

New York State

Moose

Response Manual



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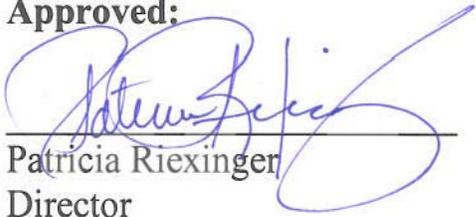
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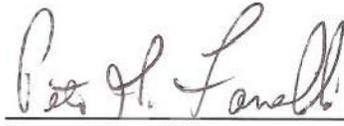
Prepared under Federal Aid Project WE-173-G

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Acronyms Used in this Manual

BOW – DEC’s Bureau of Wildlife

DEC – Department of Environmental Conservation

DLE – DEC’s Division of Law Enforcement, including environmental conservation officers

DOT – Department of Transportation

ECL – Environmental Conservation Law

OPP – DEC’s Office of Public Protection, including both the Division of Law Enforcement and the Division of Forest Protection

Department of Environmental Conservation website

www.dec.ny.us

I INTRODUCTION

After more than a century of absence, moose (*Alces alces*) returned to New York State in the early 1980s. Re-establishment of a moose population is both a wildlife success story and a reflection on forest recovery in the Northeast. The best projections for the future, absent yet unknown impacts of climate change, suggest moose numbers are increasing. While moose generally are viewed as a positive sign of a healthier, more complete natural system, there are problems associated with their return. The landscape today is different than it was 100 years ago, with more people, more structures, more traffic and roadways, and land uses that are often incompatible with a large herbivore. Moose may endanger themselves and people when they move across highways or into developed areas. They may also damage agricultural crops and private property or harm livestock.

Balancing the needs and benefits of moose with public safety and protection of property is a goal of this guidance document. It features an outreach strategy to provide local law enforcement authorities with information on appropriate actions to take if a moose is reported in their community. While much can be accomplished with information and education, direct Department of Environmental Conservation (DEC) intervention will be required in some circumstances.

This manual represents the efforts of DEC staff primarily across the northern part of the state. The advice, suggestions, and procedures outlined are considered sound and have proven effective over time. However, the manual is a “living document” that will be updated as further knowledge and experience are gained.

The complete manual is available on DEC’s website at <http://www.dec.ny.gov/animals/74663.html>. Users should refer to the on-line manual because it will be updated periodically, unlike the paper version.

II HOW TO USE THIS MANUAL

This manual contains information to help DEC staff and other interested parties address various situations involving moose. To identify appropriate responses to a report involving a moose, turn to the Table of Contents, select the situation that best fits the circumstances, and then refer to that section of the manual. Each situation included contains background information and a list of recommended actions that will be useful in resolving it. A simple rating system describes three basic levels (classes) of response and a list of situations where each response is appropriate.

OUTREACH AND INTERACTION WITH LOCAL AUTHORITIES

Law Enforcement Agencies, State Police and 911 Dispatchers

Local authorities (e.g., police and animal control officers) are likely to receive requests for assistance when wildlife appear to pose a danger to public safety. DEC is committed to protecting public safety, and our response is most effective when local authorities are involved during field operations involving moose.

DEC's outreach efforts are intended to inform local authorities about our protocols and recommended standard courses of action that can resolve situations involving moose. In addition to the manual being available on DEC's website, our agency's wildlife and law enforcement staff will offer information and their expertise on moose to local authorities. Documents in the appendix provide general references on moose life history, a quick guide for responding to moose-related calls, applicable laws and regulations, and important contact numbers for assistance.

Local agencies should be aware of several behavioral traits of moose that necessitate keeping the public at a safe distance in every situation. While moose are not normally dangerous, they can become very aggressive when harassed by people, dogs, and traffic. Moose that allow people to approach them are perceived as tame, leading some to go even closer. Moose become stressed when repeatedly approached or when chased away. Each moose has a different (and unpredictable) tolerance to stimuli. Moose aggressiveness is also a concern during the fall mating season (late September through October) and in late spring through summer when cows have calves. In most situations, the animal will move off without incident if left alone. When the situation involves a moose in a densely populated area, local agencies should contact DEC's 24/7 Law Enforcement Dispatch Center at:

1-877-457-5680

BASIC RESPONSE GUIDELINES IF A MOOSE IS SIGHTED IN THE AREA

- Advise callers to leave the moose alone.
- Tell pet owners to restrain their dogs.
- Advise those on the scene to keep crowds away and avoid following the animal. Pursuit not only stresses it but increases the risk of the animal running into traffic or a group of bystanders.
- If a moose is seen on or near a heavily traveled roadway, report its location to law enforcement units in the area, and monitor its movements.

FIELD RESPONSE BY DEC STAFF

Some situations discussed in this manual require a field response by DEC. Activities such as the transfer of a moose carcass under chain-of-custody procedures can be handled with little training. However, situations that require handling live moose should be limited to DEC personnel with knowledge of moose behavior, and only authorized staff should undertake the immobilization, capture, handling, and relocation of a moose. In this manual, “authorized” refers to personnel who have successfully completed at least one formal 16-hour course in chemical immobilization techniques and have had hands-on experience in immobilizing free-ranging wildlife (e.g., deer, bear, or moose). Public safety, animal welfare, site constraints and the safe use of immobilizing equipment and drugs must be considered before a decision is made to chemically immobilize a moose. ***Do not perform chemical immobilization without the direct supervision of one or more authorized individuals or as directed by a cooperating wildlife veterinarian!***

AFTER-HOURS AND WEEKEND RESPONSES BY DEC STAFF

The Bureau of Wildlife (BOW) and the Office of Public Protection (OPP) are typically involved in responding to moose incidents. Outside normal working hours, Division of Law Enforcement (DLE) staff usually receive initial calls regarding moose at the dispatch number **(1-877-457-5680)**.

BOW and DLE staff jointly decide the appropriate response based upon the circumstances, location, potential threat to public health and safety, and staff availability. The regional wildlife manager and the duty lieutenant coordinate dispatch of staff for situations that require an active response as described within the following pages. Staff experience or availability, regional staffing levels, and competing priorities may result in different levels of response.

MOOSE RESPONSE OPTIONS

Throughout this manual, three basic responses are referenced for various moose scenarios. The more passive approaches (technical advice/education, leave alone/monitor) require only some knowledge of moose, a thorough understanding of the situation and good judgement. A field response may be necessary to determine whether a more active response is needed. Active approaches include chasing or herding, chemical immobilization and relocation, and lethal removal. For each of these options, the potential risks should be assessed. In every case, human safety is the primary concern. When choosing to take an action, the following factors and recommendations should be considered.

