

The wolf in Slovakia

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Abstract

The wolf (*Canis lupus*) in Slovakia is both a game species and a partly protected species of European importance. Restrictions on hunting from 1975 along with an increase in prey base and expansion of forest cover allowed a natural recovery. Both numbers and occupied range increased until the 1980–90s. On a broad scale, current distribution is closely linked to forest cover; on a finer scale, wolves use a wide variety of habitats from sub-montane field-meadow-forest mosaics to sub-alpine and alpine vegetation zones. Wild ungulates constitute more than 90% of biomass consumed by wolves. The main prey species is the red deer (*Cervus elaphus*), resulting in competition with human hunters. Livestock accounts for less than 5% of the spring-autumn diet, although losses of sheep can be locally high, especially where preventive measures are insufficient. Farms with well-raised and correctly used livestock guarding dogs report significantly fewer losses than other farms and have not suffered from surplus killing. Compensation for damage to livestock caused by wolves has been available from the state since 2003 but farmers and shepherds still tend to have the most negative attitudes. Official game statistics have been found to over-estimate numbers of wolves by 5–7 times. Using four different quantitative methods, the Slovakia Wolf Census Project estimated there to be 270–405 individuals in autumn 2005 and 166–255 individuals in early spring 2006 living wholly or partially in Slovakia. Of these, c.40% had territories that spanned an international border, predominantly with Poland, which confirms the importance of international cooperation to prepare management plans at the population level. These results also imply that published criteria for favourable conservation status in Slovakia are only fulfilled if juvenile wolves and those with cross-border territories are included in population estimates. Legal hunting is by far the largest cause of known mortality. The rapid development of the road network and other infrastructure is currently the most important indirect threat to the wolf population due to the fragmentation, degradation and loss of suitable habitat. Measures should be taken to ensure that hunting pressure does not increase, that core habitats, connectivity and prey supplies are preserved and conflicts with human interests are adequately addressed.

Introduction: persecution, recovery and public acceptance

Historically, the wolf was regarded as vermin and was persecuted to the brink of eradication from Slovakia. With the exception of a brief respite provided by the Second World War, the wolf's decline continued until 1975, when it was first given legal protection. A closed season was introduced from 1st March to 16th September and all hunting methods other than firearms were prohibited. These measures, in combination with an increase in prey base and expansion of forest cover, allowed the wolf to recover. Trends in hunters'

estimates of wolf numbers and reported numbers of wolves shot legally per year indicate that the population increased in numbers until the 1980–90s. Since then it appears to have stabilised or slightly declined (Fig. 1).

