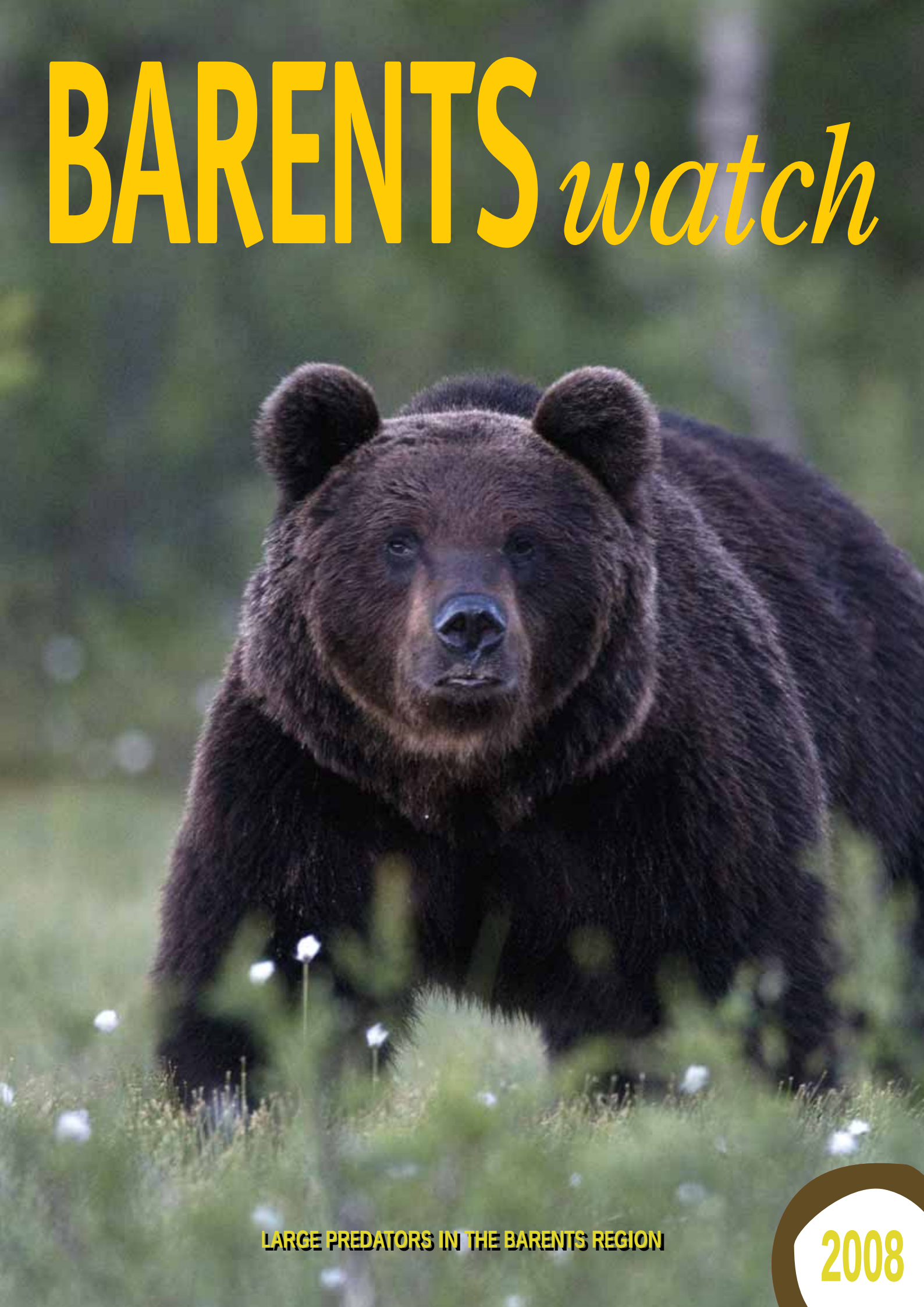
BARENTS *watch*



LARGE PREDATORS IN THE BARENTS REGION

2008

BARENTS*watch*

BarentsWatch 2008 is published by Bioforsk Soil and Environment, Svanhovd with support from the Norwegian Ministry of Environment, Bioforsk, Directorate for Nature Management and County Governor of Finnmark.
Norwegian, English and Russian editions are published.

Director:
Ingvild Wartiainen

Editor:
Espen Aarnes

Cover photo:
Brown bear *(Ursus arctos)*
©Terje Kolaas

Graphic design:
Monsen grafisk design, Finland

Print:
Papermill as, Norway

Editorial Work completed October 2008

Translators:
From Norwegian to English:
CBG-konsult AB, Sweden

From Norwegian to Russian:
Bioforsk Svanhovd

Web-page:
www.barentswatch.com

ISSN 0806 – 5411

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PREDATORS IN THE BARENTS REGION

– *both a joy and a concern*

People in the Barents Region have always lived in conjunction with large predators. There are innumerable stories and myths about these predators, and each of the different cultures have their own tales. The topic of predators never fails to promote impassioned engagement, and is often the cause of conflicts, particularly among wildlife managers, environmental activists and people working in primary industries (farming, logging, etc.). The theme for this edition of Barentswatch is the four large predators found in the Barents Region (brown bear, grey wolf, wolverine and european lynx) plus the golden eagle. Articles from all four Barents Countries illustrate examples of active research projects and management strategies for these species.

Predators in the Barents Region, as with the rest of Europe, have been heavily persecuted for the last century, contributing to their strongly reduced numbers and local extirpations over large areas of Europe. Conflicts between humans and predators are found throughout the Barents Region but with differing intensities. Depredation of domestic livestock has always been the primary conflict. The increased use of wilderness grazing areas in 1845 led to the enactment of a law in Norway requiring the extirpation of predators and protection of other wildlife (”Lov om utryddelse av rovdyr og fredning av annet vilt”). This led to huge reductions and local extirpations of some species. Since the 1970s a gradual increase in protection and more restrictive shooting policies have led to an increase for all the predator species in all of the Barents Countries.

Predators are politics, and the predator management in all of the Barents Countries is based on decisions made by politicians. All the four Barents Countries have different population goals and management strategies for each of the predator species, a situation further complicated because many of the predators have territories that cross one or more international boundaries. A good management plan demands an extensive knowledge of each species population status and habitat requirements, and in this edition of Barentswatch different projects within both research and management will be presented.

All the large predators in the north; brown bear, grey wolf, wolverine and european lynx, along with Golden Eagle are also a source of loss for grazing reindeer. With the exception of Russia, reindeer owners receive compensation for depredation losses. How these figures are calculated varies greatly among the three countries. As you can read in this issue Finland and Sweden base their compensation on the number of predators documented in their grazing district and the owners are thus compensated by preventing losses. In Norway compensation is based on the number of reindeer documented as killed or “probably-killed” by predators. This documentation includes a great deal of guesswork and most reindeer owners feel it is too unpredictable. Also this compensation-method does little to encourage the use of mitigating measures that can reduce livestock losses; many would say it in fact does the opposite.

Finland, Norway and Sweden are signatories of the Bern Convention, which among other things commits these countries to preserving viable populations of the large predators. After many years with very few predators remaining in the wild, perhaps particularly in Norway, we againhave to learn how to best live in harmony with predators close to us, whether we like it or not. To achieve this, without too much of an increase in conflict levels, it is critical that the general public increase their general knowledge on predators. It is also important that good cooperation is established among researchers, primary industry, rural residents, and wildlife managers to address specific needs.

I hope you will find this edition of Barentswatch both interesting and informative.

Good reading!

Espen Harnes

By Steinar Wikan,
Predator collaborator, Norwegian Nature Inspectorate (SNO)

PREDATORS IN THE BORDER AREA
- *a historical review*

All of the four major predators - bears, wolves, wolverines and lynx - can be found in the border area where Norway, Finland and Russia meet, but currently the emphasis is mostly on bears. They are common and can be seen most frequently. It used to be wolves that caused the greatest problems, and they were feared and hated. Now only occasional roaming wolves are seen; but even a wolf on its own can cause a lot of damage. Wolverines used to be very common but are very rare now. Lynx are relatively new.

The hated wolf

Throughout history, wolves have caused major problems for reindeer herding. Wolf packs could scatter reindeer herds to the four winds in a single night. Everything has to be arranged on the premise that predators could strike at any time. The herders shouted and yelled, and lit fires around the herd at night. Wolves could often be heard howling on quiet nights. That was scary enough, but it was even worse when it all turned completely silent. That was when the animals were in danger. The herdsmen listened to the sounds of the reindeer herd in the darkness while going about their rounds. When the reindeer heard wolves, they pressed themselves together so that their antlers were interlinked. That was when the herdsmen knew their reindeer could be killed. At best, the wolves might have eaten their fill of a small number of animals killed so that they could be pursued on skis in the powdery snow and then beaten to death. If the herdsmen were able to prevent the wolves from getting to firmer snow in the mountains, they had no problems catching up with them. But it was worse when the pack stayed in the forests. Then the wolves were more mobile, and the reindeer herd ended up spread out over a large area during attacks. Under these conditions, it was impossible to catch the predators.

Wolves were pursued in all kinds of ways, being beaten with sticks by men on skis, being shot, being poisoned, being trapped. What were known as wolf pits were commonly used for trapping. These were built in the shape of a small house or cottage in the hillside. The opening was at the top, and the bait was an old female reindeer. The wolf was tempted by the reindeer and jumped into the cottage but could not get back out again. The remains of several of these traps are known in the area.

During the major whale hunt which took place along the Finnmark coast in the latter half of the 19th century, stations were set up along the coast at which the whale blubber was boiled out. Large amounts of whalemeat were dumped on the beaches, and this attracted predators such as wolves and bears. When the hunt ended in

1903, the problem of predators became noticeable in rural communities. All kinds of domesticated animals were affected. A major war was launched against predators, but the wolves could not be broken completely. They recovered their numbers during the Second World War. The intensive post-war efforts - where planes and helicopters were also used - put an end to the wolves in the area. There were no more wolves in the area for three decades, but in about 1980 the first roaming individuals appeared again. From the 1979-1980 winter to the 1992-1993 winter, there were individual wolves at Pasvik each year. They became rarer later on.

Sale of "bear rings"

In old Lapp society, the status of bears was quite different to that of wolves. In a way, bears were a sacred animal that did not cause major problems for reindeer herding. Hunting took place in winter, when the bears were hibernating, and both the capture and the subsequent bear feast were tied in with lots of rituals and ceremonies. The den was located in the autumn by walking in circles around bear tracks in the fresh snow. Eventually a ring appeared which showed where the bear was. Instead of taking the bear themselves, people could sell their "bear ring" to a rich man.

Trader Lauritz Brodtkorb in Vadsø described such a purchase of an encircled bear in the border area between Finland and Russia "at the upper section of the Pasvik River" in 1888. No fewer than 17 bears were located, but a lot of them could not be found again due to lots of snowfall and other circumstances. Brodtkorb drove more than thirteen hundred kilometres in a "reinskyss" during the hunt in February and shot three bears. They were enticed out of their dens using a bear spear and shot by Brodtkorb himself.

▲ **Wolf shot in Pasvik in January 1980. Harry and Aili Sotkajærvi.** *©Steinar Wikan*

◀ **Result of the hunting of a "ringed" bear in the border area between Norway and Finland in around 1908.** *©G. Soot*

▶ **Wolverine young removed from a den in Pasvik, April 1970.** *©Steinar Wikan*

Tracks of wolf in Pasvik. (background). *©Steinar Wikan*

The Norwegian and Finnish colonists and farmers of new land who lived in the border area felt that bears were a problem for their livestock, and more intensive hunting and trapping commenced. Many of the Finns were clever hunters who knew of methods from their home districts. They set out bear traps and arranged snares and "bear boxes" all over the place in the wilds. This resulted in bears being more or less wiped out in the 1920s and 1930s. Only occasional roaming individuals were seen up until the mid-1960s. Since then, Pasvik has been known as one of the most important areas for bear in Norway. Sheep production in Pasvik fought a determined campaign against the bears, nature conservation stakeholders and authorities that wanted to protect the last bears in Norway, and the farmers lost their battle. Sheep production was discontinued.

Shooting rewards as a source of income

Over the years, rewards have been paid for shooting almost all kinds of predators and birds of prey. Even over the post-war years the reward for shooting wolverines was very high - up to NOK 2 000 - and that was a lot of money in those days. Wolverines were not uncommon. They wandered between Enare and Pasvik, and across to Russia, but normally they did not do any major damage to well guarded reindeer herds that stayed together. But things were worse with scattered reindeer - solitary, weak animals that did not wish to remain with the herd. They ended up as dinner for the wolverines.

For young boys who often did not have much to do in the winter, wolverine could be very lucrative. If they managed to overcome a bitch and also clear the den of two or three young, they got paid a decent annual income. A lot of effort was put into hunting wolverine on both the Norwegian and the Finnish side of the border in Pasvik in the 1950s and 1960s. This resulted in a massive decline in numbers of wolverines. This took place right across Finnmark, and one of the reasons for this was because snow scooters were very useful. Hunting from scooters was not forbidden initially.

In Pasvik, wolverine numbers have not recovered to their old level. They are in the process of reestablishing themselves elsewhere in Finnmark.

Lynx at the coast

It is only over the past twenty or thirty years that lynx have established any steady numbers in Sør-Varanger, and to date they have preferred the coastal areas where the snow is firmer. Their most important prey is probably hares, although they will also make do with lambs and reindeer calves.

