Short Communication

ARE WOLVERINES DOOMED TO LIVE IN ETERNAL CONFLICT?

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In the high alpine areas and deep boreal forest of northern Europe roams an animal virtually unknown to most Europeans. Variously known as glouton, jerv, järv, geatki, ahma, ernis, pocomaxa, rosomach, ghiottone or wolverine. Related to martens and badgers, wolverines are incredibly tough animals with a lot of attitude that eke out a living under harsh conditions.

There is much talk in Europe about large carnivores. Most Europeans will be able to identify wolves and brown bears, and many will recognize a picture of a lynx. However, the fourth European large carnivore – the wolverine – is totally unknown to the majority of Europeans. It is also a species about which there is comparatively little scientific knowledge. Wolverines are the largest mustelids, weighing between 15 and 20 kg. They live solitary lives, occupy large home ranges (100 to 500 km^2), maintain a territorial social organization, and live in habitats ranging from alpine tundra to boreal forest. Although capable of killing prey as large as reindeer, they obtain a large part of their diet from scavenging carrion and are famous for their ability to cache carcasses rapidly for later use.

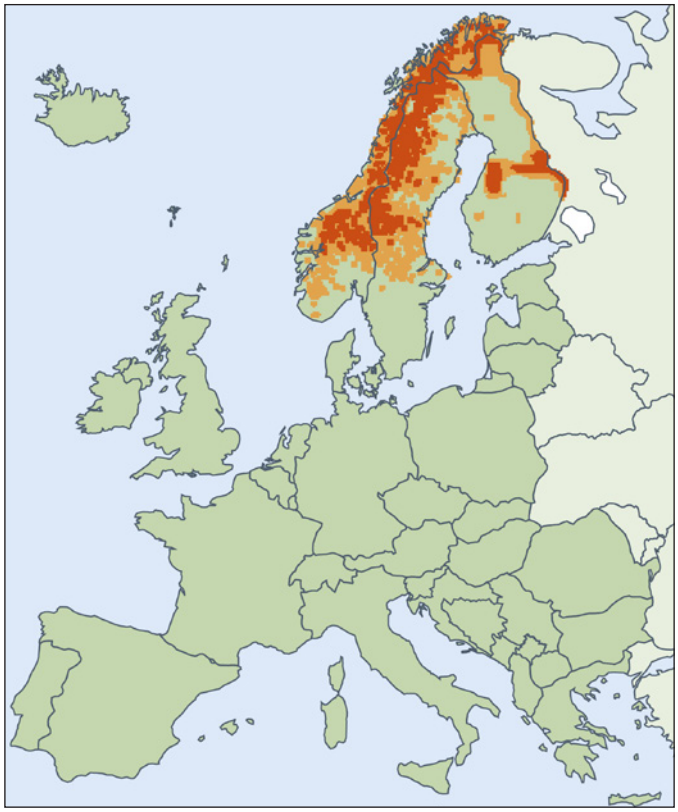

Fig. 1. Distribution of wolverines in Fennoscandia during 2006-2011 (dark cells with permanent/reproducing presence; light areas with occasional presence; Kaczensky et al., 2013).

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During the last two years, the European Commission has funded a project to conduct a European wide review of the status of large carnivores. The process involved contributions from independent experts from all European countries, and covered wolves, brown bears, lynx and wolverines. The report summarises the status of wolverines in the period 2008-2011 (Kaczensky et al., 2013).

Wolverines are only found in four European countries – Norway, Sweden, Finland and Russia (Fig. 1). There were clear differences in the quality of information available concerning wolverine status. The best data is available from Norway, where there is a nationwide monitoring program for wolverines that produces annual counts of natal dens and an annual population estimate based on analysis of DNA from faeces. Each year, over 100,000 km of surveys are driven using snowmobiles to collect scats and look for dens. Wolverines are also hunted within an annual quota hunt. In addition, state game wardens also conduct wolverine control operations, including shooting from helicopter and killing breeding animals at dens. The overall objective is to maintain the wolverine population at a level that has been determined by parliament. The latest estimates are for around 350 wolverines in Norway – distributed from the Barents Sea coast in the north of Finnmark down to the latitude of Lillehammer in southern Norway (www.rovdata.no).

In Sweden, population monitoring is mainly based on surveying known natal denning sites, with some additional use of DNA from faeces and even camera-traps in the forested areas. Current estimates are around 680 wolverines in Sweden. Monitoring between Norway and Sweden is becoming increasingly standardized. Finland has a different monitoring system, based mainly on track counts, and current estimates are for around 70-80 wolverines in the north which are regarded as being part of the same population (termed the "Scandinavian" population) as those in Sweden and Norway. In addition, come another 80-90 wolverines in the central forest areas that have some connection to wolverines in Russian Karelia. This is termed the "Karelian" population. Wolverines are not hunted to any large extent in Sweden or Finland. There is currently very poor data from the Russian side, but the most recent estimates are for 150-170 in Russian Karelia. There are also an estimated 350 wolverines on the Kola peninsula – but it is not known to what extent these connect to

either the Scandinavian or the Karelian populations, and all of these Russian estimates are little better than educated guesses.

