

THE MANAGEMENT AND CONSERVATION OF LARGE CARNIVORES IN SWEDEN AND NORWAY

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**Report No. 2011-5
from the Scandinavian Brown Bear Research Project
to WWF Poland**

This report was created as part of ‘Species Protection of lynx, wolf and bear in Poland’ project, executed by Foundation WWF Poland and co-financed by Norwegian Financial Mechanism and EEA Financial Mechanism.



Photo: Jon Swenson

Abstract:

The brown bear (*Ursus arctos*), Eurasian lynx (*Lynx lynx*), wolverine (*Gulo gulo*), and gray wolf (*Canis lupus*) occur in Sweden and Norway. An extermination campaign reduced them all and exterminated wolves in both countries and bears in Norway. Following protective measures, all species have increased, and wolves have recolonized Scandinavia naturally from the east. Norwegian and Swedish management agencies communicate and cooperate closely in transboundary management and coordinate their research funding. The political goals for these species are lower in Norway for all species and the damage they cause is higher there. All species have reached or exceeded the political goals, except for brown bears in Norway. Nevertheless, they all are threatened according to IUCN criteria, except for bears and lynx in Sweden. This means that the present political policies will ensure that most of these large carnivores will remain threatened and that continued intensive management will be necessary.

General History

Large carnivores have caused considerable problems for livestock farmers in both Sweden and Norway throughout history, resulting in political policies to exterminate them. To reach this goal, both countries instituted many programs to encourage or require the killing of large carnivores. The most effective of these were generous bounties, which were paid nationwide in Sweden from 1647 and in Norway from 1733. This was effective, as gray wolves (*Canis lupus*) were exterminated in both countries, brown bears (*Ursus arctos*) were exterminated as a reproducing species in Norway, and Eurasian lynx (*Lynx lynx*) and wolverines (*Gulo gulo*) were greatly reduced in numbers in both countries.

With time, policies changed regarding all of these large carnivores, although the introduction of policies to conserve these species varied among the species and between countries. Sweden removed all bounties on bears in 1893 and introduced a series of more protective measures during the next 30 years. Norway removed the national bounties in 1930 and introduced a series of more protective measures until 1973, when local bounties were forbidden and the species received protection nationwide. Wolverines received protection in Sweden in 1969, in southern Norway in 1973, and in all of Norway in 1982. Lynx received protection in Sweden in 1928 and in Norway in 1994. The wolf was the last species to receive protection, in 1966 in Sweden and in 1972 in Norway. A series of white papers have been produced in both countries and political policies have evolved. Today, as a result of these policies, the numbers and distribution of all species have increased, although all species are still on the red list in one or both countries (Table 1). All species are subjected to quota-regulated hunting, except for wolverines in Sweden, where they are protected. However, individuals of all species can be killed when they cause depredations or other problems. Illegal killing occurs, but its importance varies with species and area. Outside of the reindeer management area in both countries, the rate of illegal killing is a great problem for the wolf, somewhat less so for the lynx, and appears to be a minor problem for the bear. Relatively few wolverines occur there permanently. Rates of illegal killing have been documented in one mountainous area within the reindeer management area in Sweden. There, the rates seem to be higher than those documented outside the reindeer management area for lynx, wolverines and bears (no wolves occur there permanently).

Table 1. The most recent estimates of large carnivore populations and their IUCN conservation status in Sweden and Norway. (Data from www.rovdata.no, www.viltskadecenter.se, Kindberg et al. 2010, www.artsdatabanken.no, and www.artdatabanken.se). (IUCN status: CR=critically endangered, EN=endangered, VU=vulnerable, NT=near threatened, LC=least concern, °=the population is influenced positively by population(s) in neighboring countries).