TARGET-ORIENTED PREDATOR MANAGEMENT AND CARE OF GRAZING ANIMALS

ON OUTFIELD GRAZING?

Yes please, both parts!

By Geir Østereng,
Wildlife Manager, County Governor of Finnmark

Predator management in Norway is challenging. Here, management of large predators is linked with national targets for a specific number of young each year. At the same time, in Norway there is extensive use of outfields as grazing for livestock and domesticated reindeer. Norway is divided into eight regions, Troms and Finnmark together constituting a single region. The county of Finnmark has target numbers which specify exactly 4 bear young, 4 families of lynx and 3 wolverine young. The county has large areas of wilds and borders with Finland and Russia, with relatively large numbers of predators, and both reindeer herding and sheep farming run the risk of losses to bears, wolves, wolverines, lynx and golden eagles.

Young and families count

The basic principle of Norwegian predator management is to ensure sustainable numbers of predators, to farm outfields with domesticated animals on outfield grazing, and to ensure living local society.

The country is divided into eight different predator regions, with regional target numbers for bears, wolverines, wolves and lynx. For golden eagles, the target numbers are national and county governors hold management responsibility here.

Regionalised management

A political committee (predator committee) for every predator region holds management authorisation and responsibility for the management of bears, wolverines, wolves and lynx once the target numbers in the region are attained for individual species. The Directorate for Nature Management (DN) holds authority if the region fails to attain its target numbers, and can then implement quotas for general hunting and quotas for necessary culling permits. The management in every region must be differentiated and predictable. The predator committees have implemented regional management plans for large predators, with management zones and management regimes for each individual species. The County Governor manages regular hunting and can issue culling permits based on an annual necessary quota. In 2008, the County Governor of Finnmark is managing NOK 5.4 million for preventive and conflict reduction measures aimed at the grazing industry and society in order to limit losses and reduce conflict.

Management areas in Finnmark

Wanted in A areas, unwanted in B areas - bears, wolverines and lynx

In Troms and Finnmark, counties have been divided into species-related A and B areas for bears, wolverines and lynx. In A areas, target numbers must be met when a certain number of annual young are born. Once the target numbers have been attained in the A area, the presence of the species is unwanted in the B area. In the process of restricting A areas in which individual species are wanted, the starting point has been to achieve and maintain target numbers, and to safeguard the interests of the grazing industry. Attempts have also been made to keep the A areas outside of important calving areas for reindeer herdings and outside of grazing areas for sheep.

Bears - below target numbers

Bear numbers are monitored by tracking on spring snow, by observations of females with young and by collection of bear waste and hair for DNA analysis. This gives a depiction of the development of bear numbers. In the last assessment of numbers based on DNA data collected in 2006, it was shown that there are 23 bears in Finnmark. In 2006, 2 young were documented, while no new young could be indicated with certainty in Finnmark in 2007. In 2008, a new assessment of numbers is being carried out, collecting samples for DNA analysis. In Finnmark, the areas for female bears are relatively restricted and the grazing areas for sheep are mainly a good distance away from these areas. In 2006 and 2007, licensed hunting of bears in parts of Finnmark was permitted. Injuries to reindeer caused by bears occurs to a

Female bear with cub in Pasvikdalen
©Steinar Wikan

small extent as the bears hibernate when the reindeer herds are on their winter grazing in the core areas for bears in inner Finnmark. The reindeer herds are moved to the coast in spring.

Norwgian Nature Inspectorate (SNO) has the contingency and expertise to assess measures when bears get aggressive and appear to be not very timid towards humans. DN can undertake implementation of measures to frighten them off, and can implement the killing of aggressive bears. Three male bears were killed during a cull in 2007, and by July 2 aggressive bears have been killed in 2008. Management gives priority to close monitoring of bears that are not very timid in order to reduce concerns among the local population.

Wolverines - above target numbers

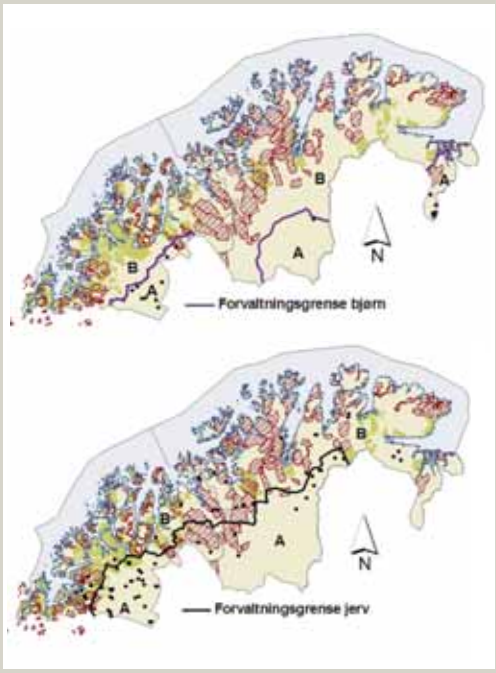
Numbers of wolverines in Troms and Finnmark form one of the three groups in Scandinavia, and in terms of management these wolverines have been prolific, with on average 19 young over the past three years in Troms and Finnmark. Known den locations are checked for young every year. Collection of waste for DNA analysis began in 2007. Despite relatively high hunting quotas, only a small proportion of the quota is killed in Finnmark. Twelve wolverine bitches had young in Finnmark in 2007, and DN opted to implement an extraordinary cull from a helicopter as well as extraordinary hibernation elimination, i.e. killing wolverine bitches and their young in dens, to prevent injury to sheep and domesticated reindeer.

The aim of management is to increase support among hunters concerning trapping and baiting so that numbers can be regulated more extensively during general standard hunting.

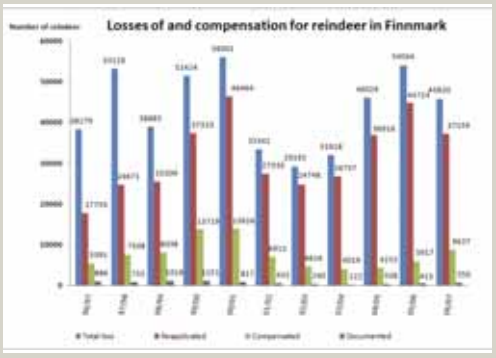
Compensation for reindeer and sheep attacked by predators

In Norway, it is the responsibility of the animal owner to show it to be probably that they have actually lost animals to predators. Animal owners report to SNO, which examines the cause of death. In addition to the documented loss, a large proportion of the compensation is based on estimates, and no less than 93.5 % of compensation was based on estimates over the reindeer herding year 2006/2007 (1.4.06- 31.3.07).

One of the most limiting factors for reindeer herding is the quality of the winter grazing, which varies according to grazing demand and weather conditions. Poor winter grazing affects the condition of reindeer, which in turn affects the production of viable calves. Uncertainty on how many calves have actually been born makes compensation assessments complex. For reindeer owners, it is also difficult to prove injuries, particularly during the calving period where the cadavers are small and quickly carried off by scavengers. Low levels of documentation of injuries in relation to large losses applied for mean that compensation assessments are based largely on estimates, and make the estimated element of the compensation large. The current arrangement for compensation for reindeer is probably perceived to be relatively unpredictable for reindeer owners and poses a challenge for the management. A new compensation model is required by the management.



Map showing management zones A (wanted) and B (unwanted) for bears (upper) and wolverines in region 8.



Losses of and compensation for reindeer in Finnmark

LARGE PREDATORS IN FINNMARK

	Target numbers	Numbers for 2008
Bears	4 young	Below
Lynx	4 families	Below
Wolverines	3 young	Above
Golden eagles	850-1200 nesting pairs (Norway)	120-160 nesting pairs (Finnmark)
Wolves	No young/ territory-marking pairs	There are roaming wolves

	Injuries to reindeer, 06/07 (%)	Injuries to sheep, 2007 (%)
Wolverines	30	6
Golden eagles	26	-
Lynx	21	21
Wolves	4	-
Bears	-	70
Protected predators	19	3

The Lynx is an effective hunter, and in Finnmark county both reindeer and sheep are on the menu. *©Ken Gøran Uglebakken*

There are few wolves in northern Sweden, and usually they occur as single, roaming individuals (picture is taken under controlled conditions).
©Michael Schneider

One of the methods used to monitor the wolverine population in Sweden is by den visits during spring (picture is taken under controlled conditions).
©Michael Schneider

MANAGING LARGE CARNIVORES

in Northern Sweden

By Michael Schneider, Large Carnivore Specialist,
County Administration, Västerbotten County, Sweden

In Sweden, as in other Nordic countries, five species of large carnivores are subject to public attention and political concern. Norrbotten and Västerbotten, the two most northerly of Sweden's 21 counties, cover more than one third of Sweden's land area and harbour a substantial fraction of its carnivores. The management of large carnivores is a big issue for both management, affected groups in society, and the public in the two counties.

Populations of brown bears *(Ursus arctos)* and Golden Eagles *(Aquila chrysaetos)* are large and increasing in Northern Sweden. Populations of lynxes *(Lynx lynx)* and wolverines *(Gulo gulo)* are relatively small and fluctuating and show no clear temporal trend. Wolves *(Canis lupus)* are few and mostly occur as single, dispersing individuals. Reindeer *(Rangifer tarandus)* husbandry is the most important factor for large carnivore management in the area.

A coherent carnivore policy

The management of large carnivores is governed by Sweden's coherent carnivore policy, which is based on a decision made by the Swedish parliament in 2001 This decision, in turn, was mainly based on the results of Sweden's first carnivore commission as well as the Birds Directive and the Habitats Directive of the European Union.

The Swedish Parliament decided that there should be viable populations of large carnivores in the country, and that carnivores are allowed to re-colonize areas where they formerly occurred. As circumstances are very different in different parts of the country, a regionalization of the carnivore management was necessary, resulting in regional, county-based management plans for the five species in 2006.

Regional stakeholders' involvement is achieved by regional predator councils in the counties, where representatives of those groups in society meet that are affected by or interested in large carnivores. Regional predator councils give advice to county administrations and are of uttermost importance for the production and revision of regional management plans.

Surveillance and monitoring

Large carnivores are surveyed according to the rules and guidelines issued by the Swedish Environmental Protection Agency (SEPA) and

the Sami Parliament. In Västerbotten, carnivore populations are monitored against regional objectives according to the regional management plans for the species and the monitoring system developed for the brown bear and the wolverine.

Each county administration has the responsibility to be well-informed about carnivore numbers, distribution, and problems caused. For this purpose, wildlife rangers are employed who mostly work in the field. In co-operation with reindeer herders, hunters and ornithologists, they survey the populations of carnivores.

Snow-tracking during winter and radio-tracking are the usual methods used to follow the lynx population and to track individual wolves. Wolverines are surveyed by looking for and visiting dens during spring. If encountered during tracking, hair, blood and excrements of the three species are sampled for DNA-analysis. The bear population is censused by direct observations during the moose-hunting season and by DNA-analyses of droppings. The population of Golden Eagles is followed by yearly nest surveys. Attitude surveys are conducted regularly to measure and to track changes of people's attitudes towards large carnivores and large carnivore management.

Population regulation

The populations of large carnivores in northern Sweden are regulated by both internal and external factors. Food availability seems to govern much of the population dynamics of lynx, wolverine and Golden Eagle. Eagles are also sensitive to weather conditions during the breeding season. Bears and wolverines kill conspecifics to some extent. Illegal killing of carnivores occurs and seems to be widespread in some areas and during certain periods of the year.

The legal hunting of large carnivores is restricted, due to the critical conservation status of some species and to international legislation. There is a hunting season for bears in autumn (August – October) and for lynxes in spring (March). Hunting quotas are set centrally by SEPA, most often tightly following recommendations from the county administrations, which in turn are based on existing management plans. Also, county administrations in Norrbotten and Västerbotten have the possibility to give permits for the killing of single bears or lynxes, if those cause severe problems. SEPA can issue permits to kill wolves and wolverines in certain cases, and a few individuals are euthanized every year. No permits have been issued for the hunting of Golden Eagles.

The current hunting legislation gives the owner or keeper of an animal the possibility to kill approaching carnivores in order to protect dogs or livestock even without a written permit.

Compensation system

Reindeer are an important prey for many of the carnivores in northern Sweden. As it is hard to find remnants of dead reindeer, Sweden introduced a compensation system where reindeer herding cooperatives, Sami villages, are compensated according to the numbers of carnivores present. Instead of reindeer herders having to find carcasses, county administrations have to find carnivores and to report numbers to the Sami Parliament, which decides on compensation payments to the Sami.

Very few depredations on dogs and livestock occur in northern Sweden. Farmers can get subsidiaries for protective measures such as electric fencing or guarding dogs. Animals that have been killed or injured or that have disappeared during a carnivore attack are compensated for financially by the state. The county administrations' wildlife rangers inspect all domestic animals, where depredation events are reported.

More information:
Tidskriften Västerbotten, nr. 3-2007 (in Swedish)
Hurford, C. & Schneider, M. (eds.). Monitoring nature conservation in cultural habitats. Springer, Dordrecht, pp. 195-214 and 215-230. (in English)

By Tuomo Ollila,
Metsähallitus,
Natural Heritage Services, Finland

THE GOLDEN EAGLE
in the Barents Region

The number of Golden Eagle (Aquila chrysaetos) territories in the Barents Region seems to be stable, and people's tolerance towards this predator has improved during the last decades. Together with more and better knowledge among the researchers, the Golden Eagle seems to have a promising future in the region.