Chasing/Herding/Hazing

Moose are large, wild animals and cannot be expected to necessarily or predictably respond to being chased or herded. Obstacles less than six feet high, including fences, may not deter an adult moose. Because moose can be dangerous, chasing and herding should not be attempted on foot, except from a safe distance. In situations where chasing/herding/hazing is considered for moving a moose away from roads or populated areas, it should generally be done from an enclosed vehicle. Crowd and traffic control are essential elements in maintaining a clear path to a safe and quiet escape route. It is preferable to herd as passively as possible to allow a relatively calm moose to choose a safe path away from danger. Hazing with flashing lights, sirens, and horns should only be considered if the animal does not respond to initial attempts at less aggressive herding or herding from a distance. Chasing and herding should not be used in circumstances where a poor result (moose traveling in the wrong direction) would pose an imminent threat to human safety or the safety of the animal. In very rare cases, using a physical stimulus like rubber buckshot (with DEC permission) or air horns may be warranted.

Immobilization/Relocation

Chemical immobilization and relocation of moose should only be done by trained and experienced individuals. **Standard procedures learned in accredited training and/or provided by a cooperating wildlife veterinarian should be followed.** For chemical immobilization to be safe and effective, a level of control must be maintained at the capture site. Factors such as ambient temperature, time of day, and the physical condition and temperament of the animal must also be considered before immobilization is attempted. Immobilizing a large animal in an urban environment presents significant risks, including serious human injury, property damage, and injury to the animal. Drug induction times of several minutes may allow enable a moose to travel a mile before the drugs take full effect. In practice, a few hundred yards is more common, and operations where the animal is confined and drug induction is rapid are most likely to be successful.

The darts and drugs used to immobilize moose may pose a serious public safety risk, and there should be absolutely no possibility of anyone being hit by a projected dart.

Bystanders must be kept away from the capture site and any potential escape routes the moose might take. It is extremely important to recover all darts. The best ways to ensure dart recovery are to use adequate-sized barbs to prevent darts from falling out after impact and to use darts equipped with radio transmitters in case they miss the animal or fall out of it.

Lethal Removal

Lethal removal by shooting may be appropriate when failure to control the moose would risk human injury or serious injury to the moose or to humanely euthanize a sick or injured moose. Because conditions can change quickly, a dynamic risk assessment must be made by the person in charge of deciding whether and when to shoot a moose.

Managing the Public

Issues associated with lethal removal are similar to those for chemical immobilization. Public safety, both in the immediate area and in the potential path of bullets or a fleeing moose, must be secured. OPP and/or local law enforcement personnel should have primary responsibility for keeping bystanders away from the area. Responding personnel must also be sensitive to public perceptions about the need to dispatch an animal, and staff should be assigned specifically to interact with the public at the scene.

Dispatching a Moose

A rifle caliber that generates a minimum of 2,500 foot-pounds of energy (at muzzle) is recommended (e.g., .270 Winchester, .280 Remington, 7 mm Remington magnum, .30-06 Springfield, .308 Winchester, and the more powerful magnum cartridges). A 12-gauge shotgun with slugs may be adequate at close range *if it is the only option available*.

The preferred location (see figures below) for a QUICK dispatch is a shot in or behind the ear, with the shot angling forward into the brain. Note that moose have a very long and narrow head, and that the animal's brain is confined to that part of the skull behind the eyes. The clearest shots to the braincase are to the side of the head, as described above, or to the top of the head if the animal is lying down or is lowering its head. For proper shot placement from the front, imagine an 'X' from each eye to the opposite ear, and aim for the area where the lines intersect. If the moose is standing with its head up, there may not be a clear shot to the braincase from the front unless the shooter is above the moose.

To prevent ricochet off the top of the skull, make sure the shot has sufficient angle. In cases that involve the dispatch of a moose that has been hit by a vehicle, a head shot is recommended. Alternative locations for killing shots include the neck at the base of the skull and the heart/lung area of the chest.

Shot placement for dispatching a moose



Figure A

For a head-on approach, the firearm should be aimed so that the projectile enters the brain (Figure A). Make sure the angle of the skull is sufficient for preventing a ricochet. The correct site for the head-on approach is the intersection of lines drawn from the base of the ear to the center of the orbit of the opposite eye.



Figure B

For a side approach, the firearm should be aimed so that the projectile enters the brain (Figure B). The correct site for a side shot is in front of the base of the ear and slightly higher than the back of the eye.

For a back approach, the firearm should be aimed so that the projectile enters the brain. The correct site for the back approach is a shot in or behind the ear, with the shot angling forward into the brain.

Before an animal is dispatched, an assessment must be made of potential dangers (e.g., ricochet and pass-through) associated with shooting near a roadway, a crowd of people or homes. The shooter must also consider potential paths the moose might take after the shot and possible locations where the animal will die. After the animal has been killed, the appropriate highway or public works agency should be contacted to discuss carcass removal. If a motorist collides with a moose, ECL 11-0915 (Appendix E, page 32) authorizes the motorist to keep the moose for personal consumption.

DEC staff authorized to dispatch a moose must follow protocols in the Division of Fish, Wildlife & Marine Resources Standard Operating Procedure #24, "Collection and Sampling of Wildlife with Firearms."

MOOSE RESPONSE RATING

To promote both consistency and realistic expectations of DEC responses to various situations involving moose, the following rating system has been developed. This quick reference distinguishes situations with the greatest, most immediate risks to public safety and the need for immediate and direct DEC response (Class 1) from those requiring a lesser response. DEC staff can be expected to be directly involved in Class 1 situations but may have only indirect and/or minimal involvement in Class 2 and Class 3 situations.

CLASS 1

A moose that is exhibiting actions or is located in a position that makes it an IMMEDIATE risk toward humans, domestic livestock, or itself

Moose in this class require immediate response to resolve human or animal safety issues. This category might include moose that are on or adjacent to highly traveled roadways, are sick or injured, or are aggressive toward people or livestock.

Response to a Class 1 incident should include calling DEC 24/7 dispatch at 1-877-457-5680. Appropriate regional wildlife manager and OPP personnel will be notified through this call.

CLASS 2

A moose that is exhibiting actions or is located in a position that MAY make it a threat toward humans, domestic livestock, or itself

Moose in this class include those that have an avenue of escape from a potentially dangerous situation. Technical advice may be warranted. No field response may be needed at this time. Regional OPP officials and local law enforcement officers should monitor the moose's movements.

CLASS 3

A moose that is observed exhibiting normal, natural behavior

Moose in this class include those observed using natural habitat and travel corridors, including the yards of rural residents. No response is necessary beyond basic information and education.

III MOOSE SITUATIONS AND RESPONSES

MOOSE OBSERVATIONS AND SIGHTINGS

Ever since moose disappeared from New York State in the late 1860s, there has been interest in their return. That interest was fueled in the late 1970s when the state became home to more than an occasional wanderer. As time passed, most moose entering the state from surrounding areas continued to survive, and their numbers appeared to increase. The 1990s sparked a flurry of reported sightings of these animals and prompted DEC to collect moose observation and sighting information. From these reports, it was clear that New York had a secure and viable moose population. Moose are now seen throughout the northern areas of the state.

