Minnesota Moose

Written by Lauren Soergel

➢ Life History

Moose are the largest critters in the deer family of North America, next to caribou and elk. They typically stand 6 feet tall and weigh about 800-1000 pounds, which is 4-5 times more than a mature white-tailed buck! Their thick, brown fur coat of hollow hairs allow them to withstand freezing temperatures. They have a large hump over their shoulders and a flap of skin hangs from their chin, called a bell. Their long legs and snout, wide-splayed hooves, and nostrils that can seal to become waterproof allow them to forage aquatic plants in streams and marshes. In fact, moose are excellent swimmers and can swim up to 10 miles and even dive. They are docile animals and are generally non-threatening unless you come upon a cow (female) and her young or bulls (male) in rut, in this case she may charge to defend her babies. They can run up to 35 mph, so if you are charged start running! Try to get a tree or object between you and the moose as you retreat. They will usually stop chasing once you are a fair distance away. There are scant reports of moose attacks, while moose-vehicle collisions are much more common and deadly. Their main predators are black bears and grey wolves that will often take out young and old or sickly moose.

➢ Antlers

Though their physical size is incredible, bull moose grow terrific antlers that can reach 5 feet across and weight up to 40 lbs. During the beginning of the year, their antlers are covered in a soft velvet that is shed before mating season. Their giant antlers are shed in winter but immediately begin growing back.

"Moose have intrinsic value and are recognized for their importance to Minnesota. To the greatest extent possible, moose shall be managed for ecological sustainability, hunting, and viewing opportunities"

- **MN-DNR Moose Advisory**

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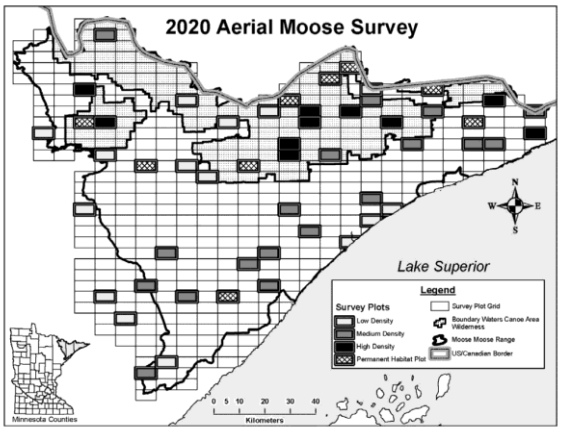
➢ Reproduction

While both female and male moose become sexually mature at 1 ½ years old, the male is not physically mature until 5 years and most breed between ages of 5-10. Mating season occurs September-October and calving occurs in May-June. It is typical for cows to have twin calves in healthy environments. Calves are born weighing 25-35 pounds and can stand/walk right away. They will nurse from their mothers for about 5 months, gaining 2 pounds each day. After weaning from their mother, they will remain close for a year. A cow may chase off a calf in order to raise a new baby. Moose stay within a small area, about 15 square miles for most of their adulthood. They may expand their territory if pushed out by human activity or if they find a better food source.



➢ History and Population

There are reports of moose in Minnesota since the start of the 1900's. Moose hunting was familiar to Native American tribes and early settlers who moved to the area for logging and mining. Moose hunting seasons occurred periodically throughout the 1900's and early 2000's. In 2013, the State closed moose hunting to all non-tribal hunter because the moose population dropped significantly. Wildlife managers continue to include moose habitat management in their plans, learning about their behaviors, and scheduling cross-agency conferences to discuss how to improve foraging opportunities, thermal cover, and decrease environmental and predator stressors.

Currently, moose hunting is open for three Anishinaabe (Ojibwe) bands- Fond du Lac, Grand Portage, and Boise Fort. For the time being, moose populations can support a limited tribal harvest of bulls only. Moose hunting is culturally significant for the Ojibwe bands as a single moose provides a bounty of meat that is often shared among many families, teaches the lessons of hard work and respect for nature and the animal, and allows tribal members to connect with their ancestors through upholding this tradition.

The Minnesota Department of Natural Resources partners with Fond du Lac Band of Lake Superior Chippewa and the 1854 Treaty Authority to conduct annual aerial surveys of moose. The 2020 flight estimated the moose population to be 3,150 individuals. This number is 64% less than the estimated moose population in 2006, when significant population decline was first detected. Moose are not listed as threatened or endangered because this number combined with populations found in other states has not yet reached a threshold that may lead to species extinction.

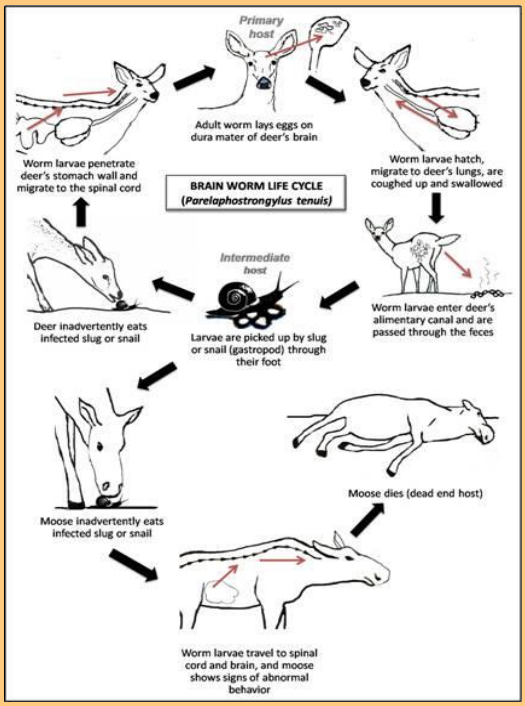
Year Aerial Survey Conducted	Moose Population Estimate	Cow:Calf
2006	8,840	0.34
2007	6,860	0.29
2013	2,760	0.33
2019	4,180	0.32
2020	3,150	0.36