Distribution and population size

The surveys in Finland and Sweden are relatively complete, but in Northern Norway they are rather limited. In north-west Russia complete surveys have been made only in parts of the area, mainly in the nature reserves.

The density of Golden Eagle is highest in the coastal areas of Troms and Finnmark counties. The high density is caused by a result of good food recourses, and the distance between two territories can be only a few kilometres. Only one eagle pair inhabits a territory. In the forest area of north-east Finland the average distance between two territories is more than ten kilometres. The known density in the north-west Russia is considerably lower than in Finland, Norway and Sweden. Because of the increased effort for surveys, number of known territories has increased in Finland, Norway and Sweden and likely in Russia. With more effective surveys in Russia, the density would probably be higher.

The number of known territories in the Barents Region is more than 1200 pairs and it`s rather stable, even if a small increase has been noticed in some areas.

Surveillance and monitoring

At the Golden Eagle symposium in Trondheim in 2003 the issue of using similar methods for monitoring Golden Eagle in Finland, Norway and Sweden was raised, and a working group was formed. In the year 2004, the group agreed on the criteria. These criteria are fundamental for the comparison of eagle data between countries and minimize the risk of misunderstanding during communication.

The four countries have organised the survey in different ways. Metsähallitus has the national responsibility of monitoring in Finland. In Norway and Sweden there are no clear national responsible organisation, but county administration has the local responsibility. In all these three countries volunteer ornithologists do a considerable part of the field work for the survey. In Russia the situation is more unclear, but universities, nature reserves and private researchers do surveys.

In Finland all known territories are visited each year, because of the compensation system to the reindeer husbandry. Also in Sweden and Norway surveillance is very complete.

The territory based compensation system in Finland

In Finland the losses to the reindeer husbandry caused by the Golden Eagle, has since 1998 been compensated by a territory based compensation system. The idea of the system is that every separate reindeer herding co-operative receives compensation due to the size of the occupied territories of the Golden Eagle. The compensation is higher if the territories have

There is only 20-25% chance for this 7 weeks old Golden Eagle to survive until reaching sexual maturity, 4-5 years of age.
©Jarmo Ahtinen

produced nestlings and it is also higher in the northern mountain area than in the southern forest area. The reason of higher compensation level in the mountain area is that the losses of reindeer calves are higher than in the forest area. The amount of the compensation is bound to the price of reindeer meat, and in 2007 the total amount of compensation was about 350.000 €.

Migration and mortality

Normally, young individuals migrate to the south during wintertime, and adults try to remain close to their territory. It is possible, though without scientific evidence, that also some adult birds can migrate at least severe winters. More than 600 Golden Eagles have been banded as nestlings during the last 40 years on the North Calotte. The data of the recovery from Finland tells that young birds from western Lapland migrate to southern Sweden and spend wintertime there. Young Golden Eagles from eastern Lapland migrate to western part of Russia, Baltic countries and some individuals even to Belarus and Ukraine. The dispersal of subadult Golden Eagles is very poorly known.

The mortality of young Golden Eagles is high, and is caused by lack of food, accidents and diseases. Persecution is also a cause of death, but has decreased the last decades. Only 25-20 percentage of all nestlings reaches the age of four or five years, when they normally are ready to breed. Birds that successfully survives the dangerous youth period, can reach an age of more than 25 years.

Food

The Golden Eagle hunts the prey species which are easiest to catch, and it is a distinct variation between areas and years. In the Barents area the main food species are hare, different species of Tetraonidaes (Grouse) and calves of reindeer. Carcass of dead reindeers and other mammals is a frequent food source during winter. The use of reindeer calves differs between years, and if the number of hare or Tetraonidaes is poor, Golden Eagle uses more reindeer calves and opposite. The reindeer losses caused by Golden Eagle are compensated in Finland, Norway and Sweden but not in Russia

Threats and future of Golden Eagle

Peoples attitude in the Barents Region have changed to more tolerance towards the Golden Eagle. Persecution is not longer a main threat, but unfortunately there are still some areas where persecution is too common. Other threats are disturbance, lack of suitable nesting sites, lack of food and environmental toxics. The latter concerns especially those Golden Eagles which are nesting on coastland.

Golden Eagle *(Aquila chrysaetos).*
©Jan Ove Gjershaug

The future of the Golden Eagle in the Barents Region seems promising, and no dangerous threats seem to appear in the nearest future.

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The Golden Eagles' choice of nest sites makes nestling registration an exacting job
©Jarmo A. Rengestaa

GOLDEN EAGLE (*AQUILA CHRYSAETOS*)

Family: *Accipitridae*
Body length: 80-92 cm
Wing-span: 190-225 cm
Longevity: >25 years
Litter size: usually 2 eggs
Prey: birds and mammals (thrush to reindeer)

The eggs are laid already in March-April, and in this period the eagle is very sensitive to disturbance. The nestlings are ready to fledge during July. Banding studies have shown that adult golden eagles from northern Russia migrate out of their nesting areas in the fall. This may also be case for some of the most northern areas in Norway as well.
Ref: Directorate for Nature Management

NUMBER OF KNOWN TERRITORIES OF GOLDEN EAGLE IN THE BARENTS REGION

COUNTRY	MINIMUM	MAXIMUM
Finland		
Lapland county	**330**	**350**
Norge		
Nordland, Troms and Finnmark counties	**290**	**>460**
Russland		
Murmansk area, Karelia and western part of Arkhangelsk	**60**	
Sverige		
Västerbotten and Norrbotten counties	**230**	**405**

By John D. C. Linnell, John Odden & Jenny Mattisson

Feast or famine in the arctic?

– THE WORLD'S NORTHERN MOST LYNX POPULATION REVEALED

Researchers from the Norwegian Institute for Nature Research (NINA) and the Swedish University of Agricultural Sciences (SLU) are using the latest in satellite technology to reveal the secrets of lynx (Lynx lynx) in Finnmark and northern Troms. The results challenge what we know about this large felid species, as well as provide insights into one of the age-old conflicts between large carnivores and man.

Lynx studies in a different ecosystem

It was with great excitement that we grabbed at the opportunity to begin a lynx study at the northernmost extent of their range – in western Finnmark and northern Troms counties (Norway). Since 1995 we (JO & JDCL) have been studying lynx in southeastern Norway – where our lynx conformed to the basic patterns found elsewhere. At long last we felt we had the possibility to push back the frontiers of lynx knowledge by investigating their ecology in a totally different ecosystem. It was not society's desire to learn more about lynx that created this opportunity. Rather it is the ongoing conflict between livestock production – in this case semi-domestic reindeer – and large carnivore depredation. There is little doubt that large carnivores prey heavily on semi-domestic reindeer throughout northern Scandinavia – although there is much debate about both the exact numbers killed and the actual nature of this depredation. Our goal in this study is to try and understand the ecology of the conflict, and to use this information to develop some mitigation measures to reduce losses.

Northern Troms and western Finnmark offer some very special conditions for lynx. There is a general lack of forest and an absence of a suitable wild prey species like roe deer. The main potential prey is semi-domestic reindeer, which are migratory. One of our main questions was how do lynx react to this migratory prey, do they follow the movements of reindeer, and if not what do they survive on when they are absent?

The decision to start working in northern Norway was made in early 2007, luckily in time to coincide with the arrival of the latest in hi-tech research equipment suitable for wilderness areas – GPS-GSM collars. These collars contain a GPS unit that obtains a location by satellite and a small GSM unit that sends these locations to us as text message. We can then follow their movements, and walk on the ground to look for the kills that they make. Using a combination of snow-tracking on the ground and a capture team in a helicopter we were able to tranquilise and mark 5 lynx in February 2007 and 10 lynx in February 2008 (this includes recapturing 3 of the animals from 2007).

▲ **By using skis and GPS the fieldworkers have found a lynx-killed reindeer.** *©Scandlynx*

The kittens are totally dependent on their mother, and get breast milk for half a year. At the same time they have to learn stalking, so they later can manage on their own. *©John Linnell*

▲ **The capture team has tranquilized a lynx from the helicopter, and she is now ready to be marked.** *©Jan Paul Bolstad*

Fascinating results

So, what has this taught us so far? At present we only really analysed the data on the 3 females caught in 2007, although the new animals from 2008 are adding more and more data every day. The most basic information provided by the

GPS collars concerns the movements – and these females are moving over some of the biggest areas ever documented for the species. In fact their home ranges are larger than almost any other large felid species – far larger than Siberian tigers for example. The annual ranges of the females are from 750 to over 2000 km^2! One of the major questions concerns how the lynx react to the seasonal movement of reindeer out of their normal territories. Most of the lynx remained faithful to their territories on the coast, but one female showed some strange behaviours. Normally she lives in the coastal areas of north Troms, but on 5 occasions she has made dramatic excursions up to 45 km into Sweden during autumn, winter and spring to try and find reindeer. Such behaviour has never before been documented for lynx!

Fieldwork, helpful for the reindeer herders

We are also using local fieldworkers to check any locations where it appears that the lynx may have killed a prey (lynx tend to stop moving for some hours or days after killing, producing a distinctive cluster of locations). This work has been coordinated by a local initiative called the North Troms Large Carnivore Project (Rovviltprosjektet i Nord-Troms). So far over 200 prey items have been found. It should come as no surprise that in the seasons when they are available it is semi-domestic reindeer that dominate in the diet. Most of the reindeer killed are calves, although yearlings are also killed. The 3 females in last year's study consumed most of the meat on the reindeer that they killed, spending between 2 and 3 nights on each kill. It really is a time for lynx to "feast". None of these dead reindeer were found by chance, so the study has already helped provide reindeer herders with information that can be used in support of their compensation claims.

In the seasons when the reindeer are not available there are few prey for lynx. During these times of "famine" the lynx have been found consuming just about everything that occurs. Hares are the second most common food item after reindeer, followed by red foxes and ptarmigan. One female living in western Finnmark developed a taste for exotic prey. She killed a roe deer north of Alta (probably one of the northernmost roe deer in the world) in addition to eating on salmon (probably scavenged from an otter that stole them from a fish farm) and a porpoise that was stranded on the beach.

In summary, the 18 months of studying the world's northernmost lynx population have provided both some fascinating insights into lynx ecology and into the nature of the conflict between large carnivores and semi-domestic reindeer herders. Our goal is to continue collecting supporting data from more individuals during the coming years and to explore possibilities for mitigating the conflicts, or at least contribute to ensuring that compensation payment is based on realistic estimates of depredation. However, this conflict between reindeer and carnivores is as old as the mountains, and "magic solutions" will not be found overnight.

LYNX *(LYNX LYNX)*

Family: Cat family *(Felidae)*
Body length: Up to 1,2 m
Weight: 10-25 kg
Longevity: 10 years
Litter size: 1-3 (usually 1-2)
Prey: hare, rodents, fox, reindeer, roe-deer, sheep and birds

Lynx have very good hearing and eyesight. These two senses, combined with stalking skills and high speed, makes the lynx a very effective hunter. It may stay several days by a prey it has killed, especially during winter. The kittens are born in May-June, and stay with their mother almost until the next litter is born.
Ref: Directorate for Nature Management

◂ One of the females wearing a GPS collar made long excursions into Sweden to try and find reindeer.
©John Ivar Larsen

John Linnell and John Odden are researchers with the Norwegian Institute for Nature Research; Jenny Mattisson is a PhD student at Grimsö Wildlife Research Station, a part of the Swedish University of Agricultural Science. More information about the lynx project can be found on http://scandlynx.nina.no and the movements of the animals can be followed online (with a two week delay) by registering yourself as a user at http://www.dyreposisjoner.no/

By Vegar Pedersen and Jon Ove Scheie,
Norwegian Nature Inspectorate (SNO)

Registration of WOLVERINES *in Northern Norway*

Norwegian Nature Inspectorate (SNO) is responsible for coordinating practical work on registering wolverines (Gulo gulo) in Norway. Topics dealing with predators are often subject to conflict, and wolverines cause a lot of damage to reindeer and sheep. There is a lot of emphasis on numbers; and this is a primary foundation for the management efforts of the authority. Our aim is to bring about good, accurate registration, with an openness which may create public trust in the results of this registration. This is a demanding task! Here, we would like to describe some of the methodology and results from registration of wolverines in Northern Norway over the past few years.

From mid-February onwards, the pregnant wolverine bitches dig themselves into the snow in order to give birth. At the same time, the predator managers at SNO make the final preparations in the office for that year's field season, specifically to locate these breeding bitches. A huge apparatus has to be set in motion. Besides the SNO's own staff in Nordland, Troms and Finnmark, Mountaineer Rangers, local predator contacts and other local staff - a total of some 50 people - also take part in this work. From about 10 March until the snow disappears in spring, these staff will have covered well over 50 000 km on their snow scooters or skis, searching for wolverine tracks and breeding dens.

SNO supplies data to researchers

Instructions and methods for the job are issued by the Norwegian Institute for Nature Research (NINA). All these instructions can be found on the NINA website at www.nina.no. The methods are the same as in Sweden, but unfortunately they are not comparable with efforts in Finland and Russia. SNO supplies data to NINA; NINA assures the quality of what we submit and is responsible for conclusions and the final report. The documentation requirements for us in fields are - and must be - strict so that our work can be checked. Emphasis is placed on methodical accuracy, good reporting and photographic documentation.

