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Ministry of Agriculture,
Forestry and Rural
Development

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Ministry of Environment
and Water Management

Management and Action Plan for The Bear Population in Romania



MANAGEMENT AND ACTION PLAN FOR THE BEAR POPULATION IN ROMANIA

The goal:

To maintain, in coexistence with people, viable populations of large carnivores as an integral part of ecosystems and landscapes across the Carpathians

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Introduction

The population size of Brown bear in Romania represents about 35 – 40 % of the total number of bears in Europe, outside Russian territory, being the largest European population of this species, according to the IUCN report “**Brown Bear Conservation Action Plan for Europe**” - 1999.

After a constant decline in numbers until 1940, the population of Brown bears began to increase slowly but continuously. This phenomenon occurred due to a more strict hunting system (individual bear tags), reduced poaching derived from a more restrictive regime concerning guns, and strengthening of criminal penalties for illegal activities affecting bears.

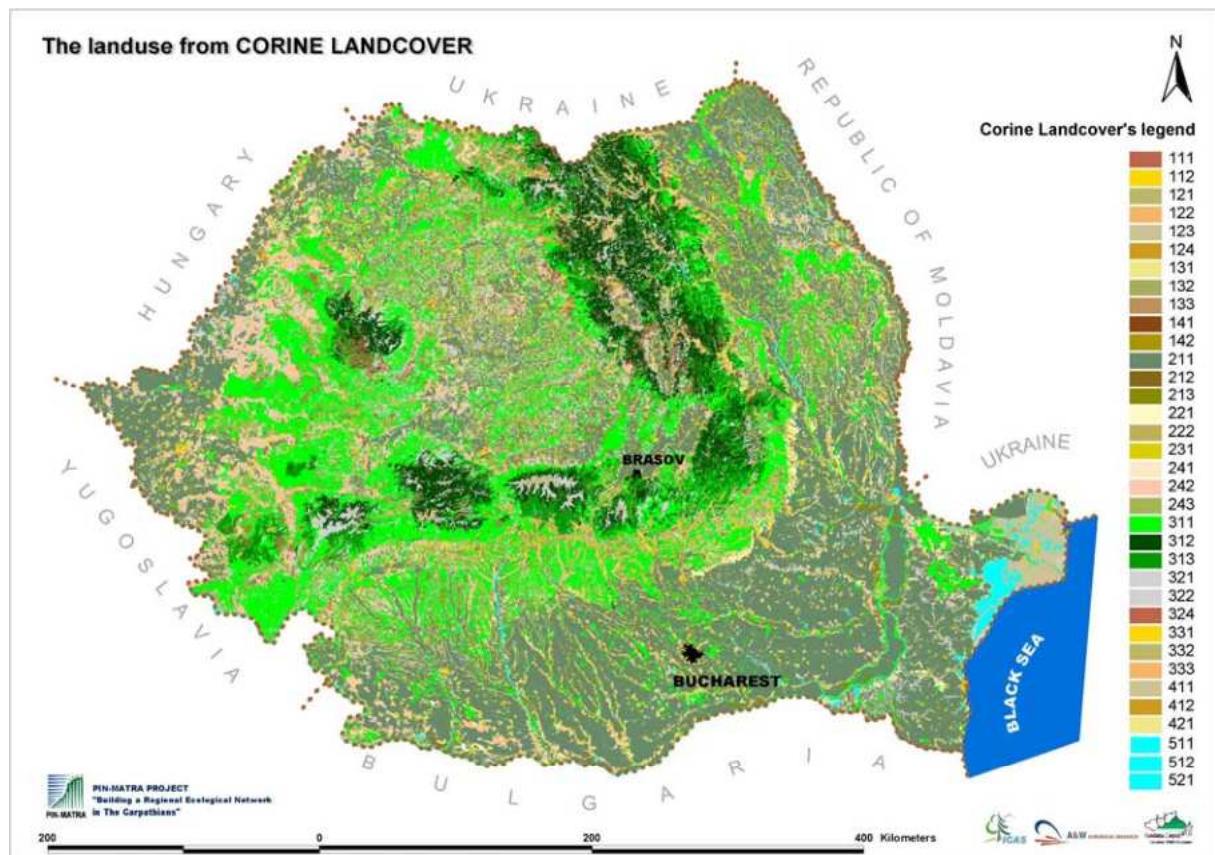
The bear population also thrived due to the increased food offer that followed some clear cuttings which resulted in increased deer and wild boar populations and growth of fruit producing shrubs consumed by bears.

The increase of the Brown bear population reached its maximum at the end of the 1980's when it was estimated at about 7,800 individuals, nearly double compared to the optimum population level established by specialists. The beginning of the 1990's marked a strong decrease of the bear population which could be explained by a strong attitude against the species coming from the local communities economically affected by bears and the correlation that was made between the overprotection of bears and the non-democrat political system. People “made their own justice” and eliminated bears that made important economical damage. After this, the bear population stabilized and even increased as a result of the economic value generated by foreign hunters, due to the protection measures re-established and also, due to a better implementation of the legislation pertaining bears.

The geographical distribution of Brown bears in Romania was much wider in the past, then it was reduced until the Second World War, increasing slowly after, so that, at the beginning of the last decade it reached an area of about 69,000 sqkm (total area of hunting units), out of which 93% are in the mountains and 7% are in the surrounding hills (Ionescu O, Isuf C.1994). The GIS studies done by the ICAS Wildlife Unit (Pin MATRA financed project) have shown that the distribution of brown bears in Romania was constant within the last decades and it covers about 70% of the Romanian forested area (Predoiu G., Popa M. 2004).

Geographically, Romania is both a central and a south-eastern European country. The Carpathian Mountains Range makes up a forested region of mountains and hills, which the brown bear has inhabited for thousands and thousands of years. This region represents an extensive biologically and ecologically conserved habitat for the largest of the European large carnivores. The health and integrity of this habitat is also confirmed by the presence of two other large carnivore species: the gray wolf

and the European lynx, as well as numerous other animal species that have disappeared in other parts of Europe.



The brown bear in Romania is a wild protected species, as well as a game species, which deserves the utmost care and attention and which undeniably has the right to exist. In this respect, the brown bear is one of the most valuable elements of biodiversity, and plays an important role in biodiversity maintenance. Compared to other animal species, the brown bear is at the top of the food web and can be directly threatened only by humans and their activities. Since bears and humans inhabit the same areas, it is apparent that there is a need to ensure their coexistence, which is the final goal that the various measures defined in this plan aim to accomplish. Where peaceful coexistence is lacking, the natural habitats for bears are destroyed and the bears disappear.

Implementation of the measures for conservation and protection of biological and ecological balance in the natural habitats of bears or, in other words, enabling the coexistence of bears and humans, has to be developed on the basis of modern ecological knowledge, suitably regulated, and there has to be a general agreement on the key issues among the different interest groups.

The measures cannot be applied according to anybody's own will or on the basis of individual cases, but must be regulated with an official document. In this case, the document is the Brown Bear Management Plan for Romania.

The purpose of this management plan is to set up a management goal within a framework defined by international and domestic regulations, to establish measures for the conservation of natural habitats and bear populations, as well as measures

aiming towards achieving the harmonious coexistence of humans and bears. Besides this, the plan should be transparent to the equivalent plans of neighboring countries which manage conserved bear populations, as well as to appropriate action plans of the European institutions.

Experience from Western Europe and North America showed that management was the more successful, the more needs and interests of people were considered in taking management decisions. Strategies like developing eco-tourism, or helping livestock raisers to reduce as much as possible damages to livestock, may not only help people to suffer less economic burden due to large carnivores but also make them feel that the specialized government agencies take them into consideration and try to understand their needs.

The Brown Bear Management Plan is the first comprehensive document which systematically offers fundamental guidelines for brown bear management in Romania. This plan is based on scientific knowledge, and will create a connection within the legislative, administrative, cultural, economic and social frameworks. It is also based on the accepted and ratified international conventions, plans and recommendations related to brown bear conservation and protection worldwide.

The brown bear in Romania is a wildlife species, which inhabits an area of about 69.000 sqkm. The area is part of the wider Carpathian region which is the home range of a substantial (viable) brown bear population. Therefore, the development and implementation of this management plan also needs to be coordinated on this international level.

In concordance with the responsibilities originating from the international conventions, directives, plans and recommendations, the Ministry of Agriculture, Forestry and Rural Development and the Ministry of Environmental and Waters Management have appointed an expert committee for the elaboration of The Brown Bear Management Plan for Romania in the year 2002.

It must be emphasized that activities for brown bear conservation in Romania started much earlier, with a goal of achieving integral management and conservation of bears in Romania. A series of national and international consultation workshops with different interest groups were held (Poiana Brasov 1993, Poiana Brasov 1999, Poiana Brasov 2001, Zarnesti – Plaiul Fcii 2002, Sinaia 2003, Zarnesti – Plaiul Fcii 2004, Poiana Brasov 2005). Besides that, biology and forestry researchers, as well as hunters, have studied bears and their biology over the past decades. The result of their research became valuable expertise, scientific knowledge and literature on bear biology.

This management plan tries to encompass the current knowledge related to brown bear management; however, it must also promote modern, ecologically based wildlife management that includes protection and conservation of biological and ecological balance in natural habitats, as well as their sustainable use.

The plan has been envisioned as an active document to be expanded upon, as needed. It will provide the basis for changes and improvements to the existing legal provisions regulating hunting, protection of biodiversity and landscape diversity, as

well as other sectors. Annual action plans for brown bear monitoring and reports to the competent authorities will be based on the plan.

In that sense, the plan is a fundamental document to which reports on special studies (sociology, economy, biology, ecology, etc.) are appended, alongside with management plans for each wildlife management unit.

Romania is currently experiencing great changes in various domains. These changes can have considerable effects on the brown bear population. The effects are expected to be mostly negative. Therefore it is important to identify, evaluate and mitigate them. This management plan will be an axis around which the protection and conservation of bears in Romania will take place in the upcoming period.



Part I – The General Overview

1. THE PURPOSE OF THE PLAN

With all of their amazing biological characteristics, their important place in the human mind and the considerable amount of international interest for their conservation, the management of large carnivores such as bears is very challenging.

With this management plan we expect to bring together different interests such as ecological, aesthetical and economic, as well as care for the safety of people and their properties.

The plan should also ensure conditions for the long-term survival of the brown bear, the species listed as an endangered species in different international regulations, in a way that preserves its game-species status in Romania. Careful evaluation of the actions affecting the population size represents the most critical part of this plan. Those actions are supposed to maintain the size of the bear population within the carrying capacity of the habitat. In other words, the density of bears should be acceptable to people. In this way, possible conflicts with people will be minimized, whilst the long-term viability of the population will be ensured. In order to achieve this goal, a series of other actions and measures related to bear habitat and human activities in the habitat (e.g. highway construction), feeding of bears by humans, prevention of problematic bear occurrences and scientific monitoring of all changes in the population have to be regulated.

The implementation of the plan is, for the most part, a task of the wildlife biologists, management experts and Romanian authorities; however, representatives of all other interest groups should also be actively involved in it. Finally, the plan should undergo occasional revisions, which should take place more often than is the case for some other management plans. In large carnivore management, and especially in bear management, there are no final and universal solutions. Each change in the number of bears, the areas of their presence or behaviour, require new decisions. The plan should offer guidelines for the decision-making process, and in the case of new, permanent circumstances, it should be adjusted through revision processes.

Romanians and people of neighbouring countries, as well as Europe and the world expect that Romania, with its Brown Bear Management and Action Plan, will ensure the long-term existence of as many bears as possible in their habitats, with as few negative effects as possible.

2. BACKGROUND FOR THE DEVELOPMENT OF THE PLAN

The Romanian brown bear population and its habitats are coming into interaction with human activities and the future management of the species should be based on an integrated management approach. Taking into account the population size (about 6.000 individuals) and the area of its habitats (about 69.000 sqkm), the bear population should be managed through a plan that is taking into account the complex relations between bear biological requirements and human development.

The plan is based on national and international scientific studies, expert knowledge, long-term wildlife management experience and collaboration between different local, regional and national institutions.

3. LEGAL PROVISIONS CONCERNING BEAR MANAGEMENT

3.1. International Legal Provisions

International Conventions and Initiatives

Bears, wolves and lynx are considered of high priority in conservation. Because of their dependence on large natural areas, they are “umbrella species” for a number of other wildlife species. This understanding has been reflected in their protection status in the international legislation such as the '*Convention on the Conservation of European Wildlife and Natural Habitats*' (Bern Convention, Bern, 1979), where the brown bear is listed in appendix II (strictly protected species), the EU Habitats Directives, or the Pan European Biological and Landscape Diversity Strategy (PEBLDS). Most European countries have adapted their national legislation according to these conventions and directives. The Convention on International Trade of Endangered Species (CITES; Washington 1973) regulates the international trade of species or parts of species that are listed in its Appendix.

The European brown bear is listed in appendix II, as a potentially endangered species.

The Large Carnivore Initiative for Europe (*LCIE*), has the goal to maintain and restore, in coexistence with people, viable populations of large carnivores as an integral part of ecosystems and landscapes across Europe. Currently, over 50 organizations from almost all European countries participate in this initiative.

Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitat Directive) is one of the basic regulations related to nature protection in the European Union countries. Member countries of the European Union must harmonize their national legal provisions according to this Directive. As a candidate country, Romania also has that obligation. The Brown bear is listed in Annex II of the Directive. The annex includes wild fauna and flora species of Community interest, the conservation of which requires the establishment of Special Areas of Conservation – SAC – within an ecological network called the Nature 2000 Network. It is also listed in Annex IV as one of the species of Community interest that need to be strictly protected (capturing, killing and disturbing are prohibited). The bear populations in Sweden and Finland are omitted from both Annexes. According to Article 16 of the Directive, the countries can deviate from the above-mentioned provisions under special conditions. The keeping, transport and sale or exchange of individuals of Annex IV species taken in the wild is prohibited, except in the interest of preventing serious damage, in particular to livestock, in the interests of public health and safety, for the purpose of research and education and for the purpose of repopulating and re-introducing these species.

Trade is also prohibited with the European Community (EC) Regulation No. 338/97 of 9 December 1996 on the protection of species of wild fauna and flora regulating trade. This act regulates the trade of protected wild fauna and flora species within the European Union and is a legal base for implementation of the CITES convention. The

brown bear is listed in Annex A of 11 the Regulation, which includes threatened, extinct and rare species – trade of which would endanger their survival.

The European Parliament ratified a Resolution on 17 February 1989, in which the European Commission was invited to encourage programmes for bear conservation in Europe and to continue already-existing programmes. The European Parliament Resolution from 22 April 1994 invited the European Commission not to support land use programmes that could have negative impacts on bear populations. Such spatial planning has to be avoided, with the identification of appropriate protected areas and corridors.

In accepting the abovementioned international legal provisions, our country has the obligation to carry out all the necessary legal and administrative measures on national, as well as international level, in order to ensure the protection of bears and their habitats. A viable population of bears is also a reservoir of genetic material and, as such, a potential source for the reintroduction of the species in suitable habitats in other European countries in which the species is extinct.

3.2. National legislation on the protection and conservation of the brown bear

Romania joined the Convention on the wildlife and natural habitat conservation in Europe, issued in Berne on the 19th of September 1979, by Law no. 13/1993. The stipulations of the Law 13/1993 concerning the measures for the protection and conservation of the brown bear had been included in a special law on the game populations and game protection - the Law 103/1996. Thus, the species *Ursus arctos* (brown bear) was included in Annex 2 of the Law 103/1996, corresponding to the strictly protected game species.

Article 9 (I) from the Berne Convention stipulates that the signatory parties can make exceptions from the stipulations of the Convention, being allowed to approve the culling of some individuals, under the provision that the population is not endangered, in the following cases: for fauna protection, for avoiding damage to livestock and for assuring the health and security of the public.

Taking into account the feeding habits of this species, in recent years there have been significant damages registered on domestic species (sheep, cattle, horses, donkeys, pigs) but there were also people injured or killed by brown bears.

The approval of a limited harvest quota for brown bear is needed in order to control the level of damages caused by the species.

At this moment, the Ministry of Agriculture, Forests and Rural Development is involved in different trials for compensation of damages caused by this protected species. Every year there are registered damages on domestic species estimated at over 2 billion ROL.

Hunting is allowed only for certain bears in certain conditions, places, and periods, and with the means established by the law. Hunting of brown bears is done only within the limit of the maximum number of individuals allowed by the law. Deduction of this maximum number of individuals for each administrator and game management unit is approved by ministerial order of the specific central public

authority. In this respect, we mention the Law 485/ 2004 which approved Ordinance no. 87/2004 for approval of individual numbers of Brown bear, Lynx, Wolf and Wild Cat allowed to be harvested in the 2004-2005 hunting season.

Hunting of the Brown bear species is allowed in Romania only in accordance with technical guidelines and regulations related to authorizing, organizing and performing of hunting issued by the public authority responsible for hunting activities on the basis of the provision of the Law no.103/1996, republished.

Specialized personnel from competent authorities of the state controls hunting activities in the game management units, and in the case of finding infringement, the measures taken are those imposed by legal provisions (Law no.103/1996, republished).

A According to article 36 of the Law no.103/1996, republished, the hunting of the game species, strictly protected (such as Brown bear) without the approval of the central authority for forestry is an offence and is punishable with imprisonment from 1 to 2 years or with a fine between 50 million ROL (approximately 1250 EUR) and 150 million ROL (approximately 3750 EUR) and confiscation of equipment (cars, guns, etc.). The attempt to hunt these species is also punishable, but in this case, the punishment is half from that of the hunting fine.

The trade with game or game trophies, no matter the species, by natural persons is forbidden, according to article 32 letter r) of Law 103/1996. The ownership on game trophies or game animals by natural persons, in accordance with the present legislation, is allowed only based on the documents certifying the provenance of the game, the copy of the hunting permit and the certificate for the evaluation of the game trophy.

Law no. 462/2001 contains provisions on species protection (Section III – Art. 26 – 28) and the strictly protected species of the Annex IV of Habitats Directive that are present in Romania were listed in the Annex 4 of Law no. 462/2001. Section III of the Law regulates the conservation of natural habitats and wild species, including of those listed in the Annex 4.

Hereby, for wild plant and animal species under strict protection, including those listed in Annex IV as well as the species included on the national red list, which live within as well as outside protected natural areas, the following are prohibited:

- a) All forms of deliberate capture or killing of individuals of these species in the wild;
- b) Deliberate disturbance of these species, particularly during the period of breeding, rearing of young, hibernation and migration;
- c) Deliberate destruction or taking of eggs from the wild;
- d) Deterioration or destruction of breeding sites or resting places;
- e) The deliberate picking, collecting, cutting, uprooting or destruction of such plants in their natural range in the wild;
- f) The keeping, transport and sale or exchange and offering for sale or exchange of individuals without the permit from the competent environmental authority.

Also are foreseen the conditions in which derogations can be provided (with the prior approval of the Romanian Academy, Natural Monuments Commission) - Art. 28:

- a) In order to protect the wild flora and fauna and preserve the natural habitats;
- b) For preventing the harm of crops, domestic animals, forests, fisheries, waters and other goods;
- c) For the interest of public health and safety;
- d) For the purpose of scientific research and education;
- e) In order to repopulate and reintroduce such species.

The derogation from the general provisions of the law related to the protection status of large carnivorous species is established only to create a useful instrument for the administrators of game species management units to prevent occurring of damages and to act efficiently when they appear.

The trade with individuals of species *Ursus arctos* is regulated by Law 69/1994 for Romania's joining to the Convention on the international trade with endangered wild species of flora and fauna, issued in Washington in 1973, and the transportation of the individuals of these species abroad can be done only with CITES permits issued by the Ministry of Waters and Environmental Protection. In order to implement the provision of the above mentioned law, the Order of the Minister of Water and Environmental Protection no.647/2001, modified by the Order 117/2003, approving the authorizing procedure for harvesting, capture and/or acquisition and trading on the internal market or at export of the plants and animals of wild fauna and flora, as well as their import has been issued.

