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Attitudes towards Moose  
among Large Private Forestland  
Owners and Managers in  
Northern New York

**PREPARED BY:**

Nancy A. Connelly, T. Bruce Lauber, Richard C. Stedman, and  
Heidi Kretser



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## EXECUTIVE SUMMARY

The New York State Department of Environmental Conservation (DEC), Bureau of Wildlife is responsible for the management of moose in New York State (NYS). DEC is in the process of developing a management plan for moose. To inform their plan, they asked the Center for Conservation Social Sciences (CCSS) at Cornell University to undertake research to provide them with information on key stakeholders' attitudes, concerns and interests related to moose and their impacts, both now and in the future. One of those key stakeholder groups is large private forestland owners and managers in northern New York. We conducted focus groups and telephone interviews with 10 industrial forestland managers and 14 non-industrial forestland owners and managers to gather information on:

- their experiences with moose,
- the benefits and concerns they associate with having moose on their properties and in northern New York,
- whether and how moose impact their land management decisions,
- their views on management needs based on the current moose population,
- actions they would be willing to take if the moose population increased or decreased in the future, and
- management actions they would support being taken by DEC or others if the moose population increased or decreased in the future.

Most participants had observed increasing moose sightings and signs over the past 20-30 years. All participants believed there were benefits of having moose in northern New York. These included their own and others' enjoyment of seeing moose or moose signs and the potential tourism benefits to the local economy. All participants, however, expressed some concerns about having moose in northern New York. The most frequently mentioned concern was the potential for moose-vehicle collisions.

Industrial forestland managers generally differed from non-industrial forestland owners and managers in the level of concern they expressed regarding moose damage from browsing, especially to regenerating forests. Most industrial forestland managers considered browse damage a major concern, especially for the future if the moose population increases. Non-industrial forestland owners and managers were less concerned, or did not perceive browse damage as a concern at all.

Lethal control of moose via moose damage permits (i.e., nuisance permits) and some type of lottery system for hunters were suggested most often as management actions to reduce the moose population. All participants appeared open to lethal control as an option. Industrial forestland managers expressed more urgency to consider lethal control options, presumably because of the current level of browse damage and potential for increasing damage that would

occur with an increasing moose population. Non-industrial forestland owners and managers thought the need for lethal control was further off in the future, even with an increasing population.

If the moose population decreases in the future, participants would be concerned about the loss of viewing opportunities and the potential economic loss to local communities. They suggested several actions that they or others could take to slow or reverse a decline, including increased clearcutting on industrial forestlands and other types of habitat improvement on non-industrial lands.

Regardless of the future moose population trend, participants wanted DEC to continue monitoring the population and conducting research on moose. Most participants indicated they would welcome DEC and other researchers on their land.

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## INTRODUCTION

The New York State Department of Environmental Conservation (DEC), Bureau of Wildlife is responsible for the management of moose in New York State (NYS). Currently, DEC estimates that there are approximately 400 moose living in northern New York, mostly within the Adirondack Park. DEC is in the process of developing a management plan for moose in the state. To inform their plan, they asked the Center for Conservation Social Sciences (CCSS) at Cornell University to undertake research to provide them with information on key stakeholders' attitudes, concerns and interests related to moose and their impacts, both now and in the future. We are focusing on three stakeholder groups in the series of studies that make up this research project: (1) NYS residents (i.e., general public), (2) large private forestland owners and managers in northern New York, and (3) landowners in the primary and peripheral moose ranges in New York.

This report focuses on our findings from focus groups and telephone interviews with the second group above: large private forestland owners and managers in northern New York. We sought information from them on:

- their experiences with moose,
- the benefits and concerns they associate with having moose on their properties and in northern New York,
- whether and how moose impact their land management decisions,
- their views on management needs based on the current moose population,
- actions they would be willing to take if the moose population increased or decreased in the future, and
- management actions they would support being taken by DEC or others if the moose population increased or decreased in the future.

## METHODS

We identified four types of large forestland owners and managers whose views about moose and moose management we wanted to understand.

- Industrial forestland upper-level managers.** These people are representatives of businesses that manage large tracts of land for forest products. They make “big picture” decisions for the business and typically supervise foresters or managers in Group B, who are working on the ground and implementing management or stewardship activities.
- Industrial forestland managers.** These people oversee the day-to-day management of large tracts of land for forest products. They see firsthand evidence of moose and

impacts from moose. They may be called foresters, consulting foresters, or land managers.

- c. **Non-industrial forestland owners.** These people own or represent a group of owners or lessees who have large tracts of land in northern New York. Unlike Groups A and B, they utilize the land for a variety of purposes including recreation. Harvesting forest products may or may not be occurring on their land. This group includes seasonal residents who visit only occasionally throughout the year.
- d. **Non-industrial forestland managers.** These people oversee the day-to-day management of large tracts of land in northern New York for Group C. They see firsthand evidence of moose and impacts from moose. They may be called consulting foresters, land managers, or property caretakers.

We identified members of each group from lists maintained by DEC, personal knowledge of the authors, and referrals from other large forestland owners or managers. Most often the lists provided by DEC had contact information for managers from whom we then requested contact information for the owners or upper-level managers.

We conducted two focus groups in May 2019: one with industrial forestland managers/upper-level managers (n=9), and one with non-industrial forestland managers (n=9). We followed these focus groups with individual telephone interviews with those who could not attend the focus groups. We also conducted telephone interviews with non-industrial forestland owners in August and September of 2019 because it was difficult to gather them together for a focus group given the infrequency with which some of them visit the region.

