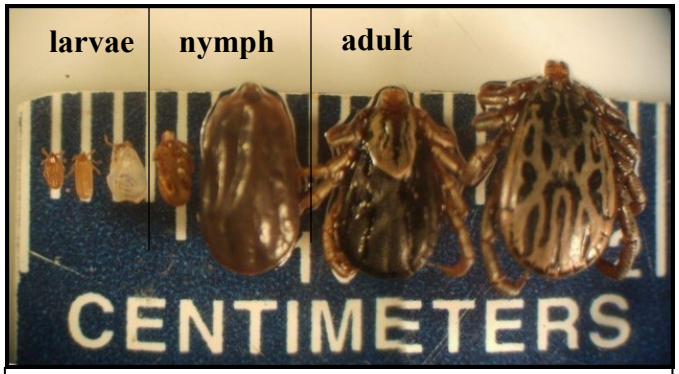
Winter Ticks and Moose

Winter tick infestations of **30,000 or more ticks per moose** cause **mortality of calf moose in late winter** and **suppress reproduction by adult cows**. In some years, more than 50% of calf moose will die in late winter due to these infestations. However, adults typically survive.

Winter tick life cycle

Most ticks that people encounter in New Hampshire are black-legged ticks (*Ixodes scapularis*) and American dog ticks (*Dermacentor variabilis*).Winter ticks (*Dermacentor albipictus*) are a different species of tick.

Winter ticks have a one-host and one year life cycle, which means all three life stages (larva, nymph, and adult) take a blood meal from the same host during the same year. Moose are the most common host.



Winter tick life stages. Photo copyright Dan Bergeron.

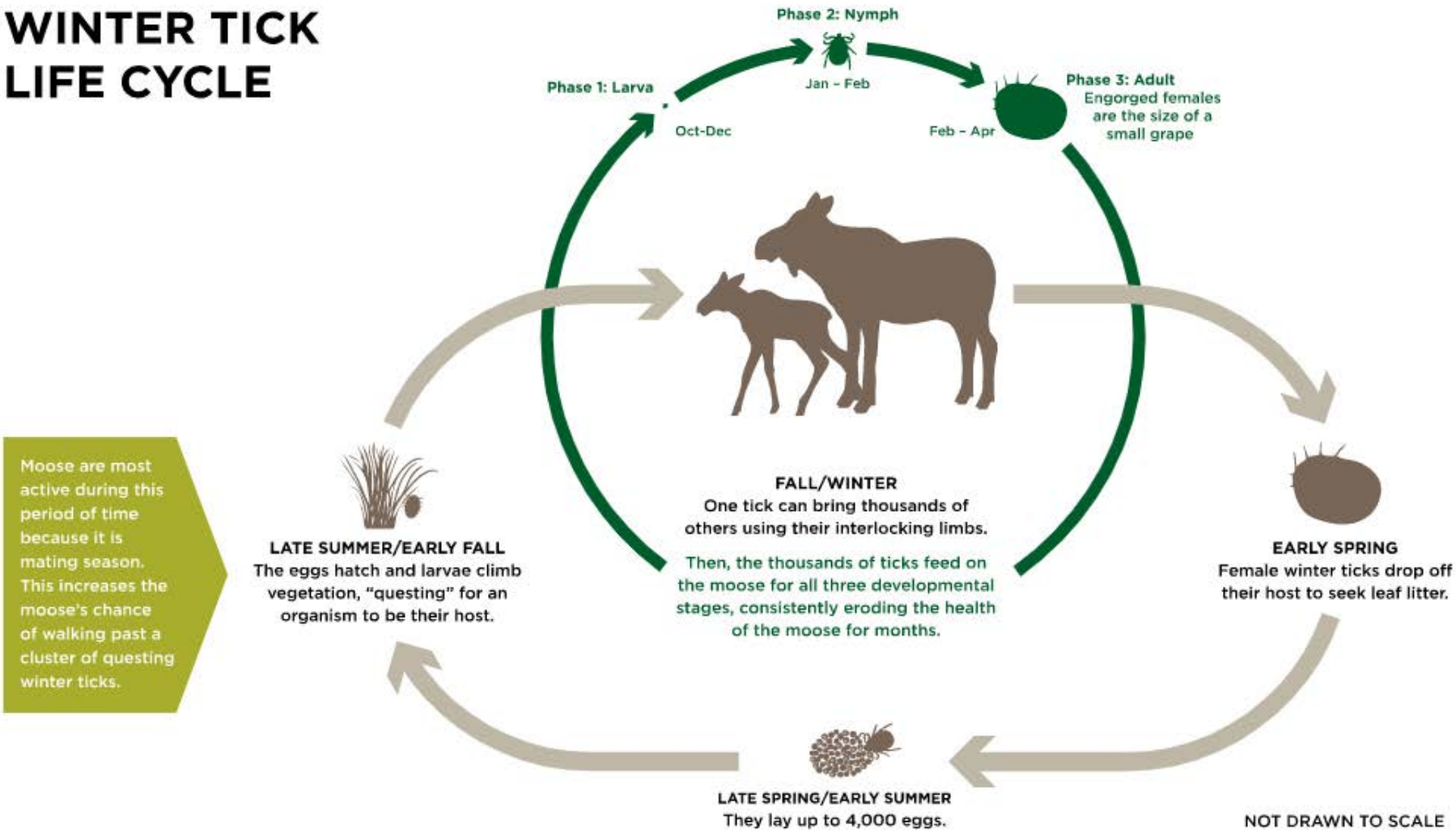
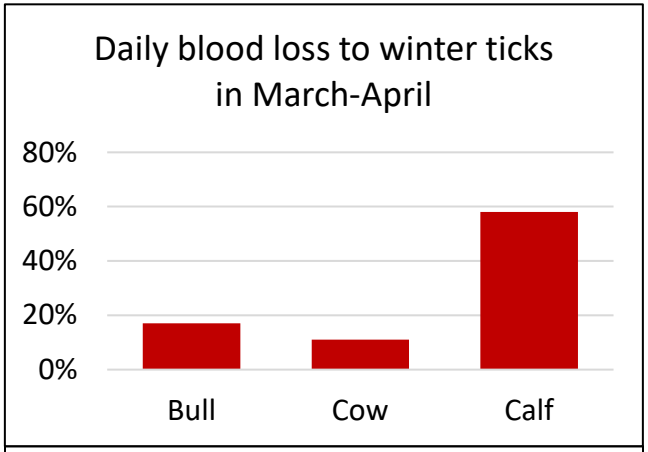