Species	Sweden			Norway		
	Number	Year	Status	Number	Year	Status
Brown bear	2,968-3,667	2008	LC°	Min. 166	2010	EN°
Eurasian lynx	1500-2000	2009/2010	NT°	411-470	2010	VU°
Wolverine	Ca 500*	2010	VU	344-442*	2011	EN
Gray wolf**	231-277	2010/2011	EN	33-35	2010/2011	CR

*Adults. **In addition, 22-23 wolves had home ranges in both Sweden and Norway.

Present monitoring and population status

All populations of large carnivores are monitored in both countries and population estimates are made regularly. The intensity of monitoring and time between population estimates varies according to how controversial the management of the species is. Generally, the wolf

requires more intensive monitoring than the other species, and large carnivores in Norway require more intensive monitoring than those in Sweden.

The monitoring programs are based on scientific research and have been subjected to scientific evaluation and review by an international board of experts from the Nordic countries. In addition, the Norwegian Ministry of Environment and Ministry of Food and Agriculture have appointed experts from Norway, Sweden and other countries to an International Commission on the Monitoring of Large Carnivores in Norway, which evaluates present methods of population monitoring and makes recommendations regarding improvements. The management agencies in both Sweden (Swedish Environmental Protection Agency NV, and the Swedish County Administration Boards CAB) and Norway (Directorate for Nature Management DN) are responsible for monitoring in their countries, but they coordinate their work closely, using the same methods when possible. A common report is published annually regarding the status of the wolf in the Nordic countries. In both countries, the management agencies cooperate with the well organized hunters and hunters' organizations, particularly the Swedish Association for Hunting and Wildlife Management (SJF) and the Norwegian Association of Hunters and Anglers (NJFF) and with representatives of the Sámi community in domestic reindeer areas. County environmental organizations in both countries and the Norwegian Nature Inspectorate (SNO) also have important roles in the monitoring of large carnivores. Other important organizations are the Norwegian Institute for Nature Research (NINA) and Rovdata (RD, Norway), which analyze and report the population estimates in Norway, and the Swedish Wildlife Damage Center (VSC), which has a similar function in Sweden. In addition the large-carnivore research projects in both countries assist with population and trend estimates. The results of the most recent population estimates are presented in Table 1.

Populations of wolverines are estimated annually in both countries using the same methods of documenting active natal dens and using research-based factors to convert the number of natal dens to an estimate of the number of adult wolverines. In Norway, DNA from collected excrements is also used to improve the population estimate. Populations of lynx are estimated annually in Norway and regularly in Sweden, based on reported tracks of family groups found before February and using research-based factors to convert the tracks of family groups and the distances between them to an estimate of the number of lynx. In Sweden, track surveys are coordinated south of the reindeer area by the CAB in cooperation with the SJF. In Sweden, the tracks are checked by CAB and SJF personell outside reindeer areas and CAB personell and Sámi representatives together in reindeer areas. In Norway, SNO personell have this responsibility and NJFF members conduct transect surveys in some areas. The wolf population is estimated each winter, based on very intensive winter tracking and DNA analyses carried out cooperatively by Hedmark University College in Norway (HiH), VSC, and the wolf research project. Bears are monitored annually using DNA analyses of collected scats and hairs in Norway and at various intervals in Swedish counties. In Sweden, moose hunters collect samples of the bear feces they find during years of organized county-wide population estimates. Population sizes are estimated using capture-recapture techniques from individually identified bears from the DNA in the feces. Annual trend is estimated for each county by the SJF from the number of bear observations per 1,000 hours of hunting effort by moose hunters during the first week of the moose hunting season.

Present management and conservation policies

The parliaments in both countries have decided that their countries have a responsibility to secure the survival of all four large carnivore species within their countries and that they will respect their responsibilities in regard to the Bern Convention (Norway and Sweden) and the Habitats Directive (Sweden). At the same time, they want the conflicts and damages these species cause to be as small as possible. The Norwegian Parliament has gone farther in this regard, accepting equal responsibilities to secure the survival of large carnivores and to secure a viable livestock industry that is based on grazing unguarded sheep and domestic reindeer on the open range. Norway experiences much greater damages and compensation costs than Sweden. A summary of depredations of farm animals is presented in Table 2. No comparative data on losses of domestic reindeer were available, because of different methods to compensate for these losses in the two countries.

