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Authors: Salvatori, Valeria, Okarma, Henryk, Ionescu, Ovidiu, Dovhanych, Yaroslav, Find'o, Slavomir, et al.

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Hunting legislation in the Carpathian Mountains: implications for the conservation and management of large carnivores

Valeria Salvatori, Henryk Okarma, Ovidiu Ionescu, Yaroslav Dovhanych, Slavomir Find'o & Luigi Boitani

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The importance of conserving wild populations of large carnivores in balance with local human interests has been recognised throughout the world. However, diverse human activities are in potential conflict with the conservation of large carnivore species. We discuss the role that hunters have in the management of three large carnivore species, the brown bear *Ursus arctos*, the Eurasian lynx *Lynx lynx* and the wolf *Canis lupus* in the Carpathian Mountains in central Europe. We considered four different countries (i.e. Poland, Slovakia, Ukraine and Romania), comparing the status of large carnivore populations and the regulations of hunting activities. The situation appears to be generally consistent throughout the Carpathian region, although the degree of protection accorded to wolf varies most. Interactions between large carnivores and hunters are well rooted in the culture of local communities in the four countries considered. The large forested areas make the Carpathians an excellent environment for large carnivores, which here are favoured by low human population density. We underline the need for integration of hunting activities and scientific knowledge for future management practices.

Key words: Carpathian ecoregion, hunting, integrated management, large carnivores

Valeria Salvatori, Istituto di Ecologia Applicata (IEA), Via Spallanzani 32, IT-00161 Roma, Italy and Department of Geography, University of Southampton, SO17 1BJ Southampton, UK - e-mail: v.salvatori@ieaitaly.org
Henryk Okarma, Institute of Nature Conservation, Mickiewicza 33, PL-31-120 Krakow, Poland - e-mail: okarma@iop.krakow.pl
Ovidiu Ionescu, Institutul de Cercetări şi Amenajări Silvice (ICAS), Sos Stefanesti 128, Sector 2, RO-72904 Bucharest, 11-04 Romania - e-mail: wildcarp@deltanet.ro

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Yaroslav Dovhanych, Carpathian Biosphere Reserve, Rakhiv, P.O. Box 8, UA-90 600 Ukraine - e-mail: ecoclub@rakhiv.ukrtel.net
Slavomir Find'o, Carpathian Wildlife Society, Tulska 29, SK-960 01 Zvolen, Slovakia - e-mail: sfindo@pobox.sk
Luigi Boitani, Department of Human and Animal Biology, University of Rome 'La Sapienza', Viale dell' Università 32, IT-00185 Roma, Italy - e-mail: luigi.boitani@uniroma1.it

Corresponding author: Valeria Salvatori

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The conservation of large carnivores (LC) poses serious problems because their needs conflict with those of local agriculture; they compete with humans for space and interfere with the pastoral economy (Kaczensky 1996). Furthermore, their predatory nature puts them in competition with hunters for wild prey. This conflict is most severe in areas where the local economy is mainly based upon agriculture and exploitation of natural resources. It involves groups whose different interests are difficult if not impossible to reconcile. In some areas, a new vision of wildlife conservation that takes into consideration the interests of local communities is becoming widely accepted and successfully applied (Clark, Mattson, Reading & Miller 2001, Jacobson & Duff 1998).

In western Europe, LC populations have been reduced considerably since World War II, and have disappeared completely in some countries (e.g. in the Spanish Pyrenees; Delibes 1990). The areas in Europe where populations of bears *Ursus arctos*, lynx *Lynx lynx* and wolves *Canis lupus* are present in considerable numbers are mainly restricted to eastern European and Scandinavian countries (CLCP 1999, Huber & Roth 1993, Ionescu 1996, Kobler & Adamič 2000, Okarma 1993, Swenson, Sandegren, Bjärvall, Söderberg, Wabakken & Franzén 1994, Swenson, Sandegren & Söderberg 1998, Turyanyn 1975). While Scandinavian countries have a strongly rooted scientific tradition of wildlife research, in the eastern European countries, scientific research activities often have very limited funding. Governmental funds are commonly allocated to other activities as the local economy is struggling to grow to reach the standards imposed by the European Community.

