Species Status Assessment

Common Name: Moose **Date Updated:** April 21, 2025

Scientific Name: *Alces alces* **Updated By:** Dave Kramer & Jim Stickles

Class: Mammalia

Family: Cervidae

Species Synopsis *(a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):*

The scientific name has changed since 2015 from *Alces americanus* to *Alces alces*, with *A. americana* now a sub-species.

The largest member of the deer family and second largest land mammal in North America, the moose, has returned to New York State after more than a century of absence. As a circumpolar species, moose occur in boreal forests throughout the northern hemisphere, from Alaska eastward to the Atlantic Ocean, southward into the Rocky Mountains, northern Great Lakes, and New England. In New York, most moose are located in the northeastern part of the state in the Adirondack Mountains and the Taconic Highlands along the Massachusetts and Vermont borders (NYSDEC 2014). Moose began entering the state on a continuous basis in the 1980s and the current population is estimated at about 700 individuals as of 2018 (Hinton et al. 2022). Population trends are currently unknown, and any potential population expansion is likely limited by resource availability (Kramer et al. 2022).

I. Status

a. Current legal protected Status

i. **Federal:** None **Candidate:** No

ii. **New York:** Not listed; No Hunting Season

b. Natural Heritage Program

i. **Global:** G5

ii. **New York:** S3S4 **Tracked by NYNHP?:** No

Other Ranks:

-New York 2025 SGCN status: Species of Greatest Conservation Need

-IUCN Red List: Least Concern

-Northeast Regional SGCN: Watchlist (Assessment Priority)

Status Discussion:

This species is very widespread and extremely abundant despite intense hunting pressures in parts of its range and recent localized declines across the southern edge of their range in the states of Minnesota, Michigan and throughout New England.

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Stable	Stable	2015-2023		(blank)
Northeastern US	Yes	Declining	Stable	2015-2023		Yes
New York	Yes	Unknown	Unknown	2015-2023	Not listed	Yes
Connecticut	Yes	Stable	Stable	2015-2023		No
Massachusetts	Yes	Stable	Stable	2015-2023		No
New Jersey	No	N/A	N/A	2015-2023		No
Pennsylvania	No	N/A	N/A	2015-2023		No
Vermont	Yes	Declining	Stable	2015-2023		No
Ontario	Yes	Stable	Stable	2015-2023		(blank)
Quebec	Yes	Declining	Stable	2015-2023		(blank)

Column options
Present?: Yes; No; Unknown; No data; (blank) or Choose an Item
Abundance and Distribution: Declining; Increasing; Stable; Unknown; Extirpated; N/A; (blank) or Choose an item
SGCN?: Yes; No; Unknown; (blank) or Choose an item

Monitoring in New York *(specify any monitoring activities or regular surveys that are conducted in New York):*

Starting in 2015, a collaborative partnership between NYSDEC, SUNY-ESF and Cornell University was developed with goals of evaluating the population status of moose, quantifying population abundance and distribution, and assessing the relationships between moose and their habitat. As part of this partnership, aerial surveys were conducted from 2015-2019 with the objective of estimating a population baseline and to develop a population monitoring approach that the agency could redeploy to assess the long-term population trajectory (Hinton et al. 2022).

Additionally, twenty-six moose were captured in the Adirondacks from 2015-2017. Each animal was fitted with a GPS radio collar and released. The movements of the moose were remotely tracked, and the animals were monitored for calf production and survival. During the winter, researchers used helicopters to fly transects across the Adirondacks to survey for moose. During the summers of 2016 and 2017, researchers used trained detection dogs to locate and collect moose scat, which can be used to generate a population estimate as well as provide data about moose diet and health (Wong 2018). Researchers also tracked collared moose to understand their diet selection and sampled vegetation across the Adirondack Park to assess the quantity and quality of available food sources (Peterson 2020).

During the winters of 2022-2023, 31 moose calves and two sub-adults were captured and outfitted with GPS collars in core moose territory in Clinton and Franklin counties to monitor survival and dispersal movements. During this same period, 105 trail cameras were deployed and several locations were sampled for parasites throughout the study area to investigate the relationship between moose, deer, and parasites. While this study is on-going, preliminary results suggest that liver fluke is the primary parasite impacting moose in the core moose range. Several collared animals that died had unusually high loads of liver fluke parasites, often accompanied with evidence of bacterial infections, and poor body condition. Also, while there is overlap between deer and moose range, moose tend to exist in greater abundance in areas where deer abundance is lower, suggesting that species co-existence is most compatible when deer abundance is very low. This is consistent with other studies investigating the relationship between deer, moose, and parasites. Deer often are a reservoir host for liver fluke and

brain worm parasites and are generally unaffected by them, whereas moose appear to be more sensitive to infections of these parasites.

