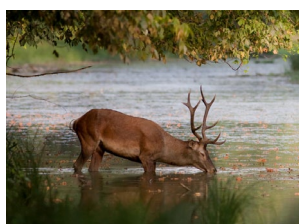
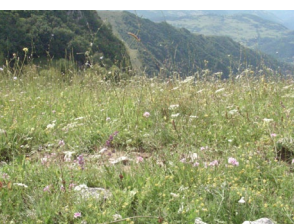
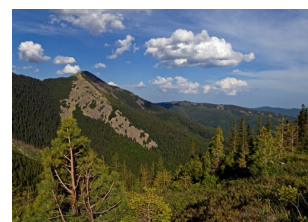
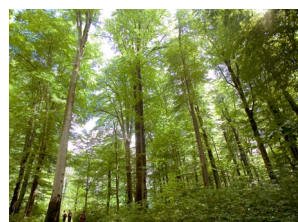
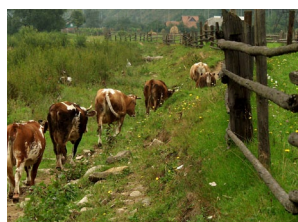
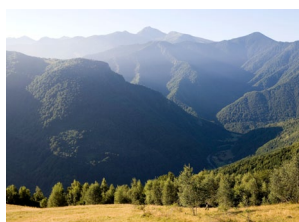
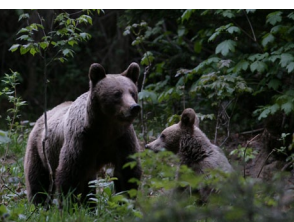


DEVELOPMENT OF COMMON INTEGRATED MANAGEMENT MEASURES FOR KEY NATURAL ASSETS IN THE CARPATHIANS



'Integrated Management of Biological and Landscape Diversity for Sustainable Regional Development and Ecological Connectivity in the Carpathians'

(ETC Programme South East Europe, Project: BioREGIO Carpathians,
Eol Reference number: SEE/B/0010/2.3/X, Work Package 4)



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DEVELOPMENT OF COMMON INTEGRATED MANAGEMENT MEASURES FOR KEY NATURAL ASSETS IN THE CARPATHIANS

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5. LARGE MAMMALS IN THE CARPATHIANS

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Picture 25: Chamois in Retezat National Park, Romania (photo: WWF)

5.1. OVERVIEW

The Carpathians are one of the strongholds of large carnivores in Europe, where the density of bears, wolves and lynxes is among the highest in the world (Zibordi *et al.* 2012), serving as an important reservoir of large carnivores for the continent (Breitenmoser *et al.* 2000). It has been estimated that the pan-Carpathian populations of brown bear, wolf and Eurasian lynx still exist in considerable numbers (7,000, 4,000, and 2,400 individuals, respectively). Generally, Romania and Slovakia have the largest populations, Poland and Ukraine moderate numbers, while the Czech Republic, Serbia (Paunovic *et al.* 2007; Cirovic *et al.* 2007; Milenkovic *et al.* 2007) and Hungary have only small numbers of individuals (Okarma *et al.* 2000).

Large herbivores are key species in the web of life, many of whose survival is closely linked to the presence of large herbivores. Red and roe deer are today among the most common European ungulates, and are the most important game species. The European bison is an ungulates that nearly became extinct, which is not recovering, but which may still be in a vulnerable status due to its limited gene pool (Linnell and Zachos 2011). Based on advice and assessment by bison experts (members of the IUCN Bison Specialist Group) in the Large Herbivore Foundation network, it was decided to nominate the Carpathian Mountains as a hotspot for bison conservation and restoration.

As well as having a significant ecological role, large carnivores and herbivores are important indicator species for the quality and the quantity of natural and the human-disturbed habitats. The basis of successful management (both protection and harvest) should be the zoological knowledge (habitat use, feeding habits, population dynamics etc.) and the monitoring of the target species' populations, which should be the best indicator of the results of protection and management activities.

The study and its recommendations are based on three main data sources

- Questionnaires circulated to experts across the region.⁶
- Results of stakeholder consultation meetings held in Hungary, Romania, Slovakia and Serbia.
- A review of relevant literature.

5.1.1. WOLF (*CANIS LUPUS*)



Picture 26: Wolf (photo: WWF)

⁶ Full details of the questionnaires and methods used may be obtained from the authors.

Zoological background

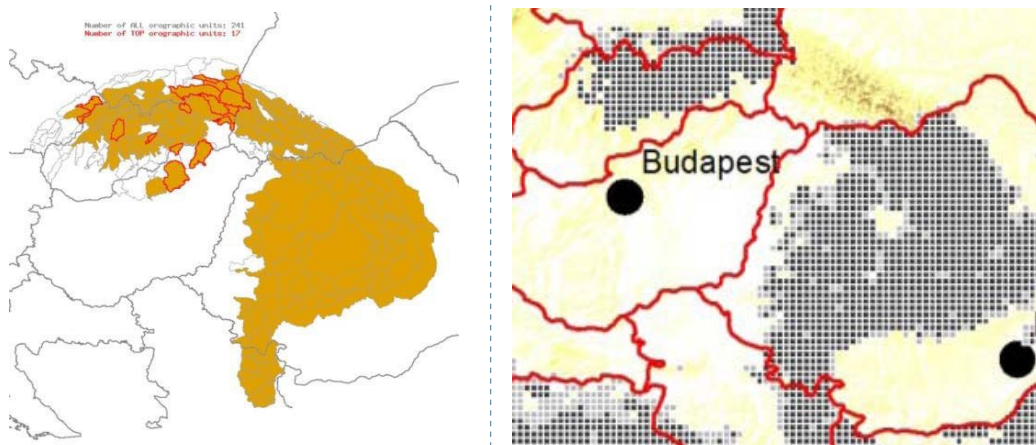
Wolves normally live in packs, which comprise family groups in the wild or instead, alone as individual animals for around 10 years. As a top carnivore, the wolf plays a significant selective role in the food web. Their main diet is large ungulates (red deer, roe deer and wild boar), but they also eat smaller prey items, livestock, carrion and garbage. Food composition depends on the density of the wolf population, on the habitat, on food availability and on the time of year. Although they can live in diverse habitats, wolves in the Carpathians tend to prefer large closed forests to exposed open areas.

Wolves are territorial and each pack actively defends its territory from animals in neighbouring packs. Territory size varies greatly, depending on wolf and prey densities, geographical features, human disturbance, and human-related infrastructure. Territories can be between 50 km² and 500 km² for regular activities, and they normally hunt within a circle of 6-10 km radius (Boitani 2000).

Distribution and population trends

The distribution of the wolf in the Carpathians covers the entire mountainous range except the Hungarian part (Map 5), although wolves have also been regularly observed in the north-east part of Hungary, spreading from the Slovak Carpathians. The total number of wolves in geographic Europe may exceed 10,000, with around 4,000-5,000 in the EU-25 countries. The central Carpathian Mountains support one of the healthiest and numerous wolf populations in Europe (LCIE 2007), although estimates of actual numbers vary. Breitenmoser *et al.* (2000) and Okarma *et al.* (2000) estimated the Carpathian population to be 4,000 individuals, the majority of them living in Romania (2,300 to 2,700 individuals) and Ukraine. Slovakia has been estimated to host about 400-500 wolves and the population of the Polish Carpathians has been estimated at 180-220 individuals (LCIE 2007).

The EC large carnivore status report from 2013, estimated a population of 3,000 individuals⁷. Experts contributing to this study estimate the Carpathian wolf population to be about 3,200 individuals (Figure 9), but local stakeholders and managers generally perceive a higher population density. The significant differences among the different estimates of population sizes is, according to our experts' opinion, a result of inadequate monitoring methods and the lack of simple monitoring systems and methods that can be carried out continuously and consistently.



Map 5. Wolf distribution according to CBIS (left) and Kaczensky *et al.* (2013) (right).
Dark cells: permanent occurrence, grey cells: sporadic occurrence.

⁷ http://ec.europa.eu/environment/nature/conservation/species/carnivores/pdf/task_1_part2_species_country_reports.pdf

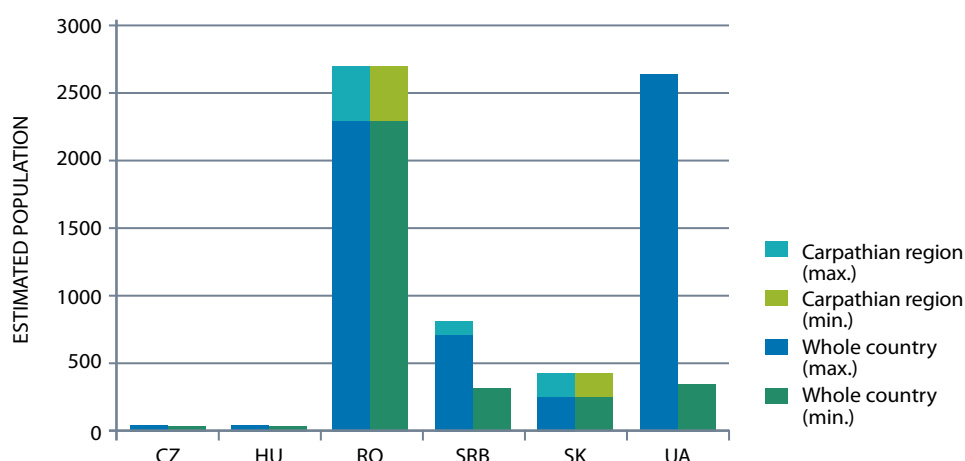


Figure 9. Wolf population abundance estimated by the experts in 2012.

Values

The main ecological value of the species identified by the experts and stakeholders who were consulted is its regulatory effect on the ecosystem. The control and selective effect of the wolf can be a significant factor in both keeping the size of the prey population in check and in maintaining its quality. Wolves maintain the stability of the ecosystem and act as a bio-indicator of the quality of that area. The wolf is also an umbrella species whose presence can lead to an overall increase in biodiversity. Control of herbivores by wolves may have a beneficial effect on tree regeneration and forest structural diversity. Wolves are also seen as beneficial by some because they control stray dogs.

The main socio-economic values of wolves are said to be ecotourism and hunting tourism, which can provide income for local people and opportunities for employment. However, opinions vary sharply over whether the species should be hunted at all. What is not disputed, is that wolves have a major symbolic and historic value throughout the region.

Threats

The main threats to wolves are as follows.

Habitat loss and fragmentation: The large habitat requirement of this species is seriously compromised and fragmented by expanding towns and villages, and by the network of roads and railways. Forest management, in particular logging, reduces cover, the transportation of timber requires new roads which further fragment the area and cause increased disturbance. Heavy traffic and associated major disturbance and accidents are particular issues in Hungary and Romania.

Human-wolf conflict: Human intolerance is perhaps the greatest threat facing wolves in Europe today, and conflict between wolves and humans increases with fragmentation and human encroachment on wolf territories. Large and poorly protected sheep herds present an easy and abundant prey for the wolf. Fear, misunderstanding and killing of livestock have given rise to an uneasy relationship with people in many areas, leading to direct conflict and persecution. Illegal killing (through shooting, trapping and poisoning) is reported to be one of the most serious problems, most notably in Hungary and Romania.

However, the local stakeholders consulted in Slovakia thought that the wolf is not threatened in their country, because they have enough food, hunting is regulated and the population is increasing. The Serbian expert and stakeholders were of the same opinion. The Ukrainian expert in our study noted that the species is very ecologically plastic and there are no natural threats to its existence there.

Conservation status

Because of the relatively large number of animals and stable or increasing population, the status of the wolf is Least Concern in the IUCN Global Red List, and also in the European, the EU-25 and the Carpathian regional assessments. The Carpathian wolf population (ca. 3-4,000 animals) appears to be in favourable conservation status, mainly due to the conservation measures implemented in Romania (LCIE 2007).

The wolf is in Annex IV of the EU Habitats Directive (strict protection) as well as in Annex II (conservation of the species requires Natura 2000 sites). It is protected in Poland, and strictly protected in Hungary and the Czech Republic. In Romania wolves are protected, but can be hunted for 6 months of the year under a derogation from the EU Habitats Directive, applicable only where there is proven human animal conflict. Wolves can be hunted all year round in Serbia, during a 5-month season in Ukraine and for only 2.5 months in Slovakia (except in two protected areas along the Hungarian and Czech border, where no hunting is allowed). See Figure 10.

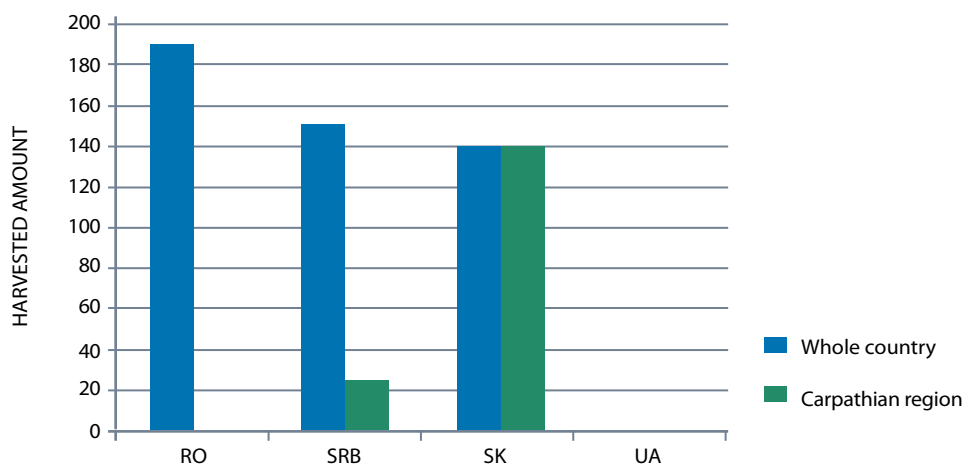


Figure 10. Harvest data for wolves in 2011.