The hunting of wild species has a long tradition in the culture of eastern European people. The hitherto well-maintained populations of wild species do not pose concerns about protection from local extinction, but the adhesion to the Bern Convention and the consideration of local wildlife populations as part of a continuous European population, necessitate controls on the harvest of some species. Hunting activities can be seen as an economic tool as they attract wealthy hunters from western European countries and feed the trophy and fur markets. In addition, they can represent a powerful tool to manage numbers of LC in wild populations. In this paper we review and describe the current hunting legislation and conservation status of LC in countries intersected by the Carpathian Mountains. We then suggest some measures that may be taken in order to ensure an effective management of LC across the Carpathians in the future.

The Carpathian ecoregion

The Carpathians are the second largest chain of mountains in central Europe (after the Alps) and certainly the largest in central-eastern Europe. They spread from the Danube River area of Slovakia, northwest of the capital city of Bratislava, to the Iron Gate on the Romanian Danube at their southeastern end (Voloscuk 1999), covering an area of approximately 160,000 km^2 (this estimate does not include the Transylvania Plane). Relatively low human population densities, difficult access to many mountain ranges, and a considerable number of large forests have allowed a rich and diverse fauna to exist in the Carpathians, including large populations of LC.

The mountain complex is divided among seven countries: Austria, the Czech Republic, Slovakia, Poland, Hungary, Ukraine and Romania (Witkowski 1999). In this paper we focus only on countries that contain at least 10% of the Carpathians within their territory, consid-

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ering that smaller areas at the boundary of the mountains are not vital for the conservation of the Carpathian LC population. Our discussion is thus limited to Poland, Slovakia, Ukraine and Romania, which all together contain 90% of the Carpathian chain.

Hunting legislation in the Carpathians

Although the Carpathians extend across different countries, these have relatively similar historical backgrounds with respect to hunting legislation. The hunting tradition in Poland, Slovakia, Ukraine and Romania is deeply rooted in the culture of local people, and hunting activities are regulated by structured legislation. The majority of the forested territory (up to 80%) of Poland, Slovakia, Ukraine and Romania belongs to the respective States, and so does the wildlife that lives in the forests. The territory of each country is divided into hunting management units, called hunting grounds (HG), which cover different areas in different countries (area ranging within 2,500-10,000 ha), but the approaches to their management are consistent across the ecoregion (Table 1).

The management of HG is regulated by plans usually produced by non-governmental management bodies. In some cases a consultation with the forestry inspectorate takes place, e.g. in Poland. Hunting permits are issued by the managers of the HG (see Table 1 for a list of institutions that manage the HG). Different permits are issued for hunting game and trophy animals. Game hunting permits must be bought in all countries except Poland. In Poland, members of hunting clubs can hunt free of charge up to the quota they have been allocated by the HG managers, and they are obliged to deliver the harvested game to the HG managers who reimburse them for hunting expenses (petrol and equipment maintenance), unless they want to buy the meat at market prices. Permits to hunt in HG administered by State Forestry must be bought. Special permits are issued for the hunting of trophy animals.

Hunting quotas for each game species are established yearly on the basis of density estimates produced by HG managers. Regulations on the methodology to be followed for producing such estimates state that track recording on snow and direct sightings should be collected during winter and spring every year. As a matter of fact, such methods are used very seldom in a systematic way, as deep snow and few available people make the task impossible. No systematic surveys are carried out in Ukraine, where sightings of individuals or tracks are reported in a haphazard manner throughout the year. Only in Romania and Slovakia do the recommended quotas need to be approved by central or local offices of the statutory body.