Trends Discussion *(insert map of North American/regional distribution and status):*

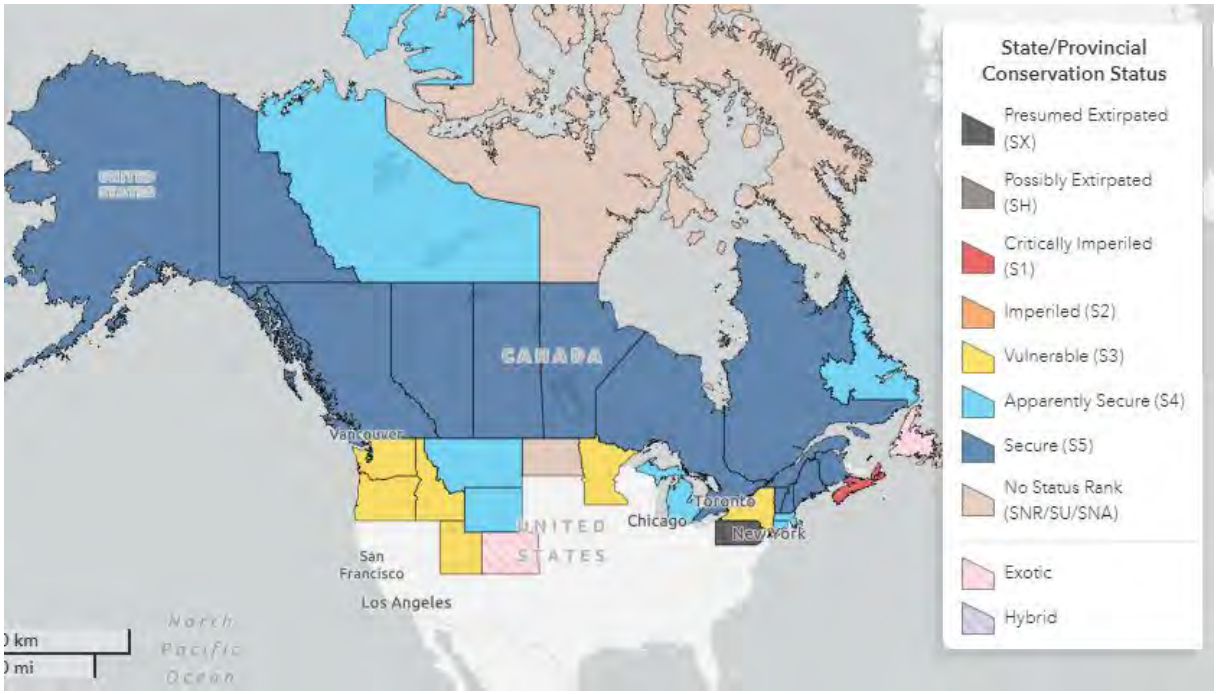

Figure 1. Conservation status of moose in North America (NatureServe 2023).