In 28 January 2005 it was adopted the Ministerial Order no. 71 regarding the approval of the regulation concerning the organizing and practicing of hunting, by which the bear hunting is allowed during 15 September – 31 December. This order will become valid at the end of the hunting season 2004/2005.

3.2.1. Management Plan Elaboration Framework and Public Participation

The Ministry of Environment and Water Management, as the responsible body for nature conservation in Romania, appointed ICAS - Forest Research and Management Institute as the focal point for the development of the management plan.

On February the 9th 2015, the last meeting of specialists involved in the field of brown bear management took place. There were more than 60 participants from all institutions, organizations and NGOs involved practically or scientifically in the management of this species. After discussions and analysis of the existing brown bear situation it was decided, amongst other aspects, that at the action of estimation of brown bear population, which will take place in the spring of 2007, to strongly support the involvement of the NGOs that are interested in this matter and to prove more transparency regarding bear management activities.



Also, the NGOs were involved in reviewing of the management plan and action plan. At the end of carried discussions in frame of 4 sections, the participants agreed with an action plan that represents the specialist position on conservation problems for brown bears in Romania.

Part II – The Situation in Romania

4. INFORMATION FOR UNDERSTANDING AND DEVELOPMENT OF THE PLAN

4.1. Bear status and distribution

4.1.1. Historic and current distribution worldwide

Today, there are eight species in the bear family present in the world. These are: the Brown bear (*Ursus arctos*) in Eurasia and North America, the white or polar bear (*U. maritimus*) around the Arctic, the American black bear (*U. americanus*) in North America, the Asian black bear (*U. thibetanus*) in Asia, the sun bear (*Helarctos malayanus*) in Southeast Asia, the spectacled bear (*Tremarctos ornatus*) in South America, the sloth bear (*Melursus ursinus*) in Asia, and the giant panda (*Ailuropoda melanoleuca*), also in Asia. They have all evolved from a common predatory ancestor, approximately 25 million years ago.

As recently as fifty years ago, different authors described the several species and the 70 to 150 subspecies of brown bears.

Recent biological findings, supported by genetic research, have shown them to be just ecological variants of the same species. Thus, the North American grizzly is the same species as the Eurasian brown bear.

Depending on the population of origin, there can be significant differences between the bears. They have an immense capacity to adapt to habitat conditions, through their size and external appearance. This is how in Alaska and the Kamchatka Peninsula, during the long winters and with a protein-rich diet of salmon (which they catch in the rapids of shallow rivers during their spawning migration), some adult males can attain weights of up to 600 kg. Contrary to that, the Brown bears from the southern parts of Europe (e.g. Italy, Spain) weigh in at almost 6 times less.

The Brown bear (*Ursus arctos*) is one of the eight species of bears. According to the most recent classification, there are 6 genuses and 8 species of bears around the world. One of them is the Brown bear, which now has the most widespread distribution of any of the eight bear species. It originally occurred over the entire Northern hemisphere, from the Northern arctic seacoasts as far south as Mexico in North America, Spain and Italy in Europe, up to Eastern Siberia and the Himalayan region, the Island of Hokkaido in Japan and possibly the Atlas Mountains in Northwest Africa.

Although it is still found in vast parts of its former range, the population has been strongly reduced or even eliminated in many areas. It is estimated that currently there are somewhere between 125,000 and 150,000 brown bears around the world.

Especially in North America and Western Europe the brown bear population has declined drastically. It is estimated that in the 1800's there were round 100,000 brown bears in North America. Today, there are between 40,000 and 50,000 left.

They have virtually disappeared from the lower forty-eight states of the U.S.A.

4.1.2. Status and distribution in Europe

The brown bear used to inhabit the entire area of Eurasia and North America. In Europe, the only places where it was never present are Iceland and the Mediterranean islands Corsica, Sardinia and Cyprus. Today the bear is practically extinct in Western Europe. The remaining populations are small, separated and undergoing extinction. The largest of those are in Cantabria in Spain, numbering 70 to 80 bears, separated into two groups, and in the Apennines in Italy, where 40 to 50 bears live in and around the Abruzzo national park. Very small groups of bears still survive in the Italian Alps (Trento), where 3 or 4 bears remain, and in the western Pyrenees, also with 3 to 4 remaining bears. The last bears in the central Pyrenees became extinct during the 1980s; however, the species was reintroduced in 1996 and 1997 with three bears from Slovenia. A similar reintroduction was carried out in Austria, where three bears from Croatia and Slovenia were added to the last remaining bear there from 1989 until 1993. Today, approximately 25 bears live in Austria. Another 10 bears from Slovenia were added between 1999 and 2002 to the Trento area, and several bears from Croatia are planned for translocation to the western Pyrenees over the next few years.

There have been three reintroductions of brown bears in Europe in recent times: (1) In the central Pyrenean Mountains (three individuals in 1996-1997, the population now numbers five bears), (2) in central Austria (three individuals in 1989-1993 into an area with a naturally occurring male bear). This central Austrian population now consists of about 13-16 bears. (3) The most recent one is the reintroduction of five bears in the area of Trentino, in the Southern Alps, Italy. Two have been released in spring 1999 and another three in spring 2000.

4.1.3. Status and distribution in Romania

Little is known about the historical situation of the bear in Romania. During World War II this species was heavily hunted and after the war less than 1000 individuals remained. In the early '50s the Romanian bear population reached its lowest size with an estimated number of 860 animals. In the '60s the management of this species changed. Ceausescu was a passionate bear hunter. During his regime bears were strictly protected. Until the late '70s hunting was still done with foreign hunters, but during the '80s foreign hunters were not allowed anymore to hunt in Romania. Many of the hunting licenses were revoked, because the political leaders wanted to limit the number of people carrying weapons. The use of poison and traps was also forbidden.

Bears were artificially fed in Ceausescu's favorite hunting areas. In addition, in one area in Argeş (Țarcul Râuşor) an intensive captive breeding and introduction

program was carried out. In seven years 216 two-year-old bear cubs were released from this enclosure into the hunting grounds of Argeş. Due to these measures the Romanian bear population grew extremely fast, reaching a peak of almost 8,000 individuals in 1988, with areas with huge concentrations of partly human-habituated bears (bears that gradually lost their ancestral fear of humans).

Ideas about the need to protect the species came from hunters aware of the importance of the fauna conservation after the World War I. Unfortunately, the preservation of the species was not stipulated in a law; first of all, for political reasons, most of the animal breeders being not interested in protecting the species. So, all the laws including the Law no.231/1947 - for the organization of the economy of hunting, classified the bear as a dangerous species, its hunting being unrestricted all over the year.

Motivated by an alarming decrease of bear populations, the hunting of this species was restricted by the Decree regarding the hunt economy no. 76/7.02.1953.

The restriction was made by establishing a legal shooting season from 1 March until 15 January and the prohibition for hunting female bears with cubs the whole year as well as the shooting of bears in their den, and on the other hand, by establishing a harvest level and the compulsoriness of getting individual shooting licenses. Due to the decree 76/1953, the bear population in our country supported a constant increasing until 1969, when they reached a climax of about 4,700 bears. Starting from 1969, because of the hunting pressure, the bear populations began to decrease reaching in 1974 about 3,700 bears. From this year forward, as a result of the protection measures and the limited number of bears hunted, the population of these animals started to show significant increases.

The year 1976 marked the beginning of a new period in the management of bear populations in Romania, by introducing the Law 26/5 November 1976, regarding the economy of hunting and the hunt itself.

The law acted by restricting the bear hunting and by taking special management measures for the increasing of the density of the population.

The law stipulated that the period of bear hunting was diminished at six months, being divided into two periods: 15 March – 15 May and 1 September - 31 December. In a special paragraph, the law provided the possibility of shooting bears that attacked domestic animals and of those becoming dangerous for people all over the year, but only with special an anticipated approval of the specialized central public authority.

Beside the protection achieved by the restriction of the legal period for hunting and the regulation of the hunt, due to the stipulations of the Law 26/1976, the forestry department initiated special units for game management. The administration regime of these units was regulated through special forestry and hunting planning which led to the increase of bear populations particularly due to higher amounts of daily food and the increasing of feeding periods (Micu, I., 1998).

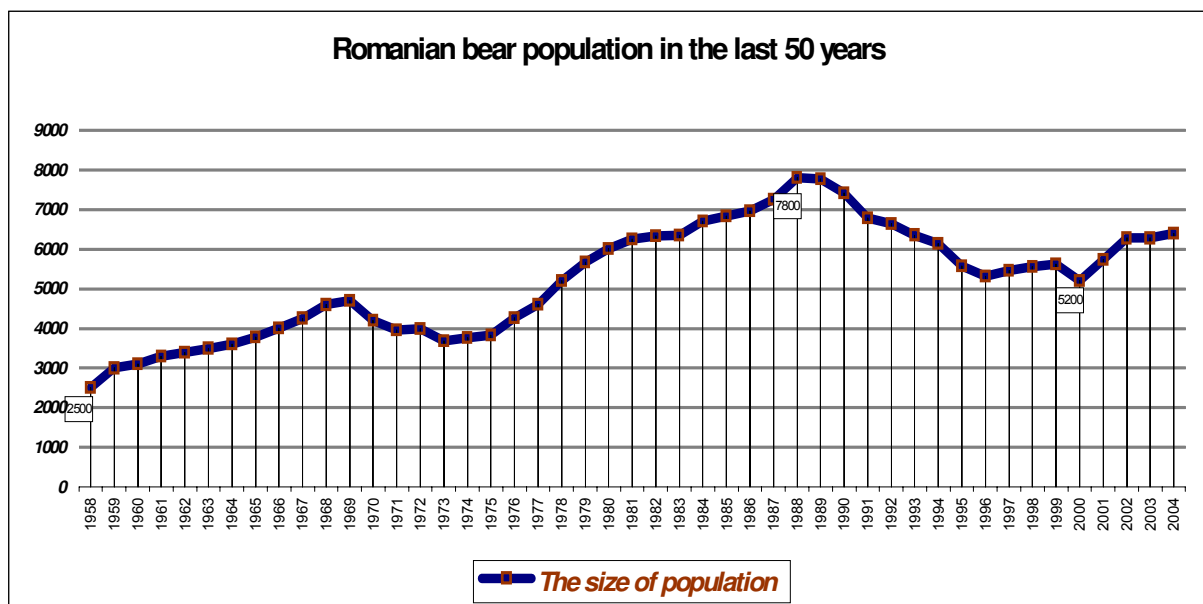
The results of these protection measures were a significant increase in the number of bears. Starting from 1978, these populations exceeded the number considered economically and ecologically optimum in research work. Simultaneously, the area of spreading of the species increased to 65,000 sqkm.

The density/10 sqkm increased constantly: 0,6 bears in the 50', 0,7 bears in the 60', 0,8 bears in the 70' and more than 1.0 in the 80'.

The bear, which until 1953 was hunted with no restriction at all, with guns, all kinds of traps and even poisoned with strychnine used to kill other carnivorous animals, remained less negatively influenced by human activities after this year. In the environmental conditions in the Carpathian natural forests, the bears were for a long period almost exclusively under the influence of hunters.

Starting 1954, the annual brown bear populations in Romania showed a significant increase. The curve of the increase in bear populations reveals an absolute maximum value in 1989 and a peak in 1969.

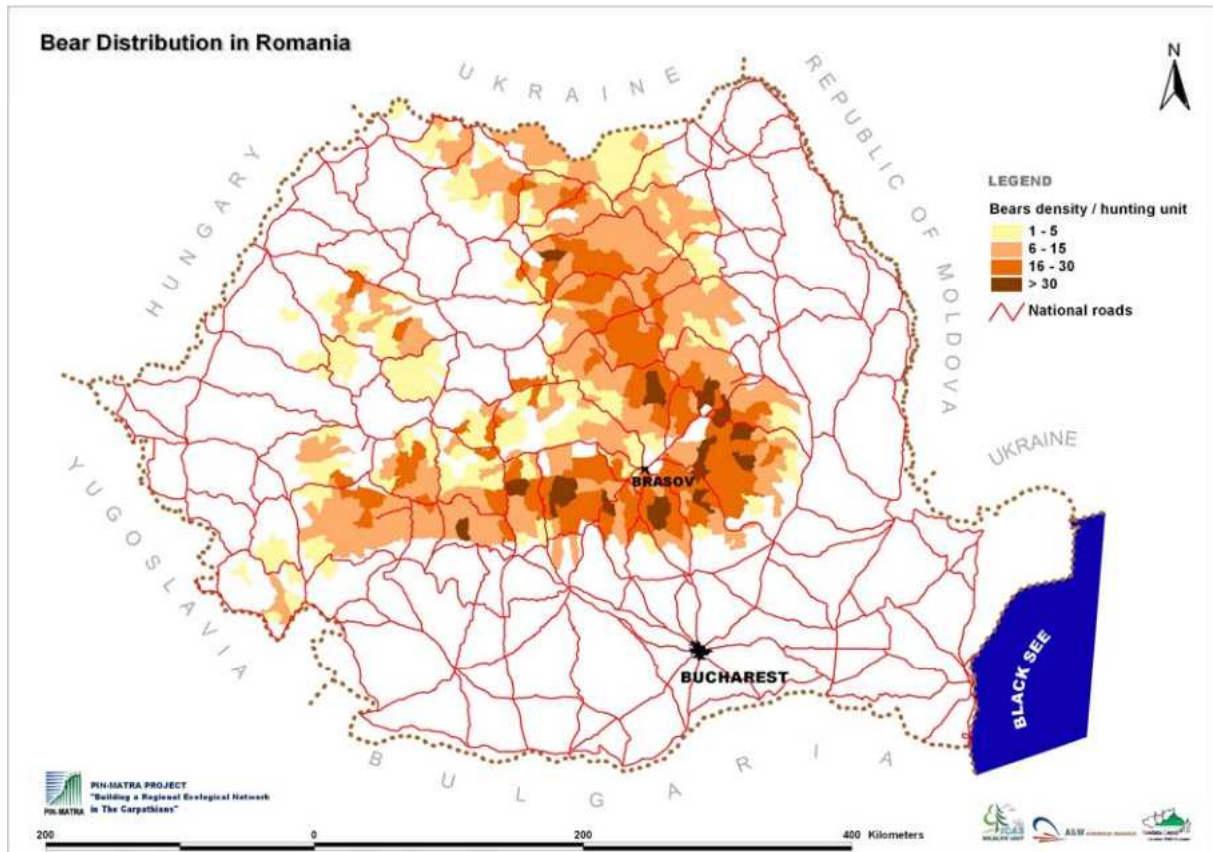
The number of bears decreased substantially from 1989 to 1996 due to poaching, illegal use of poison and a high legal harvest. The existing conflicts were the cause of a hostile attitude of the local human population towards bears which resulted in illegal using of poison, snares, traps and illegal shooting. Poisoning has decrease substantially since then, but still occurs from time to time, although it was officially forbiten by the low 13/1993 and is no more on the market.



Currently, the Romanian bear population consists of about 6,000 bears, which represents about 35% -40% of the European population west of Russia. This number exceeds the estimated optimum number of bears, which the natural habitat would sustain under natural conditions, minimizing socio-economic impact, estimated to be around 4,000. This high density of bears is due to abundant food sources provided by humans: in some areas bears congregate to feed on garbage. Also livestock, beehives and fruit plantations are still intensively used as food sources by these animals (Mertens A, 2000). In addition, in the periods before and during the hunting seasons (April-May; September-November) bears are artificially fed at feeding places in the forest. Especially this, and the fact that they feed on fruits in fruit plantations, probably provides a good food source to fatten for the winter.

The Romanian bear population is distributed all over the forested range of the Romanian Carpathians, 93% are located mainly in the mountains, and the remaining

7% live in the hills (Isuf C, Ionescu O. 1997). A smaller population of 250-300 bears is present in the Apuseni Mountains. Although the data reported from the hunting areas suggested a gap between the population in the Apuseni Mountains and the main Carpathian population, there was little doubt that the two populations are still connected. The recent studies done in the area have shown that there are connectivity corridors between the southern part of Apuseni Mountains and the rest of the Carpathians (Predoiu, G. Popa M. 2004).



The brown bear population in Romania occupies an area of around 69,000 sqkm, which represents about 30% of the surface of Romania. This means a density of 0,9 bears/10 sqkm. The highest densities can be found in the north – eastern and central part of the Carpathians, in the counties Harghita, Covasna, Bistrița, Brașov, Buzău, Mureș and Neamț.

Particularly high densities of bears can be found in autumn in concentration areas, where bears gather in huge numbers to feed on fruit plantations. The two most outstanding cases are: Dealul Negru – Bistrița, where each year, around 70-75 bears can gather to feed on a fruit plantation of 650 ha, and Domnești – Argeș, where up to 80 bears have been counted entering in the fruit plantation of about 300 ha.

4.2. Bear biology

4.2.1. Description

Due to the special situation of the bear in Romania, characterized by high bear densities in natural habitats that, nevertheless, are still quite densely inhabited by humans – it is not easy to transfer international data onto the situation in this country. Probably data from countries that are more similar to Romania from the point of view of the climate and habitat (Croatia, Slovenia, Slovakia and Poland) can be transferred more easily into Romania rather than data from North America and Scandinavia. Still, it is important to be careful in using international data for Brown bear management in Romania.



Bears are the largest land carnivores. In Romania, the average weight of adult females is 150 kg and males 250 kg, however some individuals can attain weights of more than 400 kg. In the course of a year the weight of the same adult individual can vary by more than one third: it is greater before denning in late autumn, and lower at the beginning of spring or at the end of the mating season. The body is covered with long guard hairs and thick ground hairs. The ground hair is much thicker during the winter than during the summer. The hair

color is mostly brown, and is often darker or even black over the back. However, the tips of the longer hair can be light grey. Some individuals are evenly brown, with a color similar to chocolate.

Similarly to humans, bears touch the ground with the entire surface of their feet while walking. In this way they leave foot-prints that are unlike the foot-prints of any other species living in our habitats. The fingers are tipped with claws, which are particularly long (approximately 5 to 6 cm) and strong on the forefeet. A bear uses them to dig at the soil, rotten tree-stumps and anthills, turn rocks, and to kill and tear apart prey. Unlike cats, bears cannot retract their claws. The bear's teeth have all the characteristics of carnivore teeth, with characteristic incisors, canines and carnassials (figures 7 and 8).

However, in most individuals some and in certain individuals all of the first three upper and lower premolars are missing, with the ones that do remain being small and serving no function in chewing. The chewing surfaces of molars are somewhat flatter than those of other carnivores, which is an adaptation to the grinding of plant foods.

The digestive tract is short and simple, similar to that of other carnivores, with a simple stomach, long small intestine, and short large intestine. Scats vary a lot in shape, consistence and color, depending on the food eaten. Still, they can be easily distinguished from scats of other animal species by their size and often aromatic

smell. Sometimes, a soft scat of a wild boar can look similar to a bear scat; however the boar scat does not contain bits of undigested food and lacks the recognizable smell.

4.2.2. Food

The omnivorous diet of Brown bears is reflected by their dentition. Brown bears have large canines, which may be used for defense, killing prey, and dismembering carcasses, but the small premolars, and postcarnassial molars have large grinding areas associated with a diet consisting largely of vegetarian foods and invertebrates. Green vegetation, such as grass and shoots, are eaten mostly in their most nutritious preflowering stages in spring and early summer. Bears switch to berries and fruits when they ripen. Later in autumn, and also during winter and spring, bears may consume large amounts of hard masts like acorns (*Quercus*), beechnuts, (*Fagus*), chestnuts (*Castanea*), and hazelnuts (*Corylus*), where they are available. In late summer and fall, they can feed on fruits such as plums, apples and pears.