Image created by the Maine Department of Inland Fisheries & Wildlife.

How does winter tick parasitism affect moose?

- **Massive blood loss**
- **Calf mortality in late winter**
- **Suppressed reproduction by adult cows**

Unlike other tick species, winter ticks are not known to transmit disease. However, each life stage takes a blood meal from the same moose in the same year, primarily during March-April when the adult life stage takes a blood meal. See the graphic for how much blood moose lose per day.



Daily proportion of total blood volume lost to 30,000 winter ticks.

This massive blood loss over a concentrated period of time occurs when moose forage is at its lowest nutritional level, so moose can't just replenish this loss with food. To meet the added energy demand of replacing their blood, moose metabolize their fat and muscle and consequently lose weight. Moose naturally lose weight in late winter, but blood loss to ticks results in greater, and irrecoverable weight loss in heavily infested calves.

Calves with high infestations **lose 20-30% of their body weight (approximately 100 pounds) in late winter** and run out of muscle to metabolize resulting in mortality in March and April.

Adults also lose more weight than normal, but they typically survive.

Feeding winter ticks causes irritation, and some moose spend considerable time rubbing and itching, resulting in hair loss and a whitish appearance, "ghost moose". More time itching means less time feeding or resting and a damaged coat makes it harder to stay warm in cold/wet weather. All of these factors further increase the energetic burden winter ticks on moose in late winter.

Cow moose in late April with hair loss due to winter ticks. Photo copyright Dan Bergeron.

Although adult moose typically survive high winter tick infestation, they also lose more weight than normal and are in poorer condition in early spring. This means adult cows have fewer resources for growing a fetus and providing milk for young. These unhealthy cows have fewer calves (lower twinning and more years of failed calving), and it takes juvenile cows more years to be healthy enough to have a calf.