On the hunt for breeding dens

Wolverine bitches like to use the same areas for breeding dens year after year. Our primary task, therefore, is to seek out previously known breeding areas to see whether there is any activity there. In Nordland, Troms and Finnmark in 2008, there were a total of 156 known areas to be visited. Determining whether or not a den location is being used is not quite as easy as it might first appear. This work requires people with experience in the field. Weather and environmental conditions affect the searches, and days offering good tracking conditions are utilised to their best advantage. In Northern Norway, conditions in the mountains are changeable and often difficult, so this in itself can present quite a challenge! The ideal scenario is to search for tracks after a couple of days of calm weather after a snowfall so that the wolverines are able to leave tracks. If we find wolverine tracks, these are measures in order to work out whether the animal leaving the tracks was male or female. The tracks are then followed in the hope that they will lead us to a breeding den. If we find a hole in the snow at the end of the tracks, we have to monitor the location by visiting several times in order to determine whether the hole is a breeding den or just a meat store. To avoid disturbing the den unnecessarily, we try to stay well back and observe as much as possible with binoculars or a telescope.

Approval of young

For young animals to be approved, they have to be deemed to be documented or assumed safe. We will only document them if we see wolverine cubs or documents the tracks of young in the snow. In late April, the bitches often move

WOLVERINE *(GULO GULO)*

Family: Marten family *(Mustelidae)*
Body length: up to 1m
Weight: 10-20 kg
Lifespan: up to 20 years
Litter size: 1-4 (usually 2-3)
Food: reindeer, elk, roe deer, foxes, hares, small rodents, birds, carrion, mushrooms, berries and sheep

Wolverines are hoarders and can store food for later consumption. They find their way back to their stores of food using their excellent sense of smell, and large bones and frozen meat are no problem for them thanks to their powerful teeth and jaws. Wolverines have large paws which carry them effectively on loose snow and give them a major advantage when hunting cloven-hoofed animals such as reindeer in winter. Wolverine cubs are born in February-March in a hole which the bitch digs in the snow. A den of this kind may have an extensive access system. The cubs are independent of their mother within about 7 to 8 months.
Ref: Directorate for Nature Management

Wolverine family on the move. (Background). *©Vegar Pedersen, SNO*

Wolverine on snow (picture is taken under controlled conditions). *©Michael Schneider*

with their cubs, and then we are able to document the tracks of the young. Assumed young require us to register bitch activity in towards the hole in the snow at a known den location on three visits over a period of 20 days. If we are unsure of whether young have been born, we carry out a summer check at the site. Under the snow in a breeding den, we will find traces of beds, the hair of the young, the remains of prey, piles of excrement and similar which may indicate the present of young. In addition to all this, of course dead wolverine cubs or a dead bitch with milk in her udder can also document that young have been born.

Field cooperation across national borders

As well as looking for known den locations, we look for new den locations every year. This work is done particularly in areas in which there is documented injury to livestock by wolverines, or a lot of reports of wolverine activity. All searches are logged using GPS receivers so that we have good documentation of where we have been and what areas we have not visited. We also enjoy good cooperation with Swedish and Finnish field personnel in the field and on the phone during the field period.

Collection for DNA analysis

2008 was the first year in Northern Norway in which collection of excrement for DNA analysis became a set part o the methodology for registration of wolverines. DNA can be used to identify individuals and to provide a better idea of male to female ratios and the movements of wolverines into and out of the area. This will be an important supplement to the breeding registrations, and it will be interesting to follow the results of this work in future.

Documentation of a wolverine family on spring snow. *©Vegar Pedersen, SNO*

Bar chart: Number of wolverine cubs found in Northern Norway over the past 3 years

Map: All known breeding locations (N=156) in Nordland, Troms and Finnmark. Small triangles indicate places where cubs have been disproven, and large triangles represent proven young in the winter of 2008. Breeding locations accumulate over time, and are places where young have been proven from the early 1990s to the present day.

BROWN BEAR *(URSUS ARCTOS)*

Family: Bear family *(Ursidae)*
Body length: up to 2,8 m
Mane height: up to 1,5 m
Weight: 100-350 kg
Lifespan: up to 30 years
Food: moose, sheep, reindeer, berries, plants and insects
Litter size: 1-4 (usually 2-3)

By lowering their body temperature and heart rate, the bear sleeps through the winter and utilizes the fat reserves built up through the autumn. The bear cubs usually stay with their mother the first two years. The male and female try to avoid each other, and meet only during the mating time in May-June.
Ref: Directorate for Nature Management

The author by a recently left bear den in Pinega zapovednik. *©Pinega zapovednik*

A bear is capable of killing a 400 kg moose. *©Espen Aarnes, Bioforsk*

By Alexander Rykov,
Pasvik Strict Nature Reserve, Russia

BROWN BEAR,
the omnivorous predator

Brown bear is the most widespread and numerous large predator in the north of European Russia. There are approximately 8000 individual brown bears in the Arkhangelsk region, the highest number of any Russian region. Such high numbers are explained by the large territory of the Arkhangelsk region (a little larger than Finland or Norway) and its lack of development. Hunting brown bear in the Arkhangelsk region is poorly developed, but each year about 150 animals are legally hunted. The largest number of hunter-harvested bears occurred in 1989, when 464 animals were recorded killed. It is not known how many bears are hunted illegally but the amount is anticipated to be significant.

The brown bear in Arkhangelsk area is not aggressive, and bear attacks on people are rare in the region. Even in spring the bears do not actively defend their prey from humans, they are only frightened. When the crop of wild berries is poor the bears may attack livestock and begin to chase moose *(Alces alces)* more actively in the forest. The main reason of bears' aggressive behavior is if they lose the natural fear of humans. Usually this happens when the predators begin to feed from waste or food stores of humans.

Knowledge of brown bear biology, understanding their ingenuity, their strength and their speed will cause you to treat this animal with great respect, more so than with fear. However, when one is working in the taiga, knowing that a large beast, capable of killing a 400 kg moose is probably nearby, this feeling of respect does appear, as the predator does its best to keep a certain distance to humans.

A hunter on the snow crust

When the bear wakes in the end of March and leaves the den, it stays close to the den site. Usually the animal spends some days in the vicinity of the den. It makes a bed under a thick spruce, on the southern side of its trunk, on a bed of broken branches. Here the bear lies, or wanders around, but goes back into the den at night when the frost is strong or the weather is bad. It does not eat during this time, but continues to feed on its fat reserve. When the snow crust forms, the bear leaves. At this time the snow is everywhere except for emerging thawed patches and anthills occurring on the southern slopes. Ants are the main food for bears during this early spring period, and the dates of early spring bear sign coincide with the awakening of the ants. The bears also search for cadavers of moose killed by wolves *(Canis lupus)*, or drowned in rivers during the winter, they

▲ **A mother with her cubs.** *©Oleg Durnykin*

also check places of their own successful hunts from the previous summer. However, the wolverine *(Gulo gulo)* competes with the bear, and usually eats the cadavers during winter. The bears hunt for moose mostly in spring (seldom in autumn) when a strong frozen snow-crust has formed. Under such conditions, if a bear find fresh sign of moose, this animal is doomed. The brown bear is quite persistent and will continue to chase the moose many kilometers, tiring the moose as they break through this snow crust with each step. Eventually the bear will exhaust all of the victims' remaining strength and then kills it with powerful fatal blows of the forefoot upon its backbone. During springs with long periods of snow crust condition, up to 10-15% of the moose stock may become victims of the predators in the Pinega reserve.

Female bears with cubs wake up from hibernation at the same time as males but they leave the den site later, when the snow in the forest is approximately half thawed. It is rare to see sign of bear families on snow.

Berries and plants are important food sources

When the harvest of cowberry *(Vaccinium vitis-idaea)*, cranberry *(Vaccinium oxycoccus)* or rowan *(Sorbus aucuparia)* the previous autumn was rich, the bears feed on them in spring while they wait for the appearance of the first grass shoots. The bear diet includes some tens of plant species, mainly cereals *(Gramineae)* and umbellate plants *(Apiaceae)*. The bears do not only eat the stalks and leaves of the umbellate plants, but also rhizomes and tubers. In June the bears feed on aspen *(Populus tremula)* leaves which contain the most calories at this time. It's interesting that the period they feed on the aspen leaves coincides with the peak of the bears' breeding season. The cubs do not eat the aspen leaves but they, especially the newborns, actively ruin the anthills. If the majority of the anthills in the neighborhood are ruined it means that the bear family lives here. The bear may ruin bird nests, catch willow ptarmigan *(Lagopus lagopus)* or woodcock younglings *(Scolopax rusticola)*, regale on ground wasp larvae *(Hymenoptera)* or wood ants *(Formica* sp.*)*, kill newborn moose calves or dig out a vole family *(Arvicola terrestris)*.

In summer bears feed on herbage until the first berries mature. In the end of July raspberry *(Rubus idaeus)*, bilberry *(Vaccinium myrtillus)*, and then bog bilberry *(Vaccinium uliginosum)* begin to ripen, and in September cowberry, cranberry and rowan ripen. During two months the bears will feed intensively on berries and accumulate body fat for preparation to winter denning. The animals will spend about six winter months in the dens, and adult females even give birth to their cubs and nurse them from a few ounces to 2-3 kg while remaining in the den

The intelligent omnivorous

The fact that the brown bear is omnivorous and its great "intellect" level are interconnected. Only such an animal is able to diversify its menu with the most accessible and high-calorie forages available at all times.

As it is, this big predator is mostly vegetarian. However, it should never be forgotten that first of all the bear is a predator. If humans begin to tempt it with other human-related food, the bear will agree, with pleasure and rapidly become habituated to humans and more of a danger. It is much better to keep certain distance between the bear and the humans because the predator is the predator always and everywhere.

Acknowledgments. The author thanks Boris Kashevarov, vice-director of the Kostomuksha Nature Reserve, for his developing of English translation.

A UNIQUE EXPERIMENT

By Anatoly M. Khokhlov and Olga Makarova,
Pasvik Strict Nature Reserve, Russia

The Pasvik State Natural Reserve, was established in 1992 in cooperation with the Norwegians and is located in the central part of the Pasvik River, in Pechenga area of Murmansk region. The total nature protected area in the central part of the Pasvik River is about 17.000 hectares. The whole territory lies within the Northern taiga subzone.

The brown bear *(Ursus arctos)* is a common animal in the valley of the Pasvik River, and it is not unusual to come across a bear or traces of its activities. Sightings of females with cubs are registered every year. In the Murmansk region, the brown bear is usually active for 200 days, from early April till late October.

The abandoned cubs

Cubs are born in the den in late January – early February, and they leave the den in mid-April at the age of 2.5 - 3 months. This is a difficult period of living in the northern communities, especially for female bears with cubs. That is why one may meet abandoned cubs. During the last few years, the Chystiy Les (Clean Forest) biological station in Tver region has been actively involved in bear cub rehabilitation programs under the supervision of Professor V.S. Pazhetnov. When two bear cubs were found in 2003, the staff of the Pasvisk nature reserve asked the famous researcher for help.

In late May people driving along the road near Rajakoski-Jansikoski spotted two bear cubs sitting under an old pine tree. The attempts to come closer were unsuccessful, because the cubs retreated and climbed upon a pine tree. It was suggested that the female either had died or lost them. The cubs were probably starving, but it was not possible to establish visually. The ruined anthill, pits near tree roots and torn bark on the nearby trees, demonstrated that the cubs were trying to feed themselves. On 5 June the authorities attempted to catch the cubs for further transportation to a zoo, but it was not successful because the cubs were not found at that time. It was finally decided to use the reintroduction method of V.S. Pazhetnov.

Regularly feeding

To establish the cubs' condition, condensed milk was poured out on the grass and leaves in

BEAR CUBS

In Tersk area of Murmansk region on February 1, 1996, the hunters shot a female bear with two cubs. On February 4, the newborns were transported to Murmansk and sent to Saint Petersburg by plane. The male cub weighed 500 g, the female was 450 g, and the eyes were still closed. On April 2, that year, a female bear abandoned two older cubs due to an accidental damage of the den. The male cub was 3.4 kg and the female cub weighed 3.1 kg. By these individual examples one can get some idea about young cubs' weight on the northern border of brown bear distribution area, at the time of birth and before leaving the den.
These four cubs were all put to rest and stuffed.

We can also add that in spring of 2002, people in Sør-Varanger municipal spotted a lost bear cub. The starved and exhausted youngster was shot on May 30. Its weight was 2.5 kg. It had been hanging around a remote building for quite a long time, and it did not seem like it could find anything to eat. Its inner reserves provided by nature, lasted him not less than a week.

The cubs after the rain. *©Pasvik zapovednik*

the sighting area. The next day all the milk was licked up and the soil on the spot was eaten.

After this, the cubs were regularly fed. From 7 – 23 June 2003 food was placed at the location twice a day: in the morning and in the evening. The food given contained 400g of curds, 500g of oatmeal flakes, two eggs, 2g of salt, 5g of sugar and 1l of milk. One spoonful of vegetable oil was added for each cub. At first, the mixture contained more liquid. The mixture was prepared by one person and the driver delivered the food at the same time twice a day. The bowls with food were gradually moved away from the road so that the cubs would not get used to human presence. The driver did not make any sounds, poured food into the bowls and left. The bears soon got used to the sound and look of the car, and could even run out only by hearing the sound of the engine, but would not come close. When seeing other cars or people the cubs ran away and hid in trees.

All the children and adults in the nearest settlements were warned not to seek meetings with the cubs, to avoid walking dogs in the locations and not to feed the bears. Similar warnings were also sent to the military.