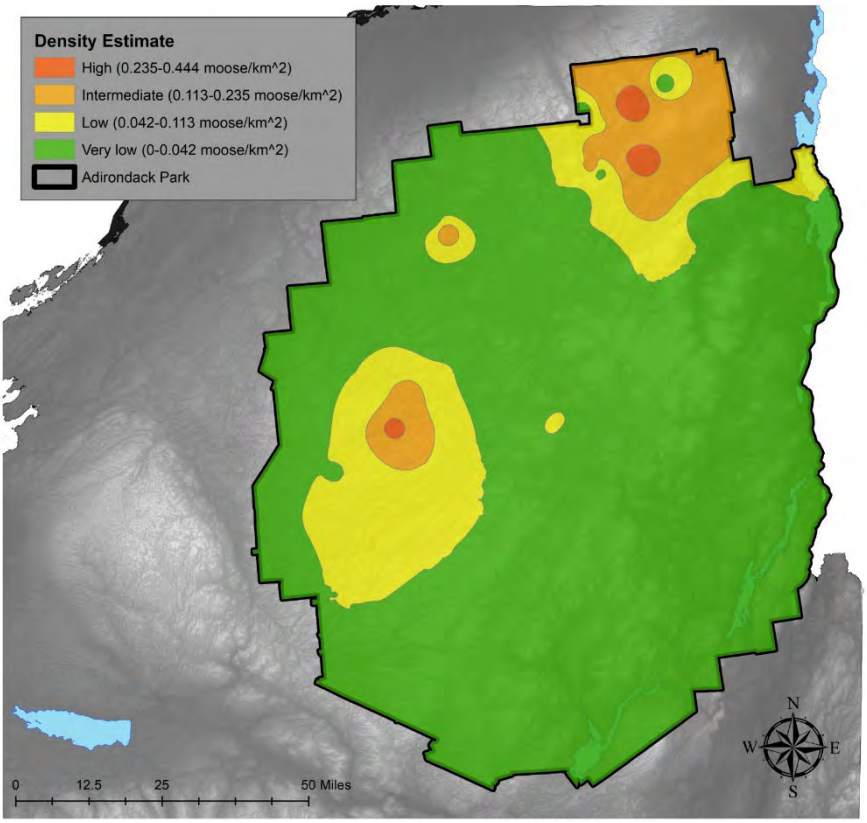

Figure 2. Moose density estimate for New York in 2018 (Hinton et al. 2022)

III. New York Rarity *(provide map, numbers, and percent of state occupied)*

Years	# of Records	# of Distinct Populations	% of State
Pre-1995		1	5
1995-2004		1	10
2005-2014		1	20
2015 - 2024		1	25

Table 1. Records of moose in New York.

Details of historic and current occurrence:

Moose (*Alces alces*) have long been present in the State of New York prior to the settlement of European settlers. Historical records that date as far back as the Pleistocene suggest that moose have always been present in the northern tier of the state, north of the Mohawk River (Fischer 1955, Ritchie 1969, Ritchie and Funk 1973). The decline of moose in New York corresponded with the expansion of European settlements into the northern tier of New York. European settlement expansion was followed by a period of intense logging for agricultural clearing and timber sales, resulting in the removal of over 75% of the state's forest by the 1880's. Following intense forest harvest and market hunting, moose were deemed extirpated from the landscape by as early as 1861 (Grant 1894). In response to the local

extirpation, there were four small-scale restoration efforts that occurred between the 1870 and 1902 to repatriate moose on to the northern New York landscape. The largest of the four events only involved 12 animals, but all efforts eventually failed (Colvin 1880, Wish 1902, Barnham 1909, Bump 1940). There had been evidence that a small number of moose periodically occupied the landscape between 1935-1980, none were known to have taken up permanent residence (Hicks and McGowan 1992a). Regular documentation of individual non-resident moose immigrating from neighboring states and provinces (i.e., Quebec and Vermont [Rosenblatt et al. 2022]) began by the late 1950's (Severinghaus and Jackson 1970). It wasn't until the mid-1980's that moose became a permanent fixture on the northern New York landscape once again, with early minimum estimates of 6-11 moose by 1986 (Hicks 1986).

By 1990, the estimated population had increased to 20, with a sex ratio skewed to males 3:1, indictive of a pioneering dispersion (Garner and Porter 1990). In 1992, NYSDEC drafted a proposal for a coordinated population restoration effort, however the plan was abandoned following substantial public safety concerns (Hicks and McGowan 1992a, Hicks and McGowan 1992b, Lauber and Knuth 1996). It is unclear exactly where these moose originated. New York moose exhibit a strong genetic resemblance to moose in Vermont, New Hampshire, Maine, New Brunswick, and the portion of Quebec that's south of the St. Lawrence River (Kretser et al. 2016, Rosenblatt et al. 2022), and it is suspected that they came from either Vermont and/or Quebec (Hicks 1986). Since the 1980s, DEC has collected public reports of sightings as an informal way of monitoring the species' progress. Though the methods for collecting reports have changed over time due to technology advancements, they are still useful as an index of population density and monitoring their presence on the landscape. During the early 1990s, DEC drafted an Environmental Impact Statement and conducted a series of public meetings on moose. As a result, DEC instituted several actions to follow until the moose population, or our understanding of it, changed substantially. DEC (1) supported the return of moose in the northern 14 counties of the state; (2) rejected a proposal to accelerate the natural return of moose through a translocation program; (3) recognized the need to monitor the species' progress, both to ensure its success and to meet public demand for information about moose; and (4) recognized the need to address nuisance situations (Hicks and McGowan 1992a).