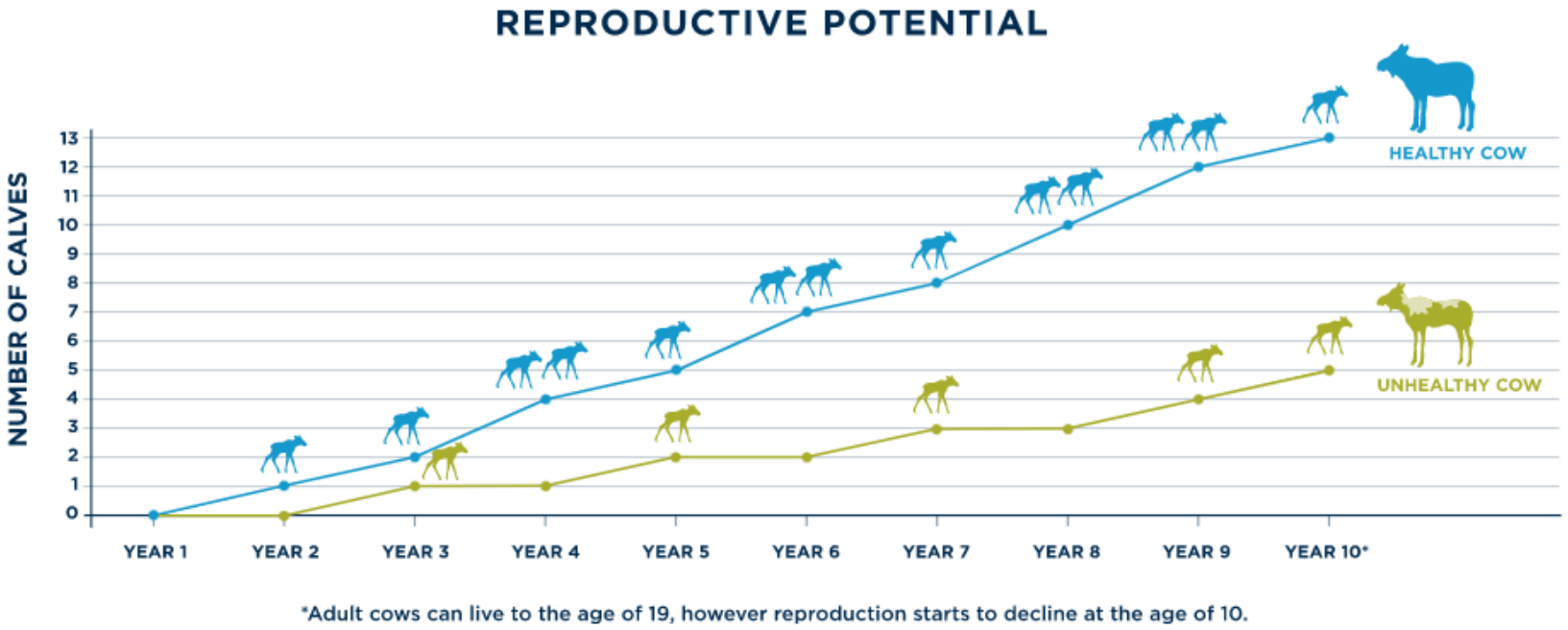


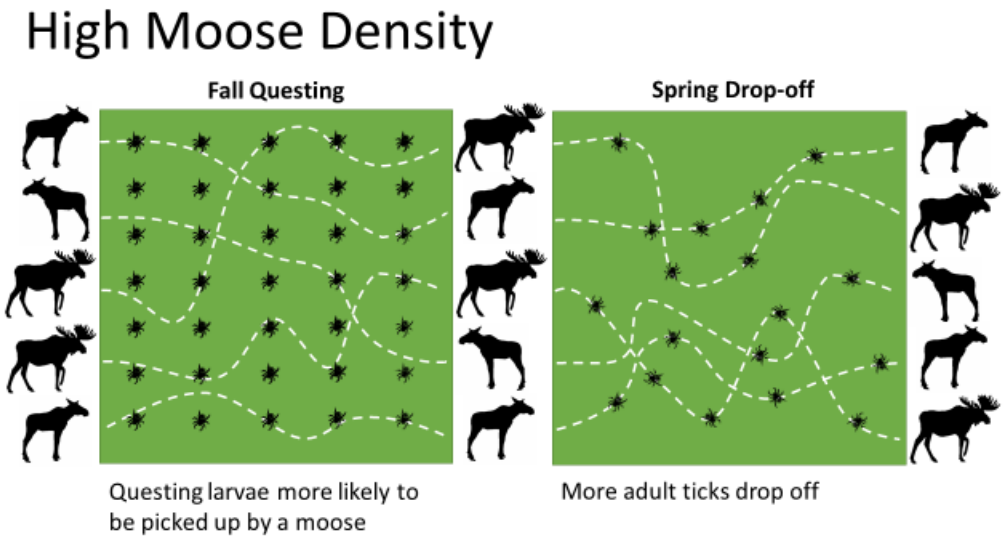
Image created by the Maine Department of Inland Fisheries & Wildlife.