Large carnivores in the Carpathians

The Carpathian population of LC is the largest in Europe, despite the fact that the Carpathian ecoregion covers an area not larger than 1% of Europe. The Carpathian bear, lynx and wolf populations represent around 14, 35 and 30% of European populations, respectively (estimates calculated from data in Boitani (2000), Breitenmoser, Breitenmoser-Würsten, Okarma, Kaphegyi, Kaphygyi-Wallmann & Müller (2000), and Swenson, Gerstl, Dahle & Zedrosser (2000)). These estimates include European Russia.

The current legal status of the three species of LC in the Carpathian countries is reported in Table 2, together with estimated population sizes for Poland and Ukraine (in 1999) and Slovakia and Romania (in 2000). The official estimates are considered to be inaccurate

Table 1. Hunting legislation in four countries in the Carpathian Mountains; statutory bodies and laws regulating hunting activities, together with proportions of hunting grounds (HG) managed by the various bodies.

Country	Proportion of the Carpathians	Statutory body	Law no	HG management	
Slovakia	22%	Ministry of Agriculture	99/1993, 172/1975	14%	Ministry of Agriculture
				86%	Non government owners (e.g. church, municipalites, hunting clubs)
Poland	12%	Ministry of Environment	147 (13/10/95)	7%	State Forest Administration
				92%	Hunting clubs
				1%	Research Institute
Ukraine	13%	Ministry of Ecological Safety	1478-III (22/02/2000)	13.9%	State Forest Administration
				80.5%	Hunting clubs
				3.9%	Research Institutes
				1. 7%	Ministry of Defence
Romania	44%	Ministry of Agriculture, Food Industry and Forestry	103 (23/09/96)	26%	State Forest Administration
				72%	Hunting clubs
				2%	Research institutes

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Table 2. Estimated official and unofficial numbers and conservation status of the three species of large carnivores in the Carpathian Mountains. The estimates reported are official (Offic.) as given by the managers of HG, and unofficial (Unoff.) as modified by local experts, for Poland and Ukraine in 1999 and for Slovakia and Romania in 2000. Conservation status: SP = strictly protected, hunting not allowed at any time of year; P = protected, with special permits being issued for cases of 'problem animals'; PP = partially protected, with hunting restricted to specified periods of the year; NP = not protected, hunting permitted all year round.

	Bear			Lynx			Wolf		
	Number			Number			Number		
Country	Offic.	Unoff.	Status	Offic.	Unoff.	Status	Offic.	Unoff.	Status
Slovakia	1467	600	PP	1037	200	SP	1281	300	PP
Poland	100	100	SP	250	150	SP	450	250	SP
Ukraine	400	300	P	300	300	SP	400	300	NP
Romania	5800	5000	P	2600	1700	PP	3600	3000	P

by most of the local researchers we consulted. They consider the track counting conducted at HG level to not account for animals that range across more than one HG. Thus, there is a risk of double-counting and overestimating the real numbers. The numbers reported in Table 2 show the estimates provided by HG managers (official estimates) and by local experts (unofficial estimates). The unofficial estimates have been produced considering biological information (i.e. average home range size) on local populations and direct field experience.

The legal conservation status of some LC has been established only very recently. All four countries have signed the Bern Convention, which stimulates the conservation of European LC populations, but effective legislation for the protection of LC has been adapted to local situations (Hell & Find'o 1999, Okarma 1993). The species are strictly protected only in some countries, where compensation for the damage they cause is offered by conservation agencies. Compensation is paid in Poland for any proven damage caused by any of the three carnivore species; in Slovakia it is offered only for damage caused by bear to domestic livestock and beehives, and not to agricultural crops or fruits. No compensation is offered in Ukraine or Romania.

Although the mountainous areas extend over large areas, the extent of occurrence (EO) of each species covers only part of the mountain range. After consulting with local researchers, we produced a sketch map of the EO for each species, which was used for estimating densities of LC in the four countries. The EO was validated using presence/absence data from the annual censuses carried out by HG managers. The density of each species in the four countries as calculated using the population estimates suggested by the local experts is shown in Figure 1.