Each focus group and telephone interview consisted of a semi-structured conversation guided by a series of open-ended questions (Appendix A). The focus groups lasted one to two hours. The telephone interviews lasted 15 to 30 minutes. The questions were designed to explore how owners and managers perceived moose in northern New York and their attitudes towards moose management under different population scenarios. The specific questions focused on personal experience with moose, perceived benefits and concerns related to moose, whether and how moose impacted their land management decisions, their views on management needs based on the current moose population, actions they would be willing to take if the moose population increased or decreased in the future, and actions they would support being taken by DEC or others to manage moose if the moose population increased or decreased in the future. A total of 24 people participated in either the focus groups or telephone interviews. Participants included six industrial forestland managers, four upper-level industrial forestland managers, seven non-industrial forestland managers, and seven non-industrial forestland

owners. No one refused to participate, but several people we identified in each group did not respond to multiple requests to participate.

After receiving participants' permission, we audio-recorded and transcribed the focus groups and telephone interviews. We conducted a content analysis of the transcripts using ATLAS.ti (Version 7.5.18), a qualitative data analysis program. We reviewed each transcript, broke all relevant sections of the transcript into segments of one sentence to one paragraph in length, and marked them with codes we developed to characterize their content. The lead author, following the questions described above, developed the set of codes and definitions of those codes for this analysis. These codes and definitions were:

- EXP = Personal experience with moose in northern New York (observation, history of observation).
- BEN = Benefits of having moose in northern New York (for the person, environment, community), also includes "no benefits."
- CON = Concerns about having moose in northern New York (for the person, environment, community), also includes "no concerns."
- MGMT DECISIONS = Considerations of moose in management decisions. Do you consider them? If so what type of changes do you make?
- ACS = Given the current moose population, what actions are you taking or would you like others to take, including DEC, to manage the moose population. Reasoning around suggested actions.
- AIP = Assuming an increase in the moose population, what actions would you take or would you like others to take, including DEC, to manage the moose population ? Including discussion of the benefits and concerns associated with increased population and actions that might take place. Hunting as an option, and issues surrounding hunting included here.
- ADP = Assuming a decrease in the moose population, what actions would you take or would you like others to take, including DEC, to keep the moose population alive in northern New York ? Including discussion of the benefits and concerns associated with decreased population and actions that might take place.

The lead author then coded all the transcripts and another researcher provided a check of the coding by independently coding one interview or its equivalent from the focus groups for each of the types of managers/owners. The lead author compared the original coding to the independent second coding and found 3 discrepancies out of 70 coded segments. Given the low percentage of discrepancies, no further error checking was done. Transcript segments with the same code were then grouped together and reviewed. In our results, we present excerpts from the transcripts that reflect as much of the range of perspectives expressed as possible.

## RESULTS AND DISCUSSION

We initially identified four groups of industrial and non-industrial forestland owners and managers whose views about moose and moose management we wanted to understand. In our analysis we found no consistent differences in opinions between upper-level industrial forestland managers and “on-the-ground” industrial forestland managers. Therefore, in our discussion of results, we have grouped upper-level and “on the ground” industrial forestland managers into one group, hereafter referred to as “industrial forestland managers.” We did not find consistent differences between owners and managers of non-industrial forestland, and therefore will refer to them as “non-industrial forestland owners and managers.” We did find a number of differences between industrial and non-industrial groups, which we will highlight in our discussion.

We present our findings from the focus groups and interviews organized by the topic areas listed above. Within each topic area, we summarize our findings and illustrate most of our findings with relevant quotes. Letters and numbers in parentheses at the end of each quote are unique identifiers allowing the authors to identify the source of the excerpt.<sup>1</sup>

### Experience with Moose

#### Sightings are becoming more common

Most participants in the focus groups and telephone interviews had had similar experiences seeing moose and moose signs increase over the past 20-30 years. Some people identified the 1990s as a period when they started to see moose tracks, scat, browse, etc. Actual moose sightings seem to have become more common in the last 10 to 20 years. For example, participants related the following histories:

*In my youth there was really virtually no moose sightings, maybe on rare occasion there would be some indication of maybe moose scat or a moose track or something like that in the area but that was about it. Recently moose have been seen on the property, maybe 8 years, something along that line. (NIO-1)*

*You know since I've seen moose sign, and it's been now quite a few years, I've seen an increase but it's not an explosion. I'm not really seeing where the population is exploding. (NIM-1)*

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<sup>1</sup> IM refers to industrial forestland manager. NIM refers to non-industrial forestland manager. NIO refers to non-industrial forestland owner.

*I would say that the first time I noticed any browse I wasn't sure what it was, 10' or 12' high, sugar maple and the tops were all destroyed and then I ...<sup>2</sup> saw the track and that was probably 15 years ago. Since then I would say that on all of the ownerships that we manage and have managed in the past, I've seen moose sign on almost all of them, probably all of them. It's common to see tracks on all the roads, droppings and I'm starting to see more browse particularly given the nature of our cutting and the age of the forest. It seems like a perfect habitat for moose. (IM-1)*

*I'll use Speculator as an example, there's a couple of places where they used to write down when someone would see a moose on the chalkboard... you'd see a couple every month ... then all of a sudden it was like 10 and then it was 20 and then ... they just stopped doing it. (IM-1)*

Currently, almost everyone is seeing signs of moose on their property, but actual sightings range from rare to common.