➢ Diseases and Stressors

There are a number of environmental and pathogenic stressors that have led to abundant moose mortality. Necropsies are conducted on collared moose that die and allow researchers to search their livers for flukes, fur for winter ticks, brains for brainworm, stomachs for diet, and other signs that lead to cause-of-death. One struggle in northern Minnesota is trying to get to deceased moose before the wolves do. Sometimes scientists must hypothesize if a moose was killed by wolves or if the wolf scavenged a dead moose. Several years of study have shown how variation in deer and wolf populations affect moose calf survival. More deer means more wolves, and more wolves mean more calf predation. A study conducted by the MN-DNR in 2016 estimated 67% of calf mortality was caused by wolf predation within the first 30-50 days of the calf's life. Deer populations impact moose survivorship not by competition for forage, but by spreading a parasitic brainworm that often leads to moose mortality.

Brainworm (*Parelaphostrongylus tenuis*) is a parasitic worm that lives in the white matter of hooved-animals' brain. The parasitic worm lays eggs in the brain and larvae exit the body through fecal matter where they then invade terrestrial snails. Deer and moose accidentally ingest these snails while foraging. Deer are tolerant of the brainworm. However, warmer temperatures have allowed deer to migrate north into moose territory, bringing this parasite that causes moose to turn in circles or stand in place for hours, until they die or become prey. If you see a moose acting in this way, contact your local conservation officer.

Winter ticks are an issue for moose because of the large amount of blood loss they can cause. 2000 adult female ticks can drink ½ liter of blood. Moose may carry 100,000 ticks! They deplete the moose's blood and energy, making them more susceptible to disease and predation. Also, moose try to scratch off these ticks and may rub off their fur in patches which decreases their ability to stay warm during winters.



"Symptoms of brainworm infection in moose may include circling, weakness in the hindquarters or inability to stand as well as turning of the neck and head to one side, lethargy, apparent blindness, loss of fear, and rapid eye movement."

– Minnesota DNR Moose Research and Management Plan

➢ Diet

On average, moose consume about 70 pounds (9770 calories) of vegetation each day and their stomach can hold up to 100 pounds. Moose are generalist consumers, meaning they will eat whatever is available during that season. In the summer, moose eat a lot of aquatic vegetation that grows in wetlands, lake shores, and stream banks. In the winter, they rely more heavily on tree/shrub twigs and seedlings; they will even eat young balsam fir. Moose are tall animals. They can reach up to 9 feet to forage, yet it can be difficult to stoop their head lower than 18 inches to munch on the forest understory. Moose are most likely to forage in areas with a mix coniferous and deciduous forest. This is not only because there is a variety of food available but also because the trees provide thermal cover during cold winters and hot summers. Their "favorite foods" include mountain maple, mountain ash, paper birch, willow, and cherry trees.

➢ Habitat Management

According to the Moose Management Plan released by the MN-DNR in 2011, moose habitat is best managed to include a mix of young forest stands, older forests with gaps of regenerating seedlings and suckers, wetlands and marsh, riparian areas, brush lands with deciduous browse within reach, and thermal cover. Creating forest disturbance either by mechanical thinning or controlled burning, encourages new growth that moose can browse on. Past studies show moose respond positively to disturbance; meaning, where there's disturbance, there's moose. It is important to protect wetland and riparian areas, which are often threatened by industrialization and development. In areas of harvest, using a method that mimics disturbance patterns (fire, wind-storms, insect/disease outbreaks, etc.) is best and can be accomplished by thinning in small hand release treatment to protect desirable tree species and decrease competition for conifers. Aspen has taken over much of the landscape in Minnesota's boreal forests. Increasing the rotation age of aspen (meaning harvesting them at mature ages), will allow for understory development while retaining summer shade. It is ideal to allow the aspen to reach 50-75 years in age, however loggers often take aspen once they reach 40 years.

Many agencies have developed guides and best management practices that provide strategies for managing and harvesting Minnesota forests while addressing moose population decline. Try looking up some of these documents for more detailed information:

Identifying Woody Species Browsed by Moose in Northeastern Minnesota (Ward, 2021)
Integrating Habitat Need for moose with Timber Management (US-Forest Service, 1988)
Minnesota Moose Research and Management Plan (MN-DNR, 2011)
Timber Management for Moose Guidelines (Ontario MNR, 1988)
Video of 1854 Treaty Authority monitoring and interactions with Moose in Minnesota, 2021
Wildlife Guidelines to Habitat Management (MN-DNR, 1985)

North St. Louis Soil & Water Conservation District is here for you! We offer a variety of services to our community and its members. Contact our forester, Lauren Soergel, if have questions on how to manage your land for moose habitat, general forest management questions, or are looking for financial assistance to complete forest management projects. Visit our website for more information, resources, and services available. www.nslswcd.org