The cubs grow up

The bears initially kept to one location, but later they went exploring the surrounding forest. They obviously grew up and demonstrated more independence and learned to play with their bowls. Sometimes they took the bowls deeper into the woods and returned them with the teeth marks.

In the end of June, the cubs were given one daily feeding. The food was delivered between 9 - 10 o'clock in the morning. The cubs would eat the food, but they also started skipping the feeding. On 14 July, after one month of feeding, the bilberries and cloudberries were almost ripe. The cubs did not give up the food. They were not always seen, but they knew the time of the feeding and, as a rule, would eat all the food.

By the end of July, the bears had grown considerably and juvenile fur was replaced. They turned brownish red, but one developed a light-colored spot on the neck.

On the 27- 28 July the bears stopped eating the food from the bowls though they were regularly seen around the area. There was no obvious necessity in continuing the feeding. On 2 August, the site was examined by the experts. The cubs themselves were not seen. It was observed that the place where the cubs stayed from May till August was considerably trampled by the bears. Several noticeable paths ran in different directions deeper into the woods and to the marshes. The lower part of the pine tree where the cubs spent most of their time, was substantially worn out. The trunks of some old pines were scratched by the cubs and the trunk of the tree that the bears used as a shelter and where they would climb in case of danger was polished smooth. A nearby anthill showed evidence of their stay and a good half of the anthill was gone. The feces found on the location showed traces of beetles, which lay eggs under the bark and remains of the anthills contents. Though berries were almost ripe, berry remnants were not found in the feces.

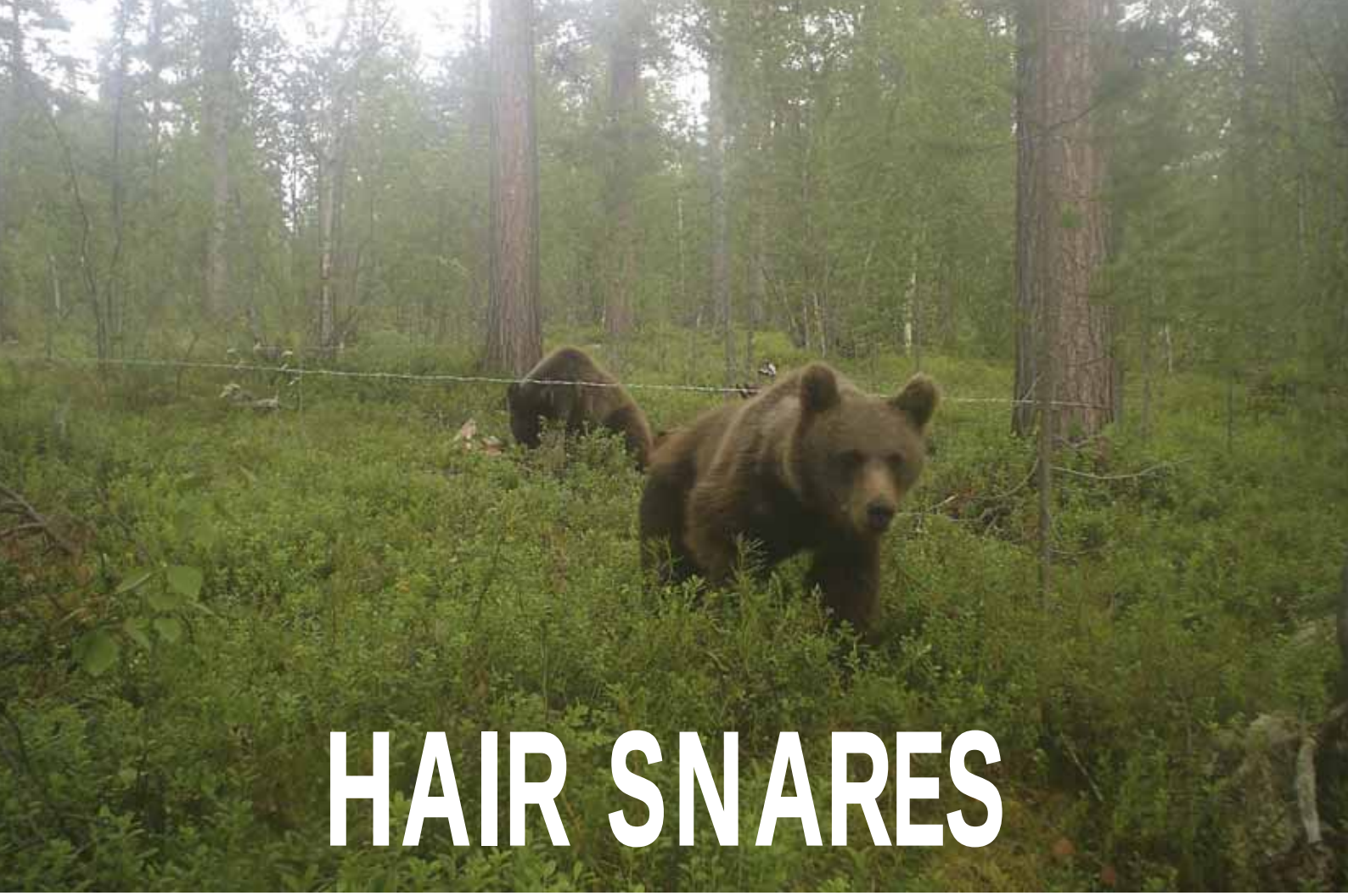
A successful reintroduction

Later the bears were no longer spotted in the area. Only in September the same year, two bear cubs were observed by a local bus driver near the original location.

The following year, in late May 2004, we examined the old feeding site and found no recent traces of the bears. Two weeks later, the border guards reported about two bears living near Janiskoski. Later on, the two bears were observed near the feeding site by workers of the local power station. The cubs obviously grew up, but were not as big as one might expect. In any case it was clear that the cubs survived their first winter.

Through the present day the workers of the Pasvik Strict Nature Reserve examine the site regularly. Bears are often seen near that location, but there is no direct evidence that these are the very bears that were saved in 2003. We tend to think that this was a successful case of brown bear reintroduction. Many feared that the bears might develop an attachment to people or could be aggressive in the future, but these fears were not confirmed, though there are more sightings of bears in our area.

Anthills was a place where the cups found food themselves. Illustration picture from the Norwegian side of the Pasvik river.
©Espen Aarnes, Bioforsk



HAIR SNARES

– A TOOL TO IDENTIFY INDIVIDUALS AND MONITOR POPULATIONS OF BROWN BEAR

By Martin E. Smith,
Bioforsk Soil and Environment Svanhovd

In a ground-breaking cooperative study, researchers from Russia (Pasvik Zapovednik), Finland (Metsähallitus, Natural Heritage Services) and Norway (Bioforsk Soil and Environment, Svanhovd) joined forces in a cross-boundary research project. Using a series of barbed-wire corrals surrounding a horribly smelly scent lure, the scientists attempted to "capture" the elusive European brown bear (Ursus arctos) by only capturing its hair!

The primary goal for this study was to evaluate the use of hair snares for long-term monitoring of the brown bear population. Through genetic analysis of the DNA extracted from hair the laboratory at Bioforsk Svanhovd can identify individuals and determine the gender. With this information in hand we can determine the minimum number of bears that occur here, calculate a population estimate, and begin to understand a bit about their behavior and habitat use.

Use of DNA

Genetic analysis of brown bear feces and hair collected in the Pasvik valley has been conducted at Bioforsk Svanhovd since 2004. In Norway this work has predominantly relied on feces samples collected randomly by members of the public and officials from Norwegian Nature Inspectorate investigating reported bear sightings. In Russia samples came from employees of the Pasvik Strict Nature Reserve, and in Finland from employees of The Finnish Department of Forestry. Because most of these samples are collected along the same few roads and trails in the area a bias is introduced into the data and only a small proportion of the area is actually sampled. Our hair-snare project sought to reduce this bias by collecting hair uniformly over the entire study area.

Attracting the bear

Within each of the grids we set up one hair snare, consisting of (20-30 meters of barbed wire strung between trees at 50 centimeter height. In the center of this barbed wire corral we poured 3 liters of scent lure made from liquefied fish remains and pig blood. This mixture is extremely strong smelling and attracts bears while not providing them with any type of food reward. Another advantage with this scent lure is that while predators are interested other wildlife such as reindeer and moose will be

Photograph showing two yearling brown bears investigating a hair snare. One smells the scent lure and the second is on his way to investigate the camera. *©Bioforsk*

extra wary and thus reduce any conflict with non-target species.

Successful DNA extraction

During the 2007 season we collected 196 hair samples and extraction of DNA was successful for 129 of these 196 samples (67%) with the following breakdown: Norway: 91 of 124 (73%); Finland: 24 of 56 (43%); and Russia: 14 of 16 (88%). Twenty samples only had 1-2 hairs (making DNA extraction much more difficult) and 9 samples had no root present (necessary for DNA analysis). If we eliminate these from the analysis our overall success for DNA extraction was 81%. We also had motion sensitive remote cameras in place at 5 hair snares and three of these produced photos. We should mention that the bears immediately ate the cameras after having their photos taken… who would've thought that our northern bears were so camera shy? Thanks to the Norwegian Arctic Fox Project for loaning us the cameras to use and of course sorry for their destruction.

New bears identified

We identified a total of 24 different individual bears within the study area, including 10 females and 14 males. In addition one male was identified from hair obtained after it was observed crossing border fence near Rajakoski, Russia. When compared with the existing database of bears previously identified through feces collection (2004-2006) we found 11 new bears (46%). The other 13 bears had been registered previously. Among the total of 24 bears, 13 had only visited one hair-snare, while the other 11 bears were documented in two or more snares, with a maximum of 6 different bears located in one grid. Two bears were documented in both Finland and Norway and 1 was documented in both Russia and Norway. Two additional bears had been documented using either Russia or Norway in previous years.

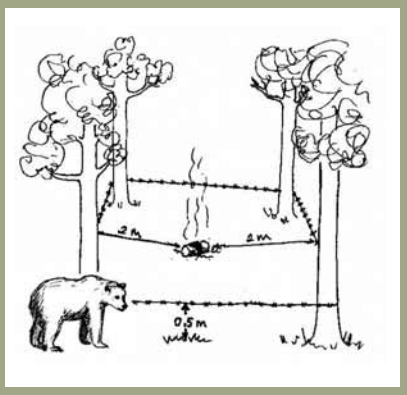
Necessary with repeated studies

Clearly this method has promise and should be evaluated for incorporation into some regular monitoring routines, particularly those without sufficient moose hunting pressure to ensure the collection of an adequate feces sample. The success rate for our genetic analysis using both hair and feces was excellent, and we should continue to develop the techniques. These data were presented at an International Bear Research Conference and the consensus from our International colleagues was that the study should be repeated and if possible combined with radio-telemetry. This additional data could provide an estimate of "closure" that is a measure of what proportion of their time these bears are spending within the study area. With this data we can then produce a much more accurate and robust estimate of the population size for brown bears inhabiting this region. And lastly with this estimate in hand it should make monitoring the status of the population even easier.

Finally we would like to thank our cooperators Olga Makarova and Natalia Polikarpova from The Pasvik Strict Nature Reserve, Russia; Tanja Kyykkä, Tuomo Ollila and Pekka Sulkava, from Metsähallitus, Natural Heritage Services, Finland; and Alexander Kopatz and Jouni Aspi, from The University of Oulo, Finland. The study was financed by the Interreg Project "Pasvik-Inari Trilateral Park: Biological Monitoring"; The Environmental Department of the Finnmark County Governors Office; Region 8 Citizens Predator Management Committee (Rovviltnemnda); and the Norwegian Department of Nature Management.

Pasvik Valley. *©Espen Aarnes, Bioforsk*

Grid locations within the Pasvik-Inari study area.



Typical Hair snare set up. Drawing by Leif Ollila 2007

Single bears indicate one individual and numbers represent total number of different bears identified at each hair snare site throughout the Pasvik-Inari study area *(Figure modeled after Kendall et al. USGS Web page).*

By Olga Makarova and Natalia Polikarpova,
Pasvik Strict Nature Reserve, Russia

BROWN BEAR
on the Russian side of Pasvik

Locations of the hair snares on the Russian side of Pasvik Park.
Symbols: the black spots mark snares within the selected area (5 x 5 km); G12 – the number of the location on the map where the first and second session catches were set up. The catches of the two sessions were located within the borders of the numbered squares at the distance of 1 km from each other.

The hair snare is barbwire strung around pine trees with a strong scent lure in the center. *©N. Polykarpova*

Passing through the snare, bears leave hair on the wire. *©A. M. Khokhlov*

In the Murmansk region of northwest of Russia, the National border runs along the Pasvik River. The river flows from Lake Inari in Finland into the Barents Sea in Norway crossing Finnish, Russian and Norwegian National borders along the way. This is an interesting territory where we find three separate nations sharing a single common natural ecosystem.

In the Pasvik River valley (in Russian – reka Paz) one can find several protected areas: the Russian-Norwegian Pasvik Nature Reserve with its 17,000 hectares, Øvre Pasvik National Park and a recently established "Landscape Protected Area" with the same name – Øvre Pasvik. On the Finnish side, near the Norwegian border, we find the Vätsari Wilderness Area.

An idea of establishing trilateral national park was conceived at the very start of the nature protection cooperation in the area of Pasvik-Inari, but the first concrete work for creation of such a park only began in 2006-2007 within the framework of the Interreg financed project "Promotion of nature protection and sustainable nature tourism development in the Pasvik-Inari area". The brown bear *(Ursus arctos)* was selected as a species for a monitoring model object in the projected park, because the brown bear is present in all three neighboring territories of Russia, Norway and Finland. Additionally it had already been established that some animals freely migrate over the common territory despite of the national borders.

