

# **Regulation of the moose population in Norway**

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Norway is the country in mainland Europe with lowest population density, and with large continuous areas of semi-natural landscapes. Despite the low human density, wilderness areas have declined dramatically in the last century through resource extraction, infrastructure development and recreation.

The moose population in Norway is regulated by hunting. The climate and the entire ecosystem in Norway are optimal for the living conditions of moose. There are plenty of food supply and almost no natural enemies. According to this, and many other factors, the Norwegian state has adopted laws in regulation of moose.

Moose is the national animal of Norway. The moose stock is regulated by “Viltloven” (the law of wildlife). “Law of wildlife, of 29 May 1981, entered into force on 2 April 1982 and replaced the law of hunting of 1951. The purpose is to manage wildlife and its habitat so that natural productivity and species diversity are maintained. Within this frame, wild animals can be harvested.”

The law specifies when it is allowed to hunt, and a specific number of moose which can be hunted. It is allowed to hunt moose in the period from 3<sup>rd</sup> of October till 31<sup>st</sup> of October. The hunting quote in 2010 was; 44 400 animals, 65% young animals, 20% ox and 15% cows. These numbers vary from season to season depending on the moose population. The reason for this distribution is to keep the population at a balanced level.

The population of moose has increased significantly the last 40 years due to big forest felling, which produced more grazing for the animals. The number of grazers (like sheep and cow) has decreased, which results in less competition for the food. Besides, the moose has almost no enemies.

Because the moose hunting is divided into communities all over Norway with different hunting quotes, the numbers of hunted moose varies from community to community.

Overhalla in North-Trøndelag is one of the places in Norway where a big number of moose is killed every year due to large forest areas and low human population (good living conditions).

The population of moose in Overhalla should have a size capable of supporting a killing of 300 animals a year. Rygblengslia is one area in Overhalla where the hunting quota 40 years ago was 1, whereas today is 9. This is a good example on the huge increase in population growth. The reasons for the specific quota numbers are utilization of grazing potential without over-exploitation, concern for biodiversity and injuries in agriculture and forestry. Other factors considered are that the populations should have a gender and age structure for optimal production and stay stable.

In Overhalla the inset of animals goes after several principles. Calves and young animals up to 1 ½ year, should constitute the total amount to at least 65% of the number of animals killed during the contract period. Calves should be at least 30% of the total number of killed animals. Furthermore, the extraction of moose on 2 ½ years and older should not exceed 15% of field allowance. Another important factor is that if a calf-bearing cow accidentally is being killed, the calf must be shot as well. If there is no available quote for the calf in the hunting area, the calf should be placed to another.

Numbers which differ from the hunting quota of moose, are the animals killed in traffic accidents. This number is approximately on 1500-2000 animals per year – but it varies. It depends on biological mating periods and growing seasons, spreading periods for young individuals, annual migration and hunting season. The risk of a collision between vehicles and moose has to be reduced; therefore “good-sight-zones” are being constructed towards the roads, so a moose could be easily spotted. High fences have been raised along some roads close to the forest and even bridges- so the moose can cross large roads safely.

Usually there is more than enough food, but during the winter months, because of all the snow, food is not always sufficient. There has been an increase of the snowfall in Norway in the last two years. When the grazing is covered with snow, the moose starts eating on the shoots of pine trees. This is destroying for the pine woods and the moose gets considered as a “pest”. However, the lack of food has led to a migration of moose closer to the villages. In some cases there has been seen moose inside shopping malls and shops!



This of course causes several problems. As mentioned, it is a problem for the traffic and not least for the drivers, but it has also become a problem that the moose are getting too tame. Furthermore this makes the moose migrate closer to civilization and causing problems in the way that they are eating farmers' food consumption. Because of this, there were discussions on whether to shoot these tame moose or not.

So called feeding-stations has been made by several farmers to avoid that their own food storage for their livestock gets eaten. It involves putting out food for the moose on certain areas away from the farms during the winter-periods. In Stor-Elvdal in Norway there was made a research on this.

The feeding started when the first snow fell, around December, and came to an end-point when the snow melted (usually in April-May). For the food to be easily supplemented, they placed the food-stations close to roads. In this way the food could be transported by cars. As a result of this, the moose was driven closer towards the car-traffic. This again increased the probability and risk for accidents between humans and moose.

As mentioned, there is damage on the pine twigs caused by moose during the winter time because lack of food. When food-stations were tested, the forest areas close to the stations were a lot less damaged.