Due to its high digestibility and high nutritional value, meat, obtained either as prey, as carcasses or as baits seems to be selected if it is available. Bears are not effective hunters of adult wild ungulates, unless they are favored by special situations. Also livestock represent an important food for bears. Insects, especially the order Hymenoptera (ants, bees and wasps) may be seasonally important foods.



Although their physical appearance is that of a true carnivore, bears satisfy up to 85% of their dietary needs with plant foods. The animal protein they consume originates mainly from invertebrates and carcasses of larger animals. The plant foods in spring and summer are mostly green plants and grasses, which are supplemented in the summer with soft fruits, and in the autumn with beechnuts – which serves as the main food for the accumulation of winter stores of subcutaneous fat. Because of the short and simple digestive tract, a significant part of the consumed plant food passes through it poorly digested or not digested at all. This forces the bear to consume as much food as it can. On the other hand, because of this incomplete decomposition during digestion, the bear aids the spreading of plant species, the seeds of which it can carry over large distances.

The plant foods it finds in the forest during spring are wild garlic (*Allium ursinum* L.) and cuckoo pint (*Arum maculatum* L.). In forest meadows it feeds on grasses (*Graminae* sp.), clover (*Trifolium* sp.) and docks (*Rumex* sp.). During the summer it most often feeds on wild angelica (*Angelica silvestris* L.), *Aposeris foetida* L. and strawberries (*Fragaria* sp.), and in late summer on raspberries (*Rubus idaeus* L.), blackberry (*R. fruticosus* L.), common buckthorn (*Rhamnus cathartica* L.) and blueberries (*Vaccinium myrtillus* L.). In the autumn, the beechnuts (*Fagus sylvatica* L.) are certainly the most important food. At that time it also feeds on crab apples

(*Malus sylvestris* Mill.) and the common pear (*Pyrus communis* L.). It also likes to eat hazelnuts (*Corylus uvellana* L.), fruits of the European mountain ash (*Sorbus aucuparia* L.), chestnuts (*Castanea sativa* Mill.), cornelian cherry (*Cornus mas* L.) and acorns of various species of oaks (*Quercus* sp.). In search of nutritious fruits and nuts a bear can often cover great distances, sometime even leaving its home range.

In agricultural fields it feeds on all species of wheat, particularly oats. It also visits cornfields, especially when the corn is still young. It visits orchards, where it eats plums, apples, pears, cherries, and other fruits. It loves to eat honey and bee larvae, so it breaks into beehives. Doing this it causes agricultural damage.

Its most common food of animal origin is carcasses of animals it finds in the forest or taken from other predators. It feeds on invertebrates, especially larvae of ants and other insects, and young wild animals. Among domestic animals it most often attacks sheep, and occasionally pigs, cows, donkeys and horses. Among game animals it attacks only young, wounded and sick animals that it is able to catch.

4.2.3. Reproduction

Brown bears have a long life span, late sexual maturity, and protracted reproductive cycles. It is a polygamous species and several males may mate with a female during the mid-May to early July breeding season. After fertilization embryos develop to the blastocyst stage, but development is delayed until implantation in late November.

The effective gestation period is 6-8 weeks and females give birth to 1-4 small (0.5 kg) cubs in their den in January-February. Young leave their mothers at the age of 1.4 or 2.4 years in Europe, the latter age is more common in the northernmost populations. In Romania mothers usually leave the cubs after the first year. The cubs themselves may remain together a longer time, but latest after the following winter (their second) they split up. Female brown bears in Scandinavia (the most intensively studied European population) give birth to their first litter at the age of four to six years (mean of 4.4), and have relatively large litter sizes (mean of 2.4). In Central and Southern Europe these data are probably similar.

Bears mate from the end of May until the middle of July. The males cover great distances at that time, and fight among them if they come close to the same female. Every male tries to fertilize several females. A female can also copulate with several males during the same mating season, so it can happen that cubs from the same litter originate from different fathers. The embryo in the uterus has delayed implantation, with the



greatest part of its development taking place during the last three months of gestation, which is altogether seven months long. The cubs are born when no other species has litters, in the middle of winter during dening. A bear spends the winter in

a specifically selected and prepared den without taking any food or liquid. In our parts most dens are located in small hollows in rocks, which the bear adapts to its needs by digging them. Only around 10% of dens are located between roots of large trees, and just as many out in the open or beneath the crowns of coniferous trees. Inside a den, a bear prepares a comfortable bed using dry grass, leaves or twigs. Still, some individuals remain active through the whole winter. If a bear is disturbed and chased out of a den, it has a shortage of body energy and has a difficult time to survive until spring unless it has a thick layer of subcutaneous fat. The young two-year-old bears are usually badly prepared for the winter, when they have to survive winter by themselves for the first time without their mother. It is still not clear if and how additional feeding at feeding sites affects the winter activity of bears.

The longest is the winter sleep of pregnant females, who usually, in the first half of January give birth to 1 to 4 cubs weighing approximately 300-500g each. Cubs are born blind and hairless. Their lives depend on direct contact with the body of their mother, who keeps them warm and feeds them with concentrated milk. Bear milk has around 22% fat and 12% protein.

The major danger to the newborn bears is inside the den in the depths of winter. If the mother is disturbed and forced to abandon the den, the cubs inevitably die since they are not able to follow her. Attempts by mothers to carry at least one cub in their teeth have been recorded in such situations; however, since they cannot carry the cub very far in this manner nor prepare a new den in the middle of winter, there are no chances for its survival. It is known that almost every winter a certain number of bear litters suffer because the den is disturbed. Fed by the nutritious mother's milk, by the beginning of April the bear cubs are big enough to leave the den and follow their mother in search of food. They stay with their mother their entire first year of life and through the next winter in the den, and separate from her at the age of one and a half years, when during May and June their mother mates again. Sometimes after mating a mother would permit the cubs of the previous year to follow her until autumn, when she finally retires to a private den where she gives birth to a new litter. Bears that live in the more northern parts of Europe stay with their mothers for 2.5 or even 3.5 years, which makes the number of births per female in these places significantly, lower. Our bears reach sexual maturity at the age of 3 to 4 years, and can survive in nature over the age of 20 years.

4.2.4. Hibernation

By late autumn, brown bears have gained sufficient adipose tissue to hibernate for 3-6 months. Dens are either dug into the ground or old anthills or they use natural cavities under rocks, etc. In southern populations some bears may remain active all year. Bears sleep more the better they are fed at the beginning of the winter and the less food is available throughout winter. Denning is probably not only an adaptation to lack of food during winter but also for birth of tiny young that are incapable of thermoregulation.

In Romania there are identified denning areas in certain habitat conditions (remote areas, rocky and thick forests, etc.) but there are also bears that use atypical denning conditions, especially on lower elevations.

In order to protect the bear population, the forest management plans include regulations related to protection of denning areas and forestry works are carried out in accordance with these regulations.

4.2.5. Activity and home range

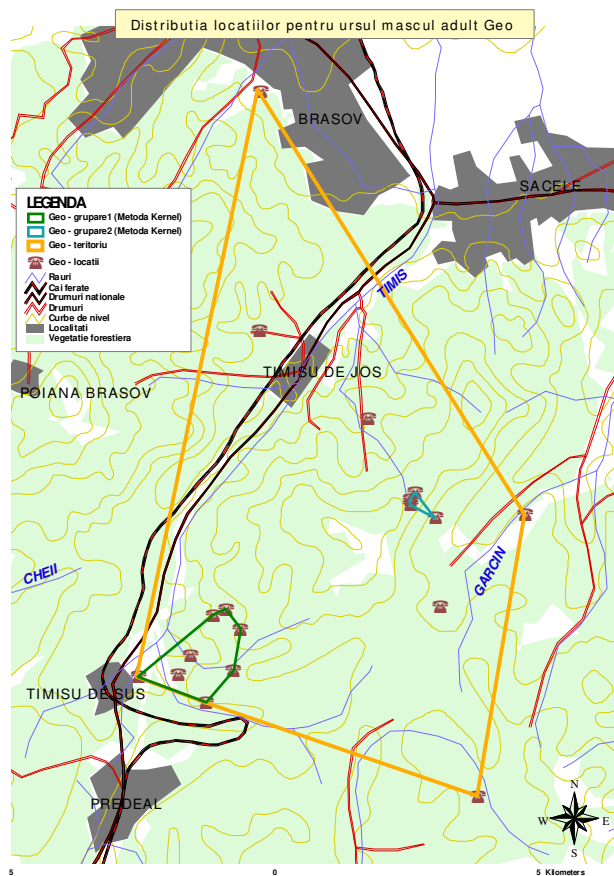
Brown bears may be active at both day and night, depending on environmental conditions, abundance of food, and human activity. Human persecution may have caused brown bears in Europe to become more secretive and nocturnal than Siberian and North American brown bears. Like most other large carnivores, brown bears occur at low densities, especially in northern populations (e.g. 0.5 bears/1000 sqkm in southeastern Norway, 20-25 bears/1000 sqkm in one area of central Sweden). (A. Mertens, O. Ionescu 2001)

In Romania densities are much higher, 90-220 bears/1000 sqkm.

Bears have large home ranges and concentrate in autumn (feeding areas) and winter (denning areas). Home range size for adult males and females varies between areas, probably due to variation in food availability and distribution, and population density. Male home ranges averaged 1,600 sqkm in Sweden, 3,757 sqkm in Yellowstone, and 128 sqkm in central Sweden, whereas the female home ranges were 225 sqkm, 884 sqkm and 58 sqkm, respectively.

In Scandinavia dispersing young males have been found to roam over areas up to 12 000 sqkm.

In Romania, the home range size of adult males is different from one area to another. Thus, overlapping is significant and due to high densities, the home ranges are between 30 sqkm to 100 sqkm. The female territories are smaller but overlapping is not as significant as it is for adult males. (CLCP Report 2000, 2001, 2002)



4.2.6. Social organization and dispersal

Little is known about the social organization of brown bears, but the relationship among individuals, especially adults, depends largely on spacing and mutual avoidance except during the mating season. Brown bears exhibit male-biased dispersal and females generally establish home ranges in or adjacent to their mothers' home range. There seems to be extensive overlap in home ranges determined by radio telemetry although the real overlap in more concentrated activity areas is less known. Food availability is directly correlated with territory overlapping. In Romania, there are some examples in which bear territories strongly overlap at least temporarily.

In the vicinity of Braşov town, several bears use to feed on garbage in the containers standing on the edge of the forest. The researchers have observed that in summer, when numbers of bears feeding on the garbage are the highest; over 30 bears can gather in an area of round 2 sqkm. The same kind of phenomenon exists in bear concentration areas, where over 80 bears gather on some hundred hectares to feed on fruit plantations. In periods in which no fruits are available, the bears retreat into areas further away, probably gaining back a territorial behavior.

4.2.7. Habitat requirements

Today, most of the brown bear's former range is not suitable habitat due to human habitat alteration and human presence. Bears are found in forested areas with generally low human density. In such areas they survived the persecution that, in most places, did not stop before the second half of the XX century. The presence of bears in many areas in the nearby of cities, like in the area of Braşov, suggests that the presence of settlements, roads and humans is not lethal for bears. Still, a healthy bear population needs large relatively undisturbed areas to exist. Bear movements and habitat use, as well as reproduction and survival are strongly affected by availability of food. Furthermore, population density is positively associated with food availability. Areas with a high availability of preferred foods, such as berries, fruits, hard mast, colonial Hymenoptera, and ungulates, are of special importance for brown bears.



The survival of brown bears in forests is not determined by food alone. Food availability may be quite good in more open habitats, but bears prefer to take refuge in nearby forests during day. In areas where bears are subject to hunting and poaching and have a long history of being persecuted by man, protective shrub or forest cover will likely be an indispensable part of the bear's home area and crucial for their survival. Den sites are often associated with remote areas with low human disturbance.

Disturbances in the denning period may drive bears to leave their den.

For all its biological needs the brown bears have distinct requirements for different habitat qualities. In the past bears also lived in lowland forests, floodplains and natural meadows. With the spread of humans they were pushed into areas that were the least suitable for human habitation, and can only be found today in mountainous, forested areas. For a habitat to satisfy the requirements of a bear it must consist of different forest types, with the crucial role being that of the deciduous trees that bear large seeds (i.e. beech, oak). The presence of thickets is also important for shelter and pasture. It is particularly important that the bears have the option to move in all

directions, including zones of different elevation. Peace and quiet in the habitat is of extreme importance during the winter for the newborn bear cubs in the dens.

A bear searches for food every night, usually in areas of lower elevation and with more open space (which means closer to humans) and retreats to quiet and densely vegetated areas during the day, where it makes a so-called “day bed”. The average daily movement of a bear is 1.6 km, while the maximum is over 30 km. Furthermore, with regard to the season, a bear needs lower areas with earlier vegetation and protein-rich food during the spring. During the mating season (May – June) the males move over large areas in search of females in heat. In autumn, bears require access to mature forests with large quantities of nutritious nuts (e.g. beechnuts, chestnuts, acorns). In winter they retreat to inaccessible, quiet areas to den and for females also to give birth. If an obstacle prevents bears from accessing any critical part of the habitat or if part of habitat is lost to bears for other reasons, significant disturbances in their life cycle can occur: females will remain unfertilized, cubs will perish in unsuitable dens or because they are underfed, the animals will be insufficiently prepared for winter, general mortality will increase and commercial damage will rise since the bears will look for unnatural sources of food to survive on.

4.2.8. Diseases

Because of their natural resistance, the natural occurrence of sickness in bears is relatively rare. Rabies was confirmed in Romania in only one case that occurred in the year 2004. Most bears have internal parasites, most often Ascarids in the small intestines; however, these invasions are within a stable host-parasite system that does not affect the health of the host. Serological testing of bears' serum found antibodies to a number of pathogens, but this is primarily a sign of resistance being developed because of exposure of the bear to these pathogens and not because of the occurrence of the disease per se.

4.3. Findings of scientific research in Romania

4.3.1. Research

In the last century a lot of research has been done about bears all over the world. Especially from North America plenty of data are available about bear biology, ecology and behaviour. In Europe the places from where most data exist are Scandinavia and eastern European countries, such as Slovenia, Croatia, Slovakia, Poland, Italy, Romania, Bulgaria and Russia. The Brown bears are one of the animals that have been studied the most. Tens of



research and management projects have been done and are still going on, about brown bears in the world. Also in Europe there are several projects about bears.

In Romania literature is available about biometrics and the anatomy of bears. Ioan Micu wrote a book about the ecology and behaviour of bears in Romania, referring especially to the bears observed in Harghita and the bears reared in the enclosure of Râușor. Annette Mertens and Ovidiu Ionescu wrote a brochure about bear status, ecology, ethology and management. Other researchers and game managers have published studies regarding brown bears (Ovidiu Ionescu, Nicolae Selaru, Micu Ioan, Serban Negus, George Predoiu, Avram Sandor, Aurel Negrutiu, Serban Parau, etc.). Also, due to the continuous monitoring of the bear population in the last 50 years, plenty of data are available about the densities of bears in all the areas of the Romanian Carpathians (see chapter 4.1.3.).

Field research on bears is done with several methods according to the objective of the research. The main methods recommended in Romania are:

1. Radio telemetry - is a useful method for monitoring the movements of bears, to identify home-range sizes, densities, activity rhythms, interactions with humans etc. The method is based on fitting an individual with a transmitter which is providing data regarding location, type of activity, etc.



2. Scat analysis - is an important tool to gather information about the food habits of bears according to the areas where they live. Bear scats can look different according to the season and to what the bear eat. Generally they are cylindrical, with variable diameter, deposited in different segments. In spring the scats are very dark, almost black, due to the intake of grass. In fall it is possible to identify in the scats the presence of beechnuts and hazelnuts residues, or of the seeds of apples, pears and plums.

Contrarily to wolves, bears do not like to eat bones and fur on an animal. Still, although rarely, it is possible to find such parts in the scats.

The scats are collected randomly from the areas in question. They are then dried; the volume of the scat is determined by putting it in a measure glass with water. The dissolved scat is then filtered and the different components are separated, identified, weighed and labeled. It is very important to consider that the different types of food leave in the scat different percentages of identifiable residues (e.g. pure meat does not leave any identifiable components, whereas a part of an animal, with bones and fur, leaves residues of bones and fur in the scat). Therefore it is not possible to determine the absolute amount of different foods the animal eats, but only ratios. It is possible to compare the occurrence of different components in the scat, or the difference in the composition of the scats throughout space or time. Until now, the method was not used in Romania, but there are foreseen several initiatives that will include such studies in the future field research.

3 - Direct observations can be made at feeding places. These observations are used in Romania for population estimation and studies of bear ethology. However, data from direct observations at feeding sites are to be interpreted carefully as:

- The bears visiting feeding places may not be a representative sample of the population. Some individuals might have a territory around the feeding place and not allow the access to the feeding place to other weaker individuals. On the other hand, females with cubs avoid approaching feeding places, in order to protect their cubs. Also, one and the same bear might use two different bait sites and thus be counted twice. Thus, the bears feeding on feeding places may not be a random sample of the population. - It is impossible to determine sex and age of a bear from a distance, unless it is a mother with cubs, or a yearling. Although males are generally bigger and stronger, the only sure parameter to determine the sex from a distance is the behaviour in the mating season. The only accurate method for age estimation is the count of cementum layers of the teeth. Bears can be very heterogeneous in their size, so that it is not possible to determine age by the size alone. Also, the weight of a bear is very difficult to be correctly estimated from far away, especially in the darkness.

- The behaviour of bears at feeding places might be different from other situations: territoriality might be different from that exhibited in other areas, their reactions to human objects, smells, noises etc. might be weaker, also the interactions of bears with other animals may be different from that in areas further from the feeding site.