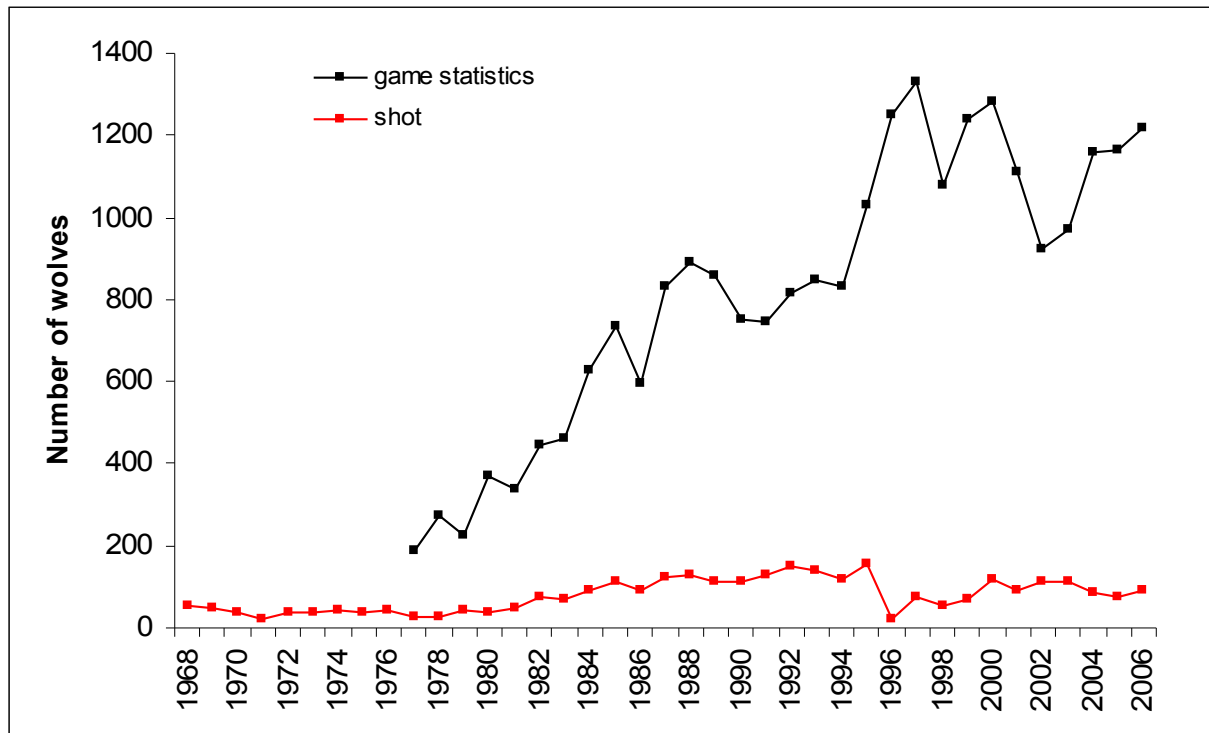


Fig. 1. Hunters' estimates of wolf numbers and reported legal hunting (Source: NLC Zvolen).

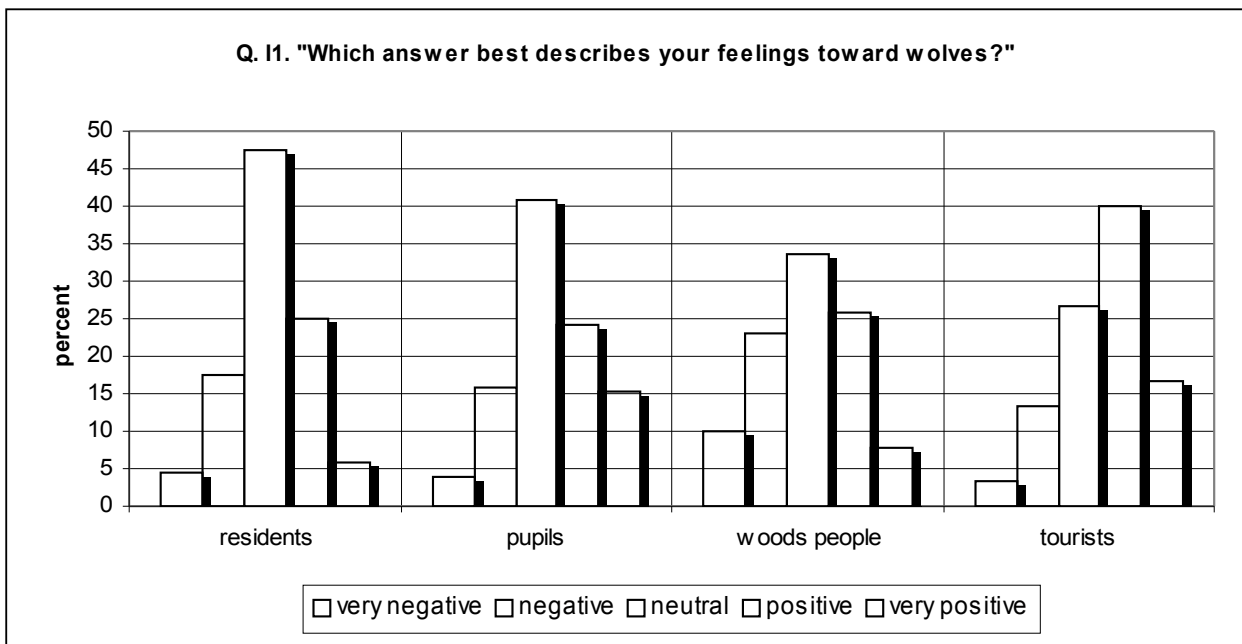


Fig. 2. Feelings of questionnaire survey respondents (n = 1,178) toward wolves by target group (Source: Wechselberger et al. 2005).