Moose sightings provide unique and exciting opportunities for people who enjoy wildlife, and reports of moose sightings continue to provide DEC with useful information. With the assistance of geographic information systems (GIS) software, public observations now allow DEC to easily view moose locations, determine possible avenues of moose travel and attempt to predict and prepare for potential human safety and nuisance issues. DEC continues to work in cooperation with the New York State Department of Transportation (DOT) to identify areas of high moose concentrations, frequently used corridors of travel, and appropriate placement of road safety signage.

Moose in areas where there is potential for human or other safety conflicts should be reported to the DEC 24/7 dispatch. All vehicle strikes or unknown causes of moose mortality should also be reported to DEC.

Recommended Actions for Observations and Sightings

- Request the location, time, and nature of the observation. Question the person reporting the moose to determine its size, sex, and markings (e.g., ear tags, color/numbers).
- Determine the reason for reporting the observation, whether out of curiosity, human safety, or a need for additional information. If the reason for the report does not involve human safety, discuss basic moose range, biology and management. Provide additional information on moose, including handouts. If the person has Internet access, refer them to DEC's website (www.dec.ny.us) or additional sites where moose information is available (wikipedia.org/wiki/moose, www.wildlifesearch.com/moose.htm).
- If there was a moose-vehicle collision, report the location to the appropriate highway department and OPP staff dispatch. Inform the motorist that they are entitled to keep the carcass or may transfer it to a designated person pursuant to Environmental Conservation Law (Appendix E, page 32, Section 11-0915). If the person reporting the moose-vehicle collision is not the motorist who struck the

animal but wishes to take the carcass, inform them that they should contact an environmental conservation officer (ECO) or the state or local police. The responding officer may, at his or her discretion, issue a permit to possess the carcass. If the moose is ear tagged (metal or plastic), it may be unfit for human consumption due to potential recent use of chemical immobilization agents. The issuance of a carcass possession tag should be discussed with regional wildlife personnel. Because moose are very large, possession of the entire animal is unlikely, and the highway department may need to remove remains of the carcass.

- When a moose is found dead from an unknown cause, the course of action is primarily data collection, and the case should be reported to OPP dispatch. (1-877-457-5680). When a crime (e.g., poaching) or disease is suspected, DLE and BOW staff should determine whether a field necropsy (animal autopsy) is warranted and what the best method for it would be. BOW staff and necropsy staff at Cornell can provide assistance with retrieval and transport of appropriate tissues when needed for clinical or forensic pathology. Rapid response in these cases may be necessary to assist in determining the cause of death.
- If the location is near a DEC regional boundary (Appendix D, page 31), DEC staff should inform the adjacent regional wildlife manager and OPP staff.

MOOSE IN OR NEAR HIGH TRAFFIC AREAS

Moose encountered on or near heavily traveled roads, particularly interstate highways, may be an immediate threat to motorist safety. Factors such as direction of travel, available open space on the opposite side of the highway, and existing fencing (e.g., height of wire, sound barrier) should be considered. Most often, a law enforcement agency will respond first, and, depending on the moose's proximity to the highway, may need to take action without the advice or participation of DEC.

If a decision is made to kill the animal by shooting, extreme caution must be used, and the shooter must use dynamic risk assessment methods to ensure safety as conditions change. Best practices for lethal removal are referenced under Moose Response Options (pages 8-9) in this manual. In situations where public safety could be further jeopardized by shooting, no action should be taken.

Recommended Actions In or Near High-Traffic Areas

- For moose **on** a heavily used high-speed highway, shoulder, or median, control traffic by reducing vehicle speed or stopping traffic and alerting motorists. Use chasing/herding/hazing options to direct the moose toward more suitable areas. If the moose is in a situation that does not allow for these options, then it should be shot.
- For moose **approaching** a high-speed highway (>50 mph), monitor its movement, implement traffic control, and attempt to chase the moose away from the highway. Use chasing/herding/hazing options to direct the moose toward more suitable areas. If the moose is in a situation that does not allow for these options, and its entering the highway seems imminent, then it should be shot.
- For moose attempting to cross busy secondary roads in urban or suburban areas, use these guidelines:

Areas of Low Human Density - Monitor movement, implement traffic control. Use chasing/herding/hazing options (page 8) to direct the moose toward more suitable areas.

Areas of High Human Density -Refer to the following section—Moose in an Urban Area.

MOOSE IN AN URBAN AREA

The recent growth of New York State's moose population has been accompanied by a range expansion that has brought moose closer to developed areas and resulted in moose entering urban areas with greater frequency. Urban moose situations arise most often in May and June during spring dispersal of yearling moose and during the breeding season in September and October, when both cows and bulls travel widely. Moose may wander along a patch of forest or waterway that leads from suitable habitat into a highly developed urban area. In many cases, the use of chasing/herding/hazing options (page 8) to direct the moose toward more suitable areas may be necessary. In some cases, concerns for public safety, property damage, and the well-being of the moose may make it necessary to immobilize and relocate the moose. In other circumstances, the moose may need to be killed.

To determine the best course of action when a moose is about to enter or has entered an urban area, the options listed below should be considered. The likelihood that any option can resolve the problem will depend on several factors, including the distance the animal must travel before reaching a more suitable location, how highly developed the area is, the number and types of barriers that may prevent the animal from safely reaching a more suitable area, whether the public can be controlled, and whether the animal is highly excited or stressed from being chased.

Involvement by DEC staff in urban moose incidents can range from simply providing technical advice to those on the scene, to capturing and relocating or killing the animal. In all situations involving urban moose, participation of local law enforcement staff is crucial for monitoring and providing information on the animal's location, controlling the public, getting DEC staff to the moose, and providing security during immobilization operations. In situations where a decision is made to remove a moose from an urban area, a rapid response by DEC staff may be critical to a successful relocation.

Evaluation Options for Moose in an Urban Area

- Keep track of the moose and allow it to move through the area. This will require that the public be kept from forming crowds around the animal and that police agencies not chase the animal.
- Chase/herd/haze the moose toward more suitable areas, especially when direct escape routes away from developed areas are available. The moose may need to be immobilized and relocated if chasing is clearly ineffective.
- Shoot the moose when it poses an immediate threat to public safety or when it has suffered a debilitating injury.

Recommended Actions for Moose in an Urban Area

- When a moose is reported to be near or in an urban area, closely monitor the direction and speed of travel of the animal through communication with officers and dispatchers for all law enforcement agencies involved. Law enforcement officers on the scene should be directed to make every effort to keep the public away (several hundred feet) from the moose, maintain escape routes for the animal, and monitor it without chasing it. Inform dispatchers in adjoining police jurisdictions of the situation so that they will anticipate reports of a moose and know to whom information should be forwarded.
- The moose's current location should be evaluated to determine whether it is traveling in a general direction that will take it into a more suitable area relatively quickly or whether it might be possible to direct the moose away from a developed area. If the moose is on the outskirts of a densely developed area, it may simply be allowed to wander, or it may be possible to redirect its course toward more suitable areas with hazing techniques. Stopping traffic on sections of busy roads where the moose is likely to cross can lessen the hazards along a travel path or escape route for both the moose and people.
- If a moose is deeper into an urban area where options for a relatively quick and direct escape are extremely limited, the moose should be immobilized and removed. Chemical immobilization and relocation of moose should only be done by trained and experienced individuals.
- If a moose is deeper into an urban area where options for a relatively quick and direct escape are extremely limited, the moose is presenting a clear threat to public safety, property damage, and its own well-being, and the situation does not allow for the other options above, then it should be shot and removed from the area.