*Just tracks and hearing them, but not visually seeing them. (NIO-3)*

*I believe we've seen moose or moose sign on every tract that we manage. All the way from the south to the northeast to the west. (IM-1)*

*I have a trail camera out and I see them all the time passing by. (NIO-4)*

### **Habitat changes caused the increase**

The 1998 ice storm and a more recent change (around 2005) by some industrial forestland owners to even aged management was seen as increasing moose habitat. People linked these changes in moose habitat to finding pockets of moose or "hot spots" where evidence of moose browse seems to be extensive.

*The ice storm was as much a driver as was harvest. (IM-1)*

*You know they're improving the habitat and none of us might see a moose today if it wasn't for the heavy cutting. (NIM-1)*

*We have noticed on ... mixed wood types, on the transition between soft wood and hard wood, they seem to set up camp there and stay. (IM-1)*

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<sup>2</sup> Ellipses indicate that material has been deleted to eliminate extraneous material and improve readability.

## Benefits of Moose

### Opportunity to see moose is valued

Participants identified several benefits of having moose in northern New York. The most often cited benefit was personally having the opportunity to see moose or signs of moose (e.g., tracks, sheds).

*I love seeing moose in the woods. They're very majestic and they're cool animals (IM-1)*

*I personally, I enjoy seeing them. I like seeing the sign ... it's neat to see, and have them around, know that they're around. (IM-1)*

*I think the idea of being able to see these ... large creatures is appealing. (NIO-1)*

Participants also thought others valued the opportunity to see moose.

*They enjoy putting out wildlife cameras and ... looking for signs of moose on their property. So there seems to be an interest from people in just observing moose. (NIO-5)*

*People from town, they drive up and down the main road looking for moose. (NIM-1)*

### Moose are an important part of the landscape

There was a recognition by some participants that moose should be present in the Adirondacks and that presence had value.

*They're a great asset to the landscape. (IM-1)*

*Part of the original fauna of the Adirondacks. (NIO-5)*

One person did not see any benefits of moose to the property they managed, and another did not see any benefits to humans, but valued their presence.

*I don't see any benefits to the property. (IM-1)*

*It's probably good for them to be that area [the Adirondacks]<sup>3</sup>, but I don't see any human benefit, true benefit. (NIO-3)*

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<sup>3</sup> Text in [ ] was added by the authors to clarify meaning.

## **Moose have economic benefits to local communities**

Some people mentioned the potential economic benefit to local communities of increased tourism.

*Probably tourism because there's a lot of people that want to see moose. (IM-1)*

*I would think the economy is not great up there and can certainly use a boost. Tourism is one of the major things that attract money in from outside. I could see that that might be of importance. (NIO-1)*

*Probably derive some benefit from ecotourism. People are very excited about the prospect of seeing moose, even though they rarely do. (NIO-2)*

## **Concerns Related to Moose**

### **Moose pose risks**

Participants listed a number of concerns related to having moose in northern New York. Personal safety, if one encounters a moose in the woods, was on the mind of several people.

*Personal safety if you get between a bull moose during the rutting season, or a cow and its calf, or something like that. (NIO-1)*

A number of participants mentioned the potential for moose-vehicle collisions. Some were concerned because moose are a larger animal than deer, so there is greater risk of vehicle damage and personal injury, including death if someone hits a moose. Others expressed concern, but also mentioned that driving a vehicle in an area with moose is just a risk you take.

*Person 1: My understanding is that a moose accident is pretty serious.*

*Person 2: Right, it's a huge animal, their eyes don't reflect right, so you take them out at the legs and you got this giant body coming into your windshield. Not good. (NIM-1)*

*Collisions with vehicles are a big concern. I understand that happens a few times a year, but you know that's just a fact of life with moose. (NIO-2)*

Several people expressed concerns about the potential for damage to gardens or landscape plantings, but no one indicated they had any such damage to date.

A few people indicated that they or the people they worked with wanted to see the preservation of the deer population for hunting. They believed that moose and deer could not co-exist in the same area, so they were concerned about the potential negative impacts on the deer population.

*If you're striving for deer population, I guess it's not beneficial to have both of them at the same time and at the same property. (NIO-4)*

*I think a lot of the mindset is well they're competing for food with the deer and we like shooting deer, and we can't shoot the moose, so I think that's the general consensus from our lessees. (IM-1)*

### **Moose could damage industrial forests**

Moose damage to trees, especially to regenerating forests, was seen by industrial forestland managers as a major concern.

*I was finding old clearcuts on a post-harvest inventory where you've got 25-acre clearcuts that regenerated perfectly to red maple, but it had all been eaten off by the moose so many times in a row that you get this gnarled stump at the top with these weird looking sprouts. It'll never be a productive tree so there's a lot of value lost. If that's just one 25-acre block, and I think there were 4 of them across the side of the mountain... it adds up over time. I think that that's a concern for the industrial landowners. (NIM-1)*

*I've seen 10" red maple girdled by moose so it's not just a regeneration situation that we've seen. (IM-1)*

Some industrial forestland managers were concerned about the profitability of the land they manage now and in the future, because of the browse damage caused by moose.

*I think it can be a real impact for forest owners, and moving forward with future owners and how those investments that we manage work. (IM-1)*

*It doesn't help the investments that we're supposed to make work. (IM-1)*

Industrial forestland managers indicated that estimates of the amount of damage and financial impact to industrial forestlands have not been calculated at this point. They suggested that in addition to losses to the current timber value, moose damage would impact the price they could get when they wanted to sell the land.