Management plans

Less than half of the countries (HU, SRB) have an approved conservation plan for the wolf. In Serbia there is only at present a 'Strategic Management Plan' as a first step towards a full species Action Plan. In Romania, a management plan for wolves was started in 2006 under the coordination of the Ministry of Environment, but the final document is not accessible to the public. The plan has not been officially adopted by central public authorities and (as far as is known) has not been subject to any monitoring in order to assess the success of conservation measures.

Different stakeholder groups are involved in the planning but in different ways in each country. However, the quality of the conservation plans is reported to differ widely and the overall level of implementation of species conservation plans is very low, even they have been accepted.

According to the responses of the experts in our study, nature conservation planning, game management planning and in some cases the forest management planning (SRB, SK, UA) all take wolf conservation into consideration.

Compensation systems

There is no compensation system in Ukraine, but in Slovakia, the Czech Republic and Romania the state pays for the damage caused by wolves. However, in Romania the complexity of the compensation system is reported to discourage affected people from applying for compensation. In Serbia, game managers are responsible for compensation. A compensation system was established in Hungary during a LIFE project (Silva *et al.* 2013), but the damages are currently not assessed or paid.

Monitoring

Only Serbia lacks a species-specific system for monitoring of wolves. According to our questionnaire, monitoring is mainly based on personal opinion/guesswork instead of scientific methods. In general, governmental organisations are mainly responsible for monitoring, followed by hunters, national parks and NGOs.

5.1.2. LYNX (*LYNX LYNX*)



Picture 27: Two lynxes (photo: WWF)

Zoological background

The lynx is poorly studied and its conservation is targeted in fewer projects than wolves and bears. (Silva *et al.* 2013) It is a mainly solitary, nocturnal forest predator, preferring rocky locations or areas with good forest cover. Lynx territories vary from 100 km² to 1000 km² depending on prey density. Lynx form pairs only during the breeding season in February and March. They prey mainly on wild ungulates such as roe deer and chamois; in areas with low ungulate availability, lagomorphs, birds and rodents are also hunted. (Silva *et al.* 2013; von Arx *et al.* 2004) Predation on livestock in the Carpathians appears to be quite rare, and studies on diet composition do not support the view from the Alps that the main limit on lynx distribution is human-predator conflict due to the widespread attacks on livestock. (Breitenmoser 1998 and 2000, Stahl *et al.* 2001)

Population density depends on habitat quality, and especially on the density of the main prey species. The highest population density occurs in areas where roe deer also exist in higher densities; where the European hare is the main prey species (due to the lack of roe deer), lynx population density is lower. (Mitchel-Jones *et al.* 1999)

Mean distances travelled by lynx per night ranged from 1-45 km. The highest movement activities are observed in males during the mating season. Females with kittens, on the other hand, usually travel over short distances. When a lynx has a fresh kill, it stays in its proximity for several days. (von Arx *et al.* 2004)

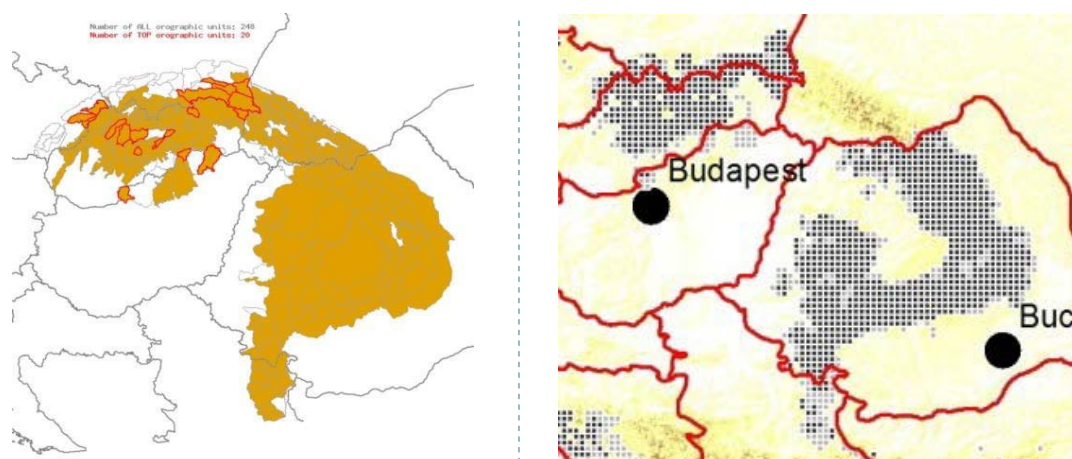
Distribution and population trends

The current distribution covers almost the entire mountain chain of the Carpathians, and is further expanding into Serbia, and most probably south into Bulgaria (von Arx 2007). Kaczensky *et al.* (2013) suggest that lynx occur in the western part of the northern middle altitude mountains in Hungary too (Map 6).

Population estimates range from 1,800 to 2,500. Breitenmoser *et al.* (2000) estimated 2,000 individuals. In 2007 von Arx estimated 2,500 individuals in the same area, Ionescu *et al.* (2009) gave an estimate of 2,400, and in 2013 Kaczensky *et al.* estimated 2,300. Our study among the BioREGIO partners estimated about 1,800 individuals in the Carpathians in 2012 (Figure 11).

The population trend appears to be stable or slightly increasing. (Okarma *et al.* 2000; Kaczensky *et al.* 2013) Our study supports this finding across the region, except in the Czech Republic, where a decrease was reported. This is in contrast with reports from the 1990s of increasing populations and ranges in Slovakia

(Hell *et al.* 1997), in the Šumava mountains in the border area of the Czech Republic, Austria and Germany (Wölfl *et al.* 2001) and in the Alps. (Stahl & Vandel 1999)



Map 6. Lynx distribution according to CBIS (left) and Kaczensky *et al.* (2013) (right).
Dark cells: permanent occurrence, grey cells: sporadic occurrence.

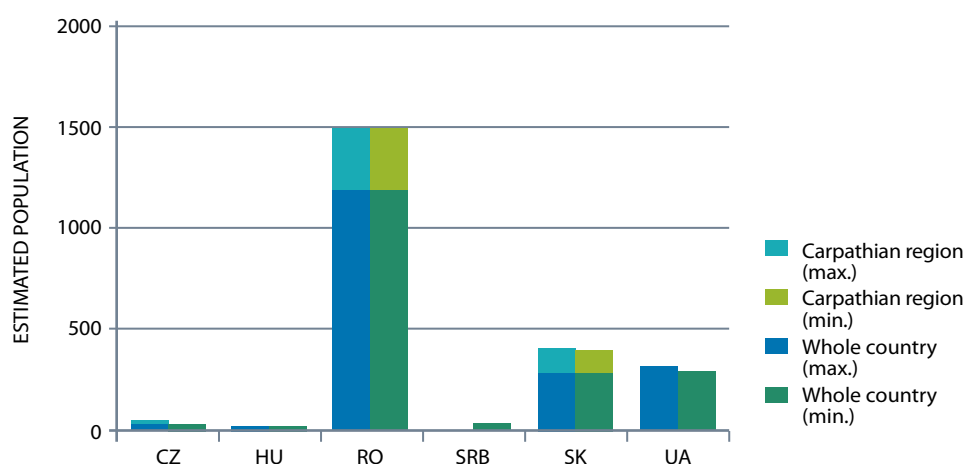


Figure 11. Lynx population abundance estimated by the experts in 2012.

Values of lynx

The ecological value of the species is mainly its regulatory effect on the ecosystem. The control and selective effect of the lynx can be a significant factor in both keeping the size of the prey population in check and maintaining its quality and good health. In turn, this helps maintain the stability of the ecosystem. The lynx can therefore be regarded as a bio-indicator that shows the quality of an area and an umbrella species whose presence can maintain biodiversity.

The main socio-economic values of lynx are as follows.

- Control of herbivores that may cause damage to forests (although in reality the lynx population is often too low to be having a significant impact).
- Nature based tourism, although it hard for visitors to see lynx, the presence of these animals can be an important factor in marketing area where they live to nature loving tourists.
- Hunting, there are disagreements in the region about the suitability of lynx as a sports hunting species, and about the potential income that may be generated from hunting where it is permitted, since the lynx is a very elusive and sparsely distributed species.

Conservation and management of lynx

According to the IUCN Red List for Europe, the pan European status of the population is Least Concern (mainly due to the large population in boreal forests in Russia and Scandinavia); in the EU-25 area, the status is Near Threatened. The species was almost extirpated from much of western and central Europe over the last few centuries, but in recent decades, and as a result of conservation action, the status of the species has improved in the EU-25. However this assessment can be misleading, as the population in the Carpathians is isolated from the boreal population (as are the other populations in western and southern Europe).

The lynx is listed in Annex IV of the Habitats Directive (strict protection) and in Annex II (species conservation requires Natura 2000 sites). National legislation and management regimes are similar across the region. The lynx is protected in Poland and Slovakia, strictly protected in Hungary, Ukraine, Serbia and the Czech Republic. In Romania, the species is protected, but up to 2013, under a derogation from the EU Habitats Directive, lynx could be hunted where there was proven human animal conflict. Since the 2012-2013 hunting season, the lynx hunt has been completely suspended for at least four years, or until new research is conducted on the population status. When hunting was allowed, it was reportedly non-selective, had little or no impact on damage reduction and probably had a negative impact on the size, area of distribution and structure of the lynx population (http://apmsb.anpm.ro/upload/114134_Raport%20CIMM_EN.pdf).

Threats

The main threats to lynx are as follows.

Habitat loss and fragmentation: According to the opinion of the Romanian and Hungarian stakeholders and experts, the size of habitats suitable for this species has been severely affected by urbanisation and the network of roads. Forest management, mainly logging and transportation also reduce habitat quality.

Disturbance: Lynx are sensitive to disturbance. Forestry operations, intensive mushroom and wild berry picking, the expansion of winter sports zones, tourism and heavy traffic are all identified as threats.

Persecution: The negative human attitude towards lynx arises mainly from two conflicts. Hunters blame lynx for reducing game abundance and availability, and livestock breeders do not like them because of predation on livestock (Breitenmoser *et al.* 2000). Consequently, persecution is mentioned as a major threat in Romania and in Hungary.

Poaching: Lynx fur and trophies can be highly valuable. Where trophy hunting was mentioned as a threat in Hungary and Ukraine, poachers were reported to shoot at lynx at any opportunity. In contrast, 50 % of local stakeholders in Slovakia thought that the lynx was not threatened in their country; the others thought that poaching or wolves could be threatening factors.

Management plans

Only Hungary and Serbia have an approved species conservation plan for the lynx. A document prepared in 2007 in Romania is considered by some stakeholders as the management plan for lynx, but has not been officially approved.

According to our study, only nature conservation and game management planning take lynx conservation into consideration, but lynx conservation is not adequately considered in forestry, agriculture and land use planning. In some senses the lynx seems to be a 'forgotten species'.

Compensation systems

There is no compensation system in Ukraine, but in Slovakia, the Czech Republic, Serbia and Romania the state pays for damages. A compensation system was established in Hungary during a LIFE project (Silva *et al.* 2013), but the damages were not assessed or paid.

Monitoring

The situation of the lynx is similar to that for the wolf. Governmental organisations, hunters and national parks are responsible for monitoring, however, in decreasing order. Monitoring systems reportedly operate best in the Czech Republic and worst in Romania.

5.1.3. BROWN BEAR (*URSUS ARCTOS*)



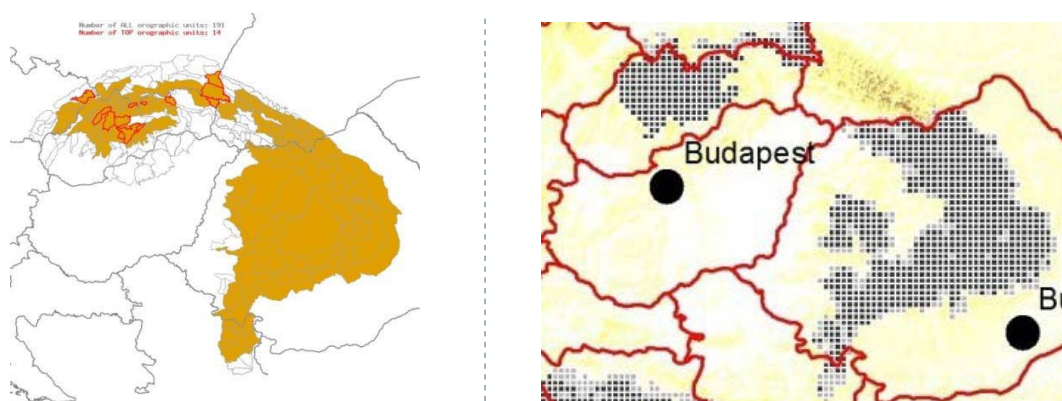
Picture 28: Brown bear (photo: WWF)

Zoological background

The brown bear is the largest mammalian predator in the Carpathians. Bear population density, movements, habitat use, reproduction and survival are strongly affected by food availability. They are omnivorous, with a diet consisting largely of vegetation, although invertebrates, fish, and mammals are also frequently eaten. Habitat choice is also affected by availability of cover (mainly dense forests) and availability of undisturbed den sites for reproduction (Swenson *et al.* 2000). Bear home ranges vary widely, and individuals disperse long distances. Jerina *et al.* (2012) found that the mean bear home range size in Slovenia was 350 km². In late autumn, bears start their hibernation for three to seven months. Cubs are born in the den during hibernation in January and February and leave the den in April-May.

Distribution and population trends

The Carpathian Mountains population is the second largest in Europe and covers the whole mountain range extending from hilly areas to sub-alpine habitats (Huber 2007), with populations in Slovakia, Poland, Ukraine, Serbia and Romania. Some occurrences are also reported from Hungary. See Map 7.



Map 7. Brown bear distribution according to CBIS (left) and Kaczensky *et al.* (2013) (right).
Dark cells: permanent occurrence, grey cells: sporadic occurrence.