Although most Slovaks hold neutral to positive attitudes toward large carnivores, the wolf is the least accepted species, with fewer people having positive feelings towards it than towards the bear or lynx (Wechselberger *et al.* 2005). People most directly affected by carnivores have less positive attitudes than others such as town residents, school pupils and tourists (Fig. 2). Shepherd and farmers tend to have the most negative attitudes due to predation on livestock. Its choice of prey also brings the wolf into conflict with human hunters who perceive it as a competitor for game that must be controlled. Hunting and poaching continue to be the most prevalent causes of known mortality.

Current distribution

With the increase in numbers came an expansion in occupied range. Currently, the wolf inhabits approximately 40% of Slovakia; for various reasons, the rest of the country is generally considered to be unsuitable for its existence. Wolves are widespread in upland areas of northern, central and eastern Slovakia, where the population is contiguous with that in the Polish Carpathians. They are absent from most lowland areas bordering Hungary to the south and are also missing, or occur only sporadically, in several mountain ranges of western Slovakia (Fig. 3).

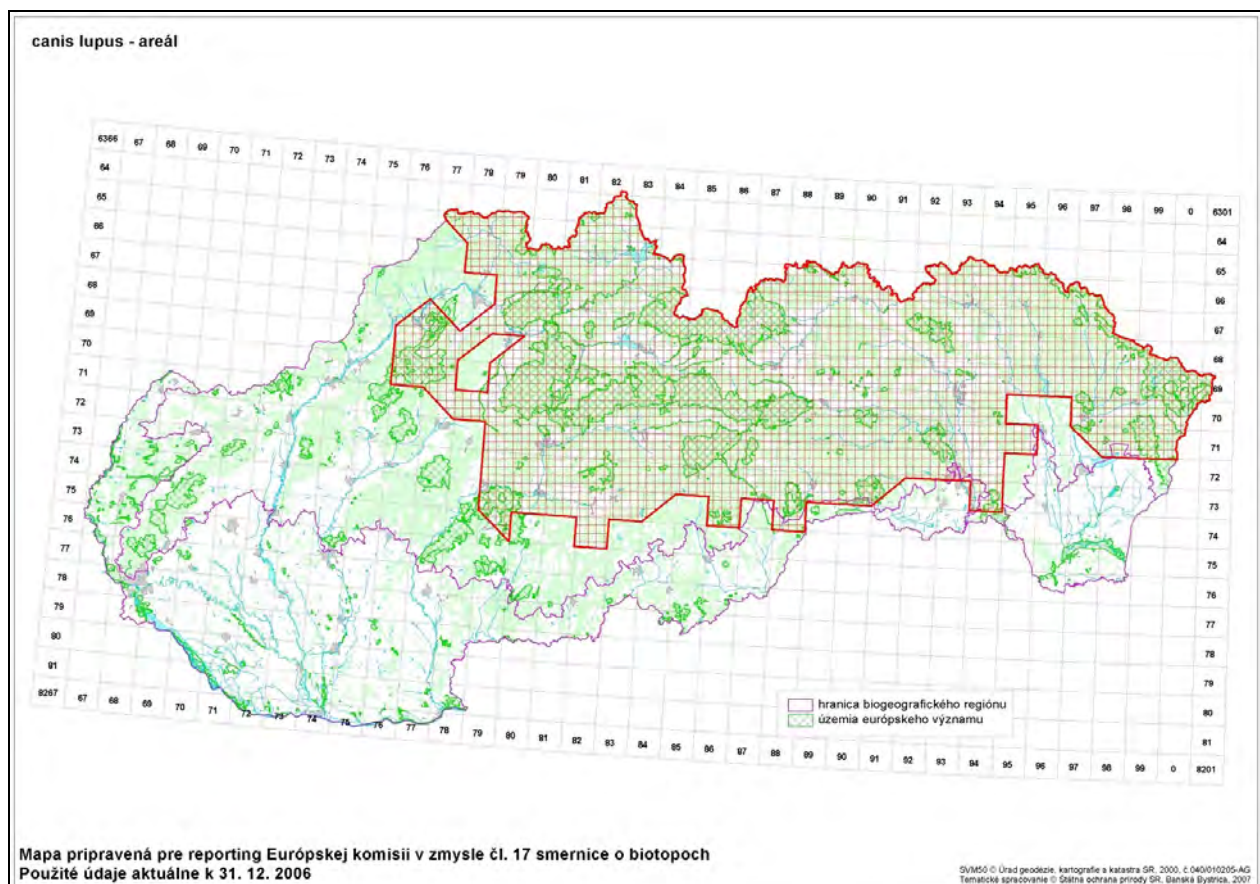


Fig. 3. Wolf distribution in Slovakia (red hatching) and Natura 2000 sites (dark green) as reported by the State Nature Conservancy to the European Commission in 2007 (Source: SNC).



