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{FIELDNOTES}

# BEATING THE HEAT: HOW DO MOOSE COPE WITH SUMMER TEMPERATURES?

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It's difficult to imagine Minnesota's northern forests without one of its most beloved icons, the moose. However, if current trends continue, only a handful of them will call Minnesota home before the close of the decade. In less than 15 years, moose in northwestern Minnesota declined from over 4,000 to fewer than 100. The northeastern Minnesota population is also declining; estimated at about 8,800 individuals in 2006, the northeastern moose population has decreased 69 percent to less than 2,800 individuals.

There are thought to be multiple reasons for declining moose populations in Minnesota, most of which are linked with warming temperatures. Moose in Minnesota are at the southern edge of the subspecies' (*Alces alces andersoni*) distribution and although they are well adapted to cold climates, moose are intolerant of heat. Temperatures in northern Minnesota have been increasing and are forecasted to continue doing so. Understanding how moose cope with the effects of warmer temperatures is critical for identifying long-term habitat needs and has been identified as a priority in Minnesota's Moose Research and Management Plan.

Over the past year and a half, I have been collaborating with researchers from the Natural Resources Research Institute and Voyageurs National Park to study moose in zoos and the wild.

At the Zoo, we have been working to determine how temperature, humidity, and wind influence their behavior and breathing rates. This information will help us understand how to care for zoo-managed moose and how free-ranging moose are affected by hot temperatures.

Fieldworkers and I also hiked about 200 miles in northeastern Minnesota last summer, collecting information from 155 sites that wild moose used to rest or "bed-down." While battling summer heat and humidity, mosquitoes, and biting flies, we measured just about everything at each site—from soil characteristics, to shrub species, to tree sizes. This information will be used to develop recommendations for resource managers, with the goal of keeping moose in Minnesota into the future.