DNA cooperation with Bioforsk Svanhovd

In order to study the shared population the Norwegian side suggested using a genetic method. Initially the samples collected for research were cells of intestinal epithelium extracted from brown bear feces. In 2005, 35 samples were collected in the central and southern parts of the park on the Russian side and further south from it. The samples were analyzed by Bioforsk Svanhovd, and unfortunately only 7 samples were valid for analysis, probably most of the samples did not contain intestinal epithelium cells, or the samples may have been collected or stored improperly. Also according to Professor V.S. Pazhetny (May, 2007), the bear intestines are designed the way that epithelium cells are shed only in the second half of summer while sampling was done in the first half. Moreover, DNA analysis requires the freshest materials while most of the samples were old.

The gender of the bear was determined in 6 of the 7 (3 females and 3 males). The southernmost point where samples were obtained was near Galgooaivi (in the area of Janiskoski) and the northernmost location was from the north of Kalkulya, 80 km apart. As a result of the work done in 2005, on the Russian side, the research established the location of 6 different bears.

Use of hair snares

In summer of 2007, the second stage of the research began. This time, hair samples were the material for genetic analysis. They were collected at special hair snares, and on the Russian side, 10 hair snares were set up and the researchers' collected 17 samples.

6 bears (3 males and 2 females) were identified on the basis of samples collected by the hair snares. In addition one male was identified by the sample incidentally collected from the border fence.

According to the results of the genetic analysis, 12 different bears inhabit the Russian part of Pasvik, and 3 bears turned out to be shared by Russia and Norway.

Simultaneously, using conventional methods of observation, we established that in 2007 on the Russian territory, there were 12-14 bears. Comparing the genetic analysis data and data from field observations, can help us to establish the size and structure of the common population.

Status of brown bear in
MURMANSK REGION

Murmansk region, located in the northwest of Russia, is characterized by atypical natural conditions, the main feature is a combination of both tundra and forest zones within one territorial entity. Brown bear is a common species of the Kola Peninsula. However, its distribution is uneven. The highest density of the predator is observed in Lovozero area around reindeer herding locations and also in southern forest areas: Tersk, Kandalaksha and Kovdor regions. Averagely, about 40% of the official hunting quota is used.

By Olga Makarova and Anatoly M. Khokhlov,
Pasvik Strict Nature Reserve, Russia

Brown bear tracks in the area of Janiskoski, Pechenga district, Murmansk Region
©A. M. Khokhlov

O. I. Semenov-Tyan-Shanskiy considered the brown bear population in the area in late 1970s – early 1980s to be 200 to 400 individuals. Later in the 1980s, after some serious work on estimating the population size, it was clarified that the number of brown bears was about 350 (maximum 400) and the distribution density varied between 0.04 - 0.07 individuals per 1000 hectares (one hectare is 10 km^2). In 2004, the total number of bears in the region was estimated at 500. In the last few years (2005-2007), according to the survey, the official number is persistently the same 500 - 550 bears in the whole region with the average density of 0.06 individuals per 1000 hectares. Higher concentrations of brown bears are observed in the Lovozero area, with its numerous reindeer herds and wild ungulates, and in southern forest areas around Tersk, Kandalaksha and Kovdor. Bears are typically hunted in these areas. In 2001-2005, almost 87% of the total allowable harvest quota of 40 animals is taken from these areas. In the Pechenga area the number of brown bears is insignificant but the data for this area is also insufficient. Very few hunting licenses are issued and they are rarely used, however poaching may be a factor here as well.

According to the Hunting Inspection records, from 1986 till 1996, there were 240 bears taken in Murmansk region and in the following decade, 1996-2005, the number decreased by 53 individuals, to 187. During the two decades, 427 bears were taken in the area.

The brown bear population structure is based on the hunting data collected during the twelve years, from 1994 to 2005. Within this period the total number of shot bears was 268. The male-female ratio was 2.9:1. The ratio varies depending on the hunting season. In the spring (from mid-May until mid-June), 75 individuals taken had the ratio of 7.3:1 (male-female) in autumn-winter season (from September until the end of December) the male-female ratio for the 193 bears shot in this period was 2.3:1. These data confirm the known tendency for brown bear populations in the North: males outnumber females.

During the five years from 2001-2005, 80 bears were hunted, the annual number varied from 3 to 29, the average per annum was 16 individuals. The percentage of the approved quota was 40.

The main hunting methods are spot-and-stalk, and hunting over bait. Winter hunting in dens is less popular.

In the last few years the bear hunting has not been officially approved due to insufficient data of the population size. There is an obvious downward trend in the population size. That is why a thorough assessment of the population condition is a necessity. We should closely monitor this important and interesting component of the northern wildlife.

BROWN BEAR HUNTING, NUMBERS IN MURMANSK REGION 2001-2005

Hunting season	Official hunting quota	Individuals taken	% of the official quota used	Taken in the spring season
2001	40	15	37.5	3
2002	40	18	45.0	8
2003	40	29	72.5	17
2004	40	15	37.5	10
2005	40	3	7.5	No hunting approved
Total:	-	80	-	38
Average	40	16	40	9.5

REINDEER HERDING AND PREDATORS

By Askild Solberg,
The Reindeer Husbandry Administration in Alta

In reindeer herding, reindeer graze in outfields all year round, and as a consequence of this they are more vulnerable to predator attacks than is the case with other livestock. In Scandinavia, reindeer are vulnerable to predation from bears, wolves, lynx, wolverines and golden eagles, and partly also to red foxes, which can take newborn calves[1]. According to reindeer owners, predators pose a significant challenge to reindeer herding in Scandinavia. Challenges linked with predators are also considered to be a growing problem as a consequence of the increase over the past few years in numbers of predators[2].

Significant compensation in connection with losses to predators is paid out each year. For 2006, the Swedish Sametinget paid out SEK 49.2 million in compensation and loss prevention to be distributed among Sami (Lapp) villages[3]. In Norway, NOK 39.5 million was paid out in compensation for losses to protected predators in 2006/2007[4].

For reindeer herding in Norway, there is a big difference between the number of losses reported by reindeer owners to have been caused by predators, and the number of reindeer for which compensation is paid by the State. Reindeer owners in Norway claim that predators are responsible for most of their annual losses. For 2006/2007, applications in Norway for predator compensation were made for a total of 51 749 reindeer, of which compensation was paid by the Norwegian authorities for 30 % of the number applied for. There are also major variations between various reindeer herding areas in Norway as regards how many lost reindeer compensation has been claimed for. For 2006/2007, Vest-Finnmark received compensation for 16 % of applied-for losses to predators, while - by way of comparison - Nord-Trøndelag reindeer grazing area received compensation for 55 % of its applied-for losses[5]. Traders are of the opinion that there is no conformity between actual losses and the number of animals for which compensation is paid by the State[6]. In addition, the industry is of the view that compensation prices fail to cover fully the overall costs involved with losses to predators. Lynx, wolverines and golden eagles are the main culprits causing losses to predators in the reindeer herding industry. This year, with difficult grazing conditions, it has been stated that losses to predators are also at their peak.

Adaptations to predators

Reindeer herding has seen losses to predators for as long as it has been used as a form of business. Herders do their best in their day-to-day work to adapt to predators and limit their losses by means of various preventive measures. Strategies for preventing losses mainly involve more intensive guarding of the herds. In some cases, herds can also be moved to other areas which are thought to have a lower concentration of predators, if this is consistent with practical operations and within the herders' own grazing areas. If the reindeer are in a poor state in winter, giving additional feed in pens or out in the

©Johan Ingvald Hætta,
The Reindeer Husbandry Administration

free may counter some of the losses to predators. Hunting and pursuit of predators are also implemented in order to minimise losses wherever possible[7]. Otherwise, Norwegian Nature Inspectorate carries out annual elimination of wolverine young in areas where there is a great risk of injury to reindeer herds.

For reindeer owners, major losses in some instances may mean unwanted changes to the herd structure, which again can result in a persistent reduction in production. Reduced production also means financial losses for individual reindeer owners both in the short term when the annual numbers of animals slaughtered is reduced, and also in the long term due to changes in the herd structure bringing about a reduction in the numbers of production animals and animals that can be slaughtered in order to raise revenue. Calves in particular are susceptible to loss to predators in their first year of life, but adult animals in good condition may also be prey for wolverines, lynx, bears and golden eagles.

For individual areas in Norway, it has also been documented scientifically that reindeer herding sees major losses to predators[8]. However, this link does not appear to be as strong in Finnmark, for example, where conditions linked with animal density and grazing quality are also factors which affect losses of reindeer.

Documentation of losses and compensation for predators

It is difficult for both the authorities and the reindeer herding industry to document the extent of losses to predators. This is because there is uncertainty concerning actual predator numbers and how much of their diet is made up of reindeer. It is also difficult to locate reindeer cadavers and often also difficult to establish the cause of death. In the discussion on losses to predators and compensation between the State and the reindeer herding industry, it is not insignificant how predators acquire their prey. In this context, four types of cause can be referred to in connection of documentation of losses to predators:

1) Reindeer have died a natural death due to causes other than predation. Predators have come on the scene as scavengers later.

2) Reindeer are taken by predators, but regardless died as a consequence of other loss-related causes linked with condition and grazing conditions. (In wild ecology, this is referred to as "compensational losses to predators".)

3) Reindeer are taken by predators irrespective of other conditions linked with the animals' condition, climate or grazing conditions. (In wild ecology, this is referred to as "additive losses to predators".)

4) Reindeer are taken by predators as a consequence of the condition of individuals being impaired to an extent which makes this possible. If the grazing situation - and consequently the condition of the animals - had been better, the reindeer would have been able to escape the predator and survived the winter. (The loss is additive, the success of the predators being dependent upon the condition of the reindeer.)

The losses to predators reported each year can be distributed in the categories noted above. However, the precise distribution of losses among the categories, years and different areas in which reindeer herding takes place is trickier to calculate. The reindeer herding industry is of the opinion that most of the losses are due to cause type 3, while the State thinks that some of the losses in the industry are also due to cause types 1, 2 and 4. In this context, there are differing opinions on the actual predator numbers, how many of the losses are due to predators and how many of them are due to other reasons or could have been prevented if preventive strategies had been implemented by the industry. Studies looking at such issues are also very costly. However, it has been documented scientifically that losses to predators increase when the condition of reindeer is reduced as a consequence of natural seasonal variations and difficult grazing conditions. In addition, the industry is particularly vulnerable to losses to predators over the calving period.

To reduce the conflict between the industry and predators, and to enhance precision in compensation for predators, it will be important in future to gain a better overview of predator numbers. It is also important for the various areas in Norway to quantify how many reindeer are lost to predators and how many of these losses are due to other causes. Finally, it is important to aim for better attainment of targets with regard to predator policy and to achieve better harmony between predator policy intentions and the actual conditions in which the reindeer herding industry works.

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ARE REINDEER CALVES *an easy prey* FOR GOLDEN EAGLE?

By Harri Norberg,
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Golden Eagle (Aquila chrysaëtos) is among the largest birds of prey in the world, and the second largest in the Barents region, right after White-tailed Eagle (Haliaeetus albicilla). While the latter is specialized on fish, waterfowl and carcasses in its diet, Golden Eagle is an active hunter of grouses, mountain hares and larger mammals like lambs and reindeer calves. Studies based on the monitoring of radio-collared reindeer calves have provided new insight on the hunting ability and techniques of Golden Eagle.

Golden Eagle has a circumpolar distribution ranging from North America to Europe and further to the easternmost reaches of Siberia. It is found only in the Northern Hemisphere, although the southernmost Golden Eagles soar over the deserts of North Africa and Arabia, even close to the Equator. The natural environment of the Golden Eagle, including climate, landscape and available prey species varies greatly within its range. Yet, there is one general habitat requirement for this well adapted species: open landscape, which provides eagles with favourable hunting grounds.

In Fennoscandia, Golden Eagle is found in the fells, along the Norwegian coast, and across the northern boreal forests. It avoids urbanized areas and is therefore distributed in landscapes with least anthropogenic impact. However, the very same areas are also used for management of semidomesticated reindeer *(Rangifer t. tarandus)* in Norway, Sweden and Finland. The coexistence is not totally without problems as the Golden Eagle is known to prey also on reindeer calves, which are the basis for the productivity of the husbandry.

The diet of the Golden Eagle

The diet of Golden Eagle includes a variety of prey species, of which reindeer is one. In the Barents region, the further North in Finland, or the further to the mountains between Sweden and Norway we go, the greater is the proportion of reindeer calves in prey remains collected from the eagle nests. Yet, the greatest proportion of eagle diet consists of Mountain Hare *(Lepus timidus)* and grouse species such as Black Grouse *(Tetrao tetrix)*, Capercaillie *(Tetrao urogallus)* and especially important in the North, Willow Ptarmigan *(Lagopus lagopus)*. It has been estimated that 50-75 per cent of the diet of eagles nesting in Finnmark, Norway is Willow and Rock Ptarmigan *(Lagopus muta)*, while the share of reindeer calves varies around ten per cent. However, one must bear in mind, that the diet is dependent on the annual population fluctuations and availability of prey species in each landscape. Furthermore, reindeer calves may comprise even more important food source for the non-breeding subadult eagles, compared to that of the breeding territorial individuals.