MOOSE IN AN ENCLOSED STRUCTURE

On occasion, moose may wander from natural travel corridors and become confined within a fenced-in area or enclosed structure. Once confined, they seldom locate an exit route, and an immediate response from DEC may be required.

Recommended Actions for Moose in an Enclosed Structure

- When a moose is enclosed in a structure, it can become agitated and, in some cases, aggressive. Law enforcement officials should focus on keeping people from approaching the area. Moose can easily clear a 5 to 6 foot-high fence if pressured, and, depending on the fence, serious injury to the animal could occur.
- Determine whether the situation allows for use of herding/chasing/hazing techniques to encourage the moose to go in a specific direction to exit the enclosure. If there are no good avenues for the moose to exit the enclosed area, consider dismantling part of the fence with permission from the landowner. When herding, a slow, passive approach is best to avoid exciting or stressing the animal. If herding fails and chemical immobilization is required, a stressed moose will be far more difficult to handle.
- When a cow moose and calf(ves) become separated by a natural or other physical barrier, evaluate potential ways to reunite the stressed animals. Determine which animal would be most apt to respond well to herding/chasing/hazing techniques, and encourage it to go in a specific direction around the barrier and toward the others. If a calf is small enough to catch and carry, it should be moved to a location that allows for the moose to reunite. Extreme caution is required as the cow could easily become very protective of the calf. Failure to herd the moose or move the calf may require the cow to be chemically immobilized and moved. Avoid chemical immobilization of the calf(ves) unless absolutely necessary.
- If chemical immobilization is required, follow suggested immobilization/relocation options discussed under Moose Response Options (pages 8-9) in this manual.

AGGRESSIVE MOOSE

Aggressive moose are rarely encountered. In these cases, it may be necessary to destroy the animal. Moose do not exhibit the typical fear of humans common to most wild animals. The general public, including law enforcement officers, often perceive an approaching moose as an aggressive animal that threatens personal safety. Truly aggressive behavior most often involves adult bulls in rut and cows with calves and is typically preceded by a posture where the head is lowered, the ears laid back, and the hair on the back of the neck raised. Animals not exhibiting these behaviors should be treated according to the protocols previously discussed.

Recommended Actions for Aggressive Moose

- Law enforcement agencies on the scene should always be directed to keep people as far away from a moose as possible to avoid any direct encounters. DEC and law enforcement personnel should confer to assess how dangerous an animal may be and determine an appropriate action as described under Moose Response Options in this manual.
- Bull in rut – A bull in rut can pose a hazard to public safety and livestock and may pose a risk to itself. If a passive approach (i.e., allowing the bull to exit the area on its own) is not possible, the animal should be immobilized and relocated by trained DEC staff. If the constraints associated with immobilization cannot be met, then plans should be made to humanely dispatch the animal.
- Cow with calf – If a cow is aggressive in defense of her calf or calves, the first step is to try to calm the animal by removing the threatening stimulus. This could involve crowd control, limiting the number of staff at the site, and removing barriers that would prohibit the cow and calves from leaving the area on their own. If the animals cannot or will not leave, the preferred method is to immobilize and relocate them. It is important that trained and experienced personnel be involved in any chemical immobilization operation, especially because adult and juvenile moose have different drug-dosage requirements. Generally, calves should not be immobilized because there is a higher risk of an overdose with smaller animals.

MOOSE CALF APPEARS ORPHANED OR SEPARATED FROM COW

Observations of moose in the northern and northeastern parts of the state continue to increase with the growing population of adult and juvenile animals. With this comes the possibility of (a) calf(ves) being temporarily or thought to be temporarily separated from the cow. Situations may also occur when the cow has been permanently removed from her young via a vehicle strike or other form of mortality leaving orphaned juveniles.

Though these situations may be rare, responses to orphaned juvenile moose may include taking no action, herding/chasing/hazing, or lethal removal. Small calves should not be chemically immobilized, although this may be the only viable option. Rehabilitation may be feasible; however, effective January 1, 2011, individuals with a Wildlife Rehabilitation License are prohibited from taking or possessing a moose under his or her license. The DEC Special Licenses Unit will establish protocols, including training and facilities inspection, for rehabilitating orphaned moose. When a wildlife rehabilitator meets the qualifications for rehabilitating moose, his or her license will be amended to allow the rehabilitation of orphaned moose. Rehabilitation of adult moose is prohibited in New York State.

Young cows normally have one calf, while mature cows may have twins or, rarely, triplets. The gestation period is about 230 days, and calves are born in late May or early June and weigh 20-25 pounds at birth. When responding to these situations, be prepared to handle more than one animal.

In spring, just before cows have their calves, they separate from their previous year's young. It is very common to see yearling moose looking "bewildered" at this time as they begin to separate from the family group. This is normal behavior, and, while it is sometimes necessary to herd/chase/haze such animals away from roadways or highly visible areas where people may try to approach them, typically a DEC field response is not warranted.

Recommended Actions for an Orphaned or Separated Calf

- A. If the cow is not present and there are no signs of mortality
 1. Leave the calf alone, and allow at least 24 hours for the cow to reunite with her young. Take steps to provide the opportunity for a reunion with the cow by keeping the public and domestic animals away from the vicinity. Provide assistance to move the calf to a more secure location if necessary. If the calf has been removed by a member of the public, return it to the same or a nearby secure spot, and release it.
 2. If the calf has not reunited with the cow after 48 hours, it may be considered a candidate for rehabilitation. This is especially true if the calf may be easily captured. Otherwise, if it can readily escape capture, it should be considered capable of surviving on its own.

3. If the calf is to be permanently moved, contact regional DEC staff (Appendix D, page 31) for advice on the location of a licensed and qualified wildlife rehabilitator. Until New York State has wildlife rehabilitators who are qualified and approved to accept orphaned moose calves, such animals will either be euthanized or taken to a zoological facility qualified to house the animal.
4. Capture and transport the calf to the appropriate facility.
5. If the only option is to remove the calf, and a suitable facility has not been found, chemical immobilization followed by relocation or euthanasia should be considered. Follow suggested immobilization or euthanasia procedures (pages 8-9).