Fig. 4 (left). Wolf distribution in Slovakia is closely linked to forest cover (Photo: R. Rigg).

Fig. 5 (right). Typical wolf habitats in central Slovakia (Photo: R. Rigg).

On a broad scale, the current distribution is closely linked to forest cover in mountain areas (Figs. 3–4). On a finer scale, wolves use a wide variety of habitats from sub-montane field-meadow-forest mosaics to sub-alpine and alpine vegetation zones (Fig. 5). The most important indirect threat to the wolf population, as well as other mammalian species, is the loss, degradation and fragmentation of suitable habitat due to rapid development of the road network and other infrastructure.

Predator-prey relations

Wild ungulates constitute more than 90% of biomass consumed by wolves in Slovakia (Find'o 2002a, Rigg 2004). The main prey species is the red deer (*Cervus elaphus*), followed by wild boar (*Sus scrofa*) and roe deer (*Capreolus capreolus*). The proportion of wild boar in the diet is higher in periods of snow cover and this species is the principle food item in some areas of eastern Slovakia. Livestock accounts for less than 5% of the spring–autumn diet. Wolves occasionally take smaller species such as hare (*Lepus europaeus*), voles and mice, as well as carnivores including the fox (*Vulpes vulpes*), badger (*Meles meles*) and domestic dog.

In 1994–2002, two wolf packs in the Western Carpathians were studied using radio-telemetry. A pack of 7 in the Tatras National Park used a home range of 146 km² and a pack of 5 in the Nízke Tatry used an area of 191 km² (MCP 100%). The nuclei of the wolves' main activity were situated in areas where red deer aggregated, e.g. winter yards, at lower elevations, especially around feeding stations (Find'o and Chovancová 2004).

Long-term research has been focused on landscape use and anti-predatory behaviour of red deer in the mountains of central Slovakia. Here, red deer share habitat with not only the wolf but also the bear and lynx. A total of 21 red deer (13 males and 8 females) have been radio-collared so far (Find'o 2002b). As in other mountainous areas, many individuals migrate between winter yards and summer grazing areas at timberline and on alpine meadows. A minority of the population is sedentary. Home range sizes were found to be 77–87 km² for migratory individuals and 5–13 km² for sedentary individuals. Research on anti-predatory

behaviour is ongoing.

In the 1990s, an epidemic of classical swine fever broke out in the free-living wild boar population and domestic breeds of pigs. Piglets and sub-adult individuals less than 1.5 years old (84% and 95% respectively) are most susceptible to this serious infectious disease. The epidemic caused major economic losses in domestic pig breeds and resulted in a decline in wild boar numbers in large parts of the country. Data reported monthly by the State Veterinary Institute indicate that, in areas where wolves and wild boar share the habitat, classical swine fever either did not occur at all or the centre of infection soon disappeared (Fig. 6). As wolves most often prey on piglets and yearlings, i.e. the age cohorts most liable to infection, it has been proposed that they limit the spread of the epidemic by eliminating infected individuals (Strnádová 2000, Findo 2002).

