2020 Moose Management FAQs

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About Winter Ticks…

What is a winter tick?

The winter tick (*Dermacentor albipictus*) is a species of tick that can be found across North America. They are a single-host tick, meaning they complete their entire life cycle on a single host. This is different than the ticks humans are most familiar with (black-legged ticks and American dog ticks), which drop off their host after a blood meal and infect multiple hosts over the course of their life cycle. Winter ticks find a host in the fall and spend the winter on the animal before dropping off in the spring – hence the common name, winter tick.

Unlike other ticks which have expanded their range northward, winter ticks are native to Vermont. They were recorded on moose here as early as the 1980s and were likely present here long before that.

How has climate change affected winter ticks?

Although winter ticks have been present in Vermont for decades, they are benefitting from climate change. Shorter winters benefit winter ticks in two ways. First, the first snowfall of the year kills most larval ticks and ends the fall questing period – the time when ticks are getting onto the moose. If that snow comes later, the larval ticks have more time to find a host, and moose will accumulate more ticks. Second, when the engorged adult females fall off moose in the spring, their chance of survival is lower if they land on snow instead of bare ground. As winters get shorter, winter ticks are able to thrive in areas where they were formerly limited by long winters.

How do winter ticks kill moose?

Sheer numbers. As many as 90,000 ticks have been documented on a single moose. When those ticks all take a blood meal in late winter, the moose simply cannot replace that volume of blood quick enough. This is compounded by the timing, as the moose's energy reserves are already depleted by late winter. Even if the moose survives, they are in poor physical condition. This can affect the survival of newborn calves, which are born about a month after the ticks drop off. Further, because the moose needs to recover from this poor condition, they aren't able to put as much energy toward growth and building energy reserves. Therefore, they enter the next winter in poorer condition which makes them more vulnerable to the impacts of winter ticks.

Do all moose have winter ticks on them?

Winter ticks are a common and widespread parasite, and it is likely that most moose will have some on them during the fall, winter, and spring. Fish and Wildlife staff occasionally handle moose during that time with no apparent winter tick load. The staff handling these moose do look for ticks, but they do not

conduct an exhaustive search of the entire body. The fact that they find no winter ticks does not necessarily mean there are none on the animal, but it does, at least, indicate a very low tick load.

Do winter ticks affect moose everywhere?

No. Winter ticks can be found on moose throughout New England and much of the southern portion of their range, but they do not affect moose populations where moose occur at lower densities. Winter ticks are a host density dependent parasite and thrive during times of elevated host populations. While they can be found in small numbers on other mammals, the poor grooming practices of moose mean that moose are the primary host responsible for fluctuations in tick numbers. In other words, high numbers of moose are required to support large numbers of ticks. Most of Vermont outside of the Northeast Kingdom has never had enough moose to have enough ticks to cause population-level impacts.

Do winter ticks affect other animals?

Winter ticks are commonly found on deer, bears, coyotes, and many other mammals. However, because of these animals' grooming practices, the number of ticks on any individual is usually limited to a few dozen at most. Winter ticks are also frequently found on livestock.

Do winter ticks pose a risk to humans?

No. Winter ticks do not transmit any diseases that affect humans. Since they are a single-host tick, the adults are only found on the host animal – they are not on vegetation where a human might come in contact with them. A person could pick up larvae in the fall, but they are easily washed off in the shower or will drop off on their own.

Can't moose or their habitat be treated to kill winter ticks?

This is a logical question that usually stems from us treating our pets for ticks. Moose are not pets or livestock, they are wild animals.

Reducing winter tick populations directly, either by treating moose or the landscape with some form of acaricide (a pesticide specifically for ticks) or fungal pathogen (there are some naturally occurring fungi that can kill ticks), is not currently a viable option. Research in this area is ongoing, but the realities of treating an entire landscape or a sufficient portion of the moose population make it unlikely that this will be a practical option in the near future.

Further, treating ticks does not kill all of them and provides them an opportunity to adapt to the treatment and develop resistance. As long as there is a high density of moose on the landscape, tick numbers will simply increase again when treatments stop or when the ticks become immune to them.

Introducing animals that consume ticks (e.g., guinea fowl or opossums) is also not a viable option. Aside from the potential consequences from introducing a new animal into an area, and the fact that they could not survive the winter in that part of Vermont, they simply would not be effective at reducing winter tick numbers. The life cycle of winter ticks results in minimal opportunity for them to be

predated. Adult ticks essentially only occur on the host, not on vegetation, and larval ticks are very small and either in the leaf litter or relatively high up on vegetation.

Lastly, we may dislike ticks because we find them unsightly or are concerned about diseases they may carry (remember, winter ticks do not carry those diseases), but we must remember that they are a native species just like moose. We just need to find the appropriate balance between winter ticks and moose.

About the Moose Population…

How many moose are there in Vermont?

About 2,000.

Is the population increasing or decreasing?

Yes. No. Both? It depends on the specific area. Generally, the population appears to be stable or slowly decreasing. As with any species, population performance is influenced by many factors, including habitat quantity and quality, the impacts of diseases and parasites, predation, hunting, and other sources of mortality. This means, at any given time, moose in some parts of Vermont may be doing better than those in other areas.

Why has the moose population declined?

Several factors are responsible for the decrease in the moose population over the past decade.