The particularly high bear density in Romania is due to historical events, especially the restriction imposed by the communist dictator Nicolae Ceauşescu, who accorded bears total protection in order to have exclusive access to trophies in the late 1970s (Crişan 1994). During the dictatorship, feeding of bears started and the population reached very high levels. Romanian bears currently feed on garbage where locally available. The population can sustain hunting, and sport hunting from foreign hunters may represent a significant source of income for game managers. The income from trophy hunting goes directly to the HG managers (who, in some cases, represent the main population of small villages). The source of income is ungulate trophies (e.g. red deer *Cervus elaphus*, roe deer *Capreolus capreolus* and wild boar *Sus scrofa*) in Slovakia and Poland rather than LC. Foreign hunters usually pay a double fee for trophy hunting, which may represent a considerable source of income that is almost entirely invested in artificial feeding of game species. Bear hunting in Slovakia is restricted to young individuals, as the population is skewed towards young age classes and requires special permits issued by the Slovak Environment Agency and valid only for the period November to March. In

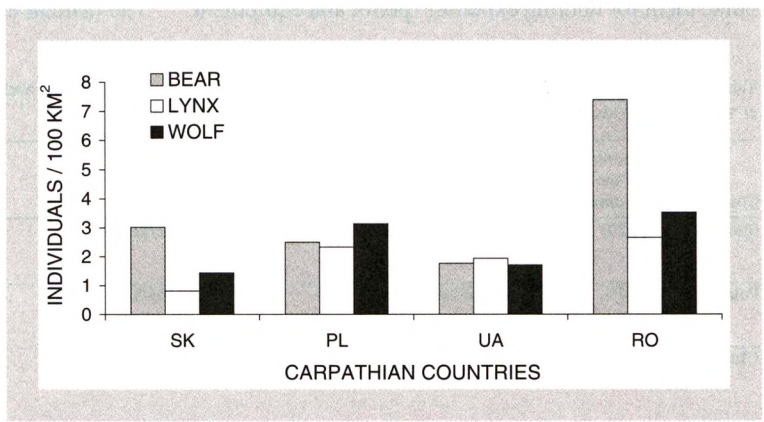

Figure 1. Densities of bear, lynx and wolf within occupied areas in four Carpathian countries (SK = Slovakia, PL = Poland, UA = Ukraine, RO = Romania) as calculated from population estimates provided by local experts.

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Poland and Ukraine the bear is strictly protected, and hunting is only possible on rare occasions when 'problem animals' need to be removed. In Romania, 102 bears were reported to have been killed by hunters in 1999. In Slovakia, 31 bears were killed in 2000, whereas no reported numbers are available for Poland and Ukraine. Damage caused by bears to beehives can be significant in Slovakia where rural economy is vital for the small communities.

The elusive behaviour of the lynx makes it a very difficult species to hunt. In Romania and Ukraine it attracts little interest from the hunters as its trophy is not as highly rated as the bear's, whereas in Poland its trophy is considered to be very valuable, and it is heavily poached. In Slovakia, it is strictly protected and legal hunting does not occur, although poaching may be considerable. The lynx rarely causes damage to livestock. For these reasons, lynx in the Carpathians is not systematically persecuted, although illegally hunted, and is consistently protected across the four countries. Romania allows hunting of lynx only in autumn and winter (15 September - 31 March). The main threats to lynx populations may be human-induced habitat modification, poaching and decline of natural prey (roe deer and chamois *Rupicapra rupicapra*) due to overharvest. In 1999, lynx hunting in Romania amounted to 72 individuals, none were reported in Poland and Ukraine, but four special permits were issued in Slovakia. Damage to livestock caused by lynx is generally very low, but its impact on the populations of roe deer can sometimes cause conflicts with hunters, who apply for permits to kill lynx.