Table 2. Number of domestic animals judged to have been killed or injured by the large carnivores and the compensation payments (in thousands of kronor/kroner for these damages in Sweden and Norway, 2010. (From www.viltskadecenter.se and www.dirnat.no Rovbase).

Species	Sweden		Norway	
	Number ^a	Payment (k SEK)	Number ^b	Payment (k NOK)
Bear	64	45	4,729	10,477
Lynx	95	189	8,727	19,336
Wolverine	0	0	9,367	20,757
Wolf	201	468	1,498	3,322

^aThe animals are 93% sheep, 5% cattle, and 1% goats. ^bThese are only sheep.

The present large carnivore policies are based on white papers published in 2004 in Norway (Miljøverndepartementet 2004) and 2007 in Sweden (Pettersson 2007) and the political decisions based upon them (Energi- og miljøkomiteen 2004 in Norway and Regeringen 2009 in Sweden). In addition, the results of a negotiation among all Norwegian political parties in the Parliament resulted in some changes in policy in 2011 (Representforlag 2011). The agencies responsible for administering the public policy regarding large carnivores, DN and NV, have a very close cooperation regarding methods, research, monitoring, and general contact. They require that the Swedish and Norwegian research projects also cooperate closely, which they do. In fact, the Norwegian and Swedish wolf researchers are integrated under one umbrella project and the bear researchers are totally integrated into one project.

Below, we describe the conservation and management policies for each country and species. Both countries express their population goals as the number of annual reproductions. The goals are exact numbers in Norway (the goal of management activities is to reduce the population when it is above the goal and increase it when it is below the goal) and usually are minimum goals in Sweden. The national goals are presented in Table 3. Both countries have delegated the management of large carnivores to lower political levels. Both countries have two major forms of hunting; general hunting by hunters that is quota-based and damage-control hunting that is aimed at problem individuals and is carried out to stop ongoing damage.

Table 3. The national goals regarding large carnivores in Sweden and Norway. The goals are expressed in annual reproductions (which have been translated to the corresponding number of individuals in the table). Types of goals are exact, minimum, and provisional (after reaching a provisional goal, Parliament will decide on a future goal).

Species	Sweden			Norway		
	Repro. ^a	Type	Individuals	Repro. ^a	Type	Individuals
Bear	100	Minimum	ca.1,000	13	Exact	Max. 210
Lynx	250	Minimum	ca.1250	65	Exact	ca.385
Wolverine	90	Provisional ^b	ca. 400	39	Exact	ca.254
Wolf	20	Provisional ^c	ca. 200	3 ^d	Exact	ca.30

^aAnnual number of reproductions. ^bProvisional goal until 2014, when a decision on a new goal will be made.

^cProvisional goal until 2014, during which time a maximum of 20 wolves will be released in Sweden to increase the genetic diversity of the population and a decision on a new goal will be made. ^dThis goal will be reevaluated at the latest in 2013, after negotiations with Sweden regarding how to handle transboundary wolves.

Sweden

General

NV has the national responsibility for the management of large carnivores in Sweden, but it delegates the responsibility to Wildlife Management Delegations (VFD), consisting of members (politicians and interests groups) representing the various interests regarding large carnivores. The VFD is administratively part of the County Government and sets local policy regarding local population goals, handling problems, paying compensation for damages, etc. based on the national policy. This management is to be adaptive, which means that management measures are planned and evaluated continually in relation to the goals, so that the resulting knowledge will result in better future management. The VFDs are members of one of 3 of regional cooperative boards in Sweden that coordinate the management within each region. When the county and national population goals have been met, the authority to set general hunting quotas is transferred from NV to the VFDs.