First, moose were overabundant in some areas, particularly the Northeast Kingdom, in the early 2000s, and the Department intentionally reduced the population in those areas through hunting to be in better balance with the available habitat. Permit numbers were greatly reduced in the early 2010s to stabilize moose numbers, but numbers continued to decline primarily because of two parasites.

In WMU E, which has always had much higher moose densities than the rest of Vermont, the primary cause of decline has been the winter tick. Due in part to their limited grooming, an individual moose can be infested with tens of thousands of ticks. Such heavy tick loads can kill more than 50% of moose calves in the late winter and early spring. Although they don't usually kill adult moose, the stress from heavy tick loads causes them to be in poor condition and produce fewer calves.

Throughout the rest of Vermont, the reasons for moose population declines are more complex. Brainworm is more common in these areas and may be increasing. Brainworm commonly infects white-tailed deer, which evolved with the parasite and suffer no ill effects. As a result, areas with higher deer densities tend to have a greater prevalence of brainworm. When brainworms infect moose, the result is usually fatal for the moose. Moose population declines associated with brainworm have been noted in areas where deer densities exceed 10 deer per square mile. Deer densities in most of Vermont exceed 10 per square mile, except for WMU E and some remote, higher-elevation areas.

Another important factor is the lack of young forest habitat. Moose require large quantities of woody browse and do best in areas with large amounts of young forest habitat that provide abundant browse. Young forest habitat is increasingly rare in much of Vermont. Lastly, the loss of thriving source populations in WMU E and possibly New Hampshire has likely had an effect. Fifteen years ago, those areas were producing large numbers of moose every year, many of which dispersed out to other areas. This likely provided an important source of moose – and boosted moose numbers – across much of the rest of Vermont.

Are moose populations declining in other states?

Yes. Moose populations are declining across the southern portion of their range due to various effects of climate change. In the northeast, populations in New Hampshire and much of Maine are experiencing similar declines as Vermont, for the same reasons.

Why is WMU E so different from the rest of Vermont?

WMU E is part of a larger region of prime moose range in New England that extends through northern New Hampshire and much of Maine. This area has a colder climate with longer winters, low deer densities, large blocks of forest, and an abundance of young forest from commercial timber management which allows it to sustain higher densities of moose.

- Based on current (2019) population estimates, approximately half of all moose in Vermont live in WMU E. Worded differently – there are as many moose in WMU E as there are in the rest of Vermont combined.
- The current density estimate in WMU E is just under 2 moose per square mile. No WMU outside of the Northeast Kingdom ever reached a density of 1 moose per square mile.

Why is the Department proposing to hunt moose?

The Department wants to reduce the moose population in WMU E to reduce the abundance of winter ticks. This will reduce the impact of winter ticks on the health of moose and result in a healthier moose population. Research indicates that winter ticks rarely impact moose populations at densities less than 1 moose per square mile and have no impact at densities less than 0.75 moose per square mile. The 2019 density estimate for WMU E was just under 2 moose per square mile.

The Department is not proposing to hunt moose in other parts of Vermont. Moose populations in those areas are below established population objectives and are not impacted by winter ticks.

Why doesn't the Department want the population to grow?

The Department wants the moose population to grow in most of Vermont, just not in WMU E. That's why the Department is not proposing any hunting of moose in those areas. Allowing the population in WMU E to grow, or even remain at the current level, will perpetuate the negative impacts of winter ticks and result in unhealthy moose for decades. This would be inconsistent with the Department's established objective of managing for a healthy moose population.

What would happen if a moose hunt didn't occur?

At this time, it appears that moose numbers throughout Vermont would remain relatively stable – or perhaps slowly decline – without hunting. Importantly, for moose in WMU E, this means winter ticks would continue to impact moose health for decades. Conducting a moose hunt allows for responsible utilization of the moose population, a relatively quick death for those animals that are killed by hunters, and a more preferable end result – healthy moose!

Why so many permits?

Given past success rates and harvest sex ratios, issuing 55 either sex permits is expected to result in the harvest of 21 bulls, 10 adult females, and 2 calves. The harvest of adult females has the greatest impact on future population size, so this is our primary concern. This permit recommendation represents a significant change from very low permit numbers in recent years and a general declining trend in permit numbers over the past decade. Lower permit numbers during the past 3 years were reflective of lower estimates of moose numbers at the time and uncertainty about the impact of winter ticks in Vermont. It now appears that moose densities in WMU E are greater than they were believed to be in recent years, and the results of the moose study clearly demonstrate that moose in WMU E are in poor health due to heavy winter tick loads. Reducing the number of moose is necessary to reduce the impacts of winter ticks and improve the health of moose in that region.

Why not more permits?

This permit recommendation is a conservative first step to addressing winter tick impacts on moose in WMU E. Given the poor health of the moose population and a clearly identified cause, action to address this issue is warranted. Ideally, moose health should be improved as quickly as possible. However, there are many uncertainties when managing wild, free-ranging populations of moose. Low survival and birth rates observed from Vermont moose, and broader, regional declines in moose populations justify a cautious approach at this time. Management of moose in WMU E and throughout Vermont must continue to be adaptive and respond to new information as it becomes available. If continued monitoring indicates that health, survival, and birth rates remain poor, and the moose population in WMU E remains above the objective, a more aggressive approach may be necessary to improve the health of the region's moose in the future.

Will moose numbers in WMU E increase after tick impacts are reduced?

WMU E has, by far, the best moose habitat in Vermont. If tick impacts are reduced and moose health and survival improve, the population would be capable of increasing.