B. If it is determined that the cow is dead

1. When a dead cow is found, examine the carcass to see whether the moose was lactating, indicating that a calf or calves should be nearby. A search of the surrounding area may be conducted to see whether this is the case.
2. If a calf is found, determine its location, age, and status. If the calf can be caught with a minimum amount of effort, stress or injury, then it should be considered a candidate for rehabilitation. Otherwise, if it can readily escape capture, it should be capable of surviving on its own.
3. If the calf is to be permanently moved, contact regional DEC staff (Appendix D, page 31) for advice on the location of a licensed and qualified wildlife rehabilitator. Until New York State has wildlife rehabilitators who are qualified and approved to accept orphaned moose calves, such animals will either be euthanized or taken to a zoological facility qualified to house the animal.
5. Capture and transport the calf to the appropriate facility.
6. If the only option is to remove the calf, and there is no place to bring it, chemical immobilization followed by relocation or euthanasia should be considered. Follow suggested immobilization and euthanasia procedures (pages 8-9).

SICK OR INJURED MOOSE

Like other animals, moose are susceptible to a variety of diseases that may cause physical and/or neurological symptoms ranging from complete debilitation to slight changes in behavior. An animal that is unable to stand up and walk or that shows some other clear sign of serious physical illness should be euthanized. Symptoms of neurological disease (such as brain worm, Appendix B, page 27) may be more difficult to diagnose, and care must be taken not to mistake some of the unique behaviors exhibited by moose for abnormal, pathological behavior. Injuries may occur as a result of vehicle collision, interaction with other moose, or simply an accident. Severely injured or sick moose are a threat to public safety because they may be easily approached. Relatively few options exist for seriously debilitated moose in the wild, and currently licensed wildlife rehabilitators are not authorized to possess moose. The potential for human injury further precludes rehabilitation as a practical option.

Recommended Actions for Sick or Injured Moose

- A debilitated moose should be evaluated by DEC or OPP staff or a large-animal veterinarian. A determination should be made as to whether the animal is likely to survive without intervention and whether people can be prevented from approaching the moose. Often OPP staff are the first responders to these situations and find it necessary to confer with BOW staff on an animal's condition.
- If the moose is injured and it is determined that chances of survival are high, the moose should be left alone and monitored from a distance that does not affect natural behavior. If the moose is in a situation where it cannot be left alone or kept a safe distance from the public, it should be euthanized as soon as possible.
- If the injury is severe enough to limit chances for survival, the moose should be euthanized as soon as possible. If a field necropsy is warranted, appropriate parts and tissues should be examined. Pathological examination off-site is generally not necessary, except in situations where warranted by a criminal investigation or following consultation with wildlife disease specialists.

MOOSE AGRICULTURE CONFLICTS

Moose are seldom a problem for agricultural crop producers but have been known to damage cabbage, broccoli, and cauliflower. Moose can also damage tree plantations by browsing, especially Christmas tree plantations containing fir species.

Moose may also damage fences, agricultural equipment, and maple sap collection equipment such as tubing. Much of this damage occurs during the rut when bulls become aggressive and attack many objects in their way.

Moose, usually bulls during the rut, occasionally stay in pastures with livestock, especially cattle, for extended periods. Landowners may be concerned with disease transmission, injury to livestock from an aggressive moose, or become intolerant of people stopping to observe the moose.

Recommended Actions for Agriculture Conflicts

- Damage to crops may be reduced with electric fencing. Cabbage producers in Newfoundland have successfully protected areas up to 13 acres with electric fence installations. Tree plantations can be sprayed with repellants such as “Deer Away®” to discourage browsing.
- A bull moose aggressively attacking fences and farm equipment is usually a temporary situation resolved when the bull moves from the area. Chasing or herding the animal may persuade it to leave sooner. In extreme situations, relocation or removal may be required.

Moose mixing with livestock are usually bulls during the rut. They normally leave on their own in a short period. Currently there is no known significant disease risk to livestock from short-term exposure to moose. In rare cases where the moose actually attacks livestock or causes a public safety hazard because of traffic congestion, then chasing/herding/hazing techniques, immobilization/relocation, or removal may be required.

Appendices

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Appendix A

Moose Fact Sheet

Moose

Alces alces

New York State Status: **Protected**

Description

The moose is the largest member of the deer family (*Cervidae*), and the largest land mammal in North America. Bulls weigh from 600 to 1,200 pounds and stand up to 6 feet tall at the shoulder. Cows weigh from 500 to 800 pounds. Both sexes have long, grayish-white legs, dark brown or black bodies, and a dangling flap of skin under the throat called a bell. A mature bull's bell is much larger than those of cows and younger bulls. Cows have light brown faces and a white patch of skin under their tails, while bulls have dark faces and no white patch. Only bulls grow antlers, beginning in March or April. The antlers, which regrow annually, may reach a width of more than 5 feet on mature bulls and are shed from November through January.



Art by Jean Gawalt

Life History

The breeding season, or rut, occurs in late September and early October. During this time, bulls compete for cows by sparring with each other, with older, larger bulls usually doing most of the breeding. A single bull may breed with five or six cows during the rut. Bulls do not eat much during the rut and lose considerable weight. After the rut, they feed heavily to prepare for the upcoming winter. Cows can breed at 1½ years old, but most don't breed until they are 2½ years old. Young cows normally have one calf, while mature cows may have twins or, rarely, triplets. The gestation period is about 230 days, so calves are born in late May or early June. Calves are 20-25 pounds at birth but will weigh 300 to 400 pounds by fall. Calves stay with cows for the first year of their lives until the cows have calves again the following year.

Distribution, Habitat and Food Habits

Moose are a circumpolar species, occurring in boreal forest areas of the Northern Hemisphere. In North America, they are found from Alaska eastward to the Atlantic Ocean, and south into the Rocky Mountains, northern Great Lakes, and the Northeast. 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.

Moose are primarily browsers, feeding on the leaves, twigs, and buds of hardwood and softwood trees and shrubs. An adult moose eats 40 to 60 pounds of browse every day. Favored plant species include willows, birches, maples, balsam fir, viburnums, aspen, and mountain ash. In the winter, moose may strip and eat the bark from small trees, usually maples and aspen. In the summer, moose feed heavily on aquatic plants in ponds and wetlands, wading into the water and reaching beneath the surface for plants. They also depend on these wet areas to escape from biting insects and hot weather.

Ideal moose habitat consists of a mosaic of upland mature mixed forest, open areas created by burns or logging, and wetlands. The regrowth of browse species after a fire or clearcut offers nutritious food in large quantities needed by moose. Small clearcuts with some softwood cover retained are better than large clearcuts of more than 100 acres.

Mortality Factors

The black bear is a significant predator of moose calves less than nine weeks old. Coyotes may also take an occasional calf. There are no predators of adult moose in New York State, but, elsewhere in North America, wolves are their main predator.

Moose are susceptible to a parasite known as brainworm that infects the nervous system and usually causes death. Other parasites such as liver flukes and lungworm can weaken a moose and make it susceptible to secondary infections. In other states with a higher moose density, winter ticks have become the main mortality factor for moose, but these ticks have not yet been documented in New York. The winter tick spends three life cycles on an individual animal, feeding on its blood during each cycle.