Wolves are legally considered to be game species across the Carpathians, with the exception of Poland. In Slovakia, wolves can be hunted during 1 November - 15 January. In Ukraine, wolves can be hunted with no restriction and sometimes bounties are offered by hunting clubs, whereas in Romania wolf hunting is allowed only for removal of 'problem animals' in areas where conflicts with human activities are particularly acute. In Romania a total of 202 wolves were legally killed in 1999, and in Slovakia 118 were killed in 2000; no numbers were reported for the other countries. Damage to livestock caused by wolf are considered to be significant. No figures are available as no compensation is offered in most countries, but local communities usually claim that the impact on flocks of cooperative farms can be very destructive where no economic means are available for maintaining trained guarding dogs (e.g. Ukraine).

Discussion

The populations of LC in the Carpathians show homogeneous characteristics across the four different countries. The population densities are within the limits of values reported for other European countries for the same species (Boitani 2000, Breitenmoser et al. 2000, Swenson et al. 2000). Despite the existence of some differences in management policies across the four countries considered here, the approach is overall consistent. The adhesion of the Carpathian countries to the Bern Convention represents a substantial basis upon which the legislation regulating the management of LC can be developed with a pan-European approach. The LC in the Carpathians have the opportunity to exist at high densities, in an environment with relatively few human impacts and in co-existence with humans. These conditions are extremely valuable and rarely met in other European countries.

The socio-economic background of the Carpathian countries has played a determining role in the conservation of LC, although actions have not always been taken with predetermined and ecologically sound goals. The Carpathian LC underwent a drastic reduction prior to World War II. The lack of persecution during the war, the social unrest and the communist rule that followed in Poland, Slovakia, Ukraine and Romania granted protection to LC to a certain extent, by not allowing uncontrolled habitat destruction and land privatisation. This caused the LC densities to reach their highest peaks in the mid-1900s when a general campaign to control wolves was adopted by Poland, Slovakia, Romania and Ukraine. Damage to livestock was the main force driving the hatred for wolves in the Carpathians (Perzanowski 1992). Bears were also persecuted for causing damage to livestock and agriculture (Georgescu 1995), although they were given protection in Poland immediately after the war. Lynx were hunted mainly for trophies. It was not until the last decades of the 1900s that environmentalists, scientists and NGOs were given freedom of expression and began to pressure the governments of Poland and Slovakia to impose protection to LC. Although the conservation status has changed various times through the years, ranging from full protection to no protection, this has allowed the recovery of LC in such countries, particularly in the Carpathian Mountain range where human population densities are lower than in the rest of the country (this applies particularly to Poland). The protection of bears in Romania was very effective during Ceauşescu's dictatorship. The policy was not particularly aimed at a thoughtful management of wild species, but rather at producing the

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largest trophies possible for international hunting exhibitions (Crişan 1994). The restriction of hunting activities and protection of forests and main prey species of the LC permitted the growth of healthy and abundant LC populations in the Romanian Carpathians. Local people relying on rural products for subsistence had to cope with the presence of LC and the threat they posed to livestock without being allowed to hunt them. Thus, a culture of tolerance for the presence of LC developed, with adoption of measures for preventing LC attacks on livestock that are still in use. These are the use of trained guarding dogs, active guarding of flocks by professional shepherds, and the use of nighttime enclosures (Mertens & Promberger in press). This situation is not consistent throughout the whole Carpathians. In western Slovakia and some parts of southern Poland, where LC were locally extinct in the past, their return was problematic as local communities had lost the habit of protecting livestock and beehives. Damage to livestock and agriculture is still suffered and claims are seldom put forward. As an example, in Slovakia it has been reported that LC killed a total of 168 sheep and goats in 2000. This is only a partial figure as no information about non-compensated damage is available. In Ukraine, no economic resources are available to maintain trained guarding dogs. In a situation where the local economy is heavily based on agriculture and pastoralism, great losses to livestock and beehives can be of significant importance if no preventive measures are used. In some areas the culture of preventive actions needs to be encouraged.