Brown bear

The brown bear population in Sweden numbers about 3,300 and is generally increasing in size and distribution. The population size is thus far over the national minimum goal of 100 reproductions (about 1,000) bears. The bear does not cause many problems in Sweden, but many people fear it. The local goals call for population stabilization in many areas, declines in some areas, and continued increase in a few areas. The national hunting quota in 2011 was 295 bears and 297 were killed.

Eurasian lynx

The lynx causes considerable depredation damage to domestic reindeer in northern Sweden. Therefore, Parliament has decided that the population be managed separately in and outside the reindeer management area, with most of the lynx occurring outside the reindeer area. Today almost half of the lynx are within the reindeer area. Lynx are expanding to the south. Totally the population of 1,500-2,000 is above the national goal of 250 reproductions annually (1,250 individuals). The goal of 250 is a temporary reduction from the former goal of 300, which is allowed as long as the population expansion continues in southern Sweden and the favorable conservation status of the lynx is not affected negatively. Hunters must register with NV prior to hunting lynx. During the 2011 hunting season, a quota of 210 was issued and 110 lynx were killed.

Wolverine

NV reported in 2008 that the provisional goal of 90 wolverine reproductions had been reached; it was 113 reproductions in 2010. As the original goal was provisional, the Government has now started an investigation to determine which long-term goal should be set to ensure the viability of the species in Sweden. The wolverine occurs almost entirely within the reindeer area and is an important predator on reindeer. The species is protected in Sweden, but individuals can be removed if they cause considerable damage and females with young can be removed from natal dens and killed if there are more than 3 combined reproductions of wolverines and/or lynx within a Sámi area.

Gray wolf

Wolves were exterminated in Scandinavia, but a pair immigrated to the border area between Norway and Sweden from the east in the 1970s. There have been a few documented cases of immigration from Finland/Russia since then. The wolf is the most difficult large carnivore to manage in Sweden, because it kills hunting dogs, preys upon moose, and it is the large carnivore species that is least liked by the people. The population is considered to be endangered, primarily due to small population size, but also due to documented inbreeding depression. The population size is about 250-300, including the wolves that also spend part of their time in Norway. NV reported in 2008 that the provisional goal of 20 wolf reproductions had been reached. In winter 2010/2011, there were about 25 reproductions in Sweden and an additional 3 in territories that occurred both in Sweden and Norway.

As the original goal was provisional, the Government has now started an investigation to determine which long-term goal should be set to ensure the favorable conservation status of the species in Sweden. Until this is done, the population was to be stabilized at 210 individuals and the population will be augmented with a maximum of 20 wolves to improve their genetic status. This was to occur during 2009-2014. This investigation will include a determination of the effects the species has, the effect of the augmentation, and an evaluation of the viability of the species in Sweden. Hunters must register with NV prior to hunting wolves. A total of 28 wolves were killed during the 2010 hunting season to keep the population as close to the goal of 210 as possible, but to date no wolves have been released to increase the genetic status of the population. However, the stabilization limit of the Swedish wolf population at 210 wolves was withdrawn by the Swedish Parliament in the summer of 2011.

Norway

General

DN has the national responsibility for the management of large carnivores in Norway, but it delegates the responsibility to 8 regional large-carnivore boards (RVN), consisting of local politicians and members of the Sámi Parliament, where appropriate. The RVN sets local policy regarding local population goals, handling problems, paying compensation for damages, etc. based on the national policy. When the regional population goals have met (except for bears, see below), the decisions about general hunting levels are transferred from DN to the RVNs. Hunting quotas are set per specific region, but are reported at the national level in this report. All of the large carnivore species cause greater depredations to sheep in Norway than in Sweden, but the effects of lynx and wolverine on reindeer are probably similar, because the form of husbandry is similar. Bears are probably less of a problem for reindeer calves in Norway than Sweden, because few bears occur in reindeer calving areas in Norway, compared with Sweden.

