years. In the 1970s, they began to map them. More recently, over the last 20 years or so, regional biologists have conducted annual winter surveys at known deer yards, gathering a variety of metrics to provide information about trends and fate of these important areas of shelter for deer. Although the annual surveys yield important data, the sheer number of deer yards (close to 1,500!) ensures that the majority of known deer yards in the state are surveyed infrequently, and potential deer wintering areas even less so. To help fill in the missing pieces, my research was conceived to evaluate the current condition and use of deer yards in New Hampshire, and to develop a model for identifying potential deer yard habitat and evaluate its value for conservation planning.

During the summer of 2014, I set out with a team of undergraduates from the University of New Hampshire (UNH), traveling all over the state to survey known deer yards. Fish and Game worked closely with UNH on this research, which was funded by the Federal Aid in Wildlife Restoration Program. We collected data on deer use and habitat conditions at 160 sites, and I spent the next few months in a semi-catatonic state familiar to most graduate students, as I entered thousands of records into the computer and began my analysis.

That’s where things got interesting. Now, one would assume that a strong relationship should exist between habitat quality and deer use. That is to say, deer yards with mature conifer cover and interspersed forage should theoretically receive greater use than sites where the cover or the forage component (or both) are lacking. But that wasn’t entirely the case. I had broken the state into three regions (south, central and north) on the basis of differing winter severity. The expected relationship held true in the central region, only weakly in the south, and not at all in the north. Given the severe winter conditions of 2013-14, which surely would have forced deer all across the state to deer yards, I was determined to understand why deer in some parts of the state were not using prime deer yard habitat.

What’s Going On?

One factor that makes it hard to get a clear analysis of deer yard locations and use is the prevalence of supplemental feeding sites, which disrupt deer movement and habitat use. Although Fish and Game strongly discourages the practice, supplemental feeding by private citizens is commonplace in the northeastern U.S. and may contribute substantially to the winter diet of deer. Previous studies in New Hampshire have documented the widespread use of feed sites. Luckily, with the foresight of my thesis advisor, Dr. Pete Pekins, I was able to incorporate an evaluation of supplemental feeding into my study design – otherwise I still might be scratching my head!

To find out what was going on, we devised a way to tell whether deer scat was from browse or supplemental feeding. We did this by looking at the chemistry of the fecal pellets. For herbivores like deer, the plant matter they feed upon has a distinct carbon composition (cue high school biology exam flashback!). Although New Hampshire residents provide a variety of supplemental feeds (hay, apples, vegetables, etc.), the most prevalent is corn (a C4 plant) and corn-based supplements. Typical natural winter forage for deer includes woody browse, lichen, litterfall and hard mast—all with C3 carbon “signatures.” The idea was that by comparing the relative proportion of C3 and C4 plant matter in fecal pellets, we should be able to assess how much supplemental vs. natural feed the deer had been eating.

And so, in addition to counting fecal pellet groups in the deer yards we surveyed, we also collected pellets wherever possible. Hundreds of pellet groups were dried, ground into a powder, and submitted to the UNH Stable Isotope Laboratory. We also had them test samples of supplemental feed, typical winter browse, as well as the fecal pellets of supplementally fed deer from Squam Lakes Natural Science Center, which provided useful benchmarks.
The Culprit – Deer Feeding

The results of the isotope analysis were intriguing, and go a long way in explaining the habitat-use relationships I had discovered. The north region, where no relationship between habitat quality and deer use had been evident, had the highest percentage of supplemental feeding sites and the highest estimated feeding levels. In the central part of the state, fewer feeding sites and lower feeding levels were found. Southern New Hampshire was an intermediary between the two.

These results suggest that a number of deer yards continue to support large numbers of deer, not because they provide the best cover or forage conditions, but rather because of long-term feeding that drives winter occupancy, in spite of the less-than-ideal habitat. Where feeding activity is lower, traditional habitat variables continue to influence deer yard use.

From a management perspective, well-documented concerns exist regarding the unintended consequences of supplemental feeding. Because deer congregate near feeding sites, the risk of vehicle collisions, predation and transmission of disease all increase, as well as aggressive behavior and impacts on vegetation. The health of the deer can be compromised – they can even die – if the transition from a typical winter diet to supplemental feed is made too rapidly at certain times of year. In March of 2015, twelve deer were discovered dead in South Hampton, N.H., the victims of well-intentioned, but tragically fatal, supplemental feeding by local residents. Increased deer density near feeding sites, coupled with increases in the human population, will likely lead to increased deer-human conflicts and may reduce public tolerance for deer.

By either concentrating deer in non-traditional habitat or reducing the relative importance of traditional habitat, supplemental feeding also undermines efforts to conserve known and potential deer yards. Without evidence of deer wintering activity, forest managers and timber companies may have less incentive to manage and protect deer yards.

For now, New Hampshire’s deer herd remains healthy and stable. Continued successful management of deer requires ongoing monitoring and conservation of known and potential deer yards, and in particular, may benefit from ongoing research investigating the relationship between supplemental feed use and the fate of traditional deer yards.

Winter is coming, and it won’t be long before deer begin the annual migration to their winter home. In good winters and bad, they continue to endure. So, the next time you have to wade out to your car, cursing through the waist-deep snow, stop and appreciate the truly impressive feat of the wintering deer. And please keep in mind that feeding deer does much more harm than good.

Andrew Moe received his M.S. in Wildlife and Conservation Biology at the University of New Hampshire in May 2016. He worked with N.H. Fish and Game on deer research and has served as a check station biologist during deer season.
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