*I don't think anybody has done the math, try to figure how many acres are being affected and what that actually is doing to your overall bottom line on the property. (IM-1)*

*It's identified, I don't think it's been quantified. (IM-1)*

*I don't think anyone has said I'm going to lower my purchase price \$10/acre or \$30/acre but I think it does factor in to the overall 'is this property you know well placed to*

*continue to produce timber?’ If I’m looking at two properties, I’m going to go after the one ... that is not suffering from that level of damage. (IM-1)*

### **Moose are a “hotspot” problem**

Some of the industrial forestland managers did not think the current level of damage was widespread enough yet. They were more likely to identify localized or “hot spot” areas.

*If moose were in balance like they are currently, I think what [Person X] is seeing is isolated ... they [moose] haven’t crossed a large part of the landscape yet. (IM-1)*

*I think that the moose we have, you know there’s probably enough to fill two hands in the land base that we manage. So, no we really don’t consider much in the way of moose [damage]. (IM-2)*

*There are localized areas where it’s really significant, but more generally it’s not been an issue. (NIO-2)*

### **Moose are of little concern in non-industrial forests**

Non-industrial forestland owners and managers were less concerned about moose damage from browsing or did not perceive it as a concern at all.

*Regeneration of red maple would be a problem in some areas as they seem to love that in particular. They make a huge mess of red maple saplings, but in general there’s not been any real sort of adverse impacts in terms of over-browsing. (NIO-2)*

*Presumably they’re not causing too much of a problem just because the numbers are so low. (NIO-2)*

*I’m sure they eat a lot of food and that might be a little detrimental to the forest but that’s yet to be seen. (NIO-4)<sup>4</sup>*

## **Considering Moose in Land Management Decisions**

### **Moose not specifically considered in non-industrial forests**

We asked participants if they considered moose and their potential impacts when they made land management decisions. Most non-industrial forestland owners and managers indicated that they did not consider moose specifically when making land management decisions.

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<sup>4</sup> This individual was referencing the same parcel that industrial forestland managers expressed great concern about loss in timber value due to moose browsing.

*We don't. The population has zero impact as far as I can see, and we're not managing to increase numbers, so it really hasn't been part of our decision making. (NIM-1)*

Some non-industrial forestland owners and managers, however, were managing to improve wildlife habitat on their property. In most cases they were considering a broader range of species than just moose, but some were improving habitat specifically for moose.

*Most large landowners are harvesting heavy to control the beech and enhance the habitat for wildlife and so it's drawing everything in. (NIM-1)*

*We aren't targeting moose but we are definitely improving habitat for wildlife especially white tailed deer. It's all the same as far as I'm concerned. (NIM-1)*

*We've found them [moose] more active in the burn areas and we went in and did some brush hogging and some clearing on the edges of the burn. It seemed to actually bring them in more... so I would say the numbers on our cameras have probably doubled in 3 years. (NIM-1)*

### **Industrial managers consider moose impacts**

Most industrial forestland managers considered moose in their decision-making.

*We definitely have hotspots, and we know where those are, and that does affect our management decisions. (IM-1)*

Those that consider moose indicated that they sometimes choose a less preferred management strategy in order to reduce or avoid moose damage. In some situations, they feel no management strategy is worthwhile.

*If I know there's a pocket of moose there and they've been there for 10 or 15 years I'm not going to do a clearcut just to feed them. We're going to try to grow something that's already there. (IM-1)*

*It would just be an intermediate tree cut rather than a regeneration harvest. If you have the option [to do an intermediate tree cut], we don't always have that option. (IM-1)*

*We're doing a lot of regeneration-type cuts, it's where we're at with the forest... it is perfect moose habitat and feed. (IM-1)*

*In some places there's no option because you know you have a low quality stand, and you're carrying trees that are non-performing, and you can't regenerate them, so you're sort of stuck in a really difficult spot. (IM-1)*

## Management for the Current Moose Population Level

We asked participants, given the current moose population level and distribution, what actions they might be taking or would like DEC to take to manage moose.

### The importance of monitoring

A number of people indicated that they wanted DEC to continue monitoring the moose population size and distribution. They offered to help by providing access to their land. Several suggested some type of citizen science using trail cameras already in place throughout the Adirondack Park as part of the monitoring effort. They were particularly interested in finding out the current population trend.

*DEC should be continuing to monitor the moose numbers to better understand what's going on with the population ... a really important piece right now is to continue that research, make sure that there's adequate funding and staff to better understand the basic questions. (NIO-5)*

*Person 1: There's thousands of these cameras out there and if you could gather that data just with dates and times and places, it might help you understand ... where they are and why.*

*Person 2: It is citizen science. (NIM-1)*

Participants were also supportive of DEC developing a management plan to keep population numbers under control.

*We'll come onboard to support DEC's efforts to manage the moose population. I don't think you're going to have any problem with forestland managers and owners being supportive of let's keep the moose population at a reasonable carrying capacity for the resource because that benefits the public, the moose, the forest, everybody. (IM-1)*

### The importance of education

Several people also suggested educating the public about moose, their natural history, and providing advice about personal safety issues. One person suggested placing articles in Adirondack Life, Adirondack Explorer, the Conservationist, and local newspapers, as these publications are read by both seasonal and year-round residents.