Vehicle collisions are a significant mortality factor for moose, especially where road densities are high. Moose are so tall that an automobile usually passes under the body, causing the moose to come over the hood into the windshield and onto the roof. Moose are most active from dusk to dawn, when their coloration makes them difficult to see in the roadway and their eyes are usually above the reach of car headlights. About one to two percent of moose/car collisions result in a human fatality. DEC is working with the Department of Transportation to develop warning methods for motorists in moose country. Research in other states has shown that vehicle speed is the most common factor leading to moose collisions, so the best way to avoid hitting a moose is to slow down, especially from dusk to dawn.

Status and Management

Moose entered the state on a continuous basis in the 1980s, having been absent since the 1860s. DEC collected reports of sightings between 1980 and 1999 as an informal way of monitoring the species' progress.

In the early 1990s, DEC drafted an Environmental Impact Statement and conducted a series of public meetings on moose. As a result, DEC instituted a number of 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.

DEC biologists estimated that there were about 500 to 800 moose in New York State as of 2010. However, a standard procedure for estimating numbers of moose has not yet been established.

Moose management in the state consists of monitoring population size and distribution and occasionally relocating an animal that becomes a nuisance or catching and moving a moose from developed areas where it is a danger to itself, to people or both. Future DEC actions include implementing studies to refine our knowledge of the factors affecting moose distribution and numbers in New York State, estimating key population characteristics (e.g., size and rates of population change), assessing potential impacts of climate change on moose populations, balancing moose population attributes with biological and social carrying capacity, and developing a moose management plan that takes these factors into account.

Moose-related Legislation

Effective July 6, 1999, the New York State Legislature amended section 11-0915 of the ECL concerning the disposition of moose carcasses resulting from vehicle collisions. It allows people who accidentally kill moose with a motor vehicle that has been damaged in the process to obtain a permit from a law enforcement officer to keep the carcass. Should the motorist decline the opportunity, the officer may issue a permit to another party.

Appendix B

Brain Worm

Brain worm is the term commonly applied to the parasitic nematode (round worm), *Parelaphostrongylus tenuis* (*P. tenuis*), that requires a living host to survive. This worm is frequently found in the subdural spaces (between the brain and the walls of the cranium) in white-tailed deer, which is its definitive (normal) host. The white-tailed deer is usually unaffected by the parasite; in fact, most adult deer in northern New York State are parasitized by *P. tenuis*.

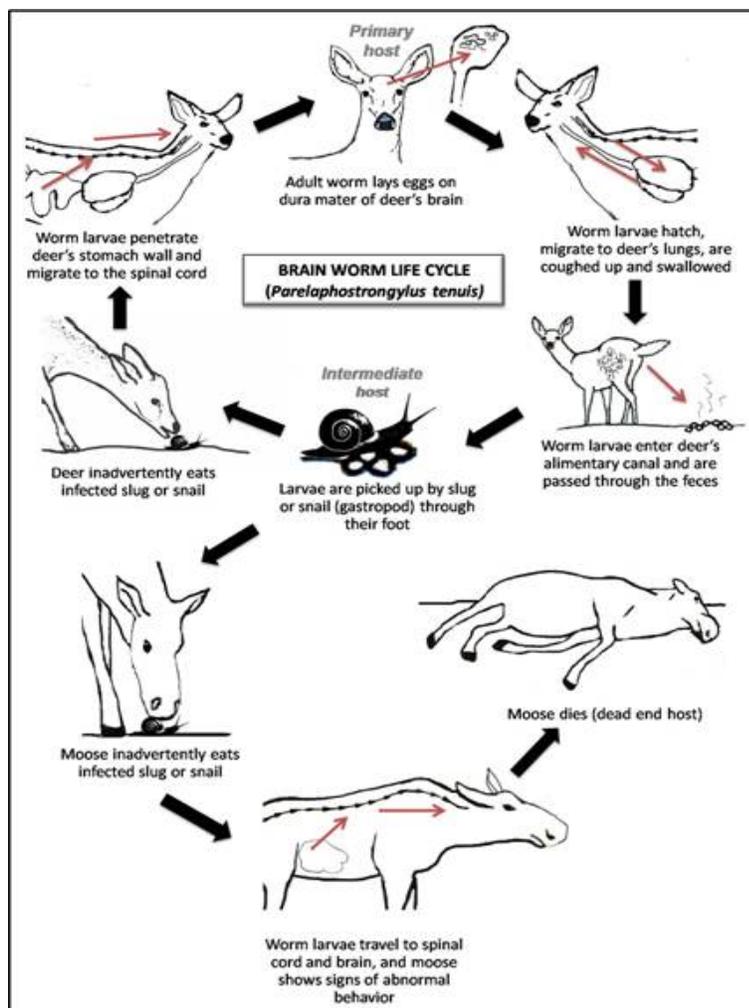
Although brain worm has no apparent effect on white-tailed deer, it is often fatal to moose, mule deer, black-tailed deer, elk, caribou/reindeer, llama, alpaca, goats, and sheep.



An adult brain worm (*P. tenuis*) on the spinal cord of a moose submitted for diagnosis.
~Photo by DEC's Wildlife Pathology Unit~

Life Cycle Description in a Deer

- Parasitic adult worms lay eggs on the dura mater (the outermost of the three layers of the meninges surrounding the brain and spinal cord) or directly into the bloodstream of the deer (primary host).
- First-stage larvae hatch and enter the deer's bloodstream, travel to the lungs, up the trachea (windpipe) and enter the mouth, where they are swallowed.
- The larvae then pass through the alimentary canal and are excreted with fecal pellets. The first-stage larvae are now within the mucoid coating on the outside of the deer's fecal pellets.
- The larvae are picked up by a gastropod, such as a slug or snail, by penetrating the gastropod's foot (part of the snail or slug that is used for locomotion). Once in the gastropod, the nematode larvae mature into infective second and third-stage larvae.
- Deer inadvertently consume the infected gastropod by feeding on plants.
- The larvae penetrate the deer's stomach wall and travel along the nerves of the deer until they reach the spinal cord and move into the brain.
- In the brain, the third-stage larvae mature into adults, and the cycle continues without affecting the deer.



~ Illustration by Natalie Sacco, NYSDEC ~

Life-Cycle Description in a Moose

- The infected gastropod (slug or snail) is inadvertently consumed by a moose.
- Parasitic larvae travel to the spinal cord and brain of moose as they do in deer.
- The nematode disrupts the nervous tissue through mechanical destruction, manipulation, and/or inflammation, resulting in neurologic signs and aberrant behavior of the infected moose. Upon infection, there may be periods when the animal seems to recover as the worm or worms move through different portions of the brain or cord; however, the moose typically shows neurologic signs again after several days. Adult *P. tenuis* within the brain or spinal cord of moose are often fatal. Death can result from paralysis, lack of fear/inappropriate behavior (resulting in motor vehicle strike or being shot by police or an ECO, an inability to feed (starvation) or feeding on inappropriate food items (malnutrition).