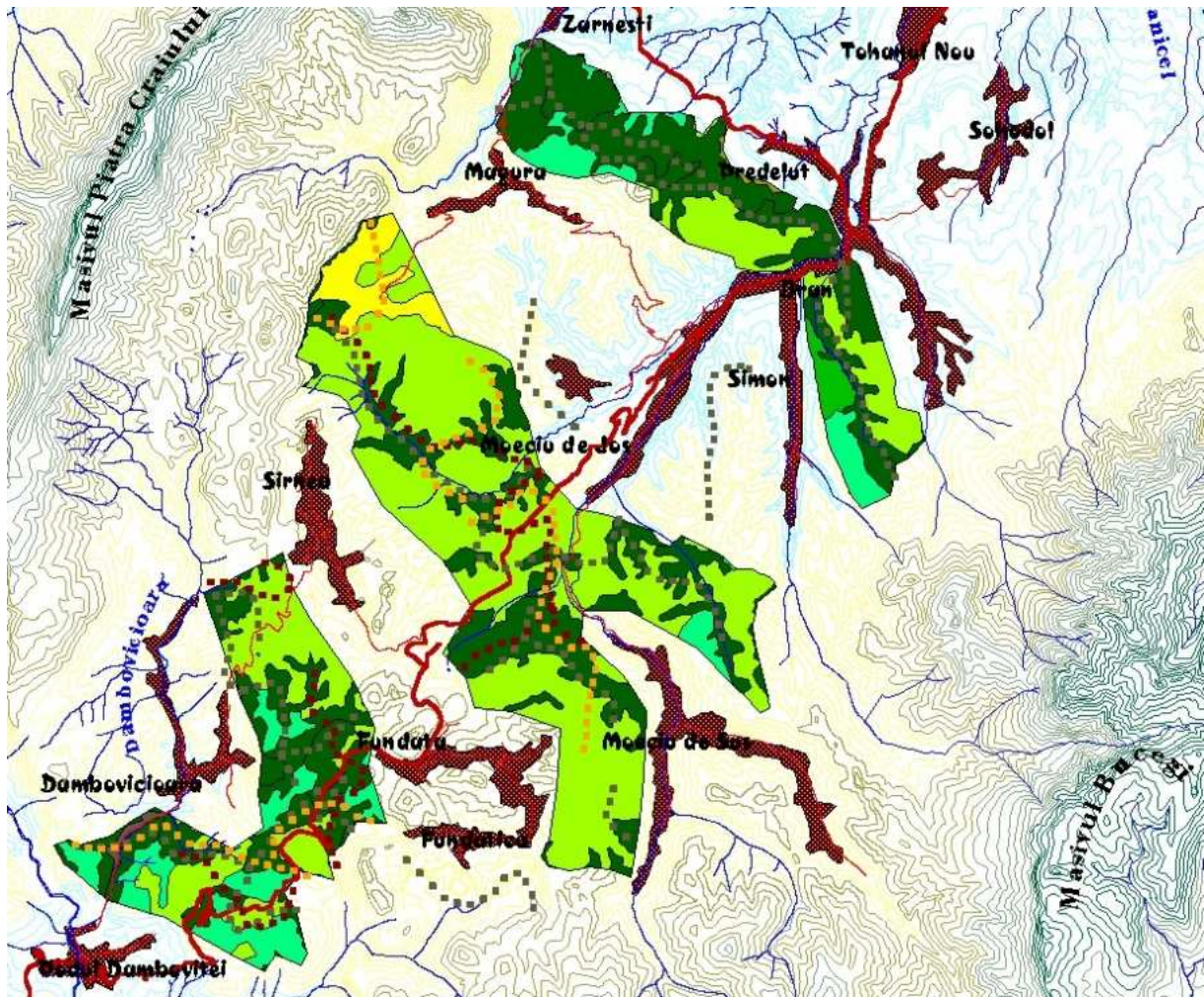
The bear footprint is very easy to recognize, not only because of its size but also because of its typical shape, due to the bear having a plantigrade gait. The footprints of the front and the hind paws look different: with the hind paw the bear touches the ground with the whole plant, whereas the front paw uses only the fingers. The size of the bear is very difficult to tell from the tracks. According to the consistence of the substrate (mud, snow) and whether the bear was standing still, moving slowly or fast, the paw can leave a more or less big sign.

Bears leave scratch marks on trees. The marks can be easily recognized by three to five parallel scratches in the bark on the tree, done by the claws of the paw. Also portions of the bark of the trees can be pulled off. This behavior can have different reasons. Probably territoriality plays an important role in the marking of trees, although different authors believe that pulling off the bark of trees can be done for playing or just to leave a sign of the own presence. As bears like to rub their fur in the resin, it is possible to find bear fur sticking on the tree. Bears can scratch open rotten tree stumps to look for invertebrates: ants, larvae, bugs or small reptiles. For the same reason they can also turn over stones or rocks, that can arrive to huge sizes, up to 20 kg or more.

Densities and habitats studies

Regarding territory size, the necessary data were collected from the field using radio-telemetry in certain areas and direct observations on national level. The radio telemetry studies done in Brasov area have revealed high densities in mountain areas with garbage available as a food source (45 individuals per 100 sqkm). On national level, the average density of bears is 9 individuals per 100 sqkm and in the highest density areas; the average density is over 20 bears per 100 sqkm.

The distribution of brown bears corresponds, with few exceptions, to areas situated above 600 meters altitude and covers coniferous forests, mixed forests, and deciduous (beech and oak) forests. The bear population is located mainly in the mountains, 93% with only 7% living in the hilly regions. Bears have their highest densities in the central part of the Romanian Carpathians, especially in the counties of Mures, Neamt, Harghita, Covasna, Brasov, and Buzau. Towards the west and north and southern mountain range, the density is lower but still high compared to other parts of the European bear range.



The connectivity of bear habitats is preserved up to now, but taking into account the accelerate economic developments in Romania (infrastructure, tourism facilities, etc.), this status of habitat connectivity will be threatened in the future. Thus, ICAS Wildlife Unit, together with other institutions from Romania and Netherlands is conducting a study regarding ecological networking of large carnivores in the Carpathian range. The study is financed by the PIN Matra program and supported by The Romanian Ministry of Environment and Water Management. Preliminary results of the study have shown that there are bottle necks of connectivity in the Carpathians and there are areas with a high intensity of human activities that could easily become barriers for the wildlife crossings. A special interest is given to the planned motorways construction (Bucharest – Brasov – Oradea and Bucharest – Sibiu – Arad), both of these projects being some of the biggest in the European context.

Further studies will be proposed to be carried out in order to analyze on local and regional level the impact of these developments on habitat connectivity.

Bear – human interactions studies

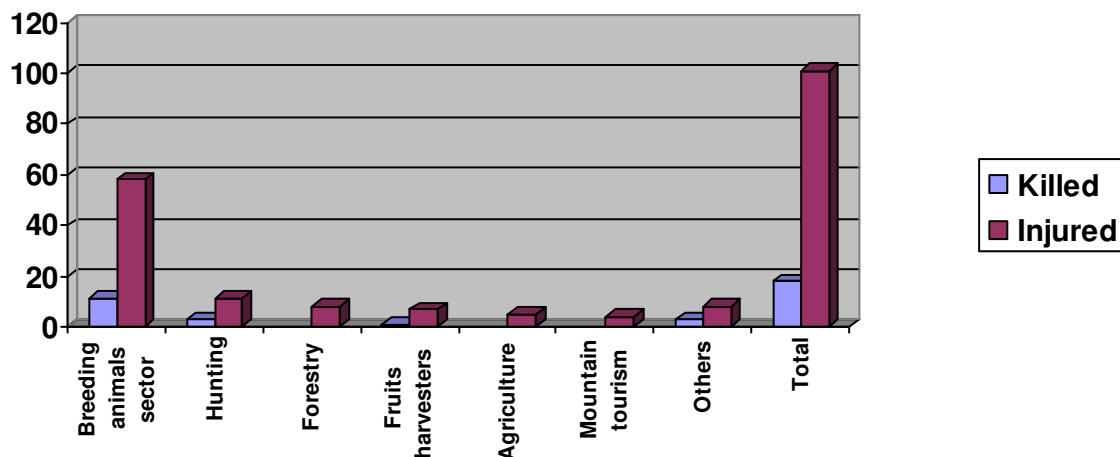
Starting with 1991, there were collected data regarding conflicts with other fields of activities. These data, centralized at the Ministry of Agriculture, Forests and Rural Development, show that every year there were reported bear attacks on humans (related to grazing activities, forestry workers and tourists), damages to livestock and orchards and damages to family farms all over the Romanian bear distribution area. In between 1990 and 1999, in all counties of Romania where bears exist, there were collected data from the wildlife units of the forest administration and hunting association about the reported bear - human conflicts. If encounters with humans and killing of cows were all reported, killing of sheep, goats or pigs were sometime not considered worth enough to be notified. When people were involved in the conflicts details were asked about the condition in which the confrontations took place.

The study was conducted in the Carpathian Mountains, in the 26 counties, where bears exist in Romania. These mountains are 60% covered by forests up to 1600 – 1800 m altitude. Above the timber line there are alpine meadows and bushes and at the bottom of the mountains crop fields.

Data were collected about 119 cases of man - bear conflicts, 18 persons were killed by bears and 101 injured. From these death accidents, 11 were connected with livestock conflicts, in the same period the killing of 3232 sheep, 1003 cows, donkeys and horses, 183 pigs and 140 goats was reported to be done by bears. The livestock breeders were visited and interviewed about management practices, prevention methods used, place and time of the kill and when possible necropsies were performed on animals killed by bears. The man - bear conflicts have as the main causes the human behavior and the lack of knowledge about “How to act” when you encounter a bear.

The greatest number of conflicts is connected with livestock grazing. The alpine meadow management seems to be one of the principal problems in the high number of accidents. Due to the overgrazing, the carrying capacity decreased and more and more herds are grazing in the forest. These create the conditions for bear depredation directly on the herd during the day or on lost animals in the night. The shepherds try to counteract bear attacks with the help of their guardian dogs and very often they succeed. Sometimes the bears respond aggressively to these actions and a great number of deaths and injuries result from this confrontation.

Structure of accidents by sectors



4.3.2. Collaborative framework for research

One of the main objectives of the future bear research in Romania is to avoid overlapping of research efforts and to ensure the synergy of these activities.

The bear research should focus on the following topics:

- bear ecology studies related to population structure, mortality and annual growth;
- habitat studies related to connectivity and estimation of natural carrying capacity of the ecosystems;
- social dimension studies related to bear-human conflicts and level of acceptance;
- damages studies related to prevention methods and compensation system;
- transboundary studies with neighboring countries.

The collaboration between different institutions should be enhanced and more institutions should be attracted to carry out field studies and analysis. International cooperation and information exchange is essential, with a special focus on neighboring countries. The national projects and initiatives should be at least known by the bear working group and the future recommendation of the group should be taken into consideration by the promoters of such activities.

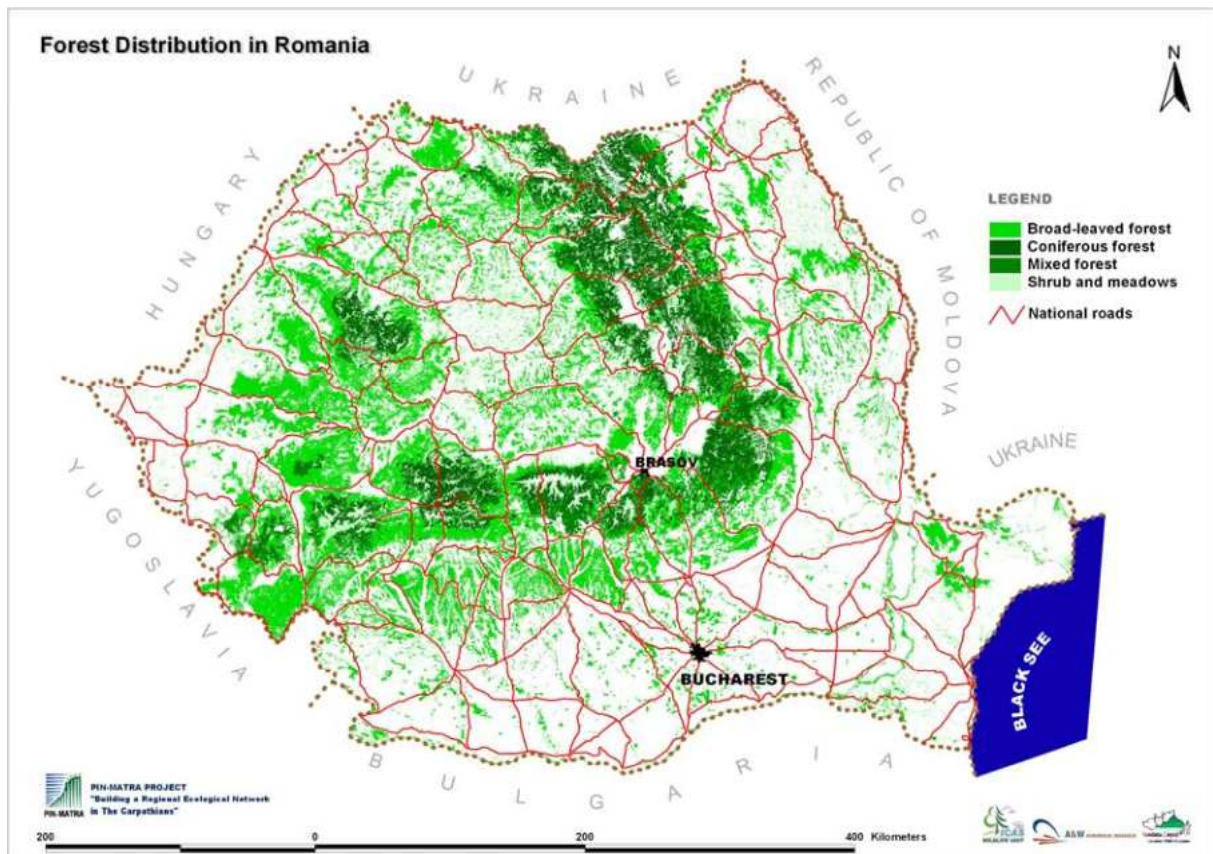
A special role in this collaborative framework is played by both MMGA and MAPDR as funding institutions and authorities for bear management in Romania. The experience of ICAS Wildlife Unit staff, game managers, forestry and biology universities and other institutions should be valorized and used within this frame.

4.4. Natural characteristics of bear habitats in Romania

Romania is a medium size European country, with a total surface of 238 350 sqkm.

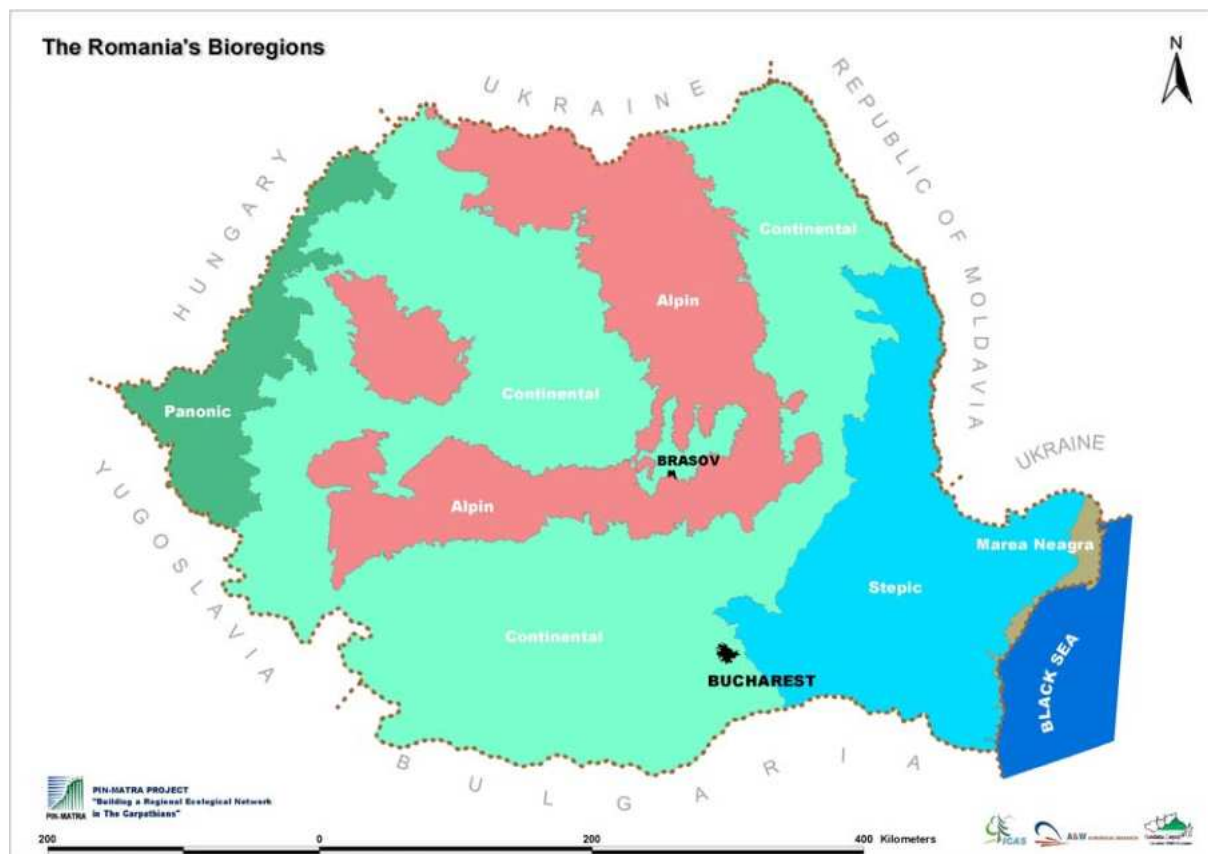
The bear population occurs permanently on 69 084 sqkm (total surface of the hunting units with permanent bear presence). This surface is mainly located in the Carpathians but there are also areas located on the Transylvanian Plateau and on hills outside the mountain range.

Within this surface, the forests and shrubs are covering 45 594 sqkm and the rest is covered by low meadows, pastures and agricultural land.



Within bear habitat about 70% of the vegetation and more than 80% of the present plant communities are natural. Altitudinal zoning of the vegetation in the mountain area is presented below:

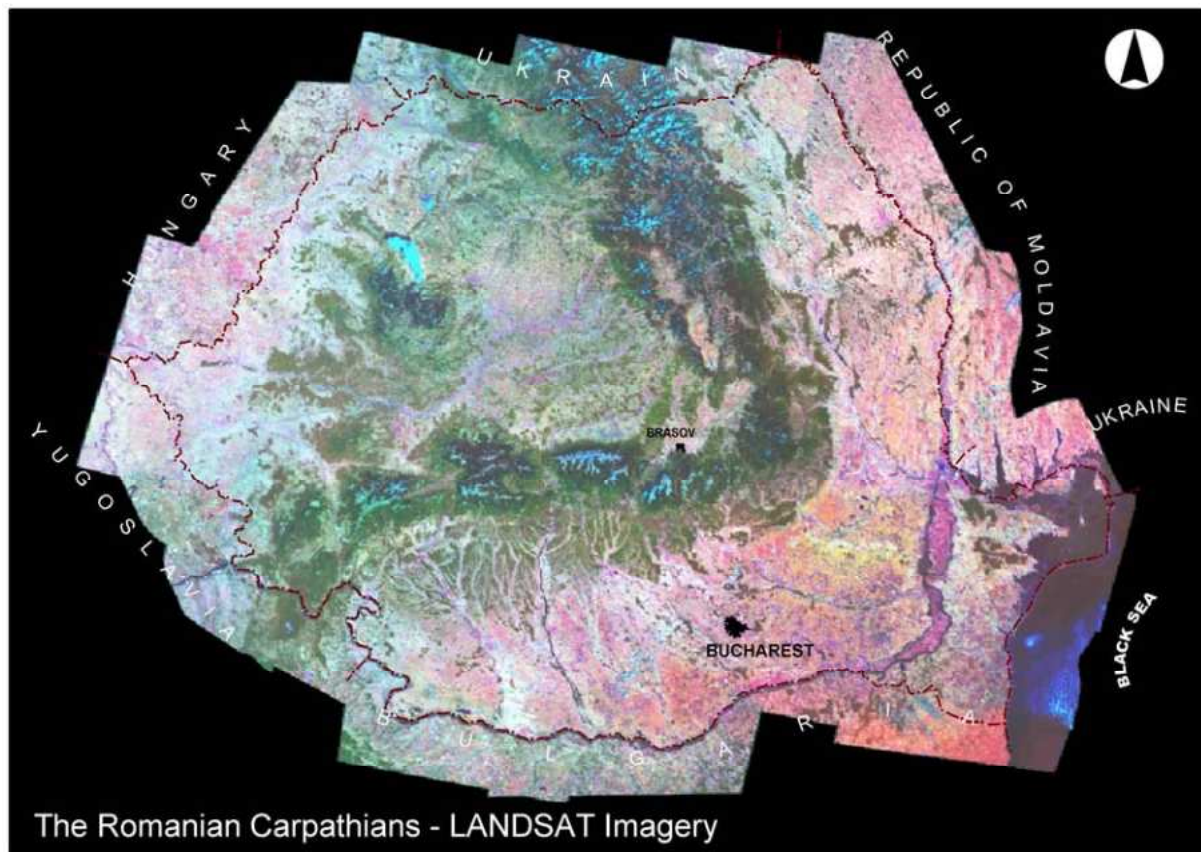
Units	Height intervals
Alpine layer	>2000(2200) m
Sub alpine layer	1650-2000 m in Northern Carpathians 1850-2200 in Southern Carpathians
Boreal layer (of Norway spruce forests)	700 (800)m- 1650 m in Northern Carpathians 1400-1850 m in Southern Carpathians
Nemoral layer (of broadleaved forests)	500 (600)m – 800 (1100) m in Northern Carpathians
- sub-layer of beech and beech-conifer mixed forest	700-1400 m in Southern Carpathians
- sub-layer of sessile oak and beech-oaks forests	250 –650 (1000)m



Each territorial vegetation unit contains a group of dominant plant species showing the diversity of the habitat.