What influences winter tick abundance?

- **Moose density**
- **Climate**

Moose density

When engorged adult female winter ticks fall off moose in March and April they lay their eggs within a few feet of where they fall. The larvae that hatch from these eggs are also relatively immobile and climb nearby vegetation to find a host. This means that for moose to become infested with winter ticks during the attachment season in September-December, they must walk through the same place an engorged adult female tick fell off a moose the preceding March-April. More moose in a specific area (higher moose density) makes this occurrence more common. Larval winter ticks that do not find a host die when persistent snow or sustained temperatures below freezing arrive.



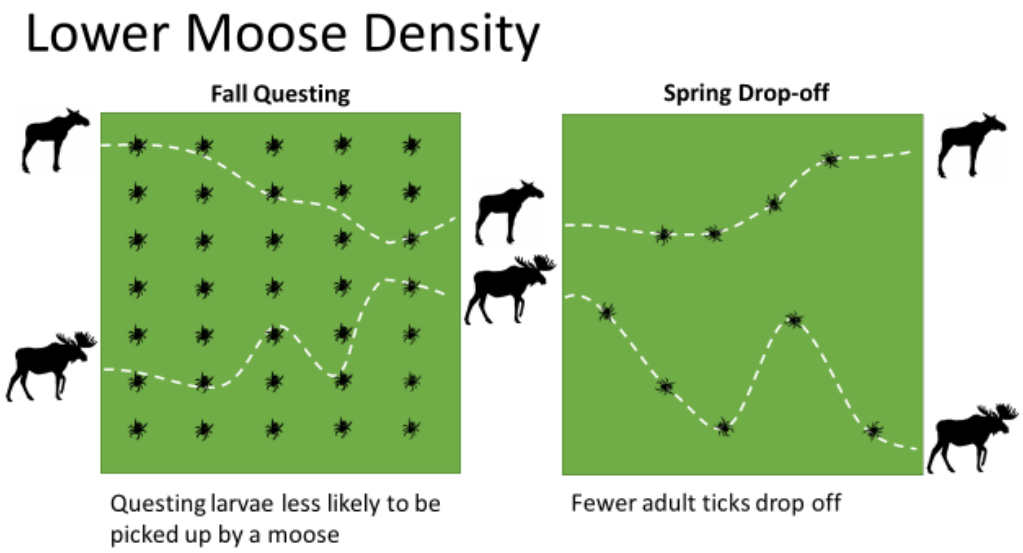


Image created by the Vermont Fish & Wildlife Department.