*If DEC wanted to keep people more informed that would be great. (NIO-3)*

Several industrial forestland managers suggested that more efforts should be made to communicate with the public regarding the benefits of early successional habitat for a variety of wildlife including moose, and pointing out specifically the management practices they use in harvesting trees provide that habitat.

*It would be a benefit to have more allies ... making a point that our management is what is sustaining these animals. ... There's a lot of critters that like our management. (IM-1)*

*I think a potential benefit is, we take a lot of flak for our even-aged management and we're constantly arguing for it, if we could have the support of people that want to see the moose praising us for our management and providing all this habitat. (IM-1)*

### **No need for new management actions on non-industrial forests**

Non-industrial forestland owners and managers tended to view the current situation positively, seeing little negative impact (e.g., little browse damage), and consequently not perceiving a need for any management actions on their part or DEC's.

*We haven't really seen any impact that would make us change from what we're doing. (NIM-1)*

*Where we're doing, uneven age management and real selective cutting, you just don't see the problems with browse. (NIM-1)*

Some non-industrial forestland owners and managers are managing for wildlife species and so the management actions they are taking, given the current moose population, are aimed at maintaining or increasing the population.

*In the future on the private property that we can log, you know we'll probably be doing some patch cutting that just could benefit early successional species in general, which would benefit moose as well. (NIO-2)*

*We're definitely trying to encourage them [moose]. (NIM-1)*

Among non-industrial forestland owners and managers there was some suggestion of starting hunting moose now before "problems" develop, but others objected to that idea. (Hunting, as a management action, will be covered in more detail in the next section of the report dealing with management for an increasing moose population.)

*I've heard folks in my own circles talk about hunting, hunting them right now before it's a problem. (NIM-1)*

*Most of our owners haven't seen them yet so ... if we start shooting them, I don't know if that would go over too well. (NIM-1)*

## **No actions to reduce damage on industrial forests**

Some industrial forestland managers did not see any actions they could take at this point to reduce the negative impacts from moose browse.

*I think from a silviculture standpoint there isn't. I mean there's not any option ... that fits within our business models. Given the current state of the forest, or type of applications that we use silviculturally, they all lean towards more food for moose. ... We're starting the forest over [clearcutting], it's just part of the process. (IM-1)*

*I don't think there's anything you can do from a management standpoint in our experience. (IM-1)*

## **Future Scenarios**

We presented participants with potential future scenarios, one in which the moose population increased and one in which the population decreases. We asked participants what actions they would be willing to take and what actions they would support being taken by DEC or others to manage moose if the moose population either increased or decreased.

## **Management for an Increasing Moose Population**

### **More moose would raise more concerns**

Before participants described actions they were willing to take, they discussed concerns about what might happen if the population increased. Most people mentioned that the concerns they expressed earlier (e.g., vehicle collisions, impact on forest regeneration, impact on other plantings). They were also concerned about the increased spread of diseases and parasites in the moose population.

*I don't want to see anybody getting in any more accidents from moose. That would be terrible. (NIM-1)*

*Moose snowmobile incidents where the moose will be walking down a groomed snowmobile trail and you've got a snowmobiler 'look at the moose' and then the thing tramples him. (NIM-1)*

*In Vermont they're saying 'yeah, the population got way out of balance and that's why we have a tick problem.' (IM-1)*

*Don't let the moose population get out of control to start with, don't let the tick problems become an issue, don't let them over-browse, run themselves out of house and home. (IM-1)*

*But if this trend continues, you think about the browsing forest and other compatibility issues with moose and white-tailed deer, ringworm, tick situation, so I think the concern is the trend. (NIM-1)*

Several people suggested that if the moose population increases, the area might support large predators, such as wolves or mountain lions. There were mixed feelings about whether these predators would be welcome in the area.

*The wolves start moving down if the moose numbers start getting that high, they start coming down and that creates a lot more problems for a lot of other things. (NIM-1)*

Some participants also talked about potential benefits of an increasing moose population, such as increased viewing opportunities and increased tourism in the area. Others thought if moose became more common, then they would be less of a draw for the area and there would be no economic benefit.

### **Skepticism about a population increase**

A few were skeptical that an increase in the population was possible due to the increasing temperatures from climate change. They thought the moose would be less likely to survive in the Adirondacks, and would move farther north into Canada.

*Climate change and the sensitivity of moose to ... the heat, etc. I have a tough time believing that [a population increase] might actually happen. (NIO-2)*

Some participants also thought it would be unlikely for the population to get 'too high' because the Forest Preserve acts as a barrier to moose population increase.

*I've always said ... the park is going to be somewhat of a barrier unless you get significant biological changes in that forest through...disturbance. I think that ... moose need that open habitat. (IM-1)*

*The park lands to me really are a moot point because you're never going to have high moose densities on the forest preserve. (IM-1)*

### **Actions could address concerns about more moose**

Participants discussed actions that they or DEC could take if the population of moose increased in the future. Since vehicle collisions would become more common with an increasing moose population, participants suggested increasing education for drivers. Another suggestion was to lower speed limits at nighttime.

A few people mentioned that landowners might need to put up barriers (e.g., fencing) to keep moose away from high value landscape plantings and gardens. This was not seen, however, as an option for larger areas.