This resulted in even better living-conditions for the moose and a more unnatural way of living. In the longer term this will probably lead to an increase of the population, which then also means that we have to harvest even more animals. At the same time it results in more

tame moose, which may also contribute to aggressiveness. Moose with calf is especially more aggressive, and could get dangerous in a confrontation with humans.

The high density of moose-population leads to increased moose-human conflicts. Some inhabitants in Norway set the government responsible for the removal of “house-warm” moose which invades gardens and properties. This is a driving force in the conflict on whether to shoot the tame moose or not. If so, how could we merge this numbers towards the given hunting quote. Should the civilians be allowed to shoot and kill moose that gets too close? Where is the limit between self defense and irritation/angriness? How should the law be regulated according to this problem?



*Picture taken 6<sup>th</sup> of February 2011 in Sunniva's garden.*

*Could be a cow with two calves.*

As seen, moose, which basically is peaceful herbivore, can provoke dangerous situations among humans. Then what to do with predators like wolf and bear? This has for many years been a controversial question. Many people, and then especially farmers, want the predators to be completely extinct.

Today there is between 25-50 brown bears in Norway, and for about 150 years ago there were approximately 3000. In the period between 1850-1860, 200 to 300 bears were shot per year in Norway. Intense hunting led to almost extinction of the bear population. This intensive hunting lasted until 1932.

Today, the population is governed by “damage hunting” (to stop or prevent damage to livestock or domesticated moose and deer) or “license hunting” (damage motivated killing, which uses a quota on animals to be shot – in the same way as moose hunting).

When it comes to wolf, there are almost no free-living individuals left. It is estimated to exist only 27-30 entirely Norwegian wolves in Norway today! The biggest problem facing the wolf-population is that wolves kill and eat sheep and other livestock. When a situation like this occurs, the wolf will be put to death.

Norway’s conservation association, “Norges Naturvernforbund”, works against license killing of wolf. The Nature Conservation Act of Norway states that all species, including wolf, should be preserved in viable populations, in the long term. In spite of this, the entire law has to be altered to allow license killing.

The moose is not only hunted to keep a balance in the ecosystem, a great amount of the meat is put out for sale in stores. As much as 1000 ton moose meat is spread all over Norway in the fresh food counter and in the cold disk. One single farmer can earn up to 20 000 Norwegian kroners for one moose. This corresponds to approximately 2500 EUR, which is a great part of the yearly income for farmers. Since there is a lot of money involved, the yearly moose hunting has a huge driving force.

Because there are so few natural enemies for the moose, what would then happen if there was no regulation by human power of the moose-population? Would it result in damaged forests and interference in the Norwegian ecosystem, or would the different species adapt to the changes over a certain period of time? And what if we let the predators live, would the entire community be able regulate itself by “nature’s way”?

What if we let moose live without regulations, but continue regulation of the predators to prevent them from expanding? The moose-populations would in that case have a high and rapid increase, and would probably compete with other herbivores like reindeer, red deer and fallow deer. Moose would increase their niche so the naturally overlapping niches between deer and moose would be more and more overlapped by moose, which would most probably result in extinction of other deer species.

Predation has been recognized as a major selective force in the evolution of behavioral characteristics of mammals. If we remove the natural predators completely, will it change natural behavior in herbivores?

As a consequence of local predator extinction, prey may lose knowledge about natural predators, but usually express behavioral adjustments after return of predators. Human harvest may replace natural predation, but prey selection may differ from that of natural predators, leading to a change in the behavioral response of prey. Hunting success of re-colonized wolves on moose is high, where moose have been continuously exposed to wolves and bears. Moose behavior towards wolves and humans typically differs in Norway from that of other countries, caused by small predation pressure by large carnivores. Instead there is a high rate and mode of human harvest.

Food shortages for the moose during winter caused by a lot of snow (which have led to testing of feeding stations) also have positive effects. First, deep snow may have positive effects on the phenology of plant species important in the moose diet. Secondly, a lot of snow may increase the availability of winter food because thick snow layers that carry a moose may enable browsing on taller trees and bushes. There is an advantage that this is avoided, so that trees can grow without being eaten before springtime. However, with the huge amounts there has been the last years, the snow might also cover bushes and tree branches. This is where the food-stations might help the situation.

Today's biologists and moose managers face a difficult challenge of balancing biological principles with a diverse array of social and economic values often in conflict with principles of optimum or maximum sustained yield harvest.

Human harvest-set quotas are based on thorough and accurate research regarding to the different moose-density in different areas all over the country. The hunting phenomenon has proceeded for so many years and with good results in terms of the welfare of moose.

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