The Carpathian Mountains population has been estimated to be between 7,000 and 8,000 (Mitchel-Jones *et al.* 1999; Zedrosser *et al.* 2001; Ionescu *et al.* 2009), with the majority in Romania, functioning also as a source population for Serbia and Bulgaria. The results of an on-going LIFE project in Romania suggest that the population has been overestimated and highlight the weaknesses of traditional monitoring methods.

According to the literature, the population appears to be stable (Okarma *et al.* 2000, Kaczensky *et al.* 2013) or slightly decreasing (Mitchel-Jones *et al.* 1999, Ionescu *et al.* 2009). Our expert data indicates an overall stable population, that is decreasing in the Czech Republic and Serbia, increasing in Slovakia and stable in Romania and Ukraine. See Figure 12.

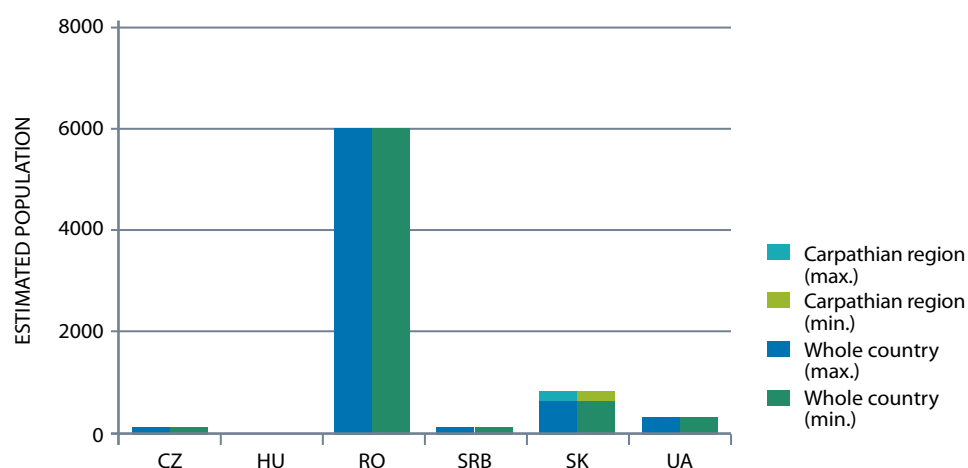


Figure 12. Bear population abundance estimated by the experts in 2012.

Values of the brown bear

The ecological value of the species as mentioned by the experts and stakeholders is mainly its regulatory effect on the ecosystem. The control and selective effect of the bear can be a significant factor in both keeping the size of the prey population in check and maintaining its quality and healthy status. Bears also influence the stability of the ecosystem and are a bio-indicator that shows the quality of that area. Brown bear can be considered an umbrella species, which plays an important role in dissemination of the seeds of plants, trees and shrubs.

The socio-economic values of bears relate to ecotourism and hunting tourism (fur, trophy), which can provide income for local people and opportunities for more employment. Bears also have symbolic and historical values (i.e. in Romania). There are also disagreements among experts about the value and appropriateness of bear hunting as a sport.

Conservation status

The status of the population is Least Concern on the IUCN Red List for Europe. However, it is assessed as Near Threatened in EU-25, because there were fewer than 10,000 mature bears and many remnant populations are tiny and fragmented. The Carpathian population is assessed as Vulnerable (Huber 2007), but as Near Threatened by Kaczensky *et al.* (2013).

The brown bear is in the Annex IV of the Habitats Directive (strict protection) and in Annex II (species conservation requires Natura 2000 sites). National legislation and management regimes are very similar across the region. The brown bear is protected in Poland and Slovakia, and strictly protected in Hungary, Ukraine, Serbia and the Czech Republic. In Romania the bear is strictly protected, but under a derogation from the EU Habitats Directive, can be hunted during a 6 months season where there is proven human animal conflict. In Slovakia, up to 10% of the estimated bear population can be hunted with special permission. In 2012 the harvest was 243 specimens in Romania and 8 in Slovakia.

Threats

Habitat degradation and fragmentation: In the opinion of the Romanian and Serbian experts, bear habitat is subject to continuous degradation and fragmentation due to human activities. Forest management, mainly large clear cuts, damages habitat and destroys or disturbs den sites. Road construction and urbanisation cause fragmentation and increase the risk of conflict with humans.

Disturbance: Forestry operations, road construction and tourism can all cause major disturbance and increase the risk of attacks by bears on people. Increased traffic leads to more collision accidents.

Conflict and persecution: The large and poorly protected sheep flocks present an easy and abundant prey for the brown bear. Bears can also cause significant damage in orchards and apiaries, which may lead to the illegal 'revenge killing'. Bears may also become habituated to humans, particularly where they are fed or where garbage is dumped. These bears may then attack humans, which may lead again to illegal killing or the need to cull dangerous individuals.

Poorly regulated hunting/poaching: Hunting in Romania is considered to be selective, oriented towards big adults and therefore having little impact on damage mitigation (the reason for the derogation). While poaching is considered a less serious problem and threat for brown bears in the Carpathians by many publications (Huber 2007, Swenson *et al.* 2000, Kaczensky *et al.* 2013), in Romania many stakeholders consider poaching to be a major threat that is severely under reported. In Ukraine, poaching is reported to be a major threat to bears that prevents the growth of the population. Local stakeholders in Slovakia consider that the bear is not threatened in their country because they have enough food, hunting is regulated, and the population is increasing. In general, the growing demand for bear products from Asia may in the near future start to encourage more poaching in the region.

Management plans

Romania, Serbia and Ukraine have species conservation plan for the brown bear. For Serbia and Ukraine, these plans contain similar goals and measurable actions, as for the wolf and lynx.

The management plan for bears in Romania

The general goal of this plan is to conserve a stable brown bear population in Romania in numbers that will ensure its viability and coexistence with humans. Special objectives for achieving the general goal include (not in order of priority):

1. Conservation of the habitat and the quality of the bear population.
2. Application of international regulations.
3. Avoiding the danger for humans and their property.
4. Achieving the desirable bear numbers.
5. Achieving of economic profit for local inhabitants through tourism and hunting.
6. Finding more data about bears in Romania (more research, better monitoring).
7. Increasing public awareness and involvement of the interest groups in decision making related to bear management.

Management planning goals

The plan was developed in accordance with studies and research, in compliance with existing legal regulations, and through widespread consultation with, among others, the Ministry of Agriculture, Forest and Rural Development the Ministry of Environmental Protection and Waters Management, Universities, NGOs, the State Forest Administration and Hunting Organizations. The following measures were agreed and approved through a Ministerial Order.

- Classifying the areas in which there are bears at present or which have the possibility of supporting bears (according to the suitability of habitats).

- Evaluation of the impact of the existing or planned infrastructure on the bear habitats and mitigation of the negative impact.
- Protection of brown bears by law: hunting is only used to benefit the wild population, where its validity is proven.
- Establishing an efficient system of compensation. The existence of the compensatory systems should be correlated with preventative measures (e.g. guard dogs, electric fence etc.).
- Making garbage disposal facilities inaccessible to bears.
- Initiation of information, education and public awareness campaigns for different target groups at local and national levels, as well as promotion of and support for educational and informative programmes to change the negative attitudes towards the bear.
- Establishing a protocol for permanent consultation with local populations regarding necessary management actions.
- Moving or culling of 'problem bears' in cases where prevention efforts fail.
- Applying in certain periods, of 'diversionary feeding', depending on species requirements and respecting the legal regulations for the bear's baiting.
- Implementation of the new population size monitoring system.
- Developing of special areas for bear conservation with a minimum size of 30,000-40,000 ha. each, with reduced anthropic impact in order to insure the stability of the population. In the identification of such area will be take into account areas from Harghita, Covasna, Mureş and Braşov.

Management of bears features mainly in nature conservation and game management planning, but not in the planning of other sectors. This result is surprising considering the wide distribution of bears and their predation on livestock, beehives, orchards and crops.

Compensation systems

There is no compensation system in Ukraine, but in Slovakia, the Czech Republic, Serbia and Romania, the state pays for damages. However, agricultural damages are normally not compensated, apart from in Slovakia.

Monitoring

Monitoring methods are similar to the wolf and lynx. Mainly governmental organisations are responsible for the monitoring, followed by hunters, national parks and NGOs. Monitoring reportedly is strongest in the Czech Republic and weakest in Romania.

5.1.4. GOLDEN JACKAL (*CANIS AUREUS*)



Picture 29: Golden jackal (photo: László Szemethy)

Zoological background

The golden jackal is the least well-known carnivore species of the region. It was extirpated from the region in the past, but is now recolonizing. Jackals are 'searcher hunters' feeding upon a broad range of small-sized prey, such as rodents, hares, birds, reptiles and arthropods (Lawick-Goodall 1970), but also frequently consuming plants (Balasubramanian and Bole 1993, Mukherjee *et al.* 2004) and scavenging on domestic animal remains (Macdonald 1979, Poché *et al.* 1987, Amroun *et al.* 2006) or carcasses left by large predators (Kruuk 1972). Jackals preferring to hunt more in open country than in forests, either alone, in pairs or in groups (Lamprecht 1978, Macdonald 1979, Admasu *et al.* 2004). Groups of jackals can successfully hunt medium-sized ungulates such as roe deer (*Capreolus capreolus*) (Demeter and Spassov 1993) and wild boar (*Sus scrofa*). (Lanszki and Heltai 2002, Lanszki *et al.* 2009)

Distribution and population trends

In Europe, the golden jackal is considered as a resident species in the Caucasus, Turkish Thrace, Bulgaria, Albania and the eastern coast of the Adriatic Sea. (Mitchell-Jones *et al.* 1999, European Mammal Assessment Group IUCN 2007, Macdonald and Sillero-Zubiri 2004) The golden jackal has spontaneously recolonised the Balkans and several parts of Central Europe during recent decades, possibly because of climate change. Observations have been increasing in Serbia (Milenkovic and Paunovic 2003), in Slovakia (Hell and Rajsky 2000, Krištofik and Danko 2012), in Romania (Kiss 2000, Papp *et al.* 2013) and in Ukraine (Rozhenko and Volokh 2000). Jackals appear occasionally in Slovenia, northeastern Italy, Austria (Mitchell-Jones *et al.* 1999) and in Germany (Reinhard 2000). Recolonization has brought jackals into conflict with people, for example, hunters, farmers, and even nature conservation activists have been complaining about the damage to wildlife and domestic animals caused by jackals. See Map 8.



Map 8. The distribution of the golden jackal in Europe (Arnold *et al.* 2010.)

Population abundance was estimated by experts in two countries in 2012. In Hungary, the total population is considered to be 5,531 individuals, with 75 in the Carpathian region. Sixteen individuals were reported from Slovakia. Population sizes are reported to be increasing in the Czech Republic, Hungary, Serbia and in the Slovak Republic. In Romania, the golden jackal population is increasing; in 2013, the estimated total number of golden jackals was 6,431 (Papp *et al.* 2013). No data are available from Ukraine.

Values of golden jackal

The relatively recent arrival of the species in the area makes an evaluation difficult. Hunting tourism (where the species is managed as game) has been mentioned by experts and stakeholders as a possible socio-economic value. Photo-tourism could be another possibility.

Management of jackals

The status of the species is Least Concern on the IUCN Red List, because of jackal is a widespread and opportunistic species. National legislation and management regimes vary in the region. The jackal is a game

species in Hungary, Serbia, and Romania. They are strictly protected in the Czech Republic. There is practically no hunting pressure on them in Slovakia, where the jackal is a protected species under environmental law and a game species in hunting law, with a 5-month hunting season. In Hungary the harvest was 1,129 (0 in the Carpathian Region) according to the National Game Management Database in 2012. According to national statistics in Romania, 2,502 individuals were killed during the 2012/2013 hunting season. In the Carpathian Region of Serbia, a kill of 105 was reported, with the comment that this is incomplete and doubtful data.

Threats

Persecution: Because of its damage to game (e.g. ungulate offspring and sometimes domestic animals) the species is often considered as a pest and comes into conflict with hunters and game managers. However, studies on food composition show that jackals feed mainly on smaller prey such as rodents, and generally avoid wild boar and cervids. (Lanszki and Heltai 2002, 2010, Lanszki *et al.* 2009) The spread of jackals may cause the spread of disease to wild animals. As a recent arrival, the interactions between jackals and other carnivores and herbivores in the Carpathians are not understood, but there is a widespread assumption that this is a harmful species. However, additional monitoring and observations are needed to understand the ecological interactions of the golden jackals in our region.

Habitat destruction: In Greece, the jackal population used to be considerable (Demeter and Spassov 1993), but today, mainly due to habitat destruction, it has become by far the rarest canid there. (Giannatos *et al.* 2005)

Management plans

None of the countries have a species conservation or management plan for the jackal.

Compensation systems

There is no compensation system in the Czech Republic, Hungary or Ukraine, but in Romania and Serbia the game manager pays for the damage.

Monitoring

Species-specific monitoring for jackals exists in three countries (Hungary, Romania, Slovakia). There is no monitoring in Serbia, despite its importance as a corridor for recolonization. A combination of scientific methods (e.g. snow tracking, howling surveys) and personal opinion (e.g. population assessment by hunters) is used. Hunters and governmental organisations are mainly responsible for monitoring.

5.1.5. RED DEER (*CERVUS ELAPHUS*)



Picture 30: Red deer (photo: Norbert Bleier)

Zoological background

The red deer is one of the most important ruminant game species in the Carpathian region. It inhabits open deciduous woodland, upland moors and open mountainous areas (sometimes above the tree line), natural grasslands, pastures and meadows. In woodland, its diet consists mainly of shrub and tree shoots, but in other habitats it also consumes grasses, sedges and shrubs (Hofmann 1985).

Red deer live in large herds. The maximum herd size is in wintertime, when several hundred might be together, and smallest in early summer in the calving period, when only maternal groups (families) move together. The red deer is a highly mobile species, but in spite of the common belief of hunters, true periodic migration of whole population has not been proven.