*You can't justify the cost of fencing each of your harvest areas with moose. A) The species mix that we're trying to protect there, the economics wouldn't support it and B) you're trying to keep a much larger animal out. So that's not really an option. (IM-3)*

As with managing for the current moose population, some participants suggested changes to silvicultural practices to reduce browse damage, while some industrial forestland managers thought that was not possible or effective.

*I think that some people are already managing their forests closer to what doesn't really provide the best food source ... for the moose. I think industrial forestland managers are the ones who ... are going to have to change their practices. (NIM-1)*

*We were talking about if you want to regenerate something and get away from the deer, just make the cut big enough. You overwhelm the deer. It's hard to do with moose. (IM-1)*

*If we continue to try to do what we need to do to make the forest sustainable over the long term from a value standpoint by growing better quality stems, we're going to have to do a lot more regeneration harvests in the short term, and that's going to allow the moose population to spread pretty rapidly. (IM-1)*

Several participants suggested compensating landowners for moose damage. They felt, however, that this was unlikely to be acceptable to the public.

*It's never going to happen politically but .... they [landowners] should be compensated for the moose damage and that way the state as a whole is paying for the opportunity to have moose. (NIM-1)*

*The landowner doesn't benefit ... there's no payments going back to the landowner for producing moose. I don't ever see that happening. I can't see the public saying 'oh great we're going to write a check to this owner ... because they have moose on their property.' (IM-1)*

Several people mentioned that with an increasing population DEC should continue its moose population monitoring and document impacts of moose. A number of people had opened their property previously for research conducted by DEC and Cornell. They indicated they were willing to continue that, and be helpful in any way possible. Industrial forestland managers also suggested that DEC should contact neighboring states (Vermont, New Hampshire, and Maine) to learn from their experiences with higher moose populations.

*Collaborate and support research toward documentation of the impacts, population estimates, and anticipated Adirondack carrying capacities. (IM-3)*

*We're all more than willing to participate to help you guys get the education out, get the message out, get our organizations involved with the lobbying that'll be necessary and educational components, and happy to do tours if you like. (IM-1)*

*It's a similar species mix. Vermont's not a lot different than the Adirondacks. (IM-1)*

### **Hunting is the only viable management action**

Most industrial and non-industrial forestland owners and managers mentioned that with an increasing population some type of "limited" hunting might be necessary. One person suggested getting the authority to hunt in place now so that it is an option for the future, even if it is never needed.

*The only control measure is to manage the population through hunting. (IM-3)*

### **Hunting would cause concerns**

No one we spoke with appeared to be completely opposed to hunting, but the population level or degree of negative impacts people thought would necessitate hunting varied widely. Non-industrial forestland owners and managers tended to think that the population would not be at a high enough level to justify hunting for some time. Hunting would only be acceptable if moose became "extremely common."

*Allowing hunting to reduce the population. That could be an action I suppose. I don't think we're there yet. I don't think we'll be there for a super long time. (NIO-3)*

Some of the non-industrial forestland managers also felt that owners or lessees would not hunt moose if they personally did not feel that the population was large enough.

Most industrial forestland managers, on the other hand, were more likely to believe hunting was needed now or likely in the very near future.

*We should do something sooner rather than later, before it becomes a major issue. (IM-1)*

Allowing hunting could be seen as an economic benefit to local communities.

*I definitely think it's going to bring sportsmen from out of the area that would be an economic benefit. (IM-2)*

## **Distributing moose damage permits was frequently suggested**

Participants offered two suggestions for lethal control of moose. The first was giving moose damage permits (also referred to as nuisance permits) to the landowner.

*The nuisance tag is going to give you a good sense of that landowner who's experiencing a high percentage of loss. They can really target the moose. (NIM-1)*

*I think you should go to the landowner in conjunction with a study that you've done both aerial and on the ground of this property. You determine okay this property has X number of moose per whatever, square mile, however you want to measure it. This is the damage that it's doing and then give out how many permits you think to that specific landowner. It might be you know this amount for one landowner and this amount for another landowner. ... Then it's up to them to do whatever they do among their ownership or lessees club, with how they distribute them. (NIM-1)*

*There are these hotspots and you can somehow quantify it. I think that seems like an easy solution. (IM-1)*

One industrial forestland manager offered an example of where permits were given to landowners for a large ungulate in another state. They felt the system worked well for decreasing browse damage on their property, and would be willing to participate in a similar system in New York.

A suggestion was made that the landowner could raffle off the moose damage permits, making a little money for themselves, as they are the ones experiencing the damage, and give some money for wildlife research. Others were opposed to this idea.

*I don't want it to be perceived that ... we're trying to profit off of the hunting of moose. No way. No way. (IM-3)*

*If landowners are in a position to "sell" moose permits, we will get ZERO buy in from the general public on control efforts. Let the state sell the permits with the proceeds going to further research. (IM-3)*

## **A lottery could raise money**

The second mechanism suggested was some type of limited lottery, where interested hunters could enter their name, pay a fee, and then DEC would pick a certain number to receive a moose hunting permit. Some people thought a lottery could provide a source of revenue for DEC, whereas others thought that was not a good idea, and suggested donating any money raised to non-profits or wildlife research.

*More of a lottery system ... see what the take numbers start to be like. A very slow initiation of a hunting season. (NIM-1)*

*I'd love to see New York do what Vermont did which was raise revenue to fund studies by lottery, where you bid on moose tags. (NIM-1)*

*I think it would be a great opportunity for DEC to use hunting as a promotional tool and to generate revenue by having a super limited lottery. (NIO-2)*

### **Concerns about lethal control**

Participants listed a variety of concerns and complications that could ensue if lethal control was permitted in some fashion. A common one was public opposition to killing moose.