Reindeer calves as prey for Golden Eagle

It has been estimated that there are even one thousand eagles within the Finnish reindeer management area. The winter stock of reindeer in Finland, on the other hand, is ca. 200 000, and every spring approximately 130 000 – 150 000 calves are born, creating an abundant source of vulnerable prey for the predators. Some calves are inevitably doomed to die before the next winter, due to many different causes. Predation is shown to comprise a major share of deaths, but the relative roles of different predators vary from place to place according to the predator densities and landscape features. Golden Eagle has been identified as one of the most significant predators of calves in the northern parts of the Finnish reindeer management area, whereas in the southern and eastern parts the impacts of large carnivores such as wolf *(Canis lupus)*, brown bear *(Ursus arctos)* and lynx *(Lynx lynx)* are greatest. In the latter areas eagles seem to utilize abundant carcasses left by mammalian predators while in the North, eagles are more actively hunting for live prey.

How many calves end up as prey for the Golden Eagles? This question is not simple to answer as the result depends on many factors and the annual variation is great. However, the extensive calf mortality studies conducted by Finnish Game and Fisheries Research Institute have gained much new knowledge on the role of predation, and in fact any cause of deaths, in the mortality pattern of reindeer calves. In some northern study areas even 3-5 per cent of the calves marked with radio-collars were preyed upon by eagles during summer and fall. Yet, the average for the northern areas in the Finnish study was around two per cent.

The capacity of Golden Eagle as predator

Calves of varying size have been documented as eagle-kills, the smallest weighing less than ten kilos (in May/June) and the biggest even forty kilos (in October/November). Most of the eagle-killed calves have been found in July and August, when calves weigh from 15-30 kilos. It has been shown that the Golden Eagle is in certain conditions capable of killing even adult reindeer. Thus, killing a calf, even a big one, seems not to be a problem for an eagle, as it punctures the walls of lung cavity with its' sharp five centimetre long talons causing shock and pneumothorax (collapsed lung). At the kill site, a line of down and small feathers is often found as the eagle has balanced in the back of a calf even tens of meters before the calf has finally succumbed. According to the feathers, most eagle-killed calves seem to be killed by subadult eagles, which fact has increased our understanding of the impact of the eagle population on reindeer stock.

The general pattern in eagle predation on reindeer calves is that most kills occur in the open terrain, and that killed calves are slightly smaller compared to surviving calves. Yet, in years, when the calves are small on average, there seems not to be any selection for the size, and the opposite is true when calves are bigger. Are reindeer calves an easy prey for Golden Eagle? We may conclude that not quite as easy as Ptarmigans or Hare, but when the circumstances are right, eagles do not hesitate to attempt for a calf as they have the power and the means for it. Nevertheless, the attacks are not always successful. One important feature in the interactions between eagles and reindeer is maternal defence. Older experienced mothers dare to defend their calves against eagles while young first-time mothers tend to flee leaving their calves without protection. Although many questions still remain, it has already been confirmed that Golden Eagle is one of the threats that reindeer calves must face during their first summer.

▲ The signals of dead radio-collared calves are tracked from the ground or from the air. The carcasses are located and studied thoroughly for the cause of death. Investigation protocol resembles those of forensic medicine. *©Pasi Koivumaa*

▼ A small light-coloured reindeer calf killed by a Golden Eagle on one of the highest peaks of Finland, close to the Norwegian border. The predation behaviour and killing event were observed and filmed for a nature document.
©Barrie Britton / BBC

◀◀ An eagle perspective towards the herd of semi domesticated reindeer on snow in north western Finnish Lapland. The herd may aggregate into a tight formation due to moving, avoiding insect harassment or also when being attacked by predators such as the Golden Eagle.
©Barrie Britton / BBC

◀ ◀◀ Calf mortality is studied using silent mortality radio transmitters attached on expanding neck collars. Transmitters activate when the calf has been motionless for more than two hours. Predation by Golden Eagle has been found to be the most significant single cause of death in the northern part of the Finnish reindeer herding area, while the large mammalian carnivores are most significant in the southern and eastern parts. *©Harri Norberg*

DYNAMICS IN THE NUMBER OF WOLVES AT THE LAPLAND NATURE RESERVE

year	Number of encounters with wolves, according to files at the Lapland nature reserve	year	Number of encounters with wolves, according to files at the Lapland nature reserve
1930	4	1982	22
1935	5	1983	14
		1984	29
1938	0	1985	19
1939	5	1986	17
1940	21	1987	7
1941	29	1988	7
1946	1	1989	5
1948	3	1990	11
1949	0	1991	6
1958	1	1992	7
1960	1	1993	9
1961	2	1994	13
1962	11	1995	6
1964	11	1996	19
1965	3	1997	25
1966	1	1998	26
1967	15	1999	18
1968	0	2000	11
1971	7	2001	25
1973	9	2002	10
1974	3	2003	13

DYNAMICS IN THE NUMBER OF WILD REINDEER AT THE LAPLAND NATURE RESERVE

Year	Number of reindeer	Note
1929	99	Counting from a hill
1940	942	Counting from a hill
1941-1945	-	Wartime - no count, but reindeer were shot for meat
1948	383	Counting from a hill
1951	510	Counting from the air (test)
		Prior to 1951, reindeer numbers were counted using reindeer teams. Counting from the air was implemented as of 1957.
1957	1964	Counting from the air
1967	12640 !	Counting from the air
1971	-	538 wild reindeer killed during hunting
1972	-	1146 killed
1974	-	~ 2000 killed
to 1976	-	- total reindeer killed 7 375 (official count from regional hunting committee)
1976	482	Counting from the air
1982	168	Counting from the air
1988	405	Counting from the air
1990	551	Counting from the air
1992	550-600	Counting from a hill
1993	–	Counting from the air, no reindeer (i.e. they migrated over the count period)
1994	~800	Counting from a hill
1995	824	Counting from the air
1996	~1000	Counting from a hill
1997	~ 500	Counting from a hill
1998	~ 585	Counting from a hill
1999	~ 520	Counting from a hill
2000	413	Counting from the air, a count throughout the entire reserve
2003	957 – 1027	Counting from the air
2004	~1000	Counting from a hill

WOLVES

- *important to maintain stable wild reindeer numbers*

By Valery Barcan, Lapland nature reserve

The special life cycle of wild reindeer (Rangifer tarandus) means that they need wide areas in which to live, thousands of square kilometres containing accessible food sources all year round, and with no serious obstacles to moving around, such as railways and motorways. At present, some 1000 wild reindeer can be found wandering around the Lapland nature reserve and neighbouring areas. Wolves (Canis lupus) can also be found here, and for them reindeer are their most important prey.

Purpose of the study

The purpose of this work was to verify the hypothesis concerning the natural regulatory role of the wolf in relation to the number of wild reindeer in a large ecosystem such as the Lapland nature reserve.

WOLF *(CANIS LUPUS)*

Family: Dog family *(Canidae)*
Body length: up to 1,8 m
Mane height: up to 90 cm
Weight: 35-55 kg
Longevity: up to 15 years
Food: reindeer, roe deer, moose (winter), rodents, beaver, carcasses and sheep
Mating time: February-March
Litter size: 1-8 puppies (usually 5-6)

The wolf is a social animal, and thus is different from bear, wolverine and lynx that are solitary. The wolf-pack has a strict hierarchy with the alpha couple on the top. They lead the pack during hunting and in defense of the territory, and as a reward they get access to the best pieces of meat and are usually the only pair allowed to mate. The puppies are sexually mature after two years, and the majority of youngsters then migrate away from the pack in search of mates and new territories.
Ref: Directorate for Nature Management

▲ **Wolves are social animals, hunting together in a pack and are clever predators.** *©Valery Barcan*

► **When hunting reindeer, calves and weaker animals are the first choice of predators.** *©Valery Barcan*

Materials and methods

To assess the number of wolves, all encounters with these animals and observed tracks (dens, pawprints, etc.) are noted, all from the basis of the nature reserve. The total number of value observations of wolves is 330 over 51 years. It should be underlined that there has never been a programme focusing on observations of wolves in reserves.

The reports of the reserve from migration and hill counts form the basis for assessment of the dynamics in herds of wild reindeer in the area from 1929.

Results

Tables 1 and 2 show the dynamics in numbers of reindeer and wolves at Lapland nature reserve between 1929 and 2003.

Reindeer numbers peaked in 1967, when a herd of no fewer than 12 640 animals was observed in the western part of Kola. An intensive reindeer hunt was then organised by the State, which was implemented in areas just outside the boundary to the reserve (5-10 km). According to official figures, 7 375 animals were killed up to 1976. There has been no significant increase in the number of reindeer between 1976 and 2005. In 1982, numbers reached a minimum of 168 animals, and since then has varied from 500 to 1000 individuals.

In 1967, when reindeer numbers were at their greatest, there were 15 encounters with wolves in the reserve. Between 1982 and 85, the number of encounters increased to 23-28, while in 1989 they were down to 5. From 1988 to 1996, the number of encounters with wolves has increased slowly from 7 to 17, while at the same time the number of reindeer has increased from 400 to 1000 individuals. Shooting wolves in the Murmansk region ceased in around 1990.

From 1996 to 2003, the number of encounters with wolves has varied from 13 to 27 (2-3 viable wolf packs), while at the same time reindeer numbers have re-mained stable at around 1000 individuals.

Discussion on results

Between 1930 and 1970, the success of Soviet nature reserves was gauged by the progressive increase in the number of "valuable" animals. The basic management strategy for animals in nature reserves was to give what were known as the valuable species ideal living conditions which led to reductions in mortality and increases in reproduction. At the same time, what were known as the "dangerous" animals were subject to active extermination. When the Lapland nature reserve was set up, the idea was to preserve a large landscape on North Kola, with its natural flora and fauna. Over the first 5 years, the reserve was linked institutionally to the hunting committee, as it was reckoned to be a reserve for game hunting first and foremost. According to this concept, the greatest need was for protection of wild reindeer, which meant intensive hunting of "dangerous" wolves.

Ideal living conditions and the almost complete absence of wolves helped to bring about an increase in the numbers of reindeer at the Lapland nature reserve. Thus progressive increase in reindeer numbers eventually led to overpopulation, with all its negative consequences. With the logic applied in nature management for use with hunting, active reduction must be applied to reduce overpopulation of a protected species (in this case wild reindeer); that is to say, a qualitative change in strategies for protection of animals - from protection to shooting - and of course, all based on the ethical guidelines stating that all hunting must take place outside the reserve.

The trial for management of cloven-hooved animals by means of active shooting at the Lapland nature reserve and other reserves in the Soviet Union have a negative result. In 1971, hunting of wild reindeer was implemented just outside the protection area west of the Murmansk region. Until 1976, 7 375 reindeer were shot (according to the hunting committee in Murmansk), but because of animals which were injured during hunting, illegal hunting and pregnant reindeer which died of stress, unofficial data showed much higher figures. There were 482 reindeer in 1976, but the herd continued to decline and by 1982, the count showed just 168 reindeer.

Conclusion

The natural, most environmentally friendly way of controlling numbers of cloven-hooved animals is to preserve large predators, in this case wolves. The influence of wolves is good for the state of reindeer herds. While wolves mainly take weak and sick animals, hunters shoot the biggest and healthiest of them, and so weaken the state of the herd. It can still not be said with certainty, but it is very likely that the stable wild reindeer numbers at the Lapland nature reserve over the past 15 years have been maintained through natural coexistence between wolves and reindeer.

The most important reference sources for this article: G.M. Kreps, O.A. Makarova and A.M. Khokhlov, A.A. Nasimovich, O.In. Semenov-Tyan-Shanskiy, K.P. Filonov, P.O. Peterson, D.H. Pimlott. Naturens krøniker, Lapland naturreservat, bøker 1 - 39, 1958 - 2003 og Laplands rapporter med registrationer av antall villrein 1929 - 2001.
Contact information: Valery Barcan, Lapland zapovednik, 184505 Monchegorsk, Murmansk region Tel.: (81536)5-72-13, Barcan@lapland.ru

By Arnodd Håpnes, Friends of the Earth Norway

PREDATORS

– an ecological necessity

We have 15 land-based predatory mammals in Norway, but the four major ones that live on the mainland are the real headline stealers. Many people have a lot of opinions on predator policy in Norway. Most of their views relate to problems for the grazing industry and shooting predators. The biology, ecological function and contributions to the ecosystems of the various species are given far too little attention.

The management regimes have become killing regimes

Predator have been hunted down and partly wiped out in many countries. 150 years ago, there were plenty of all four major predators in Norway. In 1850, rewards were paid for shooting 19 times more wolves and almost four times more bears than the total numbers of individuals of these species nowadays! Now the numbers are small. Friends of the Earth Norway is of the opinion that management of predators is characterized by political compromise on the grazing industry's terms and not based to any great extent on specialist knowledge. Numbers are so low that it is biologically difficult to state that they are viable. There are no measures in place for building up numbers and ensuring genetic survival. The management of the Norwegian list of endangered species and predators under threat demonstrates the Norwegian authorities' lack of ability to preserve our amazing natural diversity.

Friends of the Earth Norway wishes to point out a number of central terms for current predator management: at the cabinet meeting held on 18 March 2005, the Government adopted a Regulation concerning management of predators. The primary aim of the preamble is to ensure sustainable management of lynx, wolverines, bears, wolves and golden eagles, and the cattle and domesticated reindeer industry and other social interests must them be taken into account. We would also remind you of our obligations in respect of the Berne Convention, Storting resolution dated 13 May 2004 on St. rep. no. 15 (2003-2004) Rovvilt i norsk natur [Predators in Norwegian Nature] and the Convention on Biodiversity.