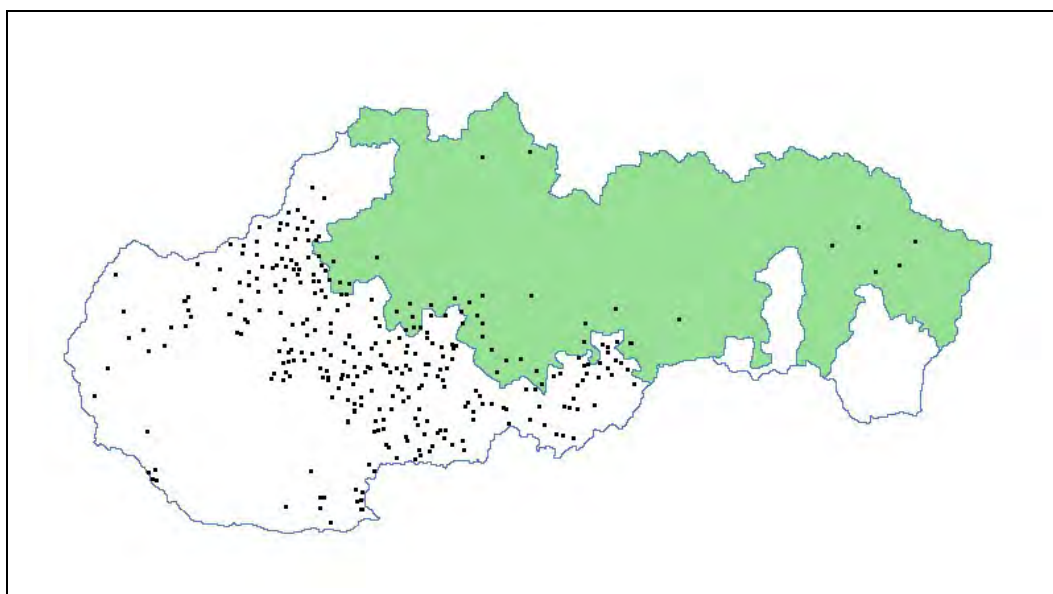


Fig. 6. Locations of confirmed classical swine fever infections in wild boar (black dots) and wolf distribution in Slovakia (green shading) in 1994–2003 (Source: redrawn from Strnádová 2000 with more recent data added).

Conflict mitigation

The proportion of livestock in the diet of wolves is small, but attacks on livestock, especially sheep, are quite common during the grazing season. Although only a small minority of farms suffer significant problems, losses can be high locally, especially where preventive measures are insufficient (Fig. 7). Farms with well-raised and correctly used livestock guarding dogs tend to report significantly fewer losses than other nearby farms and have not suffered from surplus killing (Rigg and Gorman 2006). Compensation for damage caused by wolves has been available since 2003 but farmers and shepherds still tend to have the most negative attitudes (Wechselberger *et al.* 2005).

The most widespread method used to protect flocks on summer pastures is chaining up dogs in the vicinity of a mobile sheepfold, with shepherds sleeping in a trailer or cabin nearby. This system often fails to ward off predators. Thus the Carpathian and Slovak

Wildlife Societies launched the Protection of Livestock and Conservation of Large Carnivores project to revive the traditional use of livestock guarding dogs (LGDs). During the period 2000–04 a total of 67 pups (mostly Slovensky Čuvač and Caucasian Shepherd Dogs) were given to shepherds at selected farms, who were provided with information and assistance in raising them to be attentive to livestock, trustworthy and protective. LGDs were considered the best method, as dogs have been used traditionally in Slovakia and are still widely available. Their presence with flocks also provides the potential for continuous protection, which is important as, unlike bears, wolves often attack flocks when they are grazing on pastures during the day.

