

NEW HAMPSHIRE'S MOOSE POPULATION VS CLIMATE CHANGE

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Cow and yearling moose in pond.

Photo by Dan Bergeron

How will climate change affect moose? It's a big question with no clear cut answers. There are three variables affected by climate change which in turn, will affect moose. These are increasing temperatures and two additional consequences of those increases; changes in forest species, and increasing parasites.

Moose are perfectly adapted to cold but do poorly in warm weather. A highly insulative coat, thick skin, and low surface to volume ratio make it difficult for moose to stay cool. At summer temperatures above 57°F and winter temperatures above 23°F moose start to heat stress. When moose experience heat stress, their respiration and heart rates increase, they seek shade and cooling winds or cool water and

they bed down and eventually cease foraging. Moose that don't eat in summer don't gain weight and by fall may not have enough body fat to sustain themselves through winter. Lowered body weights in cows lead to reduced calf production. It is theorized that within the next 100 years temperatures will rise on average 9-13°F in winter and 6-14°F in summer. Current average temperatures in NH are 21.1°F in winter and 65.5°F in summer. We are already at the southern limit of moose range. Will our abundant standing water supplies, evergreen trees and mountainous terrain offer moose enough cooling refugia to allow them to cope adequately with the increasing temperatures? Only time will tell.

Heat stress in domestic cows leads to lowered immune response which in turn leaves the animal more vulnerable to parasite and disease impacts. Recent research in North America suggests that increasing temperature acting in concert with disease and parasites may be responsible for the recent dramatic decline of moose in northwestern Minnesota. Currently in NH we have two parasites that have the ability to dramatically reduce moose numbers. These are winter ticks and brain-worm. Both of these parasites (whose primary host is the white-tailed deer) will become more numerous given shorter, warmer winters, sufficiently wet summer months and higher deer densities. While winter tick impacts will be lessened with decreasing moose densities, brain-worm impacts will remain high in the face of higher deer densities which are the primary host for this parasite. Recent research on continental moose declines unrelated to predation or over-harvest, concluded that brain-worm was the driving force in the recent depletion of moose stocks over much of North America.

As our temperatures increase our forest species will be changing and for moose it will become increasingly difficult to find shade especially in the winter. Spruce, fir and hemlock all face dramatic declines in our state due to stress related to increasing temperatures and increasing parasites. These species offer moose the best source of shade in the late fall, winter and spring. In addition, our maple/beech/birch forests will slowly die out to be replaced by species such as oak and hickory. Maple and birch are primary sources of browse for moose. Moose may switch over to other sources of food but they won't be able to find shade in the winter without plenty of softwood cover.



Bull moose wading for breakfast.

So, moose face a triple threat with our changing climate. Increasing temperatures, changing forest species and increasing mortality due to increasing parasites and disease may make it very hard to maintain a viable moose population in NH in the future.