Friends of the Earth Norway is to make sure that the present Government has a preservation strategy in place for the four major predators. There has been a dramatic increase in culling permits. The development of conditional culling permits has quadrupled since the Stoltenberg II Government came to office. In 2002, conditional culling permits were issued for 19 major predators; in 2004, 27 animals; in 2006, 60 animals; and culminating in no fewer than 90 animals in 2008. Large numbers of animals are being eliminated through record hunting quotas. Systematic fauna crime in the form of illegal hunting is taking place. Some animals are being shot in claimed self-defense, and animals are being run over. The authorities are seeking to eliminate "potential vermin" - wolverines - through den hunting, and among others bitches and newborn pups are being shot. 24 bears were killed over the seven years from 2000 to 2006; while in 2007 and to the present day, no fewer than 22 animals were killed. This shows the increase in elimination despite the fact that target numbers are far from being met.

▲ **Fast and clever prey demands more of predators, like the wolf (the picture is taken under controlled circumstances).**
©Michael Schneider

▲ **The predators' selection of prey is an important ecological factor (the picture is taken under controlled circumstances).**
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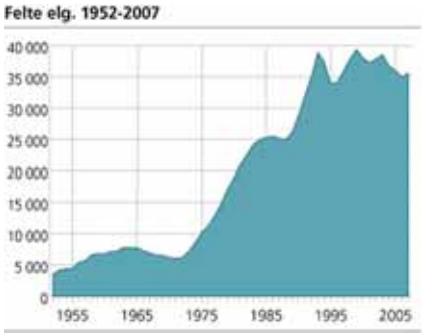
The ecology of fear

It is impossible to micromanage wild animals with a level of precision defining exact targets for the numbers of young, as has been set up.



Development in numbers of elk shot in Norway, 1950-2005. Shooting figures will reflect the development in the population to some extent: the main point here is that over the last few decades, elk numbers in Norwegian nature have increased many times over.

Wild animals undergo natural fluctuations, and other environmental factors will also have a major effect on populations. There are specialist challenges which have not been implemented in current management. In nature, predator and prey have affected one another through evolution. Predators are an important environmental factor and part of the ecology of the prey. Prey animals have to avoid being discovered by predators - and where necessary run away from them. They have to be on their guard and stay in places for only a short time. Their fear of predators controls their behavior. The ones that do this the best get to pass on their genes. Fast, clever prey demands more of predators. The poorest hunters starve. Ecology for a species affects a lot of other species and the actual dynamics of an ecosystem.

The last wolves in Yellowstone National Park were shot in 1926. The deer there enjoyed good times then; they could spend a long time in each location and grazed hard. They altered the ecosystem to a significant extent. Numbers of aspen were greatly reduced because shoots and young trees were eaten. Wolves were reintroduced there in 1995. At the same time, the aspen trees started to grow back. There are fewer deer there now, but still a lot of them. Researchers are of the opinion that the reduction in the number of deer is not the explanation for the changes now taking place in the vegetation. Prey animals graze less in all locations because they have to be on their guard for predators. Hence they are unable to overgraze the vegetation the way they used to, and the aspen trees are coming back. Other tree varieties and bushes are having the same response in the ecosystem, and the original dynamics between grazing land, prey and predators have been reestablished. Researchers call this the ecology of fear.

In many places in Norway, numbers of aspen, sallow and rowan have gradually diminished due to overgrazing from artificially high numbers of elk. Many other species - particularly insects and lichen - live in these deciduous trees. If the deciduous trees disappear, so do many other species. Elk are a real threat to biodiversity. In ecological terms, therefore, good predator populations will be necessary for biodiversity, as was demonstrated at Yellowstone. Friends of the Earth Norway is of the opinion, therefore, that a lot more emphasis must be placed in Norwegian predator management on the important ecological function of predators, and their contributions to maintenance of the natural dynamics in the ecosystems.

Predators are a must

In nature these days, the original prey species have been supplemented with domesticated reindeer and sheep in many locations. Grazing stakeholders have to realise that they are operating in an arena where predators are a must. Management which protects industry interests in the main and predatory species as a secondary concern will never be sustainable. This is a shame for grazing stakeholders, as ecological sustainability could have been a positive profiling issue for industries under a lot of pressure from many directions.

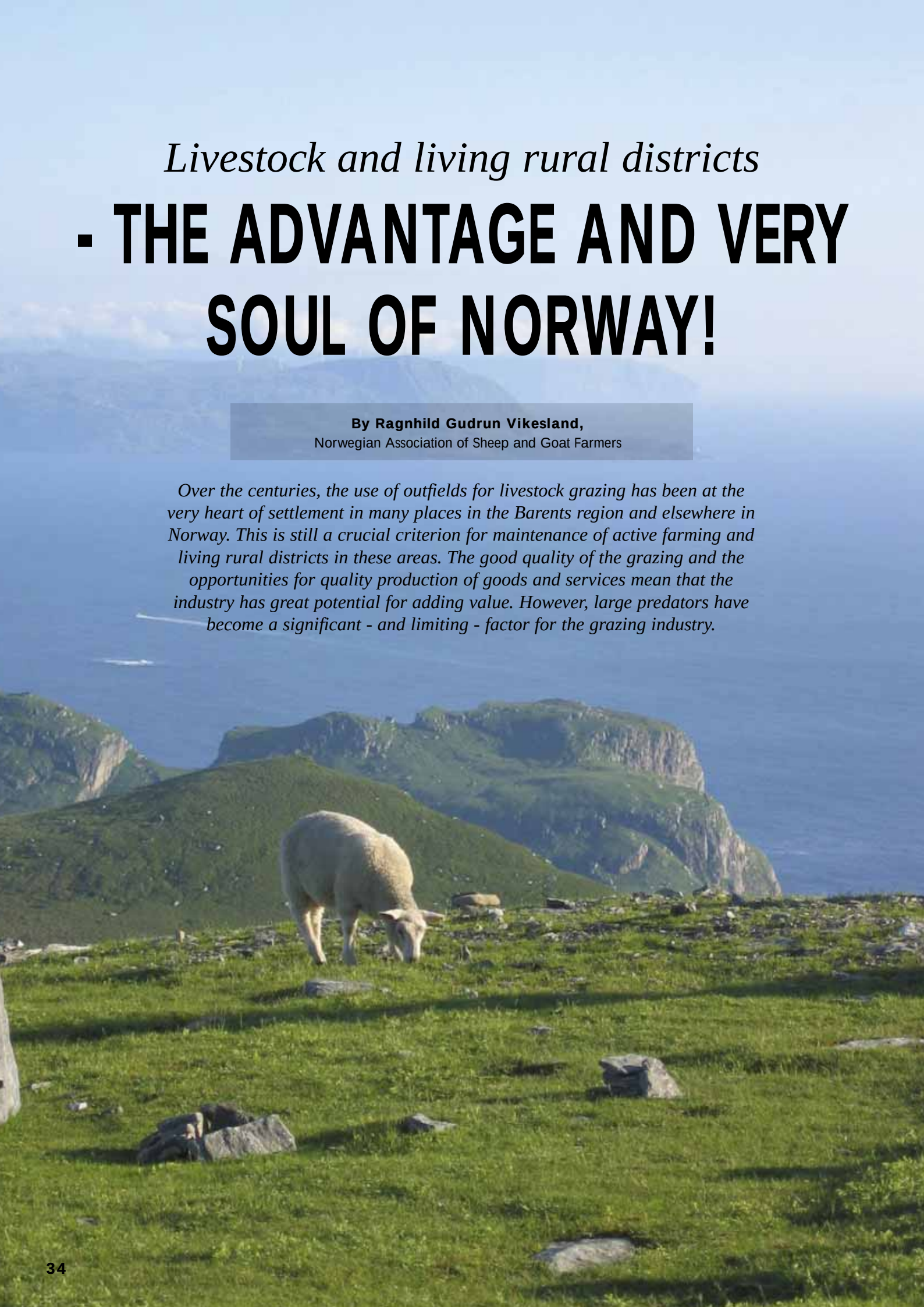
The authorities and grazing industry have to realize the positive benefits of having large predators in Norwegian nature. Not least, this includes the important ecological roles of predators. We would also remind you that the vast majority of people love intact, living nature - including predators. Management with little specialist background will lead to us failing to meet our target of stopping losses of biodiversity by 2010. The decline in wolf numbers is a clear warning of this. The management and industry stakeholders must take on board this fact.

Livestock and living rural districts

- THE ADVANTAGE AND VERY SOUL OF NORWAY!

By Ragnhild Gudrun Vikesland,
Norwegian Association of Sheep and Goat Farmers

Over the centuries, the use of outfields for livestock grazing has been at the very heart of settlement in many places in the Barents region and elsewhere in Norway. This is still a crucial criterion for maintenance of active farming and living rural districts in these areas. The good quality of the grazing and the opportunities for quality production of goods and services mean that the industry has great potential for adding value. However, large predators have become a significant - and limiting - factor for the grazing industry.



◂ **Sheep on outfield grazing.**
©Arne Flatebø

Build confidence, be heard

One of the central elements of current Norwegian policy on predators is the aim of reducing the level of conflict in areas where there are predators, and to build confidence. Binding, empathic dialogue, and active effort based on clear game rules are entirely fundamental to this.

There is also the fact that Nordland, Troms and Finnmark have borders with three other countries, all with different regimes when it comes to predator management. Here, one major challenge involves bringing about closer, more effective cooperation.

When traders feel rejected, mistrusted or ridiculed, and that nobody is listening to them, this does not help to form trust. When livestock is injured or killed, and this has no consequences in the form of elimination of the perpetrators, not even in areas where grazing animals have priority, this breaches the rules of the game and wrecks constructive dialogue.

Use the grazing industry's practical expertise

The knowledge-building processes in predator work must start to function such that sufficient importance is attached to the practical expertise of the grazing industry and other local environments in terms of outfield management. Active participation and inclusion must improve significantly. Providing instruction is not tenable; talk to users of grazing and other people in the local environments. You have to talk to people, not "at" them.

One example is that it is necessary to listen to traders' experience-based knowledge of the prevalence and behaviour of predators. And traders' expertise has to be used - for monitoring numbers and for active management - by eliminating perpetrators effectively.

Just how many predators do we actually have?

Registrations of predators is a central requirement for active management. Just how many predators do we actually have? With bears, DNA testing is handy; but registrations will not take place every year as long as this is just a trial project. For other predators, registrations will take place only with tracking and den registration - a brief season every spring. More resources should be invested here! Stock targets must be taken seriously. These are intended to be guidelines, not minimums.

Responsibility has to be allocated correctly

Nor should the grazing industry bear the financial cost of policy on predators. Policy has been established, but not implemented. Not least, this is applicable to the financing of preventive measures. Umpteen preventive measures have been trialled or are undergoing trials, and a lot has been invested in this work by researchers, authorities and farmers. Despite all this, there are still no measures which work well enough and which at the same time do not exceed reasonable cost levels. Tracking, culling, losses, preventive measures, extra patrols and - in a worst-case scenario - a switch to different production: it all costs money. At present, livestock farmers are paying a large proportion of the cost of predators.

Grazing adds value

Like many others, political authorities wish to preserve biodiversity. Biodiversity is much more than four different kinds of large predators! More than 30 % of species in the Red List are linked with grazing and cultivated land. This extent has increased. Quite simply, grazing animals contribute to a lot of biodiversity niches through what they do.

Now the sheep industry in Norway has been named a national initiative for ecological food production. The fundamental reason for this - the fact that this production is being given priority - rests in the use of outfield grazing - which is a natural, ecological feed. Investment in ecological sheep farming demands fairly simple use of outfield grazing.

International obligations

As far as predators are concerned, much of the argument concerning protection has been linked for a long time now to the Berne Convention. But the interpretation is static. The Berne Convention has previously focused on "wild species" and has been referred to as "the Wildlife Convention". Now, however, it is focusing more on species under threat on cultivated land. Modern application of international conventions focuses on uniform management of nature and cultivated land. Farming and grazing have an important part to play, according to this. Another central example is the European Landscape Convention, the first international agreement which seeks to preserve the European landscape. This convention will probably limit Norway's access to running of predator management which will involve extensive changes to the landscape.

Important cultural heritage and sustainable natural farming

All this is just some of the factors which convince us, the Norwegian Association of Sheep and Goat Farmers, the primary organisation for the grazing industry, of the fact that proportions in our work with predators/grazing animals is changing: the grazing industry is an entirely necessary factor for attainment of targets in many areas of society. But improving the framework conditions is an urgent matter. The grazing industry is short of traders, and with this resources are being lost in rural districts, in culture, in the landscape.

▴ **Gouts contribute to an increased biodiversity.** *©Ingunn Nævdal*

The Norwegian Association of Sheep and Goat Farmers is an organisation for owners of sheep and goats, and is the primary organisation for the grazing industry. The organisation has 13 000 members all over Norway, in 18 county groups and 400 local groups. There is a network of around 850 grazing groups in organised grazing use which has been operational for almost 40 years now. The purpose of this has always been to reduce losses of grazing animals and to streamline the use of grazing in outfields.

PUBLISHED BY THE SUPPORT OF:

MILJØVERNDEPARTEMENTET

◂ **Lynx *(Lynx lynx)* (picture is taken under controlled conditions).**
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