*If you start giving out moose nuisance permits, it's going to be a huge public outcry. (IM-1)*

*We [industrial forestland managers] don't want to be out on our own shooting a moose and not having support of other stakeholders. (IM-1)*

*We [industrial forestland managers] don't want to be misconstrued. We want to help with the situation. We would like to see a cooperative effort between ... the large private landowners and the DEC in a collaborative effort because the public pushback will be harsh, between the public and the environmental community. (IM-1)*

A few participants mentioned that hunters might lose their enthusiasm for deer hunting if moose hunting were allowed, and that would be detrimental to deer management where hunting is relied on as a management tool.

*As soon as you start talking about moose hunting, you're going to be losing a lot of deer hunters to that because that sounds much more interesting. (NIO-3)*

A concern raised was that roads on private land would need to be maintained so moose could be removed.

*Hunters don't like to drag them very far so what you find is that you have to keep roads open so they can get in with vehicles. (IM-1)*

One person suggested that nuisance permits would not be an effective management tool, because moose from other areas would come into the area where the moose were removed because of better food availability.

A concern expressed by a number of people was that lessees and landowners would not want the general public on their land.

*There may be a little bit of conflict if you started to opening up all the gates to some of these easements. (IM-1)*

This concern was countered by others who offered suggestions for accommodating the general public.

*If you are experiencing damage and you get some damage permits ... it would be fair to give the lessees the right of first refusal. ... But then if your guys don't want them and there is damage being done ... you could find somebody else who does want to take moose. (NIM-1)*

*Our leasing programs are different across all our properties but typically most of the easement plans are open to the public in some aspect. (IM-1)*

*My position will be very clear, the clubs just have to accept it if a couple of permittees are granted permission to take a moose on their licensed site. It's not like the general public is being allowed to hunt the property for the entire hunting season. ... The moose are not OURS or THEIRS. The moose belong to the state, that's the law. (IM-3)*

Several industrial forestland managers suggested trying hunting as a management experiment in one or two locations, including research on the impacts to the forestry resource. They were willing to have such a project implemented on their land.

*You know it seemed like that might be a socially acceptable strategy to take a property like [named property]... and say 'we'd like to test this' and use that as an example ... that might be more palatable than going to the legislature and saying 'we want to kill moose.' (IM-1)*

## **Management for a Decreasing Moose Population**

As with the discussion about the possibility of an increasing moose population, participants first discussed whether they thought the scenario of a decreasing population was possible, and what their concerns would be if that happened. Some industrial forestland managers did not view this as a likely scenario without the population increasing first, and then declining due to diseases and parasites.

### **Climate change could cause a decline**

Several non-industrial forestland owners and managers imagined that a decline could occur due to climate change.

*The issue for moose across North America, across the United States, northern tier of the United States is just ... going to be the fact that the climate is warming and making it more difficult for moose to survive. (NIM-1)*

*We're sort of in a southern edge of the (moose) range, we've seen in Minnesota, throughout the Northeast, the moose at the southern end of their range are declining. (NIO-5)*

Participants were concerned about the loss of viewing opportunities and the potential economic loss to local communities.

Participants suggested several actions that they or others could take to slow or reverse a decline.

### **Some participants willing to cut more trees**

Industrial forestland managers might be willing to do more clearcutting to provide food for moose, which they point out would also help other early successional wildlife species.

*Would we change our silvicultural practices in order to encourage moose? Yeah, we might do that. We do that for birds. (IM-2)*

Some non-industrial forestland owners and managers would be willing to take actions on their property to improve habitat. (e.g., create browse, maintain forest cover for connectivity to suitable habitat).

*We could take management actions to increase the moose browse, hinge cutting, red maple, etc. That's one thing we have pondered ... but we haven't taken any action on it (NIO-2)*

### **Other participants not willing to take action**

Some non-industrial forestland owners and managers were not willing to take action on their property or were uncertain what actions could be taken.

*I know we would not be cutting more trees. (NIO-6)*

*I don't think I would try to promote their population to grow on our property, I think you would value the sightings more but other than that, they eat a lot of food, they out-compete the deer, those are the things that we're a little concerned about. (NIM-1)*

*I don't know if we could do a whole lot different to make the population increase through forest management. (NIM-1)*

## Continued support for research

Several participants noted the importance of continued research, and suggested citizen science and the use of trail cameras could be helpful in documenting the decline. They also mentioned research to reduce barriers to connectivity between habitats.

*Looking at barriers to connectivity for the population ... from a connectivity standpoint it would be important to try to maintain forested cover. (NIO-5)*

## Concerns about some potential actions

Participants also expressed some concerns related to actions that might be taken to prevent a decline in the moose population. In cases where the interviewer suggested that moving moose from less suitable habitat to more suitable habitat might be an option within the Adirondack Park, participants were opposed to that idea.

*Moose move a long, long way in search of the right habitat and whenever a moose gets moved, oftentimes you hear about a moose dying as a consequence. So I think the moose could be entrusted to find the appropriate habitats on their own or just quietly die out where ... they're not doing well. (NIO-2)*

*I feel super strongly not to tamper with anything. (NIO-3)*

Some participants felt that deer hunters would be opposed to actions that increase the moose population to the detriment of the deer population.