Large territorial vegetation unit	Dominant species	Differential species
B. Tundra and alpine meadows	<i>Carex curvula, Oreochloa disticha, Juncus trifidus, Festuca airoides, Nardus stricta, Loisleuria procumbens</i> and lichens	
	<i>Kobresia myosuroides, Sesleria albicans, carex ferruginea, Carex firma</i>	Dycotiledonatae and lichens
C. Sub-arctic and sub alpine shrubs, meadows and open forests	<i>Pinus mugo, Rhododendron myrtifolium</i>	<i>Bruckenthalia spiculifolia, Soldanella hungarica ssp. major</i>
D. Mezophylous and higo-mezophylous conifer and broadleaved-conifer mixed forests	<i>Picea abies (Abies alba)</i>	<i>Leucanthemum waldsteinii, Hieracium rotundatum</i>
F. Mezophylous broadleaved and broadleaved-conifer mixed forests	<i>Fagus moesiaca</i>	<i>Corylus colurna</i>
	<i>Abies alba, Fagus sylvatica</i>	<i>Dentaria glandulosa, Pulmonaria rubra</i>
	<i>Fagus-sylvatica</i>	<i>Dentaria glandulosa,</i>

Large territorial vegetation unit	Dominant species	Differential species
		<i>Symphytum cordatum</i> , <i>Hepatica nobilis</i> , <i>Hedera helix</i>
	<i>Fagus sylvatica</i>	<i>Luzula luzuloides</i> , <i>Hieracium rotundatum</i>
	<i>Fagus sylvatica</i> , <i>Carpinus betulus</i>	
	<i>Fagus moesiaca</i>	<i>Helleborus odorus</i> , <i>Festuca drymeia</i>
	<i>Fagus moesiaca</i> , <i>Carpinus betulus</i> , <i>Tilia tomentosa</i>	<i>Ruscus aculeatus</i> , <i>Helleborus odorus</i>
	<i>Fagus sylvatica</i> , <i>Tilia tomentosa</i>	<i>Hedera helix</i> , <i>Carex brevicollis</i>
	<i>Quercus petraea</i> , <i>Carpinus betulus</i> , <i>Fagus sylvatica</i>	<i>Aposeris foetida</i>
	<i>Quercus petraea</i> , <i>Carpinus betulus</i>	<i>Lathyrus hallersteinii</i>
	<i>Quercus dalechampii</i> , <i>Quercus petraea</i> (<i>Carpinus betulus</i>)	<i>Carex pilosa</i>
	<i>Quercus petraea</i> , <i>Carpinus betulus</i>	<i>Tilia tomentosa</i> , <i>Fraxinus excelsior</i>
	<i>Quercus petraea</i> , <i>Carpinus betulus</i>	<i>Quercus robur</i> (<i>Fagus sylvatica</i>)
	<i>Tilia tomentosa</i> , <i>carpinus betulus</i> , <i>Quercus petraea</i> , <i>Quercus dalechampii</i>	<i>Nectaroscordum siculum ssp bulgaricum</i>
	<i>Quercus robur</i> , <i>Carpinus betulus</i>	<i>Melampyrum bihariense</i>
	<i>Quercus robur</i> , <i>Carpinus betulus</i>	<i>Tilia tomentosa</i>
	<i>Quercus robur</i>	<i>Carex brizoides</i> , <i>Molinia coerulea</i>
G. Xerothermic broadleaved and broadleaved-conifer mixed forests	<i>Quercus petraea</i> , <i>Acer tataricum</i>	<i>Lathyrus pannonicus ssp. collinus</i>
	<i>Quercus robur</i> , <i>Quercus petraea</i> , <i>Acertatricum</i>	<i>Heleborus purpurascens</i> , <i>Melampyrum bihariense</i>
	<i>Quercus polycarpa</i> , <i>Quercus dalechampii</i>	<i>Helleborus odorus</i> , <i>Digitalis grandiflora</i> , <i>Digitalis lanata</i>



The analytical data presented above shows the diversity of plant associations that occur within the bear natural habitats. Most of these habitats are a result of sustainable forestry systems implemented in the last 50 years and the low human activity in the forests. This situation will change in the next period, due to intensive economic developments and social changes. For example, the number of tourists that visited the Romanian Carpathians in the last 5 years was about 2.5 millions, but the trend is increasing and the pressure of leisure and recreational activities in the mountain areas will be higher in a short period of time (e.g. Ministry of Tourism Program Super Ski in Carpathians).

Taking into account the forest restitution process, the forest management will significantly change and extensive forestry will be replaced by different forestry management schemes. Also, the people access in the forest is increasing by construction of forestry roads and other facilities. In these circumstances, the bear habitats will be affected by these changes and it is essential to adopt mitigation measures that will be able to ensure the bear population conservation on long term.

4.5. Bears and Humans

4.5.1. Public Attitudes towards Bears and Bear Management in Romania

In mythology, the bear image was associated with power and health. Nowadays, for the Romanians, the bear represents a symbol of the Carpathians, a powerful animal that is characterizing the Romanian nature. Due to this positive general attitude and also, due to the interest in bear hunting, in the last fifty years, the bears were the

beneficiaries of a different status compared with other large carnivore species (e.g. wolves). Thus, there were no carried out direct actions that affected the bear population, but there were different activities that had a certain impact on this population (carcass poisoning during campaigns against wolves, poaching on ungulates, etc.). Bear hunting is a traditional activity in Romania and poaching is not significant. Due to its economic value (hunting and tourist attraction), the bears benefit from special attention from game managers, which carry out certain activities in order to ensure the long term presence of bears in Romanian ecosystems.

In general the level of acceptance from local the people is high but in some areas, due to continuous damage caused by bears, the local people have negative reactions regarding bears and they blame on hunters considering that the number of bears is too high and ask for active measures. Hunting bears is one of the measures agreed by the local people and demanded by them in certain situations.

From all three large carnivore species (wolves, bears and lynxes) that occur in Romanian ecosystems, the bear has, from far, the most positive image in the public opinion.

On the way to integration in the EU (foreseen date: January 2007), Romania is traversing an intensive period of socio-economic changes. Due to the intensive economic development of Romania and increased human interest on natural habitats (holiday cabins, ski resorts, eco-tourism, hunting, forest products harvest, timber harvest, etc.), this existing situation has high chances to evolve in a way that will affect the bear population in the next period of time. Therefore, there is a need for an integrated management approach that will take into consideration more and more social and development aspects combined together with species requirements.

Little is known by the public regarding bear management in Romania. This lack of knowledge is coming from the lack of initiatives regarding national information campaigns concerning these aspects and, also, from the lack of interest from the public regarding nature issues. In a period of fast development, the Romanians are more focused on economic issues and the biodiversity issues are less interesting for them. During last year meetings, the Romanian game managers have concluded that they should dedicate efforts and finances in order to contribute to better information of the public and to reduce the misunderstandings that could lead to conflict situations.

4.5.2. Damage Caused by Bears and Bear Attacks on Humans

The damage caused by bears is diverse. The damages can be divided into:

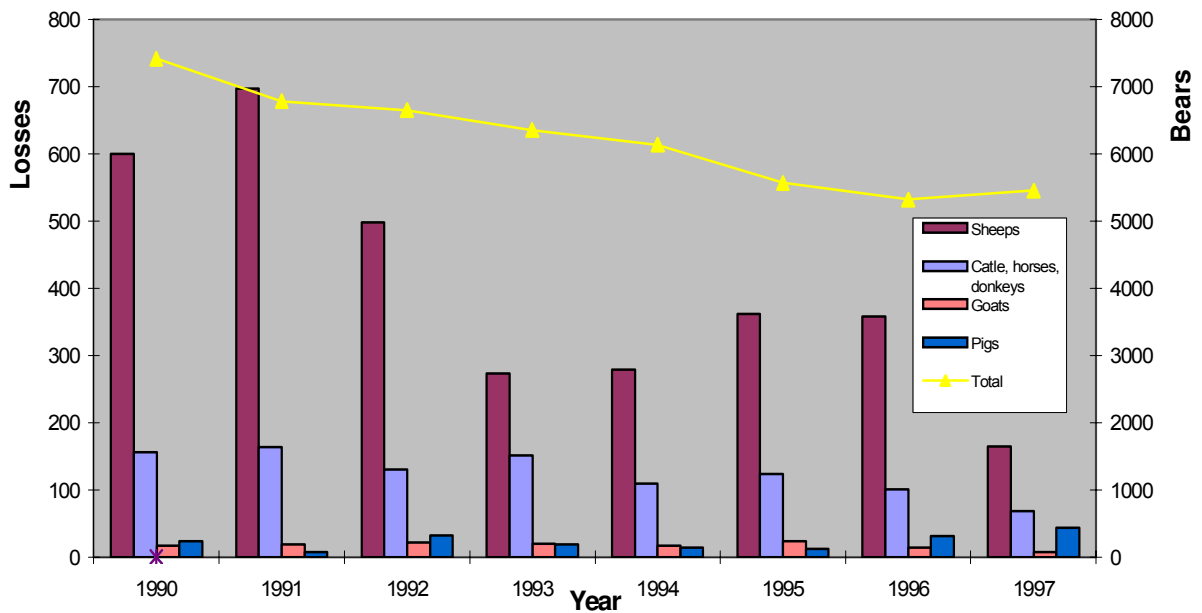
- damages to livestock (including bees);
- damages to agricultural crops and orchards;
- damages to forest components;
- damages to buildings;
- damages in traffic;
- danger to humans.

In certain areas with high bears densities (more than 20 individuals per 100 sqkm), the level of damages caused by bears to different sectors of activity is also high. In these areas, the public attitude towards bears is sometimes negative. Thus, several studies related to bear damages and typology of conflicts have been conducted.

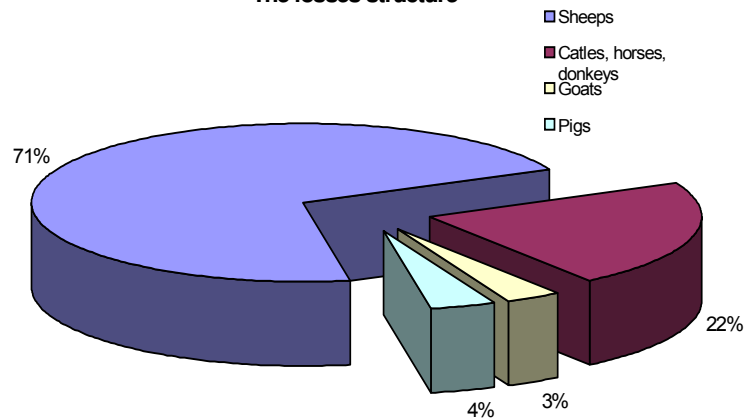


A study done between 1990 – 1999 (Ionescu O. and Isuf C.) has revealed that the bear densities and level of damages caused to livestock are correlated. Analysing the predation on different livestock categories, we could say that predation on sheep, pigs, and donkeys is quite high comparing with the existing animals that are grazing on meadows. The sheep losses are the highest but, also, the sheep number is incomparable higher than other livestock.

The livestock damages and brown bear population dynamics



The losses structure



Damage to agricultural crops depends on the location of the agricultural field. Since the bear inhabits mostly large forested areas, damage to agricultural crops is relatively rare. The most common form of such damage is grazing on wheat fields during periods of wheat ripening. Bears prefer oats, followed by corn, potatoes and wheat, and sometimes rye and barley. Bears damage fruit trees by bending and tearing off branches, during periods of fruit ripening. Bears primarily like plums, apples and pears. These damages are quite high in the areas where bears concentrate in the autumn (Dealu Negru – Bistrita county, Domnesti – Arges county). In these areas, the bear management should take into consideration the prevention principles and conflict management is essential. Damages on bee hives are also recorded all over the Carpathian range. The level of damages is unknown and the economic value was not estimated.

Damages to forest components caused by bears are done mainly in coniferous forests (bark of the fir trees). In areas with high bear densities, studies have revealed that up to 15% of the fir trees have the bark damaged by bears. The economic value of these damages was not evaluated and up to now there were no specific measures taken.

Damages to buildings and in traffic exist, but are less reported in Romania. In comparison with other types of damages, these are not significant. In the future, based on the foreseen infrastructure developments, these types of damages could increase and could lead to significant increasing of bear mortality in certain areas (high traffic) or in conflicts rising (damages on cabins, tourists facilities, etc.).

4.6. Current Management

As defined by the legal provisions, the hunting management programmes regulate bear management in Romania for each hunting unit. The hunting management programmes are basic planning documents which are developed for each hunting unit and which regulate all management of the hunting unit and its game for a period of 10 years. Hunting management programmes must be developed in coordination with the forest management programmes, local land use conditions, water management, spatial planning, ratified international conventions and agreements related to hunting and nature protection. Bear hunting, as other game species is not permitted without hunting management programmes and the hunting licenses for bears have a special regime, being issued only by the national authority.

For each game species, hunting management guidelines provide information on the habitat capacity and the optimum number of animals for the hunting unit. As with the other large game species, the number of bears is estimated by recording footprints and counting the bears during the estimation season in the hunting units, and is expressed as a number of individuals by sex and age structure. Therefore, the hunting management programmes plan bear management for a 10-year period, and at the same time, based on the monitoring of bear numbers, regulate the management for each hunting season. The best Romanian habitats for this game species can tolerate a density of 2.5 bears per 10 sqkm of forest surface.

The Romanian current management is based on the four categories of factors that influence the bear population (habitat suitability, geography and climate, human

activities and game management). Also, there are taken into account several characteristics of the Romanian bear population such as reproductive success, annual growth, population structure and harvest data. The annual growth in Romanian conditions is 10 - 15% of the population. Bear harvesting is planned according to the minimum size of this annual growth, to the estimated population size, to the structure of the population and to the structure of the harvest done in the last years. The defined management goals are to maintain the existing bear population on a stable trend and to contribute to its better structure.

The hunting management programmes also regulate the supplemental feeding of bears, and in particular define: the kind of food, the amount of food, the time period and the number of feeding sites. The supplemental feeding is regulated in order to provide basic survival food in critical periods and to prevent and reduce the damages in certain areas. Also, the feeding sites are used for observations and population estimations.

Only persons who have passed a hunting course and have obtained a written hunting permit from the hunting unit leaseholder can hunt. Bears can only be hunted with rifled-barrel hunting weapons with the caliber bigger than 7mm. The bear hunting license is issued only by the national authorities, based on the analysis on national size of the population, trends and damages. Harvested bears and their parts can be transported, stored or processed only with a special certificate. Hunting unit leaseholders provide the certificates. Since bear meat can be used as human food, the provisions of the National Veterinary Agency define the veterinary inspection and control of the meat. The hunting unit leaseholder has to inform the local veterinary organization about the harvested bear. In addition, bear meat must be checked for *Trichinella spiralis* larvae; a sample is taken from the diaphragm muscle for analysis.

Bear furs and bear skulls are hunting trophies and regardless of the age or the expected trophy value, they have to be evaluated. A trophy Certificate is issued based on the evaluation. The evaluation of the trophy is the basis for calculating the hunting fee. Bear furs and bear skulls are evaluated according to the instructions and formulas of the International Council for Game and Wildlife Conservation (CIC). The basic evaluation measures are the length and width of the skull, the length and width of the hide and the symmetry and beauty of the hair. Bear trophies of the highest quality cannot be exported. In 1996, the CIC decided that bear furs are not considered official hunting trophies anymore, and therefore cannot compete in national or international trophy competitions. The hunting unit leaseholder must keep a register of all Trophy Certificates issued.

Bear management is also based on compensation of damages produced by bears.

Measures for the prevention of damage include:

- decreasing the number of game in a hunting unit to a tolerable level;
- providing enough food for game;
- fencing and guarding of crops;
- translocation of the game, and so on.

Both hunting unit leaseholders and land users are obliged to carry out certain measures for the prevention of damage. If damage occurs regardless of preventative measures, the hunting unit leaseholder has to compensate for the damage caused



by the bears in his hunting unit. The Hunting Law permits the hunting of game that has caused a lot of damage. In the compensation system, the involvement of insurance companies is very low and the system is not efficient, being affected by bureaucracy and high costs and subjectivism. The future bear management in Romania will target these aspects in order to provide an instrument that could ensure long term bear population conservation.

In conditions in which all the hunting units have their master, at least a professional game keeper and when hunting units are managed according to the hunting management programmes, the poaching is relatively small and does not represent a serious threat to the bear population. During last years, bears poached by snares are recorded in the areas were there are high densities of bears and where the orchards or gardens are near the forests edges.

(ICAS Wildlife Unit released from snares more than 18 bears in 2004). The practice of poisoning of carcasses has almost disappeared as a cause of bear mortality and the mortality caused by road and railway traffic is not considerable but it could increase in the future, since road and railway traffic is constantly increasing in the bear areas of Romania. Bear mortality related to diseases or lack of food or water was not recorded.

4.7. Number of bears, zoning and carrying capacity of the habitats

The bear population conservation is regulated by the provisions of the Nature Conservation Law no. 462/2001, regarding the conservation of natural habitats and protection of wild species of flora and fauna, the Law for Game Protection and Hunting and by the provisions of the Hunting Units Management Plans. According to the aforementioned provisions, the number of bears is estimated based on footprints and measurements of the footprints, observation of bears from the high stands, and counting the females with cubs. The number is expressed by sex and age structure. At the end of spring, the hunting unit leaseholders are obliged to provide yearly estimates of bear numbers on their game management units. These estimations are correlated on large areas and the data are centralized and analyzed on regional and national level.

The number of bears can also be estimated through other methods accepted by the expert working group. Considering the characteristics of the bear habitat (mountain forested areas), their densities in Romania and biological characteristics of the species (need for large living space, migration, denning and so on), most of the methods used for estimating small animal species populations are not applicable to bears and the results provided by those methods would not be useful. For this reason, the number of bears in Romania until now (also for the purposes of developing this management plan) has been estimated by measurements of the footprints, tracks identification and mapping, bear observations from high stands and counting of female bears by the hunting unit leaseholder for each hunting unit with bears. Additional to these methods, there can be used other methods, such as photo

trapping, DNA analysis, etc., but all of these methods require special equipment, trained personnel and important financial support, being not suitable for large scale (national level) use.

The nowadays used methods have a series of advantages and disadvantages. Within the methods used in Romania, about 1 000 persons are involved yearly in the bear population estimations. These field personnel provides good coverage of the bear range and integrating the monitoring of the bear numbers and migrations is relatively cheap estimation and for the most part excludes the possibility of systematic errors. On the other hand, there are also disadvantages: the method requires a large number of well trained individuals (difficult to achieve); and the biggest disadvantage is that because of the large territories and seasonal migrations of the bears, there is the possibility that several leaseholders could count the same bears (double counting). Due to this, the number of bears counted must be adjusted with a correction index that is determined based on the analysis done on regional level. The establishment of the correction index is often a procedure done on mapping data basis, which can again lead to systematic errors. All these show that the estimation of bear numbers in Romanian bear habitats is a difficult and complex task. Therefore, the experts opinion is that the bear numbers should be expressed as an interval of individual numbers of bears in a certain area, that include several hunting units.