While NYSDEC lacked an estimate of moose abundance, the agency determined that moose population was securely established and believed to be permanent by 1998 (Hicks 1999). This belief was driven by a steady increase in public sightings, increasing from under 100 in the late 1980's to over 200 by the late 1990's (Figure 3; Hicks 1997). However, the consensus was that the moose population was unlikely large enough to support regulated hunting, nor large enough to generate widespread concerns related to conflict and vehicular collision. The agency had yet to initiate a long-term monitoring program to assess future population growth but chose to discontinue the public sighting request due to a limited utility in 1999 (Hicks 1999). While the agency was able to deploy a series of telemetry collars from 1996-2002, there was a reduced opportunity to deploy additional collars and a decrease in the frequency of periodic monitoring flights to check on active collars by 2002 (Hicks 2002).

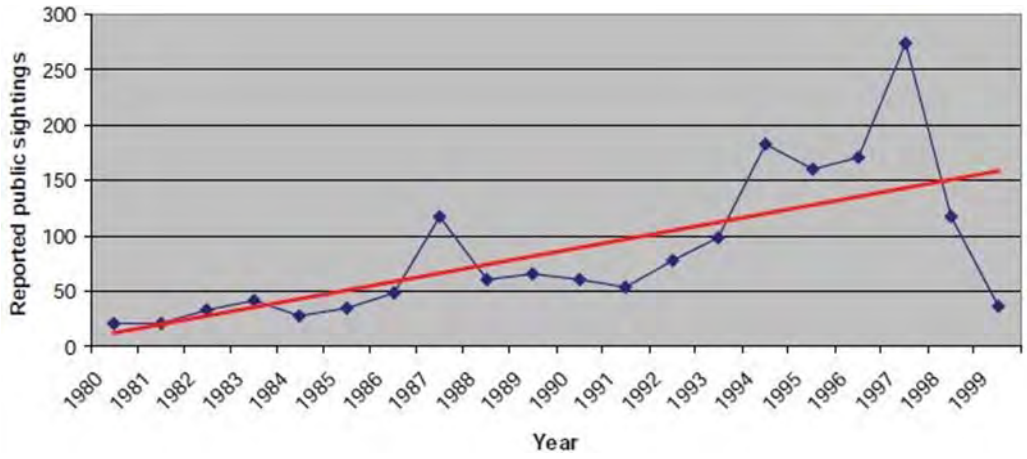

Figure 3. Moose sightings in the Adirondack Park reported by the public to DEC from 1980-1999.

Attempts to monitor the moose population using either fixed-wing aircraft or helicopters began again in earnest as early as 2007. Periodic aerial surveys have been conducted as early as 2007. However, the data collected from these flights are limited to potential population distributions and did not produce a population estimate. Additionally, an attempt was made in 2008 to quantify the quality and distribution of desirable moose habitat in the Adirondacks (Hickey 2008). The study suggested that most of the landscape was considered suitable for moose (73%), but only a small portion <35% was the highest quality of habitat that is often associated with mixed age stands interspersed with patched timber harvest and regenerating forest (Peek 1997). The study sought to utilize public sightings to validate the landscape prediction, however there seemed to be inherit bias where public sightings occurred (i.e., areas of higher population densities or regions with increased recreational opportunities), which questions the utility of public submitted moose sightings.

New York's Contribution to Species North American Range:

Percent of North American Range in NY	Classification of NY Range	Distance to core population, if not in NY
1-25%	Peripheral	

Column options
Percent of North American Range in NY: 100% (endemic); 76-99%; 51-75%; 26-50%; 1-25%; 0%; Choose an item
Classification of NY Range: Core; Peripheral; Disjunct; (blank) or Choose an item

IV. Primary Habitat or Community Type *(from NY crosswalk of NE Aquatic, Marine, or Terrestrial Habitat Classification Systems):*

a. Boreal Upland Forest
b. Boreal Wetland Forest

c. Laurentian-Acadian Northern Hardwood Forest

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/ Community Trend	Time frame of Decline/Increase
Yes	No	Stable	