Signs

Typically there are no signs of infection in the host (white-tailed deer). When *P. tenuis* infect a moose, mule deer, black-tailed deer, elk, caribou/reindeer, llama, alpaca, goat, or sheep, the following clinical signs may be exhibited:

- Ataxia (unsteady gait, loss of muscle control)
- Listlessness
- General weakness
- Fearlessness
- Apparent deafness and/or blindness
- Circling
- Unusual head tilt or neck position
- Inability to feed/forage
- Emaciation
- Paralysis
- Fatality



*A cow moose (adult female) exhibiting neurologic signs of brain worm in Rensselaer County, NY
~Photo by NYSDEC Wildlife Pathology Unit~*

Diagnosis

Definitive diagnosis relies on the detection of adult *P. tenuis* in the spinal cord or brain during necropsy (animal autopsy).

Presumptive diagnoses are sometimes based on gross or microscopic evidence of worm damage in the spinal cord or brain or by clinical signs when a necropsy is not conducted.

Management Implications

Brain worm is prevalent in New York State's white-tailed deer population, yet they apparently suffer little consequence. Brain worm is typically fatal for moose and captive deer/elk, llama, alpaca, goats and sheep. Affected moose cause public concern due to their unusual behavior, and Environmental Conservation Officers, DEC biologists, or local law enforcement are frequently called to the scene to evaluate sick moose. The moose are usually shot and submitted to DEC's Wildlife Pathology Unit for testing of brain worm, chronic wasting disease, rabies, and cause-of-death determination.

For years, biologists speculated that New York's large white-tailed deer population with its attendant *P. tenuis* infections would limit the population growth of moose in the state; however, this has not happened.

Appendix C

Protocol for Law Enforcement Agencies, State Police and 911 Dispatchers

If anyone reports a situation with a moose, use this simple keyed protocol to determine a recommended course of action and what, if any, DEC notification is appropriate. The majority of these situations involve a call to DEC Dispatch (**1-877-457-5680**). Please refer to the Table of Contents of this manual to be directed to the full discussion of appropriate responses.

~~~~~

**1a.** If the moose is alive and does not appear to be sick, injured or an abandoned calf...**Go to 2**

**OR**

**1b.** If the moose is sick, injured or dead...**Go to 3**

**OR**

**1c.** If the moose appears to be abandoned or orphaned...**Go to 4**

~~~~~

2a. If the moose is behaving in a way or is in a location that makes it an IMMEDIATE risk toward humans (such situations might include a moose being aggressive toward humans or domestic livestock, close to a major roadway, in a schoolyard, in a highly urban area or attracting a public crowd)...**Go to 4**

OR

2b. If the moose is NOT an immediate risk and has an avenue of escape from a potentially dangerous situation, no response may be needed at this time. Make every effort to keep the public away from the moose, maintain escape routes, and monitor the moose without chasing it. Regional DEC Wildlife and Office of Public Protection staff should be made aware of the situation...**End**

OR

2c. If the situation is just a casual observation and DOES NOT involve an immediate response, assure the caller that New York State has a growing population of moose and that s/he has been fortunate to have observed one. For more information on moose, tell the caller to visit DEC's website or call their local DEC wildlife office...**End**

~~~~~

**(Continued on next page...)**

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3a. Severely injured or sick moose are a threat to public safety because they may be easily approached. Moose encountered in a debilitated condition should be evaluated by Wildlife staff to make a determination on the likelihood of survival. If the injury is severe enough to limit chances for survival, the moose should be euthanized as soon as possible...**Go to 4**

OR

3b. If the moose is dead as the result of a collision with a vehicle, immediately check on and respond to human injury if any. Otherwise, the vehicle owner or an interested third party can legally possess the carcass. Issue a road kill possession tag after altering it to read 'moose' instead of deer...**Go to 4**

OR

3c. If the moose is found dead from what appears to be unknown causes...**Go to 4**

~~~~~

**4. Response**

- If a dangerous situation exists, immediately dispatch a unit to the scene.
- Keep people and direct traffic away from the moose.
- Refer to the Table of Contents of this manual for appropriate actions to take for the current situation.
- CALL and REPORT to DEC Dispatch, toll free 24/7:  
**1-877-457-5680**
- Report an accurate location, observer's name, and details of the situation.
- In the case of an aggressive moose, the animal should be safely and humanely destroyed by local authorities...**END**



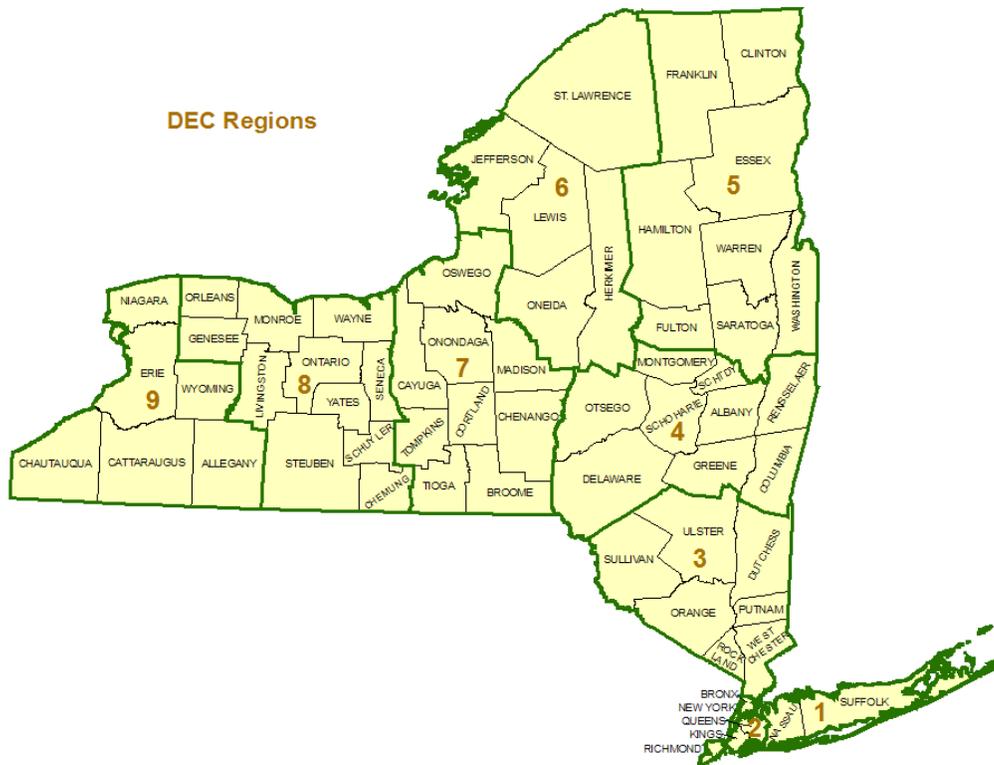
New York State  
Department of Environmental Conservation