The bear experts working group is analyzing the possibility for estimation of the number of bears in Romania using DNA analysis, for determination of individual gene markers for each individual bear. Samples will be taken from the fresh bear scats in the bear habitat. They are conserved in ethanol with a note on the place and time of sampling. In a laboratory, bear DNA is then isolated from the epithelial cells of the intestines, which can be found in scats. In the isolated DNA, the sequence of the nucleic base pairs is analyzed (gene code) in a number of gene segments large enough to identify each individual bear. A large enough sample offers the possibility of calculating by statistical techniques the number of bears in the sampled area with relatively high reliability. With a larger sample there is less risk for errors, and the expected accuracy is over 90%. This accuracy can be achieved when approximately one third of the individuals in the local (sampled) population are sampled. To have a good estimation of the population, taking into consideration the size of the population and the variety of the habitat and socio – economic conditions, we need to analyze tents of thousands of samples. This is not a realistic yearly method for the moment in Romanian conditions.

Reproductive recruitment includes offspring that have survived the first year of their life, in other words – yearlings cubs are born during December and January in dens. After the first year of life, they are called yearlings. Base game stock (BGS) is the parental part of the population and ensures reproductive increase (RI). The sum of the two categories gives the economic capacity of a hunting unit (ECHU) ($BGS+RI=ECHU$). The planned reproductive increase for bears, according to the hunting management programmes, is 10% of the base game stock. The possible base game stock was defined in the hunting management programmes as the possible number of animals per 10 000 ha (100 sqkm) of the species habitat surface (with the category of the habitat quality taken into account). In the hunting management programmes, the density of the animals (the number of animals per 10

000 ha) was 1 to 20, depending on the category of the habitat quality in each hunting unit. In this way, the possible base game stocks were calculated for all Romanian hunting units in which bears are managed as a game species. With additional feeding, poorer quality habitats can sustain higher densities of bears, while good quality habitats can sustain densities of 20 or even more bears per 100 sqkm. The success of the current and future reproduction and survival of bears in Romania depends largely on conserving the size and quality of bear habitats.

Based on expert models, since the seventies, in Romania are used diagnosis keys for calculation of habitat suitability and estimate the optimum number in a certain hunting unit. These diagnosis keys were last reviewed in 2002 and are used on national level in bear management activity. The commission that evaluates the habitat suitability for bears in a certain hunting unit, according to the diagnosis, is obtaining a certain score for the habitat conditions. This score is related to an interval of bear densities for 100 sqkm of habitat. According to the total surface of bear habitats from a certain hunting unit, the calculation is giving the recommended number of bears that should be managed in that area. This number represents an indicative and a management objective for the hunting units' leaseholders but it can be corrected according to the existing situation on the ground (concentration, movements, damages, etc.).

Key for ecological diagnosis of “optimum number” for areas inhabited by the Brown bear in Romania.

No.	Environmental factors	Specific environment	Score	Specific environment	Score	Specific environment	Score	Specific environment	Score
0	1	2	3	4	5	6	7	8	9
A. Abiotic factors: – 200 points									
1	Relief structures, determinate for hibernate place	Hilly relief with slabs and caves suitable for winter shelter on >20 % of area	150	Hilly relief with slabs and caves suitable for winter shelter on 10-20% of area	100	Hilly relief with slabs and caves suitable for winter shelter on 1-10% of area	50	Missing	0
2	Snow thickness between March 15 and May 15	Snow thickness average is between <20 cm on <50% of area	50	Snow thickness average is between >20 cm on 50-60% of area	35	Snow thickness average is between >20 cm on 60-70% of area	20	Snow thickness average is between >20 cm on >70% of area	5

No	Environmental factor	Specific environment	Score	Specific environment	Score	Specific environment	Score	Specific environment	Score
0	1	2	3	4	5	6	7	8	9
B. BIOTIC FACTORS: – 300 points									
1	Percent of forest	The forest covers > 70% of area	60	The forest covers 55-70% of area	45	The forest covers 40-54% of area	30	The forest covers <40% of area	15
2	Treatment	Preponderance of progressive cutting	20	Preponderance of successive cutting	15	Preponderance of clear cuttings	10	Preponderance of gardening cutting	5
3	Composition	Beech or beech with oak on >70 % of area	20	Beech or beech with oak on 30-70 % of area	15	Beech on <30% of area	10	Spruce on 100% of area	5
4	Scrub with fructification for bears (service tree, elder tree etc)	Scrub on >50% of area	20	Scrub on 30-50% of area	15	Scrub on 10-30% of area	10	Scrub on <10% of area	5

5	Proportion of age classes	>50% of area in age classes V and VI; 20% in age class I	15	40-50% >50% of area in age classes V and VI; 20% in age class I	10	30-40% >50% of area in age classes V and VI; 15-20% in age class I	5	<30% >50% of area in age classes V and VI; <10% in age class I	0
6	Existing of wild apple trees and wild pear trees	Existence of uniform groups in F.V.	15	Disseminated and uniformly distributed in hunting area	10	Sporadic Sporadic	5	Missing	0
7	Distribution and composition of agricultural crops	>50% from skirt adjacently with oat, corn crops and orchards	50	30-50% from skirt adjacently with oat, corn crops and orchards	45	10-30% from skirt adjacently with oat, corn crops and orchards	30	<10% from skirt adjacently with oat, corn crops and orchards	15
8	Existing of ants colonies, snags invaded by insects	>25/ha	40	15-24/ha	30	5-14/ha	20	<5/ha	10
9	Fructiferous bushes,	On > 15% of area	60	On 10-15% of area	45	On 5-10 %of area	30	On <5% of area	15

No	Environmental factor	Specific environment	Score	Specific environment	Score	Specific environment	Score	Specific environment	Score
0	1	2	3	4	5	6	7	8	9
C. Hunting management factors:- 200 points									
1	Supplementary food administered between march 15- may 15 and between October 15- December 15	5kg/day./bear	50	3-5 kg/day./bear	35	1-3 kg/day./bear	20	<1 kg/day./bear	10
2	Improvement of habitat through tree and bush planting	>100 units/100ha of forest	50	60-100units/100ha of forest	35	30-60 units/100ha of forest	20	<30 units/100ha of forest	10
3	Protections of fructiferous scrub during forestry works	Total	50	>70%	35	50-70%	20	<50%	10
4	Establishing protection areas of 200 m around known bear den	>80% of area suitable for this is protected area	50	60%-80% of area suitable for this is protected area	35	40%-80% of area suitable for this is protected area	20	<40% of area suitable for this is protected area	10

No.	Environmental factor	Specific environment	Score	Specific environment	Score	Specific environment	Score	Specific environment	Score
0	1	2	3	4	5	6	7	8	9
D. NEGATIVE ANTHROPIC FACTORS: – 300 points									
1	Grassing	Not done	60	Present on <20% of F.V. 's area	45	Present on 20%-30% of F.V. 's area	30	Present on >30% of F.V. 's area	15
2	Poaching Poaching	Not done	100	1 case/year	60	2 cases/year	20	>2 cases/year	0
3	Roads	Lack of public roads and forest roads with density <2m/ha	20	Lack of public roads and forest roads with density 2-5 m/ha	15	Public roads and forest roads with density 4-6m/ha	10	Public roads and forest roads with density >6m/ha	5
4.	Forest's fruits and mushrooms harvesting	No harvest	40	Harvesting on <30 % of the surface occupied by forest	30	Harvesting on 30-60 % of the surface occupied by forest	20	Harvesting on >60 % of the surface occupied by forest	10
5	Number of shepherd dogs	3 shepherd dogs/sheepfold No pigs	40	3-5 shepherd dogs/sheepfold No pigs	25	5-7 shepherd dogs/sheepfold No pigs	10	>7 shepherd dogs/sheepfold	0
6	Tourism	Not done	40	Seasonal and organized	25	Permanent and organized	10	Permanent and organized	0

Score interval on habitat suitability for brown bear species (Ursus arctos arctos)

Species	Score interval				Interval of density for habitat suitability categories			
	Established for habitat suitability				Habitat suitability / 10.000.ha of forest			
	I	II	III	IV	I	II	III	IV
Brown bear	1000-751	750-501	500-251	250-100	20-16	15-11	10-6	5-1

Explicative notes concerning the habitat suitability categories of hunting areas for brown bear

The total score will be computed as the sum of all categories of factors (abiotic, biotic, hunting management and negatives anthropic factors) using formula:

Total score= A+B+C+D

A= Abiotic factors B= Biotic factors C= hunting management factors D= Negatives anthropic factors

Productive areas are represented by the forest areas, meadows in the forest and alpine meadows belonging to the respective hunting areas.

The density interval on reliability categories for brown bear is for an area of 10 000 ha of habitat.

4.8. Trends and Reproductive Increase

The counting of female bears with cubs is carried out during spring (yearlings, aged 14-15 months). The male bears are counted at the feeding sites from the high stands. The reproductive increase of bears can be attributed to the following factors:

- Bears find enough food in nature (beech and oak nuts are an especially important source). Most of the forests in the bear range are mixed coniferous and deciduous forests.
- On almost all of the bear range, the bears are additionally fed as a game species. The good physical condition of the bear females when they go in the den is a condition of high reproductive rate.
- The current activities of people in the bear range do not disturb the bears in such a way that results in negative impacts on the bear population.
- Favorable climatic conditions lasting for most of the year.

It is expected that the sex ratio at birth is 1:1. Females reach sexual maturity in 3-4 years. The ratio of sexually mature (4-20 years of age) and sexually immature (1-3 years of age) is that sexually mature females make up over 50% of base game stock. The mortality rate for the cubs during their second year of life is on average around 20% (studies in Russia and North America). A certain portion of cub mortality comes from the intraspecific killing of cubs by adult males. Also, the survival rate of yearlings after they leave their mothers and until they reach adulthood is not known in Romanian conditions, but the observations at the feeding sites have showed that they are the main visitors of these locations. Thus, we consider that these feeding sites have an important role for surviving of sub adults. It is known that intraspecific killing and cannibalism exist during this period of bears' lives. Therefore, it is difficult to estimate the total possible reproductive increase. Theoretically, the reproductive increase could be as much as 25% of the total base stock of bears (older than 1 year), if the possible reproductive increase is approximately 1 cub per sexually mature female. However, it is not known how many of the cubs reach sexual maturity and participates in the reproduction cycle. In any case, before further scientific research, we can say that the total reproduction of a bear population is big enough if it successfully compensates yearly losses up to 15%.

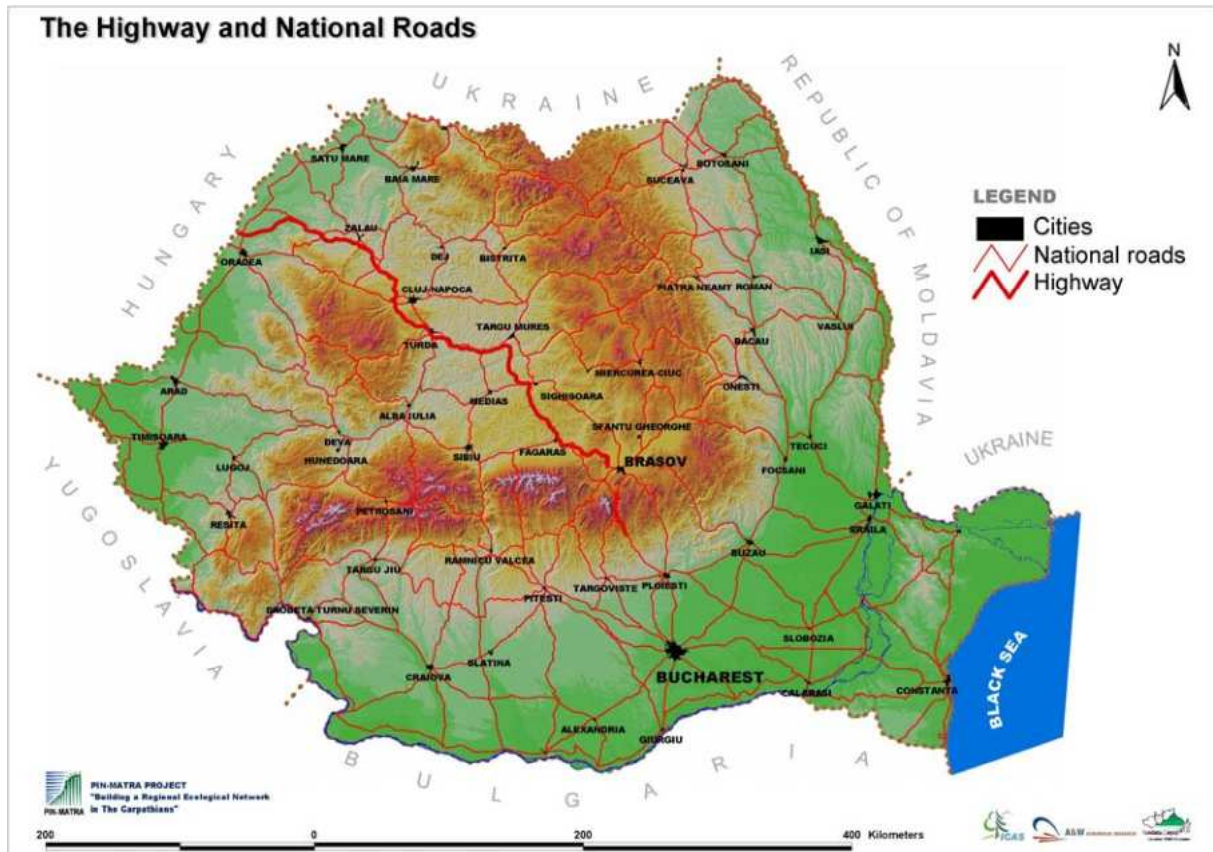
In the last decade, after a decrease at the beginning of the nineties, the population trend became stable, with an estimated number of about – 6 000 individuals. Having regard to the developments that will affect the bear habitat, we consider that the population trend in the future will be oriented on a descendent scale, management measures have to be taken in order to control this evolution.

4.9. Infrastructure and other human impacts

4.9.1. Roads

In the Romanian Carpathians, numerous roads with different level of traffic pass through bear habitats, most of these roads having low traffic loads. The main roads that pass the bear habitats are Bucharest – Brasov that is passing through high density bear habitats on Prahova Valley and the Pitesti – Sibiu road that is passing through dense bear habitats in the Olt Valley. These two roads have the most

intensive traffic in the mountainous areas. Other roads that affect the bear habitats are Brasov – Bacau, also located in a high density bear area of Covasna and the Deva – Arad road, which is passing the wildlife corridors between the southern part of the Apuseni Mountains and the rest of Carpathians. All these roads do not have fences along them and the high traffic occur mainly by day time. For the future, the authorities plan to increase the traffic capacity of the existing roads and to build several express roads on the existing transport corridors.



At the end of year 2005, in the frame of the PIN Matra project “Building a Regional Ecological Network in the Romanian Carpathians”, ICAS Wildlife Unit, together with its partners (Fundatia Carpati and A&W Ecological Research) will provide to the MMGA the GIS maps and the Vision Plan for the large carnivore ecological network in the Carpathians. This will contribute to a better understanding of the future ecological networking in the area and will be a valuable tool for strategic planning in the bear habitats.

4.9.2 Motorways

The existing 250 km of highways in Romania is not passing through bear habitats and is not affecting the connectivity of bear populations. However, the planned motorways Bucharest – Brasov – Oradea and Bucharest – Pitesti – Sibiu – Deva – Arad will pass through important bear habitats, first one passing the high density bear area on Prahova Valley and the second one passing the connectivity areas located in the southern part of the Apuseni Mountains. These planned motorways need to include active measures and special constructions (viaducts, ecoducts, tunnels) in

order to ensure the bear population connectivity within the Romanian Carpathian mountain range.

4.9.3 Railway Lines

The main railways that are passing bear habitats are Bucharest – Braşov and Sibiu – Deva – Arad, which are passing the same areas mentioned in the roads chapter. In comparison with the road network, the railways have a lower impact as bear mortality and habitat fragmentation factors.

4.9.4. Garbage

Garbage is an inevitable by-product of the progress of technology and civilization. The waste from larger towns and communities in bear habitat is some times managed in an inadequate way. Garbage dumps which are not organized in a satisfactory way and illegal garbage dumps located at easily accessible sites of relatively small visibility represent a potential danger in bear areas or close to bear areas. The danger for bears is indirect and with long-lasting significant effects. Adult and sub adult bears – instinctively following the easiest way of getting food – are regular visitors of these locations.

These bears lose their instinct for constant food searches over large areas, they gradually also lose their innate fear of people's scents, and finally they become potentially dangerous to people. Whole families of young sub adults with mothers who had grown up near the garbage dumps represent an even bigger danger. The chances that fatal incidents will occur when a man encounters such bears are much larger and can result in negative changes in public attitudes (which were formed over a long period of time and which are currently positive).



The recent events (Braşov 2004), when people were killed and injured by bears close to garbage areas have demonstrated that the garbage management is a serious issue in Romania. Unfortunately, the local authorities should understand that this is an issue that is concerning all the actors on local level, not only the hunting units' leaseholders. Currently, there are carried out lobby activities in order to initiate a collaborative framework of diverse institutions that could contribute to an adequate solution for the bears and the people.

Part III – Bear Management

5. GOALS

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

In accordance with studies and research developed by ICAS and other interested institutions, as well as existing legal regulations, by consulting of all interested factors such as Ministry of Agriculture, Forest and Rural Development (MAFRD), Ministry of Environmental Protection and Waters Management, Universities, NGOs, State Forest Administration, Hunting Organizations and others, through a participative process, a series of measures were adopted. These measures designed a model of management plan for the brown bear in Romania, approved through minister order and containing the following:

- Classifying the areas in which there are bears at present or with the possibility of existence according to the importance and suitability regarding the habitats for bear management. (done)
- Evaluation of the impact for the existing or planned infrastructure regarding the bear habitat and attenuation of the negative impact. (on going)
- Protection of brown bears by law: hunting is only used in the benefit of the wild population, where its validity is proved. (done)
- Establishing an efficient compensatory system.
- The existence of the compensatory systems correlated with damaging preventing measures (protection and preventing measures in accordance with legal provision – guarding dogs, electric fence etc.).
- Inaccessibility of brown bear to the garbage disposal facilities.
- Initiation of information, education and public awareness campaign for different target groups at local and national level as well as the promoting and support for educational and informative programmes aimed to change the negative perception of the bear.
- Establishing a protocol for permanent consultancy with local population regarding the necessary management actions.
- Moving or elimination of the “problem bears” in cases that the prevention effort fails.
- Applying in certain periods, of “deviation feeding”, depending on species requirements and respecting the legal regulations for bear 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 areas will be take into account areas from Harghita, Covasna, Mureş and Braşov

This management plan can be adapted in accordance with new conditions occurred. These changes should be only made based on the proposals of the working group and approved by the competent authorities (Romanian Academy, MMGA, MAPDR).

Opportunity of maintaining the Brown bear population size under control through hunting

Taking into account the actual habitat of the *Ursus arctos* and the fact that the habitat may support a relatively constant number of individuals, the increasing of density lead to accentuated bear – human conflicts and perturbations at the ecosystem level that require man intervention and measures for controlling and maintaining of the population to an “optimum” level. Also, when the food resources are limited in an natural habitat that supports a given population pressure, the increasing of it, will produce the migration of brown bear exemplars to anthropic areas and undesired humans – bear interactions, which beside the damages, or accidents, cloud create a negative reaction among local people.

It should be taken into account the maintenance of a vigorous population, with a health gene fund in order to allow a sustainable conservation of the species. As a consequence, the most indicated modality of control for the Romanian brown bear population is represented by hunting of the problem bears in the over populated areas. To forbid legal hunting, especially for the elimination of the “problem” bears, will generate a negative reaction among local people.