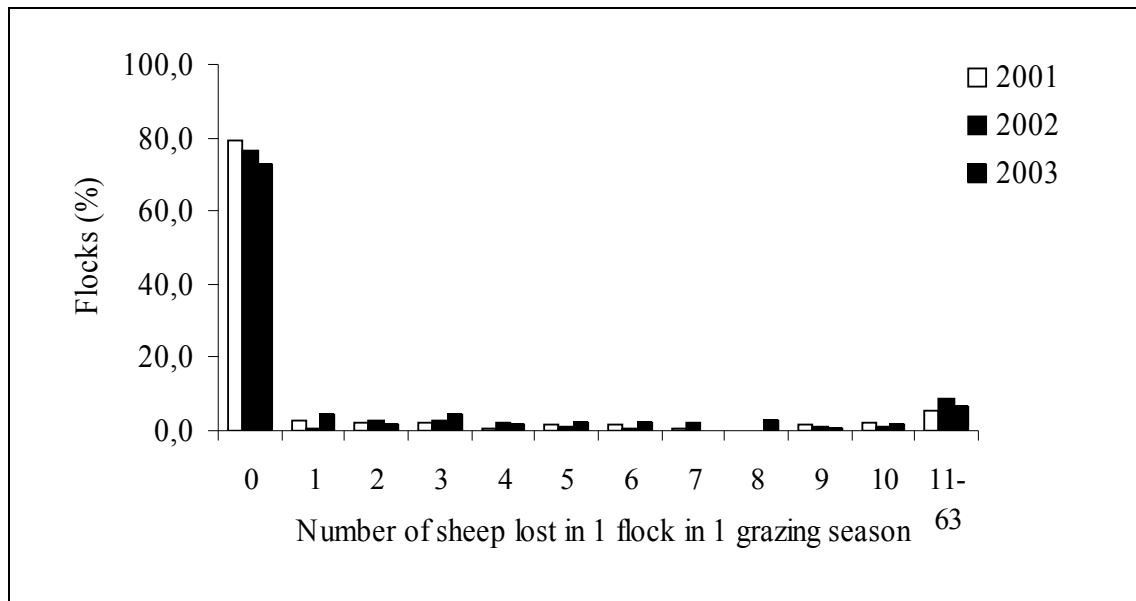


Fig. 7. Most sheep flocks are largely unaffected by wolf predation. However, a small minority lose more than 10 sheep to wolves in a year, accounting for the majority of all losses and resulting in negative publicity for the wolf (Source: Rigg 2004, Rigg and Gorman 2006).

Many unforeseen difficulties were encountered, including alcoholism and negligence of shepherds, bankruptcy of farms, hunters shooting dogs and farm visitors provoking them with inappropriate behaviour, resulting in shepherds chaining up dogs. Nevertheless, several dogs were raised successfully and regularly accompanied flocks. The maximum total loss reported at trial flocks with free-ranging, sheep-socialised LGDs was only 14% of that among control flocks in the same regions (Rigg 2004).

During the project, contact was established with around 300 farmers by site visits as well as written questionnaires and telephone surveys. This was beneficial for both sides, as farmers provided information about predation on their livestock whilst receiving guidelines on how to raise LGDs. The aim was to encourage a gradual revival of this traditional method among stockmen grazing their flocks in areas with large carnivores. This has happened in some cases, though not yet to the extent that was hoped.

Legal status: species and habitat protection

According to national hunting legislation, the wolf is a game species. In 1995–99 there was an attempt to introduce year-round protection, but this was rejected by hunters and subsequently an open hunting season has been set from 1st November to 15th January with no quota. In national legislation on nature protection, the wolf is a partly protected species of European importance with a closed season from 16th January to 31st October. It is included in the Red List of mammals of Slovakia as LR:nt (Low Risk: near threatened).

Slovakia is a signatory to the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention), Annex II of which includes the wolf as a strictly protected species. However, Slovakia made a reservation for the wolf and brown bear, reasoning that, *“the present level of their population in the Slovak Republic permits the regulation of their numbers without detriment to their survival and to the functions of these species in the natural ecosystems.”*

Slovakia has been a member of the European Union since May 2004 and is therefore bound by EU legislation. This includes Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (the Habitats Directive), which lists the wolf in Annex II (species of Community interest whose conservation requires the designation of special areas) and Annex IV (species in need of strict protection). Slovakia has a derogation allowing hunting.

In its manual for a programme of care of Natura 2000 sites and species (Polák and Saxa 2005), the State Nature Conservancy of the Slovak Republic (SNC) has defined favourable conservation status for the wolf in Slovakia as at least 300 individuals at a density of 1.5–3.0 ind./100 km² in main habitats, with an average pack size of at least 4–6 individuals.

The national list of proposed Natura 2000 sites of Community importance prepared as part of the implementation of the Habitats Directive in Slovakia includes 72 sites identified for wolf protection covering a total area of c.4,300 km². Several core areas of wolf occurrence are included, such as the Tatras, Low Tatras, Veľká Fatra, Malá Fatra, Muránska planina and Beskyd. However, connectivity of protected areas is not necessarily ensured by the Natura 2000 network. Habitat fragmentation may be an important concern in the future due to increased traffic volume and enlargement of the transport network as well as residential, recreational and industrial development. Considering the distributions of eight target species, including the wolf, 32 road segments, together comprising 42% of the country's 659 km of motorways and 49% of the 1,108 km of dual carriageways, have been identified by researchers as critically important in relation to habitat fragmentation and traffic accidents (Findo *et al.* 2007).