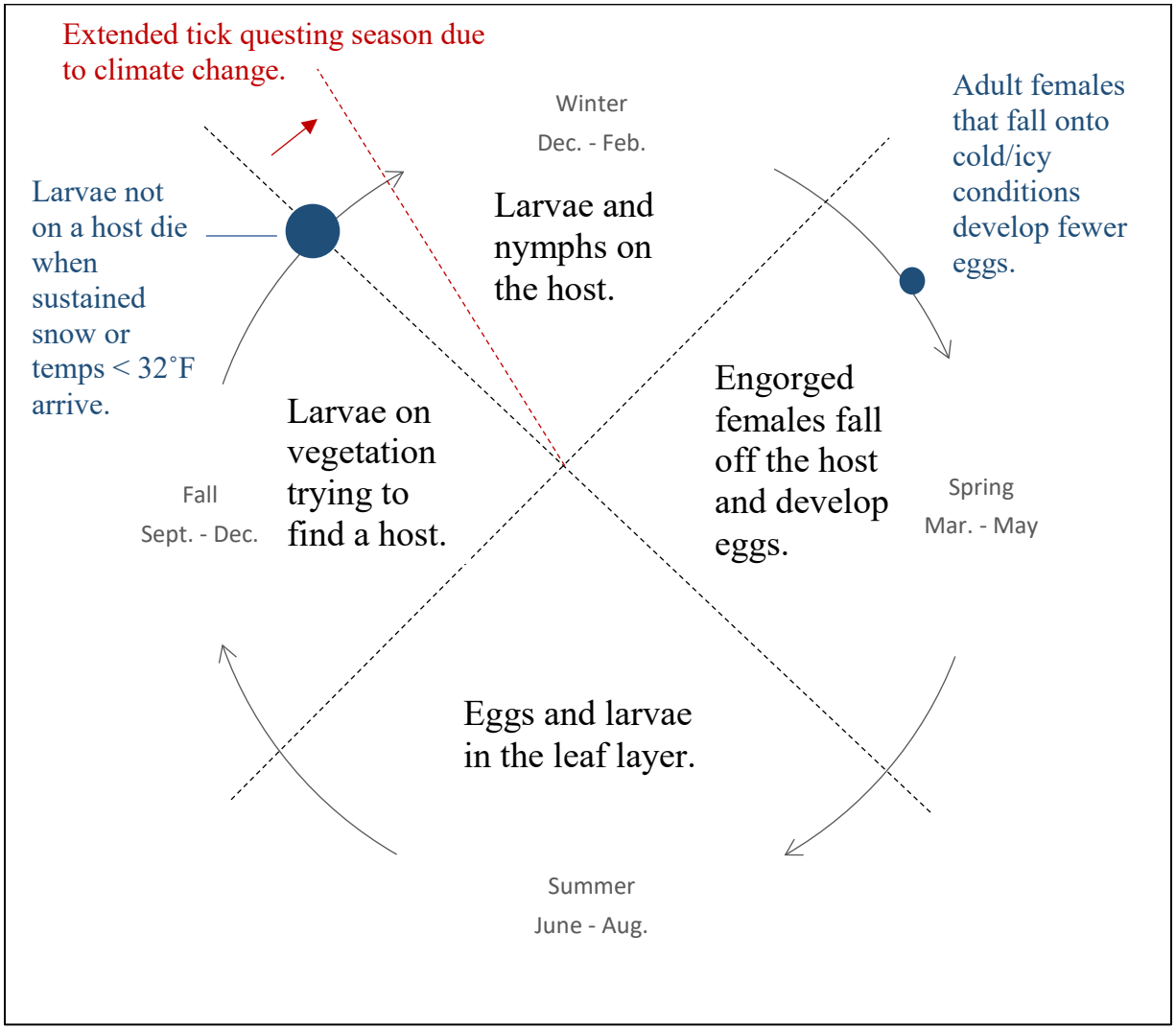
Climate

Climate impacts winter ticks primarily by influencing how much time larvae have to search for a host in the fall. If larvae that find a host survive to become adults in the spring. If larvae that do not find a host before sustained snow or temperature below 32˚F, they die. When the onset of winter is delayed larvae have more time to find a host.

Engorged adult female winter ticks that detach and fall onto icy and cold ground conditions, such as snow pack and 0˚F, develop fewer eggs than those that can immediately burrow into warm leaf litter.

Climate change benefits winter ticks by resulting in later onset of winter (more time for larvae to find a host) and earlier loss of snowpack in the spring (adult female winter ticks develop more eggs). This leads to greater abundance of winter ticks at a lower density of moose.

Winter tick life cycle by season and influence of weather.



What can be done to reduce winter ticks?

Direct reduction of winter ticks on the landscape using acaricide (pesticide for ticks) or a fungal pathogen (natural fungus that kills ticks) is not currently a viable option. Research is ongoing, but it currently seems unlikely that acaricides or fungal pathogens will be practical on a landscape level.

Why acaricides and fungal pathogens are not currently viable options:

- Ticks have high potential to develop resistance to pesticides because of their high reproductive potential. This is currently occurring with cattle ticks in Texas.
- Treating moose or the landscape with acaricides would be logistically challenging and expensive.
- Baits containing acaricide present issues of overdose and moose do not respond strongly to bait.
- Fungal pathogens are being researched, but their efficacy in the natural environment is currently unknown.

Winter ticks are a natural species that only become problematic for moose when moose density is moderate to high. Lower moose density that results in fewer winter ticks is currently the most likely outcome of this predator (winter ticks) and prey (moose) relationship.