Regarding the structure of damages due to bear population, those are mostly related to sheep farming. This situation occurs due to the grazing system, respectively, by the overlapping of the bear territory with the sheep grazing areas and with illegal grazing in the forests. (Mertens A. 2001)

At the national level it is necessary to mention the important damage occurred in the fruit-farming sector, where in some areas, especially during autumn, a large number of bears are recorded. These bears are coming to feed on fruits.

Orchards are placed in pre-mountainous areas, where, in general, the density of the bear population is low. But in the autumn there are concentrations of bears which are damaging the trees. In such circumstances the attitude of locals tends to be negative towards bears.

From the interactions of bears with different fields of man activities, human injuries often result. As the table and graph shows, most accidents had happened in the animal-farming sector. In the studied cases, the main causes of accidents are due to the imprudence of people.

In order to prevent the negative reactions of the locals, hunting should be used to eliminate especially the bears that produce damages or attack people.

6. DESIRABLE NUMBERS (CAPACITY)

6.1. Capacity

A comprehensive analysis of the “suitable” bear habitat in Romania (~69.000 sqkm) based on the diagnoses key, indicates that the natural possible size of the bear population (biological capacity) is around 4.000 bears. The desirable capacity from a social - economic point of view is around 4.000 bears as well. This number is based on current knowledge; however, it is possible that new monitoring results and future experiences in bear-human coexistence will change the desirable capacity for the bear population in Romania. With additional feeding of bears, habitats of poorer quality could also sustain higher densities of bears, while good quality habitats could sustain densities of 2 or even more bears per 10 sqkm.

7. MONITORING AND ANALYSIS OF MORTALITY

Specialists make the evaluation of Brown bear population, which is continuously monitored since 1952. The population sizes of main wildlife species, which populate the hunting areas from Romania, are estimated annually. The estimation actions of game species populations are organized from the 2nd of April until the 31st of March (next year). Each hunting area has employed a professional gamekeeper, who is responsible together with the evaluation commission for data gathering.



All the measures involved in the good management of each hunting area are based on the ecological knowledge of the species. Relied on systematic observations in the field we aim to:

- estimate population size with minimal accepted level of error,
- determinate the quality of the population, (the sanitary-veterinary state as well as age structure and sex ratio,
- establish proposals for harvesting quotas in order to reduce the conflicts between different sectors of activities.

Special commissions for population estimation are constituted at county level in order to organize unitarily the necessary actions for wildlife management.

They have the following tasks:

- to establish the program for population estimation actions on every hunting area and the responsibilities regarding the accurate organization of these actions,
- to convoke and train the persons designated to respond for the organization of evaluation actions, on each hunting area, establishing on this occasion, the limit data at which will be finished the filed phase.

- to analyse together with the responsible persons for population estimation , possible unusual situations determinate by game movements at the moment of evaluation, in some hunting areas,
- to control the way of developing of the actions of the estimation process,
- to analyse and centralize the results of population estimation ,
- to propose the amount of quotas which will be harvested for each species and hunting area which follows to be approved for the next hunting season.

The wildlife managers first divide the areas inhabited by brown bears into working units and for each forestry basin establish the routs and observers. Beginning from November, the observers identify the bears through measuring footprints in the snow and identify 85 the used dens in spring. The data referring to the location of the dens, the footprints / tracks and the specimens observed will be noted in the game keepers' notebooks and kept on special files.



The data collected until 1st May is used for GIS analysis regarding bear zoning and high bear density areas.

The activity of estimation for Brown bears in spring will be simultaneously developed on all hunting areas populated with bears which are located in the same general area in order to avoid multiple counts of roaming bears. The observations will be organized on the same forestry basin, routs and observers as established in November with the same personnel. The action will begin in two or three days, after the personnel from the field notice the getting out of the bears from the dens.

Firstly, each observer, together with the administrator of the hunting area will fill in the general data, in the "standard observation file for bear" regarding the bear habitat they examine.

The bears will be identified through direct observation of the specimens at the feeding places and after their footprints in the snow. This action will be done 2-3 times per week and the collected data will be registered in field notebooks and in the "standard observation file for bear".

At the end of April, beginning of May the observers, together with the administrator of the hunting area, will evaluate the data, noted in the standard observation file for bear, in the same day in which the action took place, taking into account the observations that were done in the field notebooks, during the phase of information from November – February. It should be underlined that in the estimation files the number of bears planned to be hunted during 15.03 – 15.05 will be subtracted from the total, according to the approved quotas during the previous hunting season.

Following the meeting that took place at the Ministry of agriculture, Forestry and Rural Development on 17.01.2005 the representatives of interested NGOs were invited to participate in the action of bear populations estimation.



Any bear mortality is recorded. Measurements and samples are taken in accordance with a prepared form. The information about bear mortality is reported to the competent ministry within a 24-hour period. The form for the mortality data will include the date and place of occurrence, the cause of mortality (if the bear was shot, then also the data about the hunter and the trophy value) as well as basic measurements (total length and measured weight), sex and age.

Basic samples are collected: one of the rudimentary molars for age determination (preserved dry in a paper bag), a piece of soft tissue for genetic analysis (kept in a freezer) and a sample for Trichinella investigation. Collecting of additional measurements and samples will be agreed upon if required. Every bear fur and skull is individually marked. Marking tags, their distribution and method of application are determined by the competent ministry.

The Forest Research and Management Planning Institute (FRMPI), through the Wildlife Biology and Management Unit, together with the specialists from other institutions (ministries, governmental agencies, hunting agencies, NGOs) develop a series of research themes and projects regarding the ecology of the Brown bear in natural ecosystems, the interactions of the species with human activities, the hunting management of the species, the ecological importance of the species and the damages produced by it.

During 1999-2002, as part of the LIFE Nature project “The sustainability of National Park Piatra Craiului” (project financed by the EU, FRMPI and WWF Austria) field research took place regarding the ecology of brown bears and the damages produced by the species. The Ministry of Education and Research sustained the project financially (Orizont Program 2000) and the results of the research were presented both in reports and in numerous communications at national and international workshops.

These research and field studies were continued during the period 2001-2003 through the program MENER, financed by the Ministry of Education and Research. In

this way the aspects connected with the damages done by bears in the livestock breeding sector and the implementation of some modern systems of protection of the flocks against the attacks (through electrified fences) were further investigated. The positive results of this research permitted the continuation of these activities in more areas of the country through some projects financed by the EU. Also, the results of the research were integrated in the LIFE Nature Project mentioned before, being used as scientific support for the elaboration of the main lines regarding the management of big carnivores in the area of Piatra Craiului National Park, and serving as a model for other areas in Romania. As for public awareness and information, a series of informative materials, as well as a web page of the project (www.icaswildlife.ro) have been constructed.

During 2002, an Action Plan was elaborated through the national authority with responsibilities in the field of hunting management coordination regarding the Management of some species of special hunting importance, respectively, roe deer, brown bear, wolf, lynx and *Tetrao urogallus*. This Action Plan was elaborated through some workshops at which participated representatives of national authorities (the Department of Forestry, The Environmental Protection Agency, The Mountain National Agency, The National Sanitary-Veterinary Agency), of the National Administration of Forests, **FRMPI**, Faculty of Forestry and Forestry Exploitation from Brasov, the Romanian General Association of Hunters and Fishermen, the local authorities, and NGOs.

During 2000-2003, the method of the ecological diagnosis of the wildlife management units from Romania was updated, action sustained financially by the central authority in this field and the National Administration of Forests. Through this activity both the criteria of **habitat suitability** for bears and the optimum densities corresponding to the intervals of **habitat suitability** (density per 10,000 ha) were analyzed and modified. These keys of ecological diagnosis and the optimum density on categories of **habitat suitability** were applied practically during the hunting season 2003-2004, being used at national level by the administrators of the hunting areas from Romania. The results obtained through the field studies and the research developed on a period of 4 years permitted to approach, beginning with 2003, some complex aspects regarding the management of brown bear at national level. That is why, at the beginning of 2003, a project financed by the Holland Government through the PIN MATRA Program was initiated through this project the Plan for an Ecological Network in the Carpathian Mountains based on the key habitats for brown bear, wolf and lynx will be materialized.

The aspects connected to the distribution, ecological corridors, densities, interactions with human activities are analyzed through a GIS data base and a Management Plan of this Ecological Network which will be integrated in the European network will be elaborated. The results of the two years of studies and research permitted to identify the areas of fragmented habitats for brown bear, to distinguish the ecological corridors and also the areas with maximum or minimum densities of the species.

These results are presented in informative materials made in this project.

To sustain the activities regarding Brown bear management at national level, beginning with 2004 the National Administration of the Forests finances the

development of a study initiated by ICAS, regarding the estimation of Brown bear, Wolf and Lynx populations from Romania. This study will target both the analysis of the densities and species distribution at national level, and the improvement of the methods of bear population estimation in the field. The result of the research will be presented in an informative booklet, which will be disseminated at national level.

In Vrancea County there is another LIFE Nature Project “In-situ conservation of Large Carnivores in Vrancea County”, which addresses the preservation, administration and management of the large carnivore populations, represented by *Ursus arctos*, *Lynx lynx* and *Canis lupus*, as part of the ecosystems in coexistence with local people.

The objectives of the projects are:

- to create a local management plan for large carnivores in Vrancea County;
- to prevent the conflicts between large carnivores and local people;
- to create an ecological protection network for large carnivores in Vrancea County.

The foreseen results will be:

- the control of large carnivore mortality due to conflicts with local people;
- to provide an ecological network for protection of large carnivores from Vrancea County;
- to improve the livestock guarding system through warning activities and training courses for the guarding personnel;
- to make a local management plan for large carnivores;
- to establish a scheme for compensation the damages produced by large carnivores;
- to improve the protection system of sheepfolds from the areas populated by large carnivores through the setting up of a demonstrative area at Baresti;
- the implementation of a campaign of public awareness regarding the large carnivores vulnerability.

Poaching

The poaching on bear is reduced being recorded as less than 20 cases per year. Generally there are cases of poaching using snares, and most of the bears found captive are tranquilized by ICAS specialists and released. The cases in which bears are accidentally hunted “as legitimate defense” at hunting by driving for other species are 1 or 2 per year, therefore this cannot be considered dangerous for the population. Reported to the number of specimens from Romania, the level of poaching does not endanger the population and could be appreciated as kept under control.



8. ACTIONS DIRECTLY AFFECTING THE POPULATION

8.1. Hunting

8.1.1. Hunting season

The bear hunting season in Romania is from 15 September until 31 December, according to the newest regulations.

8.1.2. Cull quota

On the national level, the annual quota approved was between 2% to 8% of the total estimated number of bears. This percentage is determined in accordance to the established trend of population growth. A quota of 10% can be used locally if the trend shows an increase or if there is a need to slow this trend down or stop it. If such an action does not change the trend, and objective problems with a local number of bears exist, a larger action directly affecting the population can be applied by way of exception over a limited area (see the problems in Brasov). If a negative population growth trend is recorded, the quota can be suspended in certain years or areas. The percentage for calculation of the quota and the total number of bears planned for culling in the next calendar year are determined on the basis of the capacity of the habitat, the population size estimated and the population growth trend. It can be expected on the basis of current experience that the proportion of legal harvest in total cull cotta will be 50% to 80%. The cull quota includes legal harvesting, poaching, and culling of problematically behaving bears, bear mortality caused by traffic and other anthropogenic causes, as well as the removal of live bears from the population. Young bears following their mothers and females leading their young are not to be shot. In the last 5 years the real harvested quota was as an average, less than 5% of the estimated population size.

8.1.2.1. Quota distribution and hunting rights

The basic criteria for the distribution of quota are:

- * population density.
- * level of conflicts in the areas.

In the zone with the best quality habitat and permanent bear presence, the presumed bear population density is 1.5 to 2.0 bears per 10 sqkm.

For culling of nuisance bears the competent ministry issues a permit after the presence of that bear creating problems has been confirmed several times.

The person suffering damages has no right to compensations if he has not guarded his property appropriately.

8.1.3. Hunting methods

Traditionally bears in Romania have been hunted by individual hunters watching over artificial feeding sites from high elevation stands, by individual hunters watching over fresh bear kills, or with drives organized by hunting parties.

Advantages of bear hunting from a high hunting stand:

- Provides a good observation point, determination of age and sex category of the bear and a safe place for the hunter.
- Reduces the risk of wounding the bear.
- Minimal disturbance of the habitat.

- Usually, there is a forest road leading to a hunting stand with a feeding site, which makes access to the stand, transportation of food to the feeding site and manipulation of the killed game simple and easy.
 - It is the safest hunting method for the hunter, the accompanying person and everyone around.
 - Enables the most efficient implementation of harvesting control.
- “Driving” is used especially in autumn in the concentration areas where high level of damages occur.

8.2. Supplemental feeding

Supplemental feeding with food of plant or animal origin is a common bear management measure. Bears are omnivores. Most of the food they take is of plant origin, and may account for up to 85% of their diet, depending on the season. Besides plant food, they also need protein-rich food to maintain normal metabolism. Bears increase their consumption of protein rich food (mostly) in spring. Of the protein-rich foods bears eat insects, invertebrates, rodents and carrion. They can also attack young large game and domestic animals.

The reasons for supplemental feeding are:

- To keep a bear in the desired part of a habitat, to prevent it from getting close to human settlements.
- To reduce damage to property.
- It provides a chance to observe and monitor trends of bear population growth.
- Possibility of administering medical treatment.
- Increase of the habitat carrying capacity, population growth and reproductive increase.
- Eco-tourism (photo-hunting) and education.
- Harvesting the cotta.

8.2.1. Time of supplemental feeding

The supplemental feeding of bears can be carried out up to 90 days per year in November, March, April and Mai. The aim of limiting supplemental feeding days is to keep bears from getting used to or becoming dependent on food from human sources.

8.2.2. Supplemental feeding sites

Feeding sites are designated for the supplemental feeding of bears. These structures can be constructed in small forest clearings next to roads with year-round access, making it always possible to get to the feeding site. A feeding site must be at least 2 km away from the closest permanently inhabited human settlement. Their location must be chosen in a manner that prevents contamination of water sources, waterways etc. Bears should not receive supplemental feeding in protected areas, with the exception of sites arranged for the observation and filming of bears for educational and commercial purposes.

8.2.3. Types of food

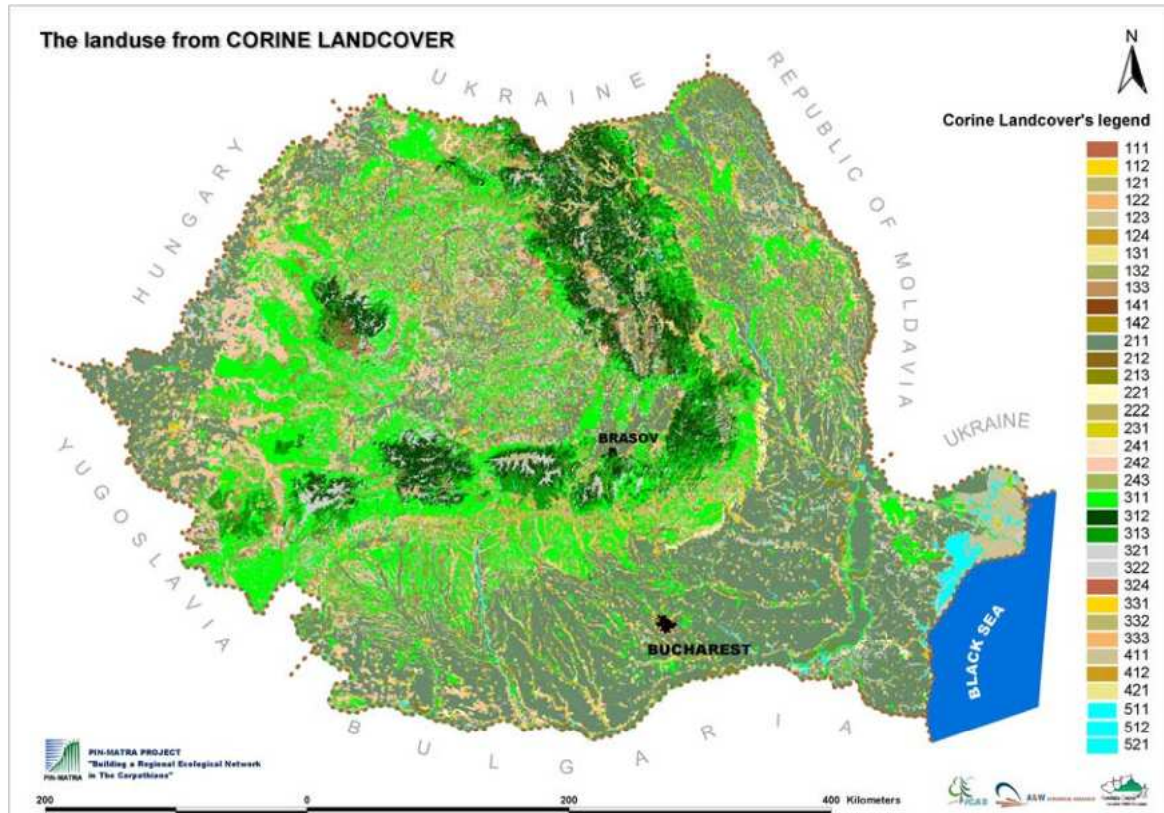
Grain, wet fodder and meat products, as well as special areas planted with annual and perennial crops are used for the supplemental feeding of bears. The grains primarily used are corn, oats and barley. The meat products used should primarily consist of carcasses of dead animals (which have been inspected by a veterinarian

before being supplied to the bears. If not enough animal carcasses are available, condemned meat from slaughterhouses may also be used. Other animal species also come to the specially constructed bear feeding sites, for example wild boar, wolves, foxes, martens, birds etc. Besides the listed supplemental bear foods, annual or perennial crops may also be planted with the goal of improving the nutrition of bears. These fields are not only used by bears, but also by other game. They should be located in forest clearings, as far away as possible from human habitation areas. Likewise, the bears utilize the feeding sites of wild boars and deer. It is desirable to keep the number of such feeding sites that attract bears as low as possible. Within the bear range the number of feeding sites for wild boar and deer should be as prescribed in the hunting management program. These feeding sites must also be sufficiently distanced from places of human habitation or borders of national parks.

9. CONSERVATION OF THE HABITAT

The Romanian bear habitats are very valuable and can be compared with the highest quality natural habitats in the Carpathian region. The basic prerequisite for the implementation of the Brown Bear Management Action Plan in Romania is the conservation of the habitat. When discussing the bear habitats in Romania, the following must be emphasized:

- They are an integral part of the Carpathian region of bear distribution in Europe;
- They are homogenous and not fragmented, strictly separate areas of bear presence does not exist up to now;
- They are associated with extensive natural forest ecosystems;
- They are connected with habitats of equal quality in neighboring countries, allowing unrestricted migration of bears.



9.1. Measures for habitat conservation

Constant monitoring of habitat status and possible changes is required for the correct identification and subsequent implementation of the measures for its conservation.

9.1.1. Identification of:

- Bear range;
- Habitat suitability for bears;
- Habitat quality.

9.1.2. Transportation infrastructure

- All types of existing infrastructure and its effect on bear habitats are to be identified;
- All types of planned infrastructure and its effect on bear habitats are to be assessed;

When construction of roads or railroads is inevitable, it should be attempted to:

- Avoid intersection of the most vulnerable parts of the habitat (e.g. Greece);
- Enable passage of bears and other animals across fast traffic roads (with tunnels, viaducts, green bridges) (Permeability of Roads for Animals – Design Guidelines, 2002);
- Roads used for forestry are to be excluded from public use.
- Construction of new and modernization of the existing roads and railroads through bear habitat is to be prohibited until the requirements set by the Law on Nature Protection no.462/2004 are not fulfilled.