Distribution and population trends

The red deer occurs almost everywhere in the Balkans and Central Europe, but the highest density is situated outside the Carpathian region (Mitchel-Jones *et al.* 1999). The average population density is between 2 and 10 specimens/km². During the last 50 years, red deer populations and harvests have increased all over Europe (Milner *et al.* 2006), except the Balkans, where the population has largely been extirpated due to overhunting. The distribution of the red deer in the Carpathians covers the entire mountain range and also the Carpathian Basin. See Map 9.



Map 9. The distribution of the red deer (*Cervus elaphus*) in the Carpathians (Lovari *et al.* 2008b).

According to our questionnaire survey, the estimated population in the BioREGIO partner countries consists of about 242,000 individuals (Figure 13). Around one third of this population is estimated to live in the Carpathians.

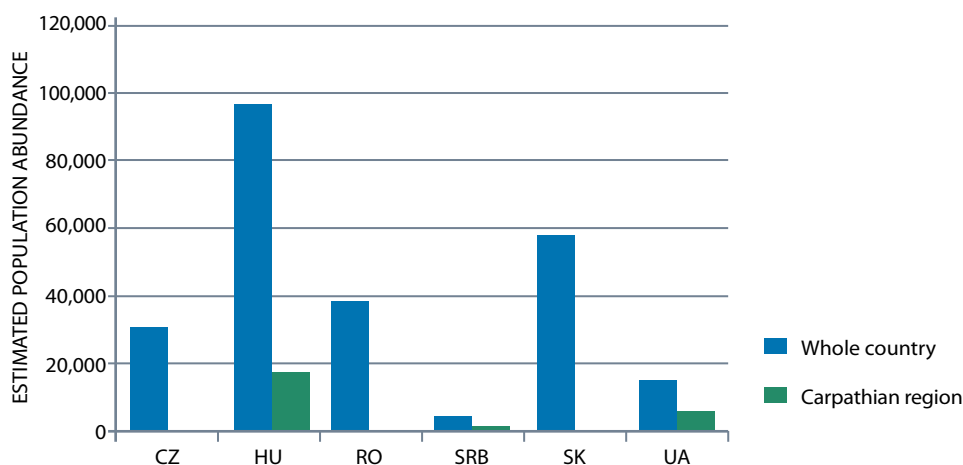


Figure 13. Red deer population abundance estimated by the experts in 2011/2012.

Values of red deer

The main ecological values of the red deer are considered by the experts to be they contribute to increasing biodiversity, maintaining the stability of the ecosystem, are an important factor in the trophic chain, are important prey for large carnivores, contribute to the regulation of the cenotic system and have a potential role as a bio-indicator.

The socio-economic values are mostly in connection with game management, forestry and agriculture. Red deer are a highly important game species for both trophy hunting and venison production. The red deer can be flagship species for conservation programmes because of its traditional values (e.g. spiritual beliefs), and is attractive for tourism (photography, filming). However, large populations have a marked impact on forestry and agriculture, where the species can cause significant damage.

Conservation and management of red deer

The status of red deer is Least Concern on the IUCN Red List, due to its wide distribution and large populations. It is protected under Appendix III of the Bern Convention. According to national legislation, red deer is a game species with a limited hunting season in all the Carpathian countries. The length of the hunting season differs between the countries and in Slovakia, there is also a bag limit.

The bag was 95,457 specimens in the subset of Carpathian countries in 2011/2012 (Figure 14). However, there were no Carpathian specific data from the Czech Republic, Romania and Slovakia. Respectively, 40, 64 and 6,844 specimens were reported from the Carpathian part of Serbia, Ukraine and Hungary. Forest and game management planning take into consideration the conservation of the species throughout the region.

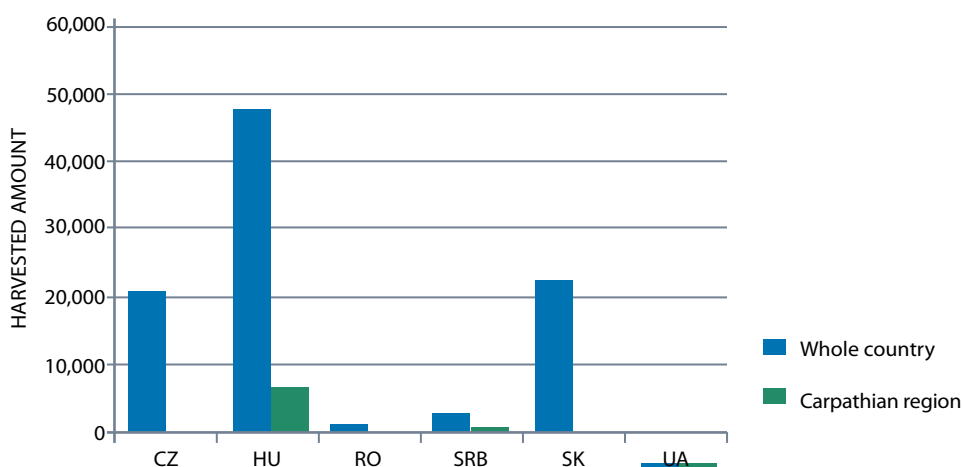


Figure 14. Red deer harvest data of the Carpathian countries in 2011/2012.

Threats

Conflict. The so-called 'game effect' caused by high deer population is identified by foresters throughout the region as a threat to forest regeneration and to the introduction of certain types of forestry (e.g. selection).

Disturbance. Disturbance can be caused during intensive mushroom and wild berry picking activities and also because of extension of winter sport zones and tourism.

Poaching/poorly controlled hunting. Widespread illegal hunting of red deer has been reported from protected areas in Romania and in the Carpathian part of Ukraine.

Differing views on the impact of herbivores

The ecological role of ungulate species in forest ecosystems and their impact on vegetation dynamics is a complex, controversial issue causing many conflicts and debates (Putman and Moore 1998; Gill and Beardall 2001). Two main approaches dominate the evaluation of ungulate-forest relationships. One considers ungulates to be predominantly pests that are 'universally overabundant' and 'natural but not elementary parts of forest ecosystems', due to perceived damage caused by them in forests. In the Carpathians region, this view is the most popular in Hungary (Katona *et al.* 2011) and is reflected in the strict regulations on compensation for forest damage in that country. However, in some Carpathian countries forest damage is not considered, or only partly or not at all compensated (Reimoser and Putman 2011).

Several investigations support the theory that increasing forest biodiversity decreases negative game effects. Studies by Jactel *et al.* (2012) comparing the risk of damage associated with various forest management systems demonstrated that intensive even-aged forestry appeared to be subject to the greatest risk, irrespective of tree species and bioclimatic zone. Katona *et al.* (2013) stated that ungulate browsing took place on all the different woody plants of the understorey of even-aged forests, not only on the main tree species. Based on these investigations, the native target tree species of Hungarian forest management (European beech *Fagus sylvatica*, oak species *Quercus petraea*, *Q. robur*) were generally avoided. Only non-native black locust *Robinia pseudoacacia* was preferred irregularly. In general species of low or no economic importance were preferred; therefore biodiversity conservation (i.e. maintaining or establishing a multi-species understorey layer), can be a good solution to diminish the attractiveness to herbivores of the main tree species.

The other, much more holistic approach considers ungulate species as essential elements of forest ecosystems, where they have necessary regulatory impacts on vegetation structure, composition and dynamics (Smit and Putman 2011). The temporal and spatial variability in local impact of ungulates on the vegetation, and the diverse responses of plant species and individuals to herbivory may increase forest biodiversity (Gordon and Prins 2008). Large predators have a crucial influence on selective herbivory at the landscape-scale, since predation risk may have profound effects on patch selection by herbivores and thus on the structure of ecosystems (Ripple and Beschta 2004). In the established 'landscape of fear' (Laundré *et al.* 2010), both large carnivores and herbivores become important constituents of native biodiversity.

As a conclusion, we recommend managing forest ecosystems in a holistic way, integrating wildlife management and biodiversity conservation aims into forest management practices. Increasing naturalness of forest ecosystems can benefit biodiversity, decrease conflicts arising from forest game damage, and at the same time can be economically competitive (see e.g. Csépanyi 2013). To help those joint efforts, understorey removal should be forbidden in Carpathian forests, field-collected data on understorey browse species should be incorporated into the forest management databases and mixed-species plantations and reforestations with native species should be promoted. Monitoring of the pattern of browsing selectivity can be important to follow reliably the balance between forest habitat quality and ungulate impact. When ungulates show selectivity for woody species that are generally avoided, we can suppose that the ungulate population is actually 'locally overabundant' and/or understorey food supply is scarce, generally preferred woody species are not available. The problem should be managed from both sides, by close-to-nature forestry practices and control of game populations (and their impact). However, we emphasise that a moderate herbivore impact is an important function in the natural dynamics of forest vegetation and that moderate pressure from a multispecies herbivore community on forest vegetation is elementary in forest biodiversity conservation!

Management plans

Only half of the countries have a specific species conservation/management plan for the red deer (Czech Republic, Hungary, Slovakia). Different stakeholder groups (mainly game managers) are involved in the

planning. According to the experts' reports, a good conservation plan exists in Slovakia, but this is not applied in practice. In Hungary, the management plan is of good quality and is applied well. In the Czech Republic (as with the other two countries) the planning of hunting depends on spring counts, which is said not to be at all reliable.

Compensation systems

There is no compensation system in the Czech Republic and in Ukraine, but in Hungary, Serbia, Slovakia and Romania, the game manager pays for the damages.

Monitoring

Species-specific monitoring of red deer takes place in every country. The methods used are a combination of personal opinion (e.g. population assessment by hunters) and, to a lesser extent, scientific methods (e.g. snow tracking, counts on sample plots). Hunters and governmental organisations are mainly responsible for monitoring. Monitoring systems functioning between countries; they are reported to work best in Hungary and Serbia, and worst in the Czech Republic and Romania.

5.1.6. ROE DEER (*CAPREOLUS CAPREOLUS*)



Picture 31: Roe deer (photo: Norbert Bleier)

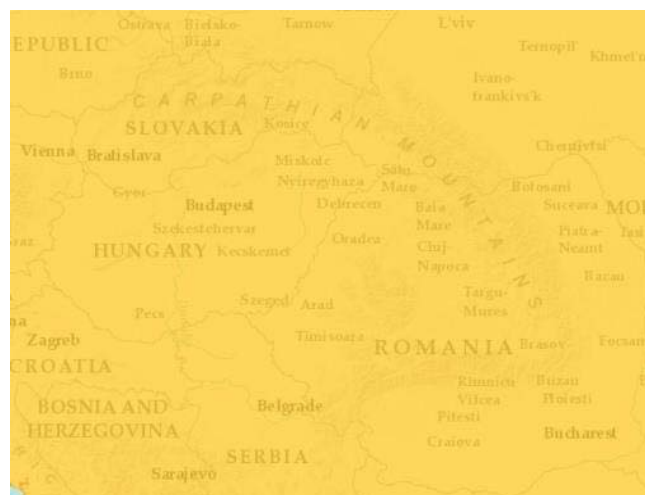
Zoological background

The roe deer is the smallest deer species in Carpathian region. It prefers landscapes with a mosaic of woodland and farmland and occupies a wide variety of habitats, including most types of forest, moorland, pastures, arable land, and suburban areas with large gardens. Roe deer live in small groups or solitarily, but in open areas exist in larger groups. The bucks protect a territory from April to August. The roe deer is a non-migratory species; individuals show high fidelity to their home ranges, which vary from 20-300 hectares. Young males can roam for up to 10-12 kilometres. Roe deer is a concentrate selector species, meaning that its diet comprises high quality, easy to digest, low fibre content plant parts such as young shoots, fruits, seeds and buds. (Hofmann 1985) The roe deer is an important prey species for the lynx and the wolf.

Distribution and population trends

The roe deer is the most common deer species across Europe, as well as in the Carpathian region, where its distribution covers the entire mountain range and also the Carpathian Basin. The population density is 10-

20 individuals/km² (Mitchel-Jones *et al.* 1999) and is increasing, amounting to at least 15 million individuals in Central Europe. See Map 10.



Map 10. Distribution of roe deer (*Capreolus capreolus*) in the Carpathians (Lovari *et al.* 2008a).

According to our questionnaire survey the estimated population in the BioREGIO partner countries is about 1,182 000 individuals (Figure 15). Existing databases about the populations are quite poor and cannot currently provide reliable data, but the populations are said by the experts consulted to be stable (Romania, Ukraine) or increasing (Hungary, Serbia, Slovakia, Czech Republic).

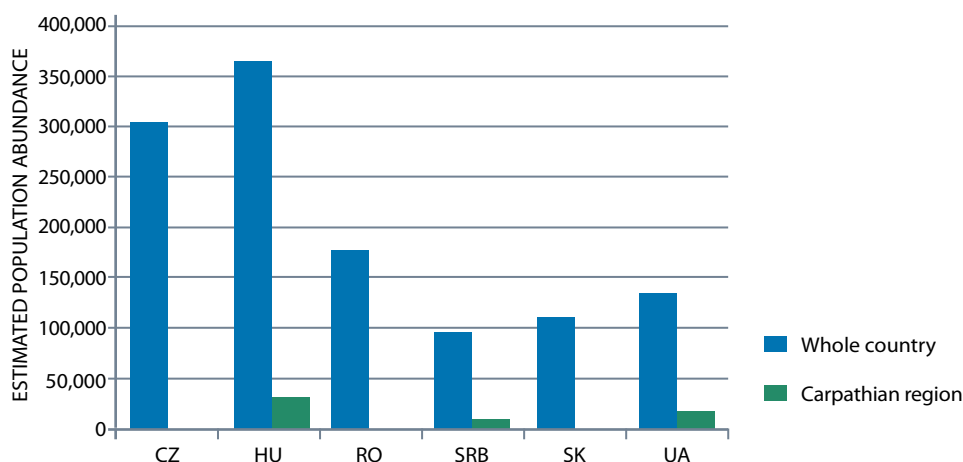


Figure 15. Roe deer population abundance estimated by the experts in 2012.