**24/7 Dispatch**  
(for reporting moose)

**1-877-457-5680**

## Appendix D

### DEC Regional Office Telephone Numbers



| DEC Regional Office Telephone Numbers |                         |              |                 |
|---------------------------------------|-------------------------|--------------|-----------------|
| Region                                | Office                  | Wildlife     | Law Enforcement |
| 1                                     | Stony Brook             | 631-444-0310 | 631-444-0250    |
| 2                                     | New York City           | 718-482-4922 | 718-482-4885    |
| 3                                     | New Paltz               | 845-256-3068 | 845-256-3063    |
| 4                                     | Schenectady             | 518-357-2355 | 518-357-2047    |
|                                       | Stamford                | 607-652-7367 |                 |
| 5                                     | Ray Brook               | 518-897-1291 | 518-897-1291    |
|                                       | Warrensburg             | 518-623-1240 | 518-623-1240    |
| 6                                     | Watertown               | 315-785-2261 | 315-785-2533    |
|                                       | Utica                   | 315-793-2554 | ---             |
| 7                                     | Cortland                | 607-753-3095 | 607-753-3095    |
|                                       |                         | Ext. 247     | Ext. 241        |
| 8                                     | Avon                    | 585-226-5380 | 585-226-6706    |
| 9                                     | Allegany                | 716-372-0645 | 716-851-7000    |
| ---                                   | Central Office - Albany | 518-402-8883 | ---             |

## Appendix E

### Relevant Laws, Regulations and Policies

The Department of Environmental Conservation (DEC) is directed under various sections of the Environmental Conservation Law (ECL) to manage the moose resource in New York State. These laws and regulations control, restrict or regulate activities undertaken with moose. Currently moose are a protected species in New York, and no hunting or supplemental feeding of them is allowed.

Relevant sections of the New York Codes, Rules and Regulations Title 6NYCRR:

Part 189 Chronic Wasting Disease:  
<http://www.dec.ny.gov/regs/3926.html>

Relevant sections of the ECL

- Sec. 11-0103 Definitions
- Sec. 11-0719 Revocation and suspension of licenses and of right to hunt, fish, or trap without a license
- Sec. 11-0915 Disposal of deer and bear killed unintentionally by collision
- Sec. 11-1705 Importation, possession and sale of wildlife and game other than domestic and foreign game
- Sec. 71-0921 Misdemeanors
- Sec. 71-0925 Civil penalties

#### Sec. 11-0103

Definitions

As used in the Fish and Wildlife Law

2. "Game" is classified as (a) game birds; (b) big game; (c) small game.

b. "Big game" means deer, bear, **moose**, and elk, except captive-bred and raised North American elk, caribou and antelope.

#### Sec. 11-0719

Revocation and suspension of licenses and of right to hunt, fish or trap without a license

1. a. Under the circumstances described in paragraph **b.**, DEC may revoke any license or stamp of any person to hunt, fish or trap, as defined in section 11-0701 or issued pursuant to any provision of the Fish and Wildlife Law, or it may revoke all such licenses or stamps. DEC may also deny such person, for a period not exceeding five years, the privilege of obtaining such license or licenses or stamp or stamps of hunting, trapping or fishing anywhere in the state with or without a license or stamp, except as provided in subdivision 1 of section 11-0707 or in section 11-0523. DEC may also require that such person successfully complete a department-sponsored course and obtain a certificate of

qualification in responsible hunting, responsible bowhunting, or responsible trapping practices before being issued another license.

b. This subdivision applies to any person who:

(2) is convicted of a violation of the Fish and Wildlife Law involving the illegal taking of a deer, **moose** or bear, or signs an acknowledgment of any such violation of that law for the purpose of effecting a settlement by civil compromise or by stipulation.

### **Sec. 11-0915**

Disposal of deer and bear killed unintentionally by collision

The owner of a motor vehicle which has been damaged by unintentional collision with a deer, moose or bear shall be entitled to possess such deer, **moose** or bear under the following conditions:

1. The accident is reported to an ECO, a member of the NYS Police, a member of the sheriff's department in which the accident occurred, or, if the accident occurred on lands under the jurisdiction of the Office of Parks, Recreation and Historic Preservation (OPRHP), to an officer of the regional park police having law enforcement responsibilities on such lands, or to any police officer of a city, town or village located in the county of such accident within 24 hours thereafter.
2. The officer shall investigate and, if s/he finds the deer, **moose** or bear has been killed or so injured as to require that it be killed, and the damage has been done as alleged, s/he shall issue a permit to the owner of the motor vehicle entitling such owner to possess the carcass. Such permit shall authorize the owner of the motor vehicle to transfer the carcass to a designated person.
3. Whenever the owner of such damaged motor vehicle declines to possess such deer, **moose** or bear, the officer may at his or her discretion, issue a permit to possess the carcass to any other party requesting such possession.

### **Sec. 11-1705**

Importation, possession and sale of wildlife and game other than domestic and foreign game

7. The flesh of game and wildlife, except birds, black, grey or fox squirrels, lynx, bear, deer, **moose**, elk, caribou and antelope may be imported and transported by any means during the open season, without permit or license, and may be imported during the closed season, as provided in section 11-1707, and may be bought and sold at any time.
8. The flesh of bear, deer, **moose**, elk, caribou, and antelope may be imported, transported and possessed as provided in section 11-1707. The flesh of such game, except bear and white-tailed deer may also be imported, transported and possessed pursuant to permit under section 11-1711 and, if so imported, may be bought and sold when tagged,

as provided in section 11-1721 but, if so imported, shall not be possessed or transported unless so tagged.

#### **Sec. 11-1721**

Tagging of carcasses and parts thereof

d. Wild deer (other than white-tailed deer), **moose**, elk, caribou and antelope, coming from outside the state, imported pursuant to section 11-1711

#### **Sec. 71-0921**

Misdemeanors

The following acts are misdemeanors, punishable as herein provided, when they are done in violation of the section or subdivision thereof specified or, if no section is specified, in violation of any section of the Fish and Wildlife Law:

10. Violation of subdivision 10 of section 11-0901 involving the illegal taking of a **moose**. Each such misdemeanor shall be punishable by imprisonment for not more than one year or by a fine of not more than two thousand dollars or by both.

#### **Sec. 71-0925**

Civil penalties

The penalties referred to in section 71-0919 to which a person is liable upon violation of provisions of the Fish and Wildlife Law or any order, rule or regulation of the department shall be:

1. Unless another penalty is specifically provided for in this subdivision or elsewhere in the Fish and Wildlife Law, two hundred dollars and an additional penalty of one hundred dollars for each fish, bird or animal or part thereof, other than shellfish or crustacea, involved in the violation; an additional penalty of one hundred dollars for each bushel of shellfish or each crustacean, including lobster, or part thereof, plus an amount equal to the market value or actual price paid, whichever is greater, of the shellfish or crustacea involved in the violation

2. Except as provided in subdivision 3 or another provision of the Fish and Wildlife Law, if the violation relates to deer, bear, elk, except captive-bred and raised North American elk (*Cervus elaphus*), **moose**, caribou, antelope, wild turkey, lynx, beaver, or a part thereof, two hundred dollars and an additional penalty of two hundred dollars for each such animal or part thereof involved in the violation