Column options

Habitat Specialist and Indicator Species: Yes; No; Unknown; (blank) or Choose an item
Habitat/Community Trend: Declining; Stable; Increasing; Unknown; (blank) or Choose an item

Habitat Discussion:

As a circumpolar species, moose primarily inhabit boreal forests and tundra regions of the world including Europe, Asia, and North America. In New York, most individuals are located in the northeastern part of the state in the Adirondack Mountains and the Taconic Highlands along the Massachusetts and Vermont borders. Moose require large quantities of food as well as high quality forage, with adults consuming 40 to 60 pounds of browse every day. Foods favor considerably, but in general are early successional woody vegetation resulting from disturbances such as logging, fire, clearing, and flooding (Franzmann 1981). Trees and shrubs constitute 87% of their diet and favored plant species include willows, birches, maples, balsam fir, viburnums, aspen, and mountain ash (Franzmann 1981, NYSDEC 2014). They will also graze on grasses, forbes, lichens and mushrooms. After fall frosts or winter snows that kill or bury non-woody foods, moose may strip and eat the bark from small trees, mostly ash and maples. Moose utilize different habitats from summer to winter; they are excellent swimmers and feed heavily on aquatic plants of ponds and wetlands in the summer. They can dive up to 18 feet for these preferred foods which are highly sought after due to their concentration of macroelements such as sodium, calcium, and phosphorus, all important for antler development, lactation, and body growth (VTF&W). Because moose can suffer from overheating during the summer months, they must have access to dense shade and cooling waters. Lowland softwood forests are important for this reason, and beaver ponds or other shallow bodies of water are favorite spring and summer habitats for moose (VTF&W). Clearcuts are used throughout the year with individuals moving to hardwoods located near softwood cover in the fall because these forest types usually provide more winter food. Moose will seek softwood shelter when snow depths reach approximately 35 inches, the snow gets a heavy crust, or during extreme cold of windy situations (VTF&W). Kramer et al. (2024) reported that adult cow moose have an average annual home range of 21.6 $km^{2.}$

V. Species Demographic, and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/ Catadromous?
Yes	Choose an item.	Choose an item.	Yes	Yes	Choose an item.

Column options
First 5 fields: Yes; No; Unknown; (blank) or Choose an item
Anadromous/Catadromous: Anadromous; Catadromous; (blank) or Choose an item

Species Demographics and Life History Discussion *(include information about species life span, reproductive longevity, reproductive capacity, age to maturity, and ability to disperse and colonize):*

A typical moose lifespan is 10-12 years, with peak productivity around the age of 4-6. Moose cows can birth their first calve at 1 ½ years of age, but the first age of production is typically 2 ½. The breeding period occurs during fall, the months of September through November. When in good body condition, twin calves are not uncommon, with twinning rates around 30-40%. Calves will stay with their mother for at least a year, until the cow will drive them off prior to the next calving season. Female calves will typically take up residence in the same areas to which it was born, while male calves are more likely to disperse farther distances before establishing a home range.

VI. Threats *(from NY 2015 SWAP or newly described):*

Throughout much of its range, threats are primarily human-caused habitat alteration. Forestry and agricultural practices have caused extensive reductions in the extent of boreal forest in southern Canada, leading to increased occupation of white-tailed deer and therefore increased cases of brainworm in moose (Geist et al. 2008). Deer are not negatively impacted by the brainworm but this parasite is detrimental to moose, which infects the nervous system and usually leads to death, and may limit their populations in areas where deer are common. Other parasites such as liver flukes and lungworm can weaken moose and make them susceptible to secondary infections or nutritional deficiencies (Murray et al. 2006, NYSDEC 2014). Winter ticks have become a main mortality factor in other states with higher moose density. Long-term winter warming trends have led to less snow and a rise in tick populations, and ultimately a decrease in moose survival. Vehicular collisions are also a significant mortality factor in New York and throughout their range, especially where road densities are high, and the number of moose mortalities due to vehicle collisions has steadily increased in the state since 1990. In New York there are no natural predators of adult moose but black bears are a predator of calves and coyotes may occasionally take a calf.