Values of roe deer

The main ecological values of the roe deer are considered by the experts to be they contribute to increasing biodiversity, maintaining the stability of the ecosystem, are an important factor in the trophic chain, are important prey for large carnivores (particularly lynx), contribute to the regulation of the cenotic system and have a potential role as a bio-indicator.

From a socio-economic perspective, the roe deer is an important game species for trophy hunting and selling venison. The species are also valued culturally (e.g. spiritual beliefs), and are an attraction for tourism (photography, filming). Roe deer has an impact on forestry and agriculture, where it can cause damage.

Management of roe deer

The status of the population is Least Concern on the IUCN Red List, since it is considered to be a widespread and common species with no major threats. The roe deer is listed under the Bern Convention (Appendix

III). According to national legislation, roe deer is a game species and has a limited hunting season in all Carpathian countries. The length of the hunting season is different from country by country, and in Slovakia, there is also a bag limit.

In 2011/2012, 241,199 roe deer were reportedly shot in the partner countries (apart from Romania, where no data were available). Data were not provided for the Carpathian Region of the Czech Republic, Romania and Slovakia. Hungary, Serbia and Ukraine reported 9,527 specimens (Figure 16).

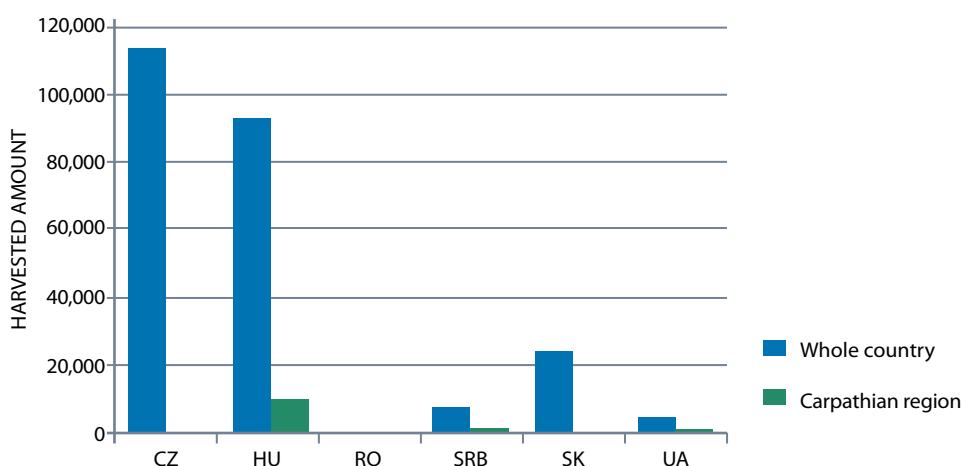


Figure 16. Roe deer harvest data of the countries in 2011.

Forest management and the game management planning take into consideration the conservation of the species throughout the region.

Threats

Conflict. Conflicts can occur between roe deer and humans, mainly due to the damage caused by the animals. There is no compensation system in the Czech Republic or Ukraine, but in Hungary, Serbia, Slovakia and Romania, the game manager pays for the damages. The so-called 'game effect' caused by high deer populations is identified by foresters throughout the region as a threat to forest regeneration and to the introduction of certain types of forestry (e.g. selection).

Habitat degradation. Degradation of the quality of habitats suitable for this species was mentioned by the BioREGIO partners and stakeholders as a problem.

Disturbance. Disturbance can be caused during intensive mushroom and wild berry picking activities and also because of expansion of winter sport zones and tourism.

Poaching/poorly controlled hunting. This is a problem in some areas, especially in Ukraine.

Management plans

The situation of management planning of roe deer is very similar to that for red deer.

Compensation systems

There is no compensation system in the Czech Republic and in Ukraine, but in Hungary, Serbia, Slovakia and Romania, the game manager pays for the damages.

Monitoring

The monitoring of roe deer is very similar to that of red deer.

5.1.7. CHAMOIS (*RUPICAPRA RUPICAPRA*)



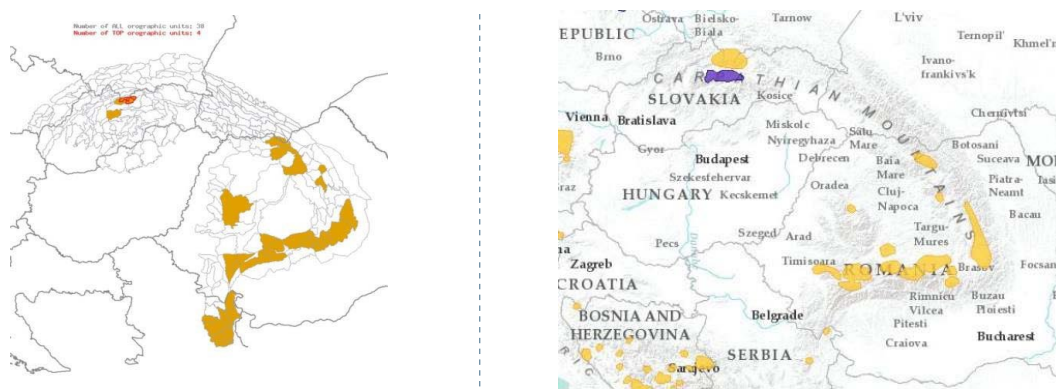
Picture 32: Chamois (photo: Dan Dinu)

Zoological background

The chamois is a typical mountain species, inhabiting steep, rocky areas in the mountains, using a variety of habitats including alpine meadows, open rocky areas, mixed broadleaf woodland, and coniferous woodland (Pedrotti and Lovari 1999). Females and young occur in herds of 5-30 animals, while adult males remain solitary. During the summer, chamois herds use alpine meadows above 1,800 meters. In winter, due to thick snow coverage, they move to the lower regions (below 1,100 meters), where forest cover is denser and provides shelter and better hiding places for them. The average home range size is 74 hectares. Their dominant food sources are grasses, leaves, shoots, fungi and buds. The main predators of the chamois are humans, feral dogs, lynx and occasionally wolves.

Distribution and population trends

In Europe currently, the species is widely distributed and is generally increasing. The most important populations in Europe are in the Alps and the Balkans, while lower density populations occur in the Carpathians. In some areas the population density can be as high as 20 individuals/ha, and the estimated number of the European population is close to 440,000 (Aulagnier *et al.* 2008). The distribution of the chamois in the Carpathians covers only widely separated, isolated areas of the mountainous range in Romania, Slovakia, Poland and Serbia. See Map 11.



Map 11. Chamois distribution according to CBIS (left) and Aulagnier *et al.* (2008). Yellow: extant; purple: introduced

According to our survey, the estimated population in the BioREGIO partner countries is about 8,200 individuals (Figure 17). The populations in the Czech Republic (an introduced population, not in the Carpathians) and Romania are said to be stable, while in Serbia and Slovakia they are increasing according to the BioREGIO experts. In Slovakia, there is a native subspecies, and the Alpine subspecies has been introduced to some mountains.

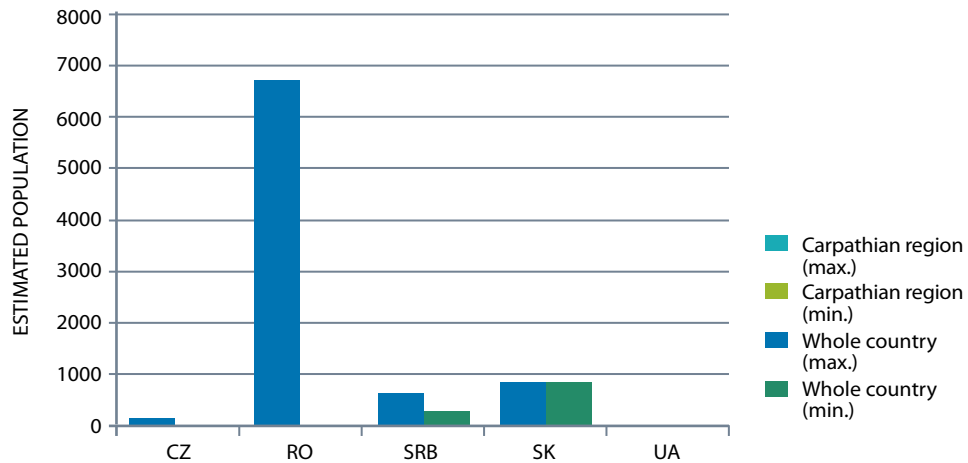


Figure 17. Chamois population abundance estimated by the experts in 2012.

Values of chamois

The ecological values of the chamois identified by the experts and stakeholders are: increasing biodiversity, maintaining the stability of the ecosystem, being an important factor of the trophic chain, contributing to the regulation of the cenotic system; maintaining grasslands; potential role as a bio-indicator; prey species of large carnivores (wolf, lynx).

The socio-economic values of chamois are mainly connected with the ecotourism and photo tourism, which can provide income. Hunting tourism has an important economic role. Moreover, chamois has symbolic and historic values and can be a flagship species of conservation programmes.

Management of chamois

The status of the population is Least Concern on the IUCN Red List. However, several chamois subspecies qualify as globally threatened. The species is listed in Appendix III of the Bern Convention. The subspecies *R. r. tatrica* is listed in Annexes II and IV of the EU Habitats and Species Directives. The Carpathian part of Serbia is inhabited by chamois originating from Mt. Prenj (Bosnia and Herzegovina), belonging to subspecies *R. r. balcanica*, which is also listed in Annexes II and IV of the Habitats and Species Directives. The chamois is a game species with a limited hunting season in the Czech Republic, Romania and Serbia, and for the introduced *R. r. rupicapra* subspecies in Slovakia. The subspecies *R. r. tatrica* is protected in Slovakia and Poland. See Figure 18.

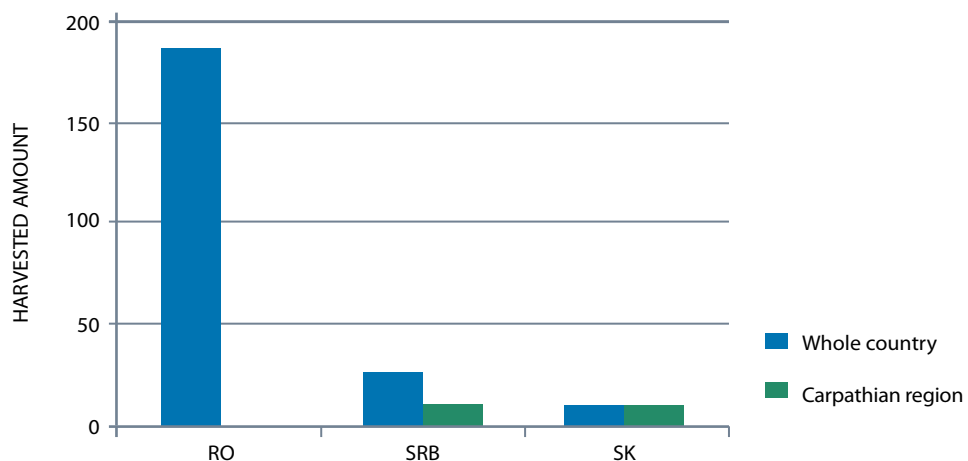


Figure 18. Chamois harvest data of the countries in 2011.

According to the answers of the experts in our study, planning for nature conservation, forest management and game management all take into consideration the conservation of chamois.

Threats

Habitat degradation and fragmentation. Chamois are vulnerable to the degradation of their summer habitats in the high mountains and their winter habitat in higher elevation forests. Establishment of high-level ski resorts and infrastructure is a particular threat.

Disturbance. Increased mountain tourism (both winter and summer) can cause disturbance and affect breeding and feeding of chamois.

Habitat sharing with grazing animals. Use of alpine pastures for livestock grazing can limit access for chamois, and lead to transmission of disease between domestic and wild animals.

Inbreeding. Because the various populations of chamois are isolated from each other, outbreeding is impossible and populations may be subject to the effects of inbreeding.

Interbreeding. Interbreeding with introduced alpine chamois may affect the genetic integrity and specific local adaptations of local Carpathian races.

Poaching and poorly regulated hunting. In some areas, chamois are subject to illegal killing.

Management plans

Only the Czech Republic and Slovakia have a specific species conservation/management plan for the chamois. The planning process in these states includes foresters, game managers and nature conservationists. According to experts' reports, Slovakia has a good conservation plan, in actuality however, is not implemented in practice. In the Czech Republic, the planning of hunting depends on spring counts, which are said to be unreliable.

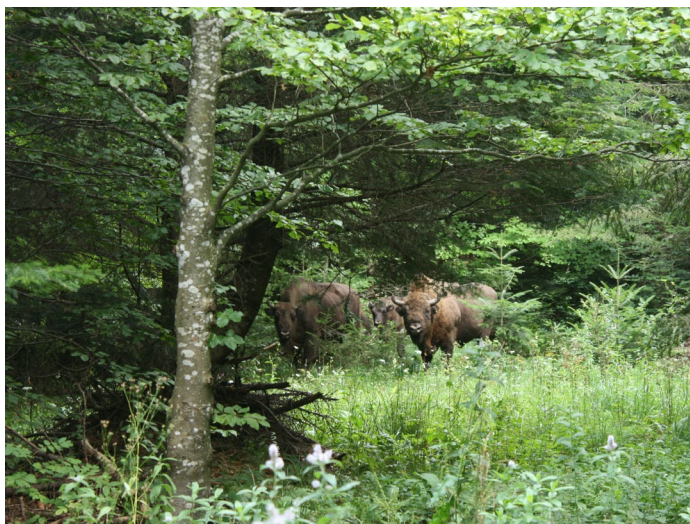
Compensation systems

There is no compensation system in the Czech Republic and Slovakia, but in Romania game managers pay for the damages.