The total of around 1,200 wolverines in the three Nordic countries makes wolverines by far the rarest of the four large carnivore species in Europe. However, most of their distribution overlaps with the reindeer husbandry areas in the Nordic countries, and the conflict caused by depredation on reindeer is common to all countries. Reindeer herding is mainly conducted by members of the Sami people, to whom reindeer are a central element in their cultural heritage. The reindeer herding districts cover very large parts of all the Nordic countries, covering over 40% of the land area of Norway and Sweden for example. Although wolverines also occur in the mountains of central and southern Norway outside the reindeer herding areas, they are also associated with significant conflicts with free-ranging sheep in these areas. Presently between 7,000 and 10,000 sheep are compensated as wolverine kills each year in Norway. As a result there are virtually no areas in Norway where wolverines can exist without overlapping either domestic sheep or semi-domestic reindeer. It is only in the forested habitats of south central Sweden and central Finland that wolverines occur in areas with limited depredation conflicts.

Depredation represents a great challenge for management as it is clear that the Nordic countries have a special responsibility in a European context for the

wolverine, yet their distribution is almost entirely in areas where they conflict with some form of livestock. In fact, in most of these areas wolverines depend on domestic reindeer as their primary food source (no other wild ungulates exist in these areas, and small game species like hares are a poor substitute), which implies that their conservation requires that they have a certain access to reindeer. In such situations it is not clear if adopting livestock mitigation strategies is actually the best strategy for dealing with the conflict as is normally recommended for carnivore-livestock conflict. It is unclear as to what mitigation measures actually exist for semi-domestic reindeer. The wide-ranging movements of the herds, combined with their shy nature and their year-round exposure to depredation make it difficult to implement any effective protection. Paying a fair level of compensation for losses may be the only successful strategy. However, this depends on being able to determine just how many reindeer are actually killed by wolverines. While there is no doubt that wolverines can, and do, kill adult semi-domestic reindeer and adult sheep, there is much uncertainty about how many. Wolverines are primarily known as scavengers and in areas where other predators, such as Eurasian lynx, exist at high densities, they can primarily live off the remains of kills that these predators leave behind. Furthermore, there are severe problems of poor body condition in many reindeer herding districts caused by an over-abundance of reindeer, which results in many animals dying of other causes, also providing plenty of carrion. In addition, poor body condition in reindeer may predispose them to wolverine predation.

It is therefore an important research priority to determine exactly what impact wolverine depredation is actually having on reindeer, and how this relates to the other factors influencing their production. A key question here concerns the extent to which wolverine depredation is additive or compensatory for other mortality, which will depend on the overall condition of the livestock and the presence of other mortality factors. It is only then that it will be possible to set fair compensation levels that avoid perverse subsidies with undesired side-effects.

The situation for the 2 million domestic sheep that free graze every summer in Norway and wolverines is more complicated as there is far less probability that their depredation is compensatory for other causes because sheep are kept indoors or at the farm for 7-8 months a year making them less exposed to environmental conditions. Furthermore, there is less scope for wolverines to scavenge on other carnivore's kills in the areas with highest sheep densities as lynx are not present in these areas. Although there are more potential mitigation measures for sheep than reindeer, implementing them in practice in the low productivity, rugged and remote alpine tundra ecosystems where they graze is logistically challenging. The only measure which offers some scope to minimize depredation is to bring the sheep in from the mountain pastures earlier than normal (August instead of September) as for reasons that are not fully understood depredation tends to peak late in the season. However, this shortens the period when sheep can free graze and requires farmers to provide extra fodder on the home fields.

The wolverine case raises many interesting questions. Firstly, it represents an example where the conservation of a regionally endangered species virtually depends on the maintenance of some level of conflict. Secondly, it occurs with animal production systems where the opportunities for protection measures are limited and the production has very strong cultural value to an ethnic minority. In cases like this, the central questions are (1) what level of conflict is tolerable, and (2) how to provide a compensation system that is fair, efficient, and transparent? The present day systems in Norway and Finland depend on documenting losses, which is virtually impossible with these extensive grazing systems. The Swedish system in the reindeer herding areas, based on paying for wolverine presence, seems to offer many advantages if it can be further refined. It is also important that any such system should avoid providing a perverse subsidy for undesired side-effects (it has been shown that the present compensation system in Norway stimulates unsustainable herding practices) and should positively incentivize for desired practices and outputs. It is therefore important to adopt a holistic view of both the factors influencing the whole animal production system (see next article) and the whole set of economic measures that are in place to support the system. Finally, it underlines the importance of fostering wolverine expansion into the forested areas outside the reindeer husbandry districts.

References

Kaczensky P, Chapron G, Von Arx M, Huber D, Andrén H, Linnell J (2013) Status, management and distribution of large carnivores - bear, lynx, wolf and wolverine - in Europe. Istituto di Ecologia Applicata, Rome, Italy.

Further Information

www.lcie.org

ec.europa.eu/environment/nature/conservation/species/carnivores/

www.rovdata.no

This animation shows the development of the Scandinavian wolverine population from 1996 to 2010:
www.youtube.com/watch?v=0geRd8iXKHg

This short video (in Norwegian) shows how DNA technology is used to monitor wolverines in Norway:
www.youtube.com/watch?v=OcJdeAr5C5Y