The division of the countries' territory into HG shows how important hunting activities have been in the past and still are at present. The decentralisation of management has the advantage of giving responsibility to local people, who directly take advantage of the quality of the environment and its game. Fine-scale control over national property was a priority during the communist rule, and the heritage left to the current generations is a well-structured system of regulation. Unfortunately, in the majority of cases, this structure is well designed only in theory, as in practice the control over illegal hunting is extremely inefficient (Hunchack 1999). Nevertheless, the revenue generated by hunters and HG managers has stimulated them to make an effort to maintain healthy game populations to ensure fruitful future hunting seasons. This is particularly true for post-communist times when the revenue from hunting is effectively allocated to local HG managers and the hunts are open to foreign hunters at high prices (bear trophy hunting can cost up to EUR 12,000 in Romania).

The management of game species has an active character in the Carpathians, as shown by the setting of annual hunting quotas based on population estimates produced by local personnel of the HG management bodies. In spite of the theoretical robustness of such management actions, the whole process is greatly weakened by the considerable unreliability and inaccuracy of such estimates. Where guidelines exist for the estimation of game abundance, they are seldom followed. Errors in the estimates of LC are amplified by the use of large areas by such species, leading to a danger of double-counting when home ranges cross HG boundaries (Voskár 1993). In terms of hunting quotas, such inaccuracy is often reflected in overestimates of LC populations that subsequently risk being overharvested.

The strict legislation regulating hunting activities, such as payment of permits and hunting quotas, do offer valuable opportunities for the long-term conservation of LC in the Carpathians. Notwithstanding this potential, regulation of hunting activities is highly monopolised by hunting clubs (the majority of the Carpathian territory is managed by hunting clubs; see Table 1) and the law enforcement process is often unsuccessful as officers do not consider illegal hunting as a social offence.

The consistency of hunting legislation and game management throughout the different countries is remarkable, and it certainly offers an opportunity for coordinating international management of LC. The Carpathian ecoregion is homogeneous not only in ecological terms but also, to a certain extent, socio-politically. The attitudes towards LC are consistent, in that lynx are fully protected and generally ignored by local communities, bears are fully or partially protected and tolerated (and feared) by local people, whilst wolves are generally disregarded and sometimes not protected at all (i.e. Ukraine; Okarma 2001). This homogeneity can be considered as an advantage over other areas where LC populations are distributed across national boundaries. One clear example is the Alps ecoregion where LC are present and their conservation is strongly threatened by lack of tolerance and policy inconsistencies (Kaczensky 1996). The main problems in the Alps seem to be the impossibility to control heavy illegal killing and the great human impact on the land. Fragmentation of habitat and dense human population sharpen the conflicts between LC and humans, stimulating the adoption of extreme measures such as removal of LC.

The main constraint on management of LC posed by hunting and conservation policies in the Carpathians is the noticeable lack of scientific involvement. Research funds are virtually non-existent and the few ongoing scientific projects rely on international financial support (e.g. the World Bank, the EU and WWF International).

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With the exception of Poland where research projects are carried out by the Polish Academy of Science and the Jagiellonian University of Kraków, this situation gives cause for concern. Scientific knowledge and understanding are required for the eventual development of management plans to be implemented by the Carpathian countries. An example of how a scientific contribution is required is the inaccuracy of the LC population density estimates. These are not carried out in a standardised manner, and sometimes they are only based on previous years' harvests, making the proposed hunting quotas highly unreliable for the maintenance of a sustainable harvest. A higher level of integration between hunting clubs and wildlife scientists is doubtless required. To a certain extent, this can be achieved relatively easily in the Carpathian countries where the hunting clubs have such a strong interest in maintaining the LC population (particularly bear) because it represents a source of income.

The management of natural resources in general is an urgent and practical matter that needs to be uncoupled from the heavy bureaucracy that characterises ex-socialist countries. Although hunting activities should be coordinated at the national level, local situations can be variable enough to require decentralised flexibility in order to cope with specific situations. This flexibility is presently offered by the HG management system. Finally, a more effective system of controlling illegal hunting and checking legal hunting must be enforced both at local and national levels.

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