Monitoring

Specific monitoring of chamois functions in every country in its range (Czech Republic, Romania, Slovakia, Poland, Serbia). The methods used combine scientific methods (e.g. snow tracking, spot counts) and personal opinions (e.g. population assessment by hunters). Hunters and governmental organisations are mainly responsible for monitoring, but in some cases National Parks are responsible as well. Overall, monitoring systems are reported to function quite poorly.

5.1.8. EUROPEAN BISON (*BISON BONASUS*)



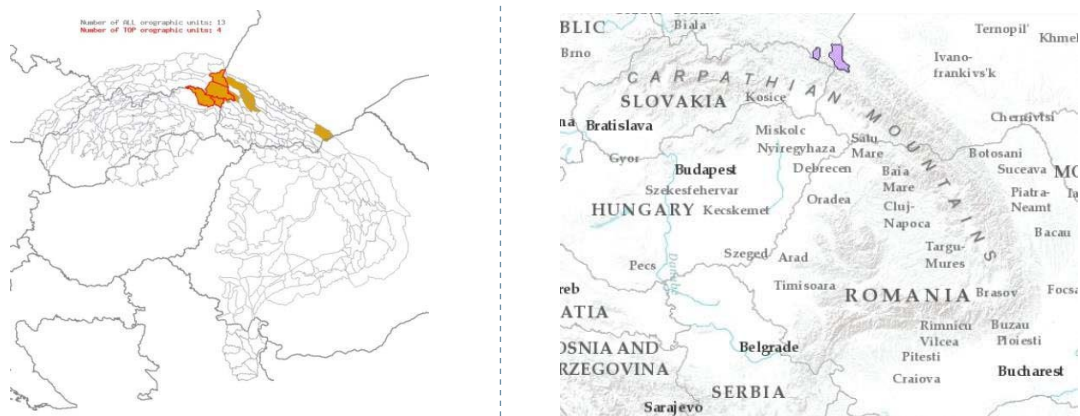
Picture 33: European bison in Vânători Neamț Nature Park, Romania (photo: Razvan Deju)

Zoological background

The European bison is the largest ungulate in the region, with a mean body mass of 634.1 kg for bulls and 423.7 kg for cows (Kraśnińska and Kraśniński 2002). It is a social animal; mixed groups and bull groups are the basic units (Puce *et al.* 2004). European bison mainly forage in moist deciduous forests and in mixed coniferous forests. In the Carpathians they select forest-dominated habitats, with a preference for complex mosaics of forests and grassland patches in areas of low human disturbance. (Kemmerer *et al.* 2010)

Distribution and population trends

The species became extinct in the wild in the 1920s and was saved by captive breeding programmes. The total European bison population is currently about 3,100 individuals, with some 1,900 living in the wild and 1,200 in captivity (Linnell and Zachos 2011, Olech 2007). At present, populations are being established along the Carpathian mountain chain in Poland, Slovakia, Ukraine and Romania, aimed at establishing a viable metapopulation of interconnected stocks (Linnell and Zachos 2011). Ziolkowska *et al.* (2012) estimated that around 350 European bison live in the Carpathians in five free-ranging herds (2 in Poland, 1 in Slovakia, 2 in Ukraine). In Romania, there are captive herds in three national parks awaiting reintroduction and a free ranging herd of 5 individuals in Vânători Neamț Natural Park. See Map 12.



Map 12. Bison distribution according to CBIS (left) and Olech (2007).

The total Carpathian population is estimated by the experts in this study to be about 96 individuals (excluding the Polish Carpathians) (Figure 19).

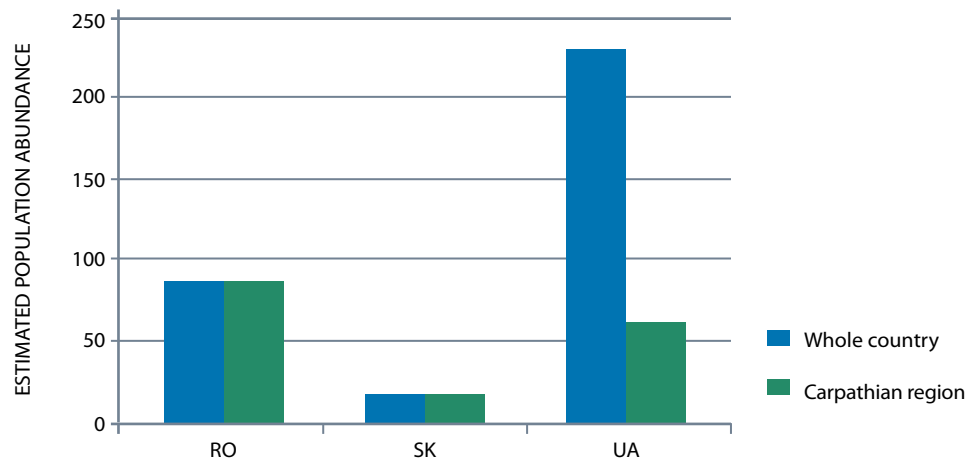


Figure 19. Bison population abundance estimated by the experts in 2012 (excluding Poland).

Values of bison

The main ecological value of the species identified by the experts and stakeholders is its role in the formation of the prehistoric European broad-leaf forest and forested steppe ecosystems. Bisons are an important surviving component of the original European fauna. In the places of permanent occurrence, bison can cause considerable harm to the undergrowth of broadleaved forests.

The main socio-economic value is likely to be ecotourism. The bison has a long history and is connected with many communities that use it as a symbol. The European bison also appears on the old Moldavian and Romanian blazon. Its symbol can be also used to attract tourists and to promote traditional products.

Management of bison

The status of the whole population is Vulnerable according to the IUCN Red List for Europe and for the EU-25, because of the low number of mature animals. The Lowland line is assessed as Vulnerable and its numbers have increased in the last 10 years, but the Lowland-Caucasian line is assessed as Endangered, because it has been declining since 1990. (Olech 2007)

The European bison is listed in Annex IV of the Habitats Directive (strict protection) and in Annex II (species conservation requires Natura 2000 sites). National legislation and management regimes are the same across the region; it is strictly protected in all countries.

Threats

The main threats are as follows:

Inbreeding and diseases. These are consequences of the low genetic variability and include balanoposthitis (the inflammation of the penis and prepuce).

Small isolated populations. Low populations make the bison very vulnerable to a range of catastrophic events that could eliminate entire breeding groups. Such events might include disease outbreaks, poaching and accidents.

Conflicts with landowners. This may be a problem as herds increase (Hofman-Kamińska and Kowalczyk 2012). Specific issues may be hybridization with cattle, disease transmission and competition effects (Kuemmerle *et al.* 2011). It should be noted that in northeastern Poland, where the population is higher, large amounts of compensation are paid for bison damage to crops (over € 90,000 in 2010; Hofman-Kamińska and Kowalczyk 2012).

Management plans

Three countries have conservation plans for bison (Ukraine, Slovakia, Romania). Mainly nature conservationists and game managers participated in the planning (farmers were not involved). Evaluating the planning quality, we concluded that participation was better in Ukraine, but the plan was more reliable in Romania.

Compensation systems

There is a compensation system in Romania and Slovakia, where the state pays for the damages caused by bison, but in Ukraine, where many more free-ranging bison can be found, no compensation is paid, which may lead to illegal killing.

Monitoring

Only the Slovak Republic reported an existing monitoring system, under which an annual countrywide survey takes place, conducted by government hunters. The quality is reported to be quite low.

5.1.9. CONCLUSIONS FROM THE SPECIES ASSESSMENTS

Overall status and protection of large mammals

In general, the status of all the species assessed was reported by the consulted experts to be quite stable; none of the species were assessed as being seriously threatened at the moment, and the Carpathians remain a stronghold of European large mammal fauna. However, this is no motivation of complacency, the pressure and threats are increasing (Table 8) and much of the available information is not particularly accurate or reliable. The protection status of large mammals is variable and inconsistent in Carpathian countries; regulations for hunting differ widely, as to perceptions as to whether hunting should be allowed at all for the carnivores. Although in some cases it may be quite acceptable to adapt protection status and management to national conditions, national assessments may not be taking into account the overall regional status of species and the distribution and movement of species across international boundaries. Applying Europe-wide directions and categories to regional populations can be confusing, and leads to anomalies, such as the derogation of the protection status for some species in Romania.

Code	Threat description	Wolf	Lynx	Bear	Jackal	Red Deer	Roe Deer	Chamois	Bison
A04	Grazing							X	X
B02.02	Forestry clearance	X	X	X		X	X		X
B02.03	Removal of undergrowth					X	X		
A05	Animal breeding	X	X	X	X		X		
F03.02.03	Trapping, poisoning, poaching	X	X	X	X	X	X	X	
F03.02.04	Predator control	X	X	X	X				
D01	Roads, paths and railroads	X	X	X	X	X	X	X	X
E (most sub categories)	Urbanised areas, human habitation	X	X	X	X	X	X		X
G01.02	Walking, horse-riding and non-motorised vehicles	X	X	X				X	X
G01.03	Motorised vehicles	X	X	X		X	X		
G01.04	Mountaineering, rock climbing, speleology							X	
G01.06	Skiing, off-piste	X	X	X				X	
G02.02	Skiing complex	X	X	X				X	
K03.03	Introduction of disease					X	X	X	X
K03.06	Antagonism with domestic animals	X	X	X					X
K05.01	Inbreeding							X	X
M01	Climate Change (change in abiotic conditions)							X	
M02	Climate Change (change in biotic conditions)							X	

Table 8. Summary of main threats to large carnivores and herbivores (EU threat codes).

Planning

Less than half of the total possible number of national management plans are in place for the species assessed; many of these plans are considered to be weak (especially for carnivores) and poorly implemented. The integration of large mammal conservation into management plans of different sectors is also generally weak. Very important sectors that strongly influence the conservation of the large mammals, such as land use planning, infrastructure and settlement development do not specify conservation actions and do not take into account conservation requirements.

Data availability, quality and reliability

The regional questionnaire also asked experts to assess the availability, reliability and quality of population estimates and harvest data from their countries (the full results are available from the authors). In summary, there are great variations across the region. There are numerous data gaps and several experts have noted that it is very complicated and takes long time to acquire data, as a result of administrative bureaucracy. In general however, the harvest data appear to be more reliable than the population estimates, and population data is more reliable in countries where species are rare and less widespread.

Overall, insufficient data on large mammal populations are available to evaluate accurately their current status, plan appropriate conservation, management and sustainable use measures, monitor and assess the threats (especially illegal killings) and monitor the results of management measures. There is also lack of data from different administrative authorities nationally and on the EU level. The present field surveys are carried out in different ways in Carpathian countries, so that data are not comparable across species ranges. Despite these well-known limitations, insufficient attention is paid to the improvement of population estimations and to basic research.

The lack of a 'common language' and different understandings of terminologies often causes problems in the coordination of conservation/management measures. Lack of common methods of measuring and reporting basic parameters prevents accurate regional assessments.

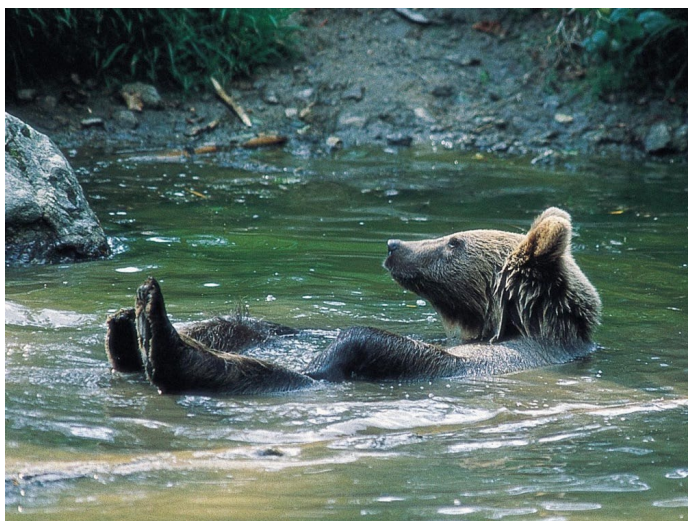
Monitoring

Monitoring systems exist for all large herbivores and most large carnivores (jackals are not monitored in a systematic way), and systems are quite similar across the region. However, monitoring methods are based mainly on personal, subjective judgement rather than scientifically tested methods. Some methods that were listed as being 'scientific' are in fact far from fulfilling the requirements of an objective, replicable survey method relying on representative sampling. It is impossible to determine the bias, accuracy and precision of these methods. It can be concluded that the overall quality and reliability of monitoring data is quite low and that the existing databases are generally quite poor and cannot provide reliable data, meaning that adequate information is not available for good quality management planning. In addition, other important associated factors such as habitat quality and threat impacts are not monitored.

Compensation systems

Compensation is a common way to mitigate conflicts, to increase tolerance and to decrease illegal killings. Most Carpathian countries have compensation systems for damage caused by both large carnivores and herbivores. The damages are paid mainly by the state in case of protected carnivores (unless they are also game species), but always by the game managers in case of the herbivores.

Estimation of damages is mainly through field examination by an expert (especially in case of carnivores), but sometimes (mainly in the case of herbivores) the relevant stakeholders and managers make an agreement. However, many stakeholders are apparently not satisfied with the system, which is often not fully functional.



Picture 34: Brown bear, Romania (photo: WWF-Canon)

5.2. COMMON INTEGRATED MANAGEMENT MEASURES FOR LARGE MAMMALS

5.2.1. OVERALL GOAL

The Carpathians should remain a stronghold for viable populations of the full range of European large mammals native to the region.

5.2.2. IDEAL MANAGEMENT REQUIREMENTS

Total protection and non-intervention alone will not be effective means for achieving the overall goal; a range of strategies are required, both at national and regional levels.