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
4. Transportation & Service Corridors	4.1 Roads & Railroads	4.1.1 Roads • Moose are regularly struck by vehicles throughout the year, accounting for approximately 10-15 moose deaths annually throughout the state.	Large	Slight	Long-term	Stable and ongoing	High
5. Biological Resource Use	5.1 Hunting & Collecting Terrestrial Animals	5.1.4 Poaching/persecution of terrestrial animals • Moose are occasionally poached, or sometimes shot in self-defense.	Large	Slight	Long-term	Unknown	High
5. Biological Resource Use	5.1 Hunting & Collecting Terrestrial Animals	5.1.5 Management/control of terrestrial animals • White-tailed deer serve as a host for parasites that impact moose. State statute disallows deer management permits to be used in New York's "Northern Zone", thus limiting the ability for deer to be effectively managed in core moose range.	Large	Moderate	Near-term	Intensifying	High
8. Invasive & Other Problematic Species	8.2 Problematic Native Plants & Animals	8.2.7 Ectoparasites • Winter ticks are becoming an increasing issue in areas with the greatest moose densities.	Large	Slight	Long-term	Intensifying	Moderate
8. Invasive & Other Problematic Species	8.4 Pathogens	8.4.4 Worm-induced disease (Liver flukes)	Large	Moderate	Long-term	Unknown	Moderate
8. Invasive & Other Problematic Species	8.4 Pathogens	8.4.4 Worm-induced disease (Brain worm)	Large	Slight	Long-term	Unknown	Moderate

8. Invasive & Other Problematic Species	8.4 Pathogens	8.4.6 Prion diseases • Chronic Wasting Disease was detected in a captive deer in Herkimer County during October 2024.	Unknown	Unknown	Unknown	Unknown	High
11. Climate Change	11.1 Habitat Shifting & Alteration	11.3.1 Heat waves • Moose are adapted for cold climates – at a minimum, heat waves impact moose behavior by making them seek cooler refugia, but more severe impacts may include hyperthermia and/or death.	Pervasive	Slight	Long-term	Unknown	Low
11. Climate Change	11.3 Changes in Temperature Regimes	11.3.3 Gradual temperature change • Reduced winter severity in recent years has caused increases in deer populations. Increased deer densities facilitate parasite impacts.	Pervasive	Moderate	Near-term	Intensifying	High

Table 2. Threats to Moose.

Are there regulatory mechanisms that protect the species or its habitat in New York?

Yes: X **No: _____** **Unknown: _____**

If yes, describe mechanism and whether adequate to protect species/habitat:

The Adirondack Park was created by the New York State Legislature in 1892. State-owned Forest Preserve comprises 2.6 million acres (42%) and is protected by the state constitution as “forever wild”. One million acres of the Forest Preserve is further classified as wilderness.

Although the New York State Conservation Council began lobbying state legislators in 2011 to initiate the process of creating a moose hunting season, hunting moose is still illegal at this time.

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

There are currently three parasitic concerns for NY moose, winter ticks, liver flukes, and brain worm. Winter tick epidemics are affected by moose density, so NYSDEC could decrease the likelihood of a winter tick epidemic by artificially suppressing the population at a low density. To accomplish this, the legislature needs to grant NYSDEC the ability to set a moose hunting season to use as a tool to manage populations.

Liver flukes and brain worm affect moose health and can result in mortality, but they are primarily distributed across the landscape by deer. Recent research suggests that as deer densities increase, parasite risk increases for moose (Grauer 2024), therefore theoretical reductions of deer densities could mitigate the negative impacts of parasites on moose. Opportunities to harvest antlerless deer in Northern Zone are limited to archery and muzzleloader seasons. In the absence of harsh winters, these limited antlerless harvest opportunities are proving to be ineffective at keeping deer populations stable with populations growing rapidly in and surrounding the areas where the greatest density of moose exists in NY. Legislative action granting NYSDEC the ability to issue deer management permits (DMPs) in the Northern Zone could help stabilize deer populations in the absence of harsh winters, and thereby mitigate impact of deer-spread parasites on moose, allowing them to more effectively populate and persist in areas where good habitat exists.

Action Category	Action	Description
A.2 Direct Species Management	A.2.1.4.4	Control deer populations to reduce spread of parasites to moose
B.3 Outreach	B.3.1.4.16	Increased/targeted road signage to reduce vehicle strikes
C.7 Legislative and Regulatory Framework or Tools	C.7.1.2.2	Create moose hunting season; create ability to issue DMPs for deer in Northern Zone

Table 3. Recommended conservation actions for moose

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