One or two participants raised the potential that if the moose population declined moose might be listed as an endangered species. These individuals were concerned that such a listing would limit certain management actions, such as hunting.

## CONCLUSIONS AND MANAGEMENT IMPLICATIONS

Most participants in the focus groups and telephone interviews described a similar pattern with increasing moose sightings and signs over the past 20-30 years. All participants believed there were benefits of having moose in northern New York. These included personal enjoyment of seeing moose or moose signs, the enjoyment they believed others got from seeing evidence of moose, and the potential tourism benefits to the local economy. All participants, however, expressed some concerns about having moose in northern New York. The most frequently mentioned concern was the potential for moose-vehicle collisions.

Industrial forestland managers generally differed from non-industrial forestland owners and managers in the level of concern they expressed regarding moose damage from browsing, especially to regenerating forests. Most industrial forestland managers considered browse

damage a major concern, especially for the future if the moose population increases. Non-industrial forestland owners and managers were less concerned, or did not perceive browse damage as a concern at all.

## **Potential Considerations for the DEC Moose Management Plan**

Participants were asked about actions they would be willing to take or would like DEC to take now or in the future to manage moose under different moose population scenarios. This type of information will be useful to DEC as they develop their moose management plan.

Regardless of the moose population trend, participants wanted DEC to continue monitoring the population and conducting research on moose. Most participants indicated they would welcome DEC and other researchers on their land.

If the population remains at its current level, non-industrial forestland owners and managers indicated they would appreciate the benefits of having moose on their properties and had few concerns. Some would continue efforts to encourage moose on their properties. They also saw benefit in continuing public education efforts about moose and their natural history for both residents and visitors to the area.

On the other hand, industrial forestland managers identified several “hot spots” where they considered current moose damage to be too high. The perceived difference in moose distribution between industrial and non-industrial lands poses challenges for management, suggesting more targeted actions may be needed in the “hot spots.” Industrial forestland managers suggested a variety of options for addressing their concerns in those areas (e.g., moose damage permits, experimental plots where moose were removed and damage assessed).

If the moose population increases in the future, a few participants cited potential benefits such as increased opportunities to see moose and increased tourism. On the other hand, participants expressed concern about the potential for increasing moose-vehicle collisions and suggested increasing education for drivers and lowering speed limits at nighttime. Industrial forestland managers were particularly concerned about more widespread browse damage to forests. Some of these managers thought it might be possible to adapt their silvicultural practices to reduce the impact of the increasing population, while others did not.

Lethal control of moose via moose damage permits and some type of lottery system for hunters were suggested most often as management actions to reduce the moose population. All participants appeared open to lethal control as an option. Industrial forestland managers expressed more urgency to consider lethal control options, presumably because of the increasing browse damage that would occur with an increasing population. Whereas, non-industrial forestland owners and managers thought the need for lethal control was further off in the future, even with an increasing population.

A number of concerns were expressed with utilizing lethal control as a management action. These concerns were described in detail in the results section of the report, and will likely need to be addressed in a management plan.

If the moose population decreases in the future, participants would be concerned about the loss of viewing opportunities and the potential economic loss to local communities. They suggested several actions that they or others could take to slow or reverse a decline, including increased clearcutting on industrial forestlands, other types of habitat improvement on non-industrial lands, and continued research by DEC and others to better understand the decline.

In this study we focused on gathering information from large private forestland owners and managers in northern New York regarding, in part, their opinions on possible management actions they or DEC could take as the moose population changes in northern New York. Along with information being gathered from other key stakeholders—New York State residents, and landowners in the primary and peripheral moose ranges in New York, the information generated from these focus groups and interviews will be used by DEC as they develop their moose management plan in NYS.

## APPENDIX A: OPEN-ENDED QUESTIONS

How common are moose on the property you own?

- Timeframe, frequency, number of moose

What experiences have you had with moose?

What are the benefits you see of having moose on your property? And in your part of northern New York?

What concerns do you have about moose on your property? And in your part of northern New York?

To what degree do you consider moose when you make decisions about the management of your lands?

Now I'd like to talk about the moose population that currently exists in northern New York. Then we'll transition to talking about how the moose population might change in the future. Currently, researchers estimate that there are about 400 moose in northern New York. They are found throughout the area, but are concentrated primarily on private, managed forests in the northern third of the Adirondacks.

- If the population remains at this level and concentrated on managed forests, are there things you want to do on your property related to moose (to make the impacts more tolerable, or increase the number of moose)? What are the reasons you would take these actions?
- What do you hope moose management by DEC might do?
  - Specific to your property. In the larger area.

OK, let's think about how the moose population might change in the future. So first imagine moose populations are increasing. There is increased damage to young forests and more moose-vehicle accidents, but people are enjoying opportunities to see moose.

- How acceptable would it be to you?
- What if the population increased even more to an intolerable level for everyone. What types of actions might you be willing to take on your land to reduce the number of problems in northern New York?
- What do you think DEC should do?

OK, let's think about another scenario where moose populations are declining. Diseases within the moose population are high.

- How acceptable would it be to you?
- Now imagine the population is declining a lot. People want the moose population to continue to exist in northern New York, but their survivability is in question. What types

of actions might you be willing to take on your land to increase the number of moose in northern New York?

- What do you think DEC should do?

One final scenario: What if the situation was a little different and the moose population was declining a lot in other nearby states but doing well or even increasing in New York State.

- Would you be willing to take actions on your property to preserve the moose population in northern New York?
- What actions would you be willing to take?