- Adequate protective measures are required for all species, especially those with restricted ranges and/or low populations. Conservation of large carnivores also requires healthy populations of prey species.
- Management of species should be integrated across their ranges, rather than being determined at the country level. It cannot be expected that each country will adopt identical laws and management practices, but national practice should conform to general regional strategic approaches.
- Management should be based on reliable and holistic knowledge, including the basic data about population parameters, the roles of species in ecosystems and interactions with different management sectors. Data collection should be reliable, replicable and representative using scientifically tested and generally accepted standard methods.
- Sustainable use through regulated hunting can play an important role in population management of certain species, in mobilising support for conservation and in generating income. However, such hunting must take place within an adequate and effective regime of monitoring, scientific setting of quotas and control of both poaching and breaches of regulations during authorised hunting.
- There are differing views on the hunting of large carnivores. While some consider that carnivore hunting should be an integral part of a wildlife management, many also consider that hunting of large carnivores should only be permitted where there is proven human wildlife conflict. However, in the case of disagreement and as a basic principle, the precautionary principle should apply.
- Efforts are required to increase support and tolerance of local people towards living alongside large carnivores and herbivores.

5.2.3. SPECIFIC CONSERVATION MANAGEMENT MEASURES FOR IMPLEMENTATION BY PROTECTED AREA ADMINISTRATIONS AND GAME AND WILDLIFE MANAGERS

These are measures associated directly with the management of species, habitats and ecosystems. They are most likely to be implemented through protected area systems and through the work of agencies and organisations managing land and resources.

Intensifying and coordinating efforts in the field to stop poaching

There is a fundamental need to decrease illegal killing and poaching. This is one of the most threatening factors and also the one that is hardest to address. The following measures should be adopted.

LM1. Increase cooperation between protected area administrations, law enforcement authorities, police, judiciary and border guards

Protected area administrations cannot ensure adequate protection of large mammals by themselves. These species are wide-ranging and many of the threats to them originate from outside protected area boundaries. Effective protection requires coordinated action, for example:

- Keeping local law enforcement authorities informed about threats and illegal activity.
- Working with judiciary in order to emphasise the severity of the threats and encourage appropriate action.

- Organising joint patrols and information sharing between the protected area rangers and other law enforcement agencies.
- Sharing information and expertise about threats and violators.
- Improving transboundary cooperation and information sharing.

LM2. Encourage cooperation of local people in anti poaching activities and other measures

It is important to enlist the support of the general public in the fight against poaching. Successful measures can include:

- Conducting awareness raising campaigns.
- Setting up means for citizens to report poaching and illegal activities (for example, telephone hotlines).
- Setting up voluntary patrol systems to discourage poaching.
- Making use of media to publicise the impacts of poaching and successes in anti-poaching activities.

LM3. Standardise and tighten legal procedures concerning illegal killing (poaching)

There is a need not only to increase penalties for poaching, but also to improve the rate of convictions. This requires not only stronger laws, but improved cooperation from police and judiciary in tackling wildlife crime.

Poaching in Ukraine

In the Ukrainian Carpathians, populations of wild ungulates have for many years remained far below optimal levels. Analysis of the population dynamics of wild ungulates, their food supply, the level of official shooting and the number of predators has shown that forage is at an optimal level, official shooting is 6-8 times lower than the annual increase in population and the number of predators is low. The only factor that can significantly affect the number of game animals, and which goes unrecorded is poaching, which must therefore be considered as the greatest threat.

A critical factor that promotes poaching is absence of state financing of state forest enterprises, which have reduced numbers of forest guards, so that each guard is responsible for protecting ever larger areas (currently around 4,000 ha per guard). Forest guards have very low salaries (< € 100 per month) and are poorly qualified. The quality of protection is only likely to increase if the prestige of the profession is enhanced by increasing wages, providing better equipment and improving individual capacity.

The system of forest protection in Ukraine focuses on illegal woodcutting and not on poaching. Many poachers are well armed and work in groups, making it impossible for isolated guards to act against them. The introduction of coordinated anti-poaching teams may improve protection of wild animals from poachers. It is also important to increase the level of environmental awareness of the local population, including informing of relevant public authorities about cases of poaching. At the judicial level, reported high level of corruption in the Ukrainian court system also promotes poaching.

Improving species management

LM4. Plan a coordinated extension of the bison breeding and reintroduction programme

There is a need to ensure coordinated management, captive breeding and reintroduction programs for bison, in order to maximise genetic diversity and to exchange information and lessons learned about the reintroduction process.



Picture 35: Bisons release in Romania (photo: WWF DCP)

Bison reintroduction in Romania

The last records of free-ranging European bison in Romania date from the beginning of the 19th century in Romania's Calimani Mountains, Bargaului Mountains and Maramuresului Mountains (Cătănoiu and Deju, 2012).

Since May 2005, Vânători Neamț Nature Park (VNNP), a 30,000 ha protected area in the north-east of Romania, has been implementing a European bison reintroduction programme, which aims to establish free ranging, viable bison herds in the Romanian Carpathians (Perzanowski and Deju 2005; Kuemmerle *et al.* 2010). This programme, respecting the IUCN guidelines regarding reintroductions, was developed in four phases. The first phase, addressing feasibility studies, was fulfilled with the support of The Zoological Society of London and Polish specialists (Dixon *et al.* 1997). During the preparation phase, the main facilities for European bison acclimatization and pre-release were installed and staff training and public awareness activities were conducted. In addition, 15 animals of the Lowland-Caucasus line were imported from Western zoos. The release and post-release monitoring phases are on-going; the first releases in the park took place in spring 2012 and spring 2013 (Cătănoiu and Deju 2013). The release area comprised the Cracau valley, 5,000 ha of forested area, with low human impact. Monitoring by radio telemetry revealed that in the first year the European bison explored around 2,000 ha, in the second year this increased to around 5,000 ha, and in some cases the animals ranged beyond the Cracau valley ridges into the neighbouring valleys. The actual free herd comprises 11 animals, including two bison calves born in the wild in 2012. A new release is expected in spring 2014.

Because of the specific characteristics of VNNP's heritage (natural, cultural and spiritual), the park's intention regarding the European bison reintroduction is not only to re-establish a keystone species in the ecological sense, but also in a spiritual and cultural sense. The managers are convinced that emphasizing the cultural and spiritual properties of an endangered species represents an essential step towards effective conservation (Cătănoiu 2007; Cătănoiu 2012).

Useful websites:

<http://www.bisonbonasus.ro/>

www.vanatoripark.ro

www.waza.org/en/site/conservation/waza-conservation-projects/overview/european-bison-reintroduction_1

www.europeanrewildingnetwork.com/projects/26/

www.truenaturefoundation.org/project/romania/cracau-valley-wildlife-reserve/

LM5. Establish reliable and common damage mitigation, estimation, and compensation systems

Dealing with human wildlife conflict, and specifically the economic damage caused by wildlife, is a challenge in the region that is likely to increase. Approaches to dealing with conflict vary between countries and in many cases are considered to be ineffective. There is a need for improved information sharing and development of best practices for dealing with conflict, at the local (protected area), national and regional levels. Specifically, further information and testing is required for a number of approaches.

Prevention and mitigation. Locally applicable and (wherever possible) low-cost measures are required for preventing or minimising damage. Possible measures might include use of electric fences (to protect sheep, crops and beehives), use of shepherd dogs, use of various deterrent methods. The Romanian experiences have shown that 'electric shepherds' are successfully protecting flocks from bears and wolves. Since this is not a cheap solution, environmental charities and NGOs could help shepherds in acquiring electric fences.

Compensation. Fair and transparent methods are required for assessing damage, assigning responsibility and calculating compensation. Special support should be made available through agri-environmental schemes in the EU.

Special measures. An emergency derogation system is required for dealing with specific major problems on a case by case basis. Derogation should not be used generically as a means for enabling hunting of protected species.

Compensation system in the Slovak Republic

In the Slovak Republic, a balanced compensation system functions. The regulation determines the goods and circumstances that can be compensated. The stakeholders share the responsibility for damages; the state takes responsibility when one of the defined, protected species causes the damage, while the hunters (game managers) are responsible for damages caused by hunted species.

The regulation also clarifies the responsibility of the owner, who is expected to defend his or her goods and properties as needed with legal methods. There are detailed guidelines for damage prevention and there is no compensation for game and protected species damage in fenced areas. The owner has to cooperate with the nature conservation bodies and hunters to prevent damages and does not qualify for compensation if he/she is to blame for the damage. Several further factors, which can affect compensation (e.g. circumstances of damaged animals in animal breeding, agro technical factors), are also clarified.

The State does not pay for the damage when there is an official appointee, who is responsible for damage prevention. The hunters do not have to pay compensation if they manage the game population in accordance with the regulations, especially if they shoot the defined quota completely.

Damage caused by protected animals must be reported to the Nature Conservation Authority in writing. The Authority holds an inquiry into the case, and if the request is legitimate, pays compensation. In case of game, local stakeholders have to come to an agreement with each other on the means and amount of compensation. If the plaintiff is not satisfied or there is no agreement, the stakeholders can ask for a court judgement. The court can employ an independent expert if necessary.

Improving ecosystem and habitat management

It is widely understood that protected areas alone are not sufficient to protect populations of large mammals; therefore, ecosystem and landscape scale measures are required based on population ranges of species rather than protected area and international boundaries. The following measures are recommended:

LM6. Identify priority areas for threatened species and apply special protective measures

Priority conservation areas for threatened large mammal species should be identified across the region and made subject to special measures for protection. These areas should comprise:

1. Strongholds of species (core areas which are inhabited by breeding individuals), which can act as secure source populations for dispersal more widely across the region and, where appropriate, for sustainable harvesting in designated hunting zones.

2. Stepping-stone areas (areas used temporarily during movement between core areas). These areas should be identified on the basis of populations and are likely to include:

- Nationally/internationally protected areas including Natura 2000 sites (or parts of them) and zoning systems should be designed accordingly.
- Zones along international borders; it has been suggested that a general agreement to stop hunting within a fixed distance of state borders would create a network of corridors that would allow for the migration and expansion of species ranges.
- Protection forest (as designated in forest management plans).
- Creation of new or enlargement of existing protected areas, protected forest zones etc. where an adequate level of protection does not exist.

These priority conservation areas would then act as nodes for the system of ecological corridors (see next measure). As a first step, areas for lynx and chamois should be identified and established.

LM7. Establish an ecological corridor system based on habitat use data

One of the main threats to large mammals is habitat loss and fragmentation due to anthropogenic interventions (e.g. highways, urban sprawl, ski resorts). Connectivity between suitable habitat patches is a basic pre-condition for species dispersal, colonisation and enables linking of meta populations. A set of possible corridors has been elaborated in Work Package 5 in this project.

Once these corridors have been identified, the next step should be to plan and to carry out practical measures to establish them and develop common regulations for their management. For example they must be protected against infrastructure and settlement development and construction in order to allow free animal movement through the corridor areas.

Ecological network between the Apuseni Mountains and South West Carpathians, Romania

This initiative focused on large carnivore species, especially brown bears, the most critical issue being related to the isolation of the (sub) population of bears in the Apuseni Mountains. Studies to assess the suitability of habitats for large carnivores in the Carpathians and to verify the distribution and abundance of the species in the field led to the identification of core zones, of potential re-colonisation areas and of ecological corridors.

The field studies revealed both the critical areas for structural connectivity based on the actual permeability of the landscape, as well as the local factors that influence functional connectivity. In addition, the presence of the brown bear in the ecological corridor was documented for the first time outside its 'official' distribution. The analysis of these areas in relation to existing Natura 2000 sites allowed the elaboration of proposals to achieve the conservation objectives of existing protected areas and the declaration of new Natura 2000 sites.

The LIFE+ Connect Carpathians project (2013) implemented by Fauna & Flora International (FFI) and the Zarand Association aims at the identification of conservation objectives for large carnivore species and elaboration of a regional action plan in the corridor area with the involvement of stakeholders. Concrete conservation measures will be demonstrated and implemented, including measures for reconstructing structural connectivity by creating micro-corridors, identifying measures for limiting poaching, preventing damage and harmonising game and forest management plans with conservation objectives.

The actions from the regional plan will be adapted and included in the management plans of the Natura 2000 sites that are part of the ecological corridors, allowing coherent management. An efficient monitoring system of the species will allow both tracking of the achievement of the conservation objectives and adaptation of conservation measures for ensuring the efficiency of the ecological corridors and, consequently, of the favourable conservation status of the large carnivore species.

See Salvatori (2004) and Mot *et al.* (2010).

5.2.4. LEGAL MEASURES

LM8. Increase penalties for poaching, especially of protected species

To support measures for reducing poaching, it is necessary to increase penalties for poaching and illegal trading of large mammals. At present, many of the penalties do not act as sufficient deterrents.

LM9. Strengthen legal provisions for intersectoral coordination of protection and management

Special legislative acts should be adopted concerning land use planning, infrastructure and settlement development where conservation requirements will be included into planning process.

5.2.5. PLANNING MEASURES

LM10. Agree regional species management strategies to provide an overall common framework for the conservation and management of large mammals

According to the conclusions of the recent large carnivore LIFE project, management actions should be shifted from the local to the population (regional or larger) level, but currently no Carpathian large mammal population is managed through a joint management plan (Silva *et al.* 2013).

The European Commission published guidelines for population-level management plans for large carnivores in 2008, because of the importance of the transboundary approach. However this is not possible without wide and detailed cooperation of different governments and synchronisation of policies and actions. As a priority, regional plans should be developed first for the large carnivore species, bison and chamois.

Transboundary cooperation in bear conservation between Romania and Ukraine

The 'Open borders for bears between the Romanian and Ukrainian Carpathians' project was implemented in the region of Maramures (Romanian-Ukrainian region of the Carpathians) between May 2012 and April 2013. The project's aim was to establish a critical stepping-stone for the connectivity of the Carpathian Mountains by reducing the risks of habitat fragmentation, restoring ecological corridors for bears as an umbrella species and securing responsible use of natural resources. The project was implemented by WWF DCP Romania (Maramures Branch) and the NGO RachivEcoTur from Ukraine.

No systematic research into large carnivore populations had previously been conducted in the region; the only available information came from hunting units and partly from protected area administrations. The project has now significantly improved the level of information and knowledge about bears in Maramures and their habitats.