Brown bear

The population of brown bears in Norway consists of a minimum of 166 bears, with a majority (80%) of males. The reason for the unbalanced sex ratio is that the bear had been exterminated in Norway, which is being recolonized from the neighboring countries of Sweden, Russia, and Finland. As males disperse much farther than females, Norway receives many more dispersing males than females and the population thus has a heavily male-biased sex ratio. In 2011 Parliament reduced the reproduction goal from 15 to 13 and decided that there would be 6.5 females per reproduction and a maximum of 1.5 males per female in the Norwegian bear population. The calculated number of reproductions in 2010 was 6.2, which is half of the goal. Unlike the other large carnivore species in Norway, the regional boards will receive management responsibility for bears when 10 reproductions have been documented nationally, rather than reaching the national goal.

Bear hunting is allowed as “license hunting”, which is quota-limited hunting designed to reduce depredations and occurs outside of the areas where females generally are found. Hunters have to register for permission to participate in license hunting. The sum of the regional quotas in 2010 was 19 bears and 3 were killed.

Eurasian lynx

The lynx population in Norway is similar to the national goal and the population is generally held stable with hunting. The lynx is classified as a big game species, and is the only large carnivore that is not hunted with license hunting, but rather according to the normal big game hunting regulations. During the 2010 hunting season, the sum of the regional quotas was 175 lynx and 136 lynx were killed.

Wolverine

The Norwegian wolverine population of 344-442 is above the goal of 39 reproductions (about 250 wolverines). This has been the case since 2003. License hunting is allowed for wolverines, and during the last 18 years the quota has never been reached. In the hunting season of 2010/2011, the combined regional quotas added up to 119 wolverines, and 37 were killed. In addition to hunting, female wolverines and their young are removed from natal dens and killed in areas where depredations are anticipated. In their agreement after negotiations in 2011, the political parties stressed that the level of wolverine harvest through license hunting was not acceptable and that other methods should be used to increase the harvest, with a goal to reduce the killing of females with dependent young. They recommended courses for hunters to improve their hunting skills and state-financed hunting, preferably during the normal hunting season and using cost-effective methods. The RVNs and DN, in agreement with them, can decide on extraordinary removals. Research suggests that the protected population in Sweden is a source of wolverines to Norway.

Gray wolf

The wolf is also the most difficult large carnivore to manage in Norway, because it kills sheep and hunting dogs, preys upon moose, and it is the large-carnivore species that is least liked by the people. The population is considered to be critically endangered, primarily due to small population size, but also documented inbreeding depression. The population size is about 30-35 wolves (3 reproductions), which is the population goal. At this time, Norway does not count the wolves that spend part of their time in Sweden, which included 23-25 wolves and 3 additional reproductions in the winter of 2010/2011.

The political parties stated in 2011 that they want an agreement with Sweden regarding transboundary wolves. They want the transboundary wolf packs to be counted as Norwegian wolves, but are willing to negotiate that half of these wolves be considered as Norwegian and half as Swedish for management and in determining whether the goals have been met. Today's goal will remain in force until the Swedish white paper on large carnivores has been completed, but at that time Norway will begin the negotiations with Sweden. When they are completed, the Norwegian Parliament will revise the Norwegian goals and make a final decision. This should be done in 2013 at the latest.

Conclusion

Norway and Sweden provide an excellent example of the transboundary management of common large-carnivore populations. Although the management and political problems are quite different for some of these species, the management agencies communicate and cooperate closely during their work. They also coordinate their funding of research to meet their common needs. All of the large carnivore species have reached or exceeded the political goals, except for brown bears in Norway. Nevertheless, all of the species are in one of the threatened categories according to IUCN criteria, except for brown bears and lynx in Sweden. This means that the present political policies will ensure that most of these large carnivores will remain in a threatened category, and that intensive management will be necessary for the foreseeable future.

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