Population size and hunter harvest

It is widely acknowledged that official game statistics (Fig. 1) over-estimate the number of large carnivores, primarily due to the same individuals being counted in more than one hunting ground. In addition, official numbers of hunted wolves reported by the Ministry of Agriculture under-estimate total human-caused mortality, because they do not include

poached animals or all those hit by vehicles. Other estimates of population size are usually either restricted to individual protected areas or are based on expert opinion, lacking clear and objective methodology.

Since 2005, the Slovakia Wolf Census Project has aimed to produce estimates of population size that are national in scope but verifiable locally (Rigg 2007). Four different quantitative methods have been used: 1) mapping the distribution and size of wolf packs; 2) extrapolating from estimated winter mortality; 3) recalibrating game statistics from tracking in model areas; and 4) extrapolating from densities observed in model areas. Using these methods, it was estimated that in 2005–06 there were c.270–405 wolves in autumn and c.166–255 wolves in spring living wholly or partially in Slovakia (Tab. 1). Around 40% of packs had trans-border territories, which shows the importance of international cooperation to prepare management plans at the population level.

Combining the results of the Slovakia Wolf Census Project with an annual survey of wolves and lynx in Poland coordinated by the Mammal Research Institute of the Polish Academy of Sciences suggests that the average of 88 individuals shot legally per annum in Slovakia represents c.20% of all wolves in the Czech Republic, Slovakia and the Polish Carpathians (Rigg 2007). This is lower than estimates of mortality rates likely to achieve population control or sustainable harvest (cf. Fuller *et al.* 2003). However, the population is also subject to illegal killing in Slovakia as well as in Poland, where it has been asserted (Okarma 2005) that illegal killing has prevented population growth, despite a complete ban on hunting since 1998.

Method	Estimated number of wolves		
	Autumn	Winter	Spring
1. Mapping wolf pack territories	234–384	234	84–234
2. Extrapolating from winter mortality	270–405	-	170–255
3. Recalibrating official game statistics	-	-	166–233
4. Extrapolating from model area density	-	308	-

Tab. 1. *Estimates of the number of wolves in Slovakia in 2005–06 according to the Slovakia Wolf Census Project (Source: Rigg 2007).*

Conclusions and recommendations

Results of the Slovakia Wolf Census Project suggest that the wolf is only at a favourable conservation status in Slovakia as defined by the State Nature Conservancy if pups of the year and wolves shared with neighbouring states are included in population estimates. The very large proportion of wolves shared with neighbouring states emphasises the importance of cross-border cooperation in order to plan management at the population level, as encouraged by several recommendations adopted by the Standing Committee of the Bern Convention.

Taking the whole population in Slovakia, Poland and the Czech Republic into consideration, legal hunting in Slovakia seems to be below the level likely to prevent

population growth. However, the population is also subject to illegal killing which is difficult to quantify but believed to be considerable. Measures should be taken to ensure that hunting pressure is not allowed to increase, that core habitats, connectivity and prey supplies are preserved and conflicts with human interests are adequately addressed.

An apparent downward trend in wolf numbers over the last decade emphasises the need for careful, ongoing monitoring. Large disparities between game statistics and tracking surveys show the importance of developing more accurate methods to assess population size. Non-invasive genetic sampling and telemetry could help to improve population estimates by refining measurements of density, home range size and mortality as well as the ability to distinguish reliably between individuals and packs.

There is no doubt that the wolf is a highly controversial and contradictory animal: admired by some people, hated by others. Animosity towards wolves fostered over hundreds of years poses a major obstacle to those striving to increase its acceptance. Clearly, while some useful work has been done, more research is needed to improve scientific knowledge of the wolf in Slovakia. Awareness-raising campaigns, including documentary films and high-quality publications, are very important in improving the image of the species and transmitting knowledge to the public, stakeholders and decision makers. Ultimately, it is these groups who will determine the future of the wolf in Slovakia.

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