The critical habitats for bears in the project area have been identified using several methods, such as capturing and monitoring 5 bears with GPS-GSM technology, use of infrared sensor motion cameras, monitoring with a network of volunteers and experts, and workshops and meetings with key stakeholders. The information gathered allowed for the identification of both critical habitats and corridors for the movement of bears between the two countries.

To ensure the long-term conservation of the natural values in the region, several tools have been used, including the High Conservation Value Forest Toolkit, and High Nature Value Farmlands Toolkit, which have contributed both to the conservation of critical habitats and corridors for bears and to the sustainable development of local communities.

The major threats and pressures affecting large carnivores have been identified, analysed and addressed on both sides. After collecting information from various sources, management measures for the long-term conservation of bears have started to be defined in a participatory way, targeting the transboundary area, as well as locations either side of the border, where major differences between the two countries have been identified.

Examples of management measures for corridors to allow the movement of bears across the landscapes include:

- Establishing the minimum width of the identified corridors (monitoring is needed for each critical corridor).
- Agreement for maintaining/responsible management of the corridors with all key stakeholders.
- Legal establishment of the critical corridors.
- Assumption of legal responsibility for the management of the corridors.
- Establishing 'quiet zones' within hunting units for protecting the identified critical corridors.
- Maintain the land use categories and prohibiting any changes.
- Controlling and monitoring the establishment of sheepfolds and the collection of forest fruits and forest related products.
- Controlling human activities and issuance of authorizations for building houses, constructing roads etc. Inclusion of the corridors in the General Urbanistic Plan (land use planning document).
- Limiting/banning off-road activities and limiting the speed of vehicles in critical areas.
- Forbidding the provision of supplementary food.
- Visual delimitation of corridors (e.g. panels) and other information/awareness raising activities.
- Diversion of touristic trails from the corridor areas.

The identified management measures will be agreed with the main stakeholders in the upcoming period. For further information, see www.openbordersforbears.org/ or contact the project team at www.openbordersforbears.org/noi/

LM11. Develop national multi-sectoral species management plans that take into account national priorities and conditions

Species management should be integrated into the management practice not only of nature conservation bodies, but also of other sectors, especially, forestry, hunting, agriculture and land use. Plans should:

- Follow a more holistic approach, addressing not only one single species, but also populations and ecosystems. There have been many successful local actions, but their influence on a wider scale is limited.
- Large mammal populations cover large areas and connect different habitats and many other species, as well as human activities. A really successful plan has to cover all of these factors.
- Be adapted to local contexts.
- Involve stakeholders in planning processes. The only positive correlation in the questionnaire survey was found between the number of stakeholders involved and the quality of plans.
- Be integrated into the plans of other sectors and stakeholders.
- Address conflicts among the stakeholders.
- Consider sustainable economic exploitation if the species population size allows it, based on a strict planning and control system.
- Be widely available; they can only be put into the practice if they are available and known.
- Include more concrete actions and goals that are understandable and feasible in practice.

Management planning and the National Game Management Database in Hungary

In Hungary, game is state property, but hunting rights belong to the landowner. Three levels of management planning have been established to harmonise the different interests, with the following main goals: long-term survival, improvement and sustainable use of game populations and habitats; mitigation of the conflicts between game management and other land use interests (agriculture, forestry); administrative support for the interest of nature conservation.

The Ministry of Rural Development is responsible for the state game management strategy. The National Game Management Council, representing the main stakeholder groups (state and private game managers, foresters, nature conservationists, NGOs and scientists), serves as advisory body for the Minister.

Game management regions and sub-regions were defined by a multifactorial analysis of game population and management data and then synchronised to administrative regions. Regional management plans were elaborated for game management sub-regions by the regional County Game Management Inspectorate (CGMI, a state administration body) with the help of County Game Management Councils (CGMC), which represent the stakeholders regionally. These documents set long-term goals and directions for game and habitat conservation and management for the regions and sub regions, and are the basis for developing 10-year plans for Game Management Units (GMU).

These 10-year management plans must be prepared by qualified and registered experts. They summarise the relevant information from the regional plans and contain information on the GMUs, on game species, habitats and their conservation and management and on nature conservation rules and special game conservation/management activities. GMUs also prepare annual plans and reports on management and harvesting, which contain the spring population estimates, harvest quotas/plans, data on trophy scoring, hand-rearing and release, game feeding, game field management and measures to reduce/avoid game damages. Both plans must be accepted and altered, if necessary, by the CGMI with the consultation of CGMC.

The National Game Management Database serves as a background data source for game management and planning. The database collects the data on the 3-level planning system, game management and trophy scoring reports and monitoring programmes, prepares statistical analyses and annual publications of game populations and bag statistics, maintains GIS databases and provides data to administrators and game managers.

LIFE projects to support action for large carnivore conservation in Romania

The LIFE EX-TRA Project 'Improving the conditions for large carnivore conservation' was an international initiative for the conservation of wolves and brown bears that operated between 2009 and 2013. The project had seven partners, coordinated by the National Park Gran Sasso e Monti della Laga, and worked in four countries: Italy, Romania, Bulgaria and Greece.

In Romania, the project was implemented in areas that represent all the main issues concerning local large carnivore management and where wide range of stakeholders operate: game units, hunters' associations, state forest offices and universities/research institutions. The focal areas were:

- Herculian (ROSCI0091), a Natura 2000 site for large carnivores.
- Dalnic, a hilly area with high densities of large carnivores and significant livestock grazing activities.
- Sacele, a typical large carnivore mountain area partially included in two Natura 2000 sites.

Project activities focused on the following:

- Assessment of the damage caused by carnivores on livestock, prevention of damage (livestock guarding dogs, promotion of best practices) and development of damage prevention and monitoring strategies as models for Romania.

- Monitoring protocols for large carnivores and prey species.
- Improving conditions for large carnivores and prey species management (poaching control, feeding conditions).
- Implementation of a Bear Emergency Team (BET), a national group of specialists who work for reduction of bear-human incidents and implement prevention methods.
- Enhancing the cooperation between different interest groups: livestock breeders and livestock guard-dog breeders, hunters, conservationists, local and national authorities, NGOs and nature conservation authorities.
- Supporting the national working group for large carnivores.
- Information and experience exchanges: national and international field trips, training of the main actors, compilation and distribution of best practice manuals.
- Raising public awareness regarding the coexistence issues, problems and solutions for improving the existing situation.

For further information see www.lifextra.it/index.php?option=com_content&view=frontpage&Itemid=1&lang=en

The website <http://www.carnivoremari.ro/home.php> provides information from implementation of three other LIFE projects concerning large carnivore conservation in Romania and the Carpathian region. Notable outputs have included:

- Good practice guidance at the regional scale:
 - Guide for population assessment (new methods).
 - Guide for assessing the risk of conflict.
 - Guide for land owners on how to prevent conflict with carnivores.
 - Guidelines for assessing the ecological corridors and how the authorities should work on preserving them.
- Information dissemination and education <http://www.lifeursus.carnivoremari.ro/systems-for-reducing-damages-produced-by-bears.php>.
 - Establishment of the first GIS open portal for the general public related to large carnivores. (<http://www.lifeursus.carnivoremari.ro/gis-database.php>)
 - Development of a thematic and virtual tour of a protected area especially for large carnivores.
 - Promotion of local bear friendly products.
- Practical measures:
 - Over 200 farms equipped with electric fences to protect livestock.
 - Two rehabilitation centres for bears and other mammals.
 - Work in over 15 Natura 2000 sites and elaboration of seven management plans for protected areas related to large mammal conservation.

LM12. As a priority establish a special regional project for lynx conservation

Lynx is a 'forgotten species'. The relatively low protection status of lynx in Europe is misleading because it does not reflect the status of the isolated populations. The species is the most vulnerable large carnivore in the Carpathian region and the least studied. Their secretive, solitary behaviour, high fidelity to territory, special habitat and food requirements make lynx highly sensitive. Habitat alteration and destruction, especially in large old growth forests, threaten lynxes more than the other large carnivores.

A special lynx conservation project should be established for the Carpathians similar to that successfully operating in the Balkans. (See http://www.catsg.org/balkanlynx/20_blx-compendium/home/index_en.htm) with the following main objectives:

- To act as a central point for collecting, collating and publishing data about the lynx observations, threats to lynx, and conservation activities.
- To develop and coordinate standard monitoring systems for lynx.
- To organise regional training and information exchange for all those involved in the protection, management and study of lynx.
- To lobby for improved protection measures at national and regional levels.



Picture 36: Lynx (photo: WWF DCP)

5.2.6. AWARENESS AND CAPACITY DEVELOPMENT MEASURES

LM13. Conduct programmes to improve the image of carnivores

Long-term conservation of large carnivores requires the support of the public and decision makers and communication with stakeholders at the local, regional, and country levels. This can increase the sensitivity of other sectors and help stakeholders understand the importance of large mammals. A range of activities is recommended:

- Production of educational material (leaflets, lectures, websites) and their distribution through different stakeholder networks.
- Establishing dialogues and cooperation with farmers, hunters and other local stakeholders. Organising meetings and lectures.
- Increasing involvement of interest groups in decision making related to large mammal management.
- Increasing local, regional and transboundary cooperation in order to share information.

LM14. Build capacity for large carnivore protection and management

Capacity development is required for a range of groups:

Local farmers. Training is required for methods to prevent or mitigate damage caused by large mammals.

Field monitoring staff. This group requires training in the skills needed to recognise the traces and signs of target animals (footprints, tracks, prey remains, faeces, urine, hair, den and voice). Training is also required in basic survey and recording techniques.

Experts. The main need is for knowledge sharing. It would be useful to establish a forum where experts can exchange experiences, good and bad practices, research results, etc. It would also be useful to build international relations with groups working on large mammal conservation in other parts of Europe.

Law enforcement authorities. Training is required on the law and effective measures to stop poaching and illegal wildlife trade.

Hunters. Hunters play a crucial role in game management in most Carpathian countries. They are often relied on to provide population estimates of game species, from which hunting quotas are set. Hunters are also relied on to be self-regulating with respect to observing regulations, adhering to quotas, remaining within permitted hunting areas, reporting bags and avoiding opportunistic killing of protected species. Although many hunters do act responsibly, programmes of education and awareness raising may be required to help all hunters become better stewards and monitors of wildlife and important contributors to conservation efforts.

5.2.7. MONITORING, RESEARCH AND INFORMATION MANAGEMENT

LM15. Establish reliable and common monitoring systems at the regional and national levels

One of the main limitations to effective management is the lack of reliable knowledge acquired through monitoring that is regular, representative, replicable and reliable and standardised. It was the unanimous recommendation of the experts in this study to establish a reliable common monitoring system at bioregional and national levels that provides replicable and comparable results on population sizes and densities.

It is now generally accepted by experts that it is impossible to determine the absolute numbers of species using traditional methods. The focus should be on presence/absence and relative abundance, which can be measured through sampling and using more practical methods. This approach is in fact already being used in many countries; the problem is that field surveys are carried out in different ways in different Carpathian countries, so that data are not comparable across species ranges.

Therefore, a basic minimum monitoring method should be established for all species that can be readily used across the region and that identifies and addresses factors that cause bias in monitoring. Monitoring experts should prepare and test a detailed field guide on the recommended methods. One possibility is the application of synchronised counts on sample plots and track counts on sampling routes, using routes and plots that are representative samples of the distribution area of the population. This should be accompanied by comprehensive, user-friendly guides for identification of large mammals in the field.

LM16. Develop new methods for monitoring

In parallel with the basic actions recommended under the previous measure, a range of new monitoring methods should be tested and publicised (several projects in this field are in progress in Romania, Slovakia, the Czech Republic Hungary and Serbia). Methods include:

- Camera trapping.
- Telemetry using satellites and GPS.
- DNA analysis from hairs, scats and urine.
- Use of questionnaires and public surveys.

The use of many of these new techniques is limited by the associated expenses; their use should complement, not substitute lower cost, more sustainable methods.

LM17. Establish a network of long-term monitoring sites in order to monitor the impact of the measures for long period.

Selected large areas should be identified as 'regional samples' of species ranges and be subject to systematic monitoring using a common method. These sites could be integrated with the Priority Areas proposed in CIMM as control areas.

It would be good practice to conduct joint surveys of these areas involving conservation biologists, hunters and foresters (this approach is already used in Slovakia).

LM18. Establish a regional data centre for large mammals

One centre is required that will enable experts to submit and access data from across the region using a multilevel GIS based monitoring database. This approach was first used in a lynx project in the Swiss Alps (SCALP), but the Hungarian large carnivore LIFE project and the Romanian bear LIFE project have also developed similar GIS based databases⁸. This data centre should allow:

- Uploading of data.
- Free access to data for experts.
- Links to national databases.
- Access to case studies, reports, training materials, etc.
- Data should not only include scientific monitoring data, but also management and threat data (e.g. locations of conflicts).

LM19. Encourage research projects

Universities, research institutions and individual researchers should be encouraged to conduct management-oriented studies about large carnivores and herbivores. These should include:

- Ecological studies of particular species (population parameters, habitat use and requirements).
- Causes and possible solutions of conflicts.
- Impact and effectiveness of various management interventions.
- Sociological and economic aspects that would allow elaboration of models for the implantation of large mammal conservation and management into rural development.

5.2.8. FINANCIAL SUPPORT

LM20. Secure funding for large mammal conservation

Funding is required for many of the proposed CIMMs. Possibilities include:

- Promoting transboundary projects financed by Transnational Cooperation Programmes and LIFE+.
- Developing a financial instrument between Carpathian countries to support small grants for mammal conservation/research projects whose results will be integrated in the developed common database.

⁸ Examples of databases from Romania can be found at
<http://www.lifeursus.carnivoremari.ro/baza-de-date-gis.php>
<http://carnivore.biodiversitate.ro/>
<http://www.forestdesign.eu:81/VOLUNTARI/site/>