9.1.3. Conservation and improvement of forest ecosystems

- Identification and evaluation of current status;
- Adoption of long-term forestry development guidelines (Forestry Strategy), natural restoration, mixed forest stands, conservation of old beech and oak forest;
- Evaluation of the parts of forest placed under special protection
- Increase the size of forests placed under special protection.

9.1.4. Agricultural development

- The existing agriculture practice is to be identified and evaluated;
- Planning and assessment of future actions in this field (avoidance of intensive crop production over large areas and preventing the promotion of intensive livestock production in bear habitat).



9.1.5. Sport and tourist facilities and activities

- Current status and the effects on bear habitation have to be identified;
- Construction of such tourist facilities and activities is to be banned from the central part of bear range unless they meet the requirements set by the laws;
- Tourist and sport activities that disturb peace and quiet in bear habitats are to be banned;
- All activities resulting in damage to bear habitats are to be avoided.

9.2. Garbage

Every food source that is treated as garbage – food scraps, garbage in various garbage cans and containers or garbage deposited in legal or illegal garbage dumps must be inaccessible to bears. On such sites bears start associating the smell of humans with a positive experience, this being the opposite from experiences they had before. A bear with such experiences might not try to avoid humans, or may even become habituated to humans. This does not mean that the bear is dangerous per se, but such behavior is certainly very undesirable.

Prevention of bear access to garbage should be based on:

1. Garbage dumps should not be located in bear habitats. Where this cannot be avoided, a garbage dump should be fenced-in in a manner that prevents bears from accessing and feeding on garbage. The most effective method is to surround the garbage dump with an electric fence. The entrance gate to the garbage dump should be closed.
2. Illegal garbage dumps should be cleared (low implementation).
3. Containers for the collection of garbage before it is being transported to a garbage dump should be inaccessible to bears. Additionally, they should be made of sturdy metal and always closed in a manner that prevents bears from opening them. They should be emptied on a regular basis and there should never be garbage lying around them.
4. Household garbage bins should be kept inside structures that are inaccessible to bears. They should be placed out in the open only during the day, immediately before pick-up.
5. Trash cans in bear habitats should be made of metal and equipped with covers which can prevent bears from accessing their contents. They should also be emptied on a regular basis.
6. The dumping of food remains in bear habitats should be banned and people should be educated on this issue.

10. PROBLEM BEARS

In most parts of the European bear range, attacks of bears on humans are extremely rare. Due to the overpopulation of bears in Romania and the lack of persecution for decades due to Ceausescu's hunting policy towards bears, Romania was an exception concerning bear attacks. It was and is the only country in Europe that has a substantial number of human injuries and even fatalities through encounters with brown bears. Between 1987 and 1992 (the period with the highest bear population), a total of 447 accidents were reported, of which 193 were serious attacks where people ended up in hospitals, and 20 persons were killed. Since the bear population has decreased again and problem bears are more frequently shot, the number of fatal bear attacks has correspondingly decreased as well. Still, casualties happen: in

October 1997, three people were killed by bear attacks in Brasov County only and in November 2004, a subadult bear feeding on garbage in Brasov area has killed 2 persons and injured another 8 people (the bear proved to be rabied).

In most cases, attacks are due to four reasons:

- shepherds attacked by a bear while attempting to defend their livestock or recover carcasses;
- people attacked during accidental encounters with bear sows with cubs;
- hunters attacked by a wounded bear during a hunt;
- people attacked by bears which were surprised at a kill site.

10.1. Habituated bears

Habituated bears, bears that lost their fear of humans, can become particularly dangerous for humans. Such situations occur frequently all over the world in areas where bears find food in the nearby of humans. An extreme case is to be found in the quarter of Racadau, in Brasov, where increasing numbers of bears approach the garbage containers standing right at the edge of the forest. Like this, night by night bears come into close contact with humans.



This situation has caused serious accidents in 2004 and if the number of bears increases it might be only a matter of time until other persons will get killed or severely injured. In these circumstances, we consider essential the involvement of local authorities and public in solving the problem of habituated bears.

10.2 Orchards

During the '80s when bear numbers increased, the damage to orchards reached an extremely high level: between 1987 and 1992, the equivalent of US \$ 45 million damage was reported. Correlating to the most frequently found fruit trees, bears feed mainly on apples and plums. They cause damage not only by picking fruits but also because they climb on trees and break branches or whole trees. Although the damage reported has decreased with the decreasing number of bears, it is still common to see damage from bears in almost every orchard close to a forest in the bear range.

In the context of land restitution, the compensations that should be paid to the land owners will increase and their negative attitude towards bears have to be mitigated. Thus, effective compensation systems have to be set up and implemented on national level.

10.3. Livestock

During the period of 1987 to 1992, the losses of livestock were estimated to be the equivalent of US \$25 million. A survey done on an area of 1000 sqkm around Brasov showed that the vast majority (91%) of livestock killed by large carnivores are sheep. The rest are occasional cases of cattle, donkeys, horses and pigs being killed. About 2% of all sheep grazing in the area are killed by large carnivores. 35% of the kills are done by bears. In Romania livestock protection methods are still relatively well preserved. The sheep are always accompanied by shepherds and by livestock guarding dogs and they are penned during the night.

However, the livestock is not always optimally guarded due to several economic reasons: (1) The sheep are left free to graze also in the night in order to produce more milk, (2) dogs are expensive, and not always good guarding dogs in the camp, (3) often there is not enough money to hire a sufficient number of shepherds, (4) the dogs are not well fed and often search for additional food, leaving the flock unattended. Through hunting these dogs might have a negative influence on prey numbers. Hunters might think wolves and lynx are responsible for prey animals killed, which were actually hunted by livestock guarding dogs. Also, staying in the forest, the dogs can transmit diseases (parvoviroses, distemper, tuberculoses) to wildlife.



In most west European countries a compensation system pays the damage caused by large carnivores on livestock. According to the law of hunting, damages to livestock, caused by protected game species, have to be paid back by the Ministry of Environmental Protection. Condition is, to demonstrate that the livestock was properly guarded and that the manager of the hunting ground was responsible for the damage (Art 15, Law no. 103/1996).

During the communist regime the public insurance constituted a kind of compensation system for the damages caused to agriculture. After the revolution the public insurance was replaced by several private companies. These companies offer

insurance policies for damages caused to agricultural activities by wild animals, diseases and natural catastrophes. The owner will theoretically be reimbursed 100% of the market value of the animal, determined by the ministry of finances. These insurance policies are too expensive for private small-scale animal raisers. Due to this and the complicated bureaucratic procedure for getting the animals reimbursed hardly any small-scale livestock raisers insure their animals.

10.4. Bears – human encounters



Bears that do not flee from humans are potentially dangerous. Loosing their fear of man does not mean that the bears will become more aggressive; however, the actual danger is significantly greater. Some people will try to get closer to such a bear to get a better look or picture, while others will shoot and wound it. In both cases the bear may respond with an active defense. Besides, frequent sightings of a single bear habituated to humans often make people think that bears have multiplied beyond reasonable

numbers. Some bears habituated to humans will start causing regular damage in their search for food from human sources, and thus become problem bears. Their behavior is difficult to amend. Such bears usually end up getting killed by traffic, shot in so-called self-defense or killed through planned culling.

A measure preventing the development of problem bears:

A) Preventing habituation to foods from human sources.

These measures include all the measures listed in the chapter on the prevention of garbage feeding. All other human food sources (e.g. food stores, orchards and gardens next to houses, means of transport, places for reloading of cargo etc.) which might attract bears should be appropriately fenced in, protected or removed.

B) Preventing the existence of bear cubs that have lost their mothers. Bears which have lost their mother before the time of physiological separation are particularly inclined to search for food close to humans. The following should be done:

1. Measures should be taken to decrease the probability of occurrence of orphan bear cubs: a) special care in hunting operations, b) prevention of poaching, c) avoidance of disturbance in habitats during winter months (from December until April), especially around known bear denning sites.

2. It is prohibited to feed a motherless cub bear when one appears.

3. A bear cub that loses its mother during the first 4 to 5 months of its life cannot survive in the wild. If it is taken and fed artificially, then it will have to be kept in some sort of enclosed space for its entire life. Such bears may be taken by a specialized shelter, within the limits of its capacities. If such facilities are not available, no artificial

feeding of orphan bears of that age should be started. Bear cubs that were orphaned at the end of May or later in their first year of life have certain chances for survival in the wild, but will behave normally only if people do not feed them and if they do not find food in garbage.

Measures for dealing with problem bears

A bear that has become habituated to humans or has started making problems is difficult to cure of such undesirable behavior. Possible measures are:

1. Prevention of access to food sources it regularly visits.
2. "Negative conditioning" – curing of the habit through unpleasant stimuli:
 - noise from various acoustic simulators;
 - electric shocks from electrical fences;
 - shooting with noise-making ammunition;
 - shooting with rubber bullets.



3. Removal of a bear for which the preceding measures did not work:
 - Capturing and relocation. This is not advisable in our conditions, as there are always human settlements within any area of size to accommodate a bear's home range.
 - Capturing and putting into captivity.
 - Lethal measures - shooting or capturing and euthanasia.

4. Sick and wounded bears.

If a bear appears that is suffering from an injury or disease and is temporarily incapable of surviving on its own in the wild, the possibility of medical treatment can be considered only if the bear can be helped by a single treatment performed on-site.

11. BEARS AND TOURISM

In the previous chapters there are in detail described the fundamental factors that define the bear habitat in Romania. It has a low density of human population and a

typical rural character. Besides the conserved biological and ecological values there are few other comparable advantages in this area. The gross domestic product of this area is considerably lower than in other parts of Romania; people are leaving the area and the local economy is in decline, in comparison with the Romanian economy overall. At the same time, local administrations and local communities hardly benefit from any of the abovementioned activities, which could cause a lot of problems in the future. Because of this, it is important to gain the maximum value of the presence of bears and to use it for the benefit of the locals. Here it should be noted that Romanian bear areas are also inhabited by the other two large carnivores: the wolf and the lynx. These two species have considerable impacts on hunting management because they use game animals as food.

It is important to ensure enough financial resources from the bear hunting fees and from the other ways of using bears, wolves and lynx, for the conservation of these species and for the benefit of the local population.

Brown bears have been both persecuted and valued by people through the centuries. Recently, bears have been valued for trophy hunting. In some areas, their numbers have been maintained by hunters, who have eventually helped bear populations to survive and recover. Today, the presence of a healthy bear population is a sign of a high-quality forest and thus the availability of resources such as timber, mushrooms, berries and game animals.

Bears are a symbol of the richness of nature and it is known that the quality of the natural environment is one of the main factors in tourism. Local communities can use this symbol to increase the market value of the local traditional products, such as handicrafts. For instance, the creation and use of a "bear label" on local products would mean that the products are derived from a well-maintained forest. For wildlife enthusiasts the presence of bears can considerably enhance their wilderness experience. Research has shown that the majority of residents in bear areas feel that the animal's presence attracts tourists, bringing economic benefits to local communities.

Besides the "hunting tourism" already mentioned in this Plan, bears can be used in other ways for tourism purposes and within a concept usually called "ecotourism". According to the International Ecotourism Society, ecotourism can be defined as "responsible travel to natural areas that conserves the environment and improves the well-being of local people" (2003). The concept therefore includes so called "non-consumptive" use of natural resources. This chapter will primarily attempt to cover the possibilities of non-consumptive utilization of bears in producing economic benefits for the local people.

Shackley (1996) mentions four main factors that influence the development of the non-consumptive use of wildlife in tourism:

- The global increase in a variety of tourism products;
- Cheaper and faster journeys to tourism destinations;
- Increased public awareness about the environment;
- The search for sustainable substitutes to mass tourism.

11.1. Bears in the wild

In the context of tourism, there are three different categories of areas which bears inhabit in Romania. These are protected areas, hunting units and mountaineering destinations. The three categories can overlap. Visitors to these areas come in contact with the bears, which can result in different effects both on the visitors and the bears. The key issues regarding the interactions of visitors with bears that need to be dealt with are:

- The disturbance of bears;
- The habituation of bears to people;
- The safety of visitors;
- The satisfaction of visitors;
- The habitat carrying capacity for tourism.

For the purposes of this plan we use the following definition of the tourism carrying capacity: the highest possible level of utilization of an area by the visitors with the highest possible level of visitor satisfaction and the lowest possible level of negative impacts to the bear population. Such an approach is particularly important in the protected areas and because of that it is necessary to carry out objective and quantitative scientific studies on:

- The levels of visitor disturbance to the bears;
- The visitor satisfaction levels during a visit to a protected area.

In order to avoid the disturbance and habituation of bears and ensure the safety of visitors, it is important to educate visitors about the correct ways of behaving in bear habitat (through brochures, flyers, signs on the hiking trails, lectures etc.), and if necessary, to limit the areas accessible to visitors or to limit the number of visitors in certain areas or times. It should be noted that the remaining activities related to these issues can be found in the Chapters "Garbage" and "Problem bears".

With the aim of increasing their satisfaction levels, visitors can participate in the following controlled activities:

- enjoying the bear habitat;
- searching for, observing and photographing (filming) signs of bear presence;
- observing and photographing (filming) bears from high stands near bear feeding sites;
- participating in the activities of researchers and/or park rangers;
- education about bears.

11.2. Bears in captivity

Institutions that keep bears in captivity should use the bears with the aim of educating and entertaining visitors, as well as creating economic profit. Also, there are several institutions (including Vier Pfofen) that implement projects related to orphan bears and relocation of captive bears kept in bad conditions.

Fiți atenți! Nu hrăniți urșii din mână!

CE NU TREBUIE SĂ FACEȚI DACĂ ÎNTÂLNIȚI URȘI ORFANI ?

AVEȚI GRIJĂ SĂ ...

- NU** le dați de mâncare direct din mână. Dumeavoastră vorbiți în prezența urșilor, mai ales atunci când îi hrăniți.
- NU** aduceți urși în contact cu alți oameni, aceștia nu sunt câmpaci.
- NU** i aduceți în preajma altor animale domestice.
- NU** uitați că acești pui de urs care sunt foarte drăguți acum, vor crește. Este imposibil să țineți un urs în casă! Vă vor crea multe probleme. Trebuie să respectați aceste centre pentru ca pregătirea puilor în CENTRU să aibă succes. Ei trebuie aduși cât mai repede în CAMPUS. Dacă le oferiți prea multe amănunțit, pregătirea lor și separarea de părinți va fi un eșec.

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CENTRUL PENTRU REABILITAREA URȘILOR ORFANI

In captivity, the bears must have:

- Suitable enclosures with sufficient space for moving, in which the animals will not get bored and which are the best possible copies of their natural habitat;
- Proper nutrition;
- Peace and quiet.

The visitors should have:

- Safety;
- Education about bears;
- Entertainment;
- The chance to spend money.

12. MINIMIZING AND COMPENSATING DAMAGE

12.1. Minimizing damage

12.1.1. Measures to be undertaken by hunting unit leaseholders and other bear managers:

- Develop a plan for the prevention of damage;
- Gather and distribute instructions on how to prevent damage;
- Supplemental feeding of bears, with the purpose of keeping the bears away from human goods;
- Keep the size of the population at a level with tolerable damage.

12.1.2. Measures to be undertaken by the land users:

- Report damage to the hunting unit leaseholders;
- Proper implementation of the protective measures;
- Correctly use protective equipment;
- Harvest crops within agro technical timeframes.

12.1.3. Other measures

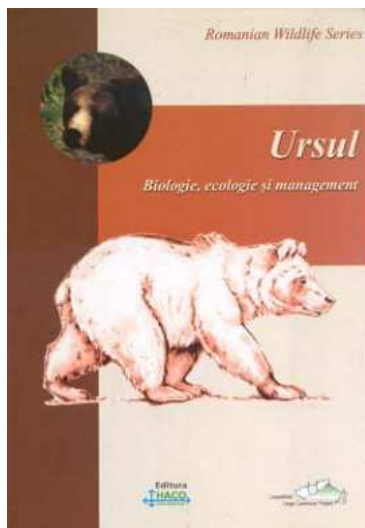
Includes all other measures defined in the chapters Garbage and Problem bears related mainly to the bears' access to garbage and other human-sourced food.

12.2. Compensation of damages

The current legal practice makes hunting unit leaseholders responsible for the damage caused by game, if protective measures were taken by the owners. Any damage which has been proven to be caused by a bear must be compensated in as short a timeframe as possible by the hunting unit leaseholder if they do not respect the hunting unit management plan. Otherwise the Ministry of Environment and Water Management will support the damages, bears being protected.

Besides amending various legal provisions, a single method for evaluating the damage should be developed, as well as criteria related to justification of the compensation claims.

13. PUBLIC INFORMATION AND PARTICIPATION IN DECISION-MAKING



In order to improve the quality of bear management in Romania and to avoid conflicts between different interest groups, in coordination with the Bern Convention recommendations for Romania, the following activities have been planned:

A) Education and information campaigns for different target groups. With the aim of ensuring public support for bear management and to prepare the public for constructive participation in decision-making, the public has to be informed correctly and in time. Depending on the targeted groups, the ways and volume of information have to be adjusted.

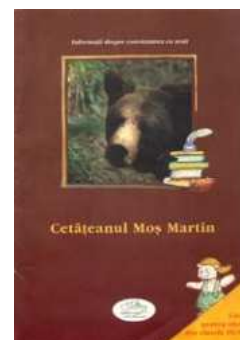
1. Local inhabitants of areas with permanent bear presence. Accurate information has to maintain the current level of acceptance of bear population. Special care should be directed towards educating the public about measures for the prevention of damage and of the direct dangers to humans, as well as avoiding behavior which can lead to the creation of problem bears. The public should be informed about the progress of bears and the ways of utilizing them in the local economy.

2. Local inhabitants of areas with occasional presence of bears. Emphasis should be placed on education about the biology of bears, in order to avoid panic reactions related to the presence of bears. Here as well special care should be directed towards educating the public about measures for preventing damage and of direct danger to humans, and about avoiding behavior which can lead to the creation of problem bears.



3. Inhabitants of areas where bears are not present.

All Romanians should be familiar with the basics of bear biology and accept and appreciate the existence of the bear population in Romania. Also, the general public should understand and accept all of the elements of bear management, including harvesting.



4. Students.

Elementary and high school education should provide a clear understanding of bears and other large carnivores in Romania as valuable parts of our natural heritage with a special ecological status in regards to their habitat, feeding and relationship with humans.

5. Visitors to bear areas.

Every visitor, Romanian or foreign, to bear areas and especially to protected and tourism-attractive areas, should receive basic information about the fact that he/she is visiting a bear habitat and about the recommended behavior in the bear habitat. The causing of fear in bears and the danger to humans should be avoided and, at the same time, information on how to recognize signs of bear presence provided. The proper informing of visitors will decrease the responsibilities of the organizations that are managing the area in case of conflict situations.

B) Identification and involvement of interest groups as representatives of the public in bear management, through consultations and joined planning.

The Brown Bear Management and Action Plan for Romania should be public documents to which interest groups can give comments and proposals. Once a year, a public workshop meeting should be organized in which the results of the previous year's management and plans for the next year should be presented.

C) Development of a lasting protocol of cooperation with the local population

Local inhabitants have to be informed about the status of the bear population on a regular basis. In particular, they have to be informed about any out of the ordinary situations. Also, local inhabitants have to be familiar with the procedures for reporting damage or dangerous situations as well as their general opinion about bears and bear management.

D) Monitoring of public attitudes toward bears and bear management

An understanding of public attitudes towards bears and towards different options in bear management will facilitate fair decision-making. To this extent, public attitudes and possible changes in attitudes should be monitored by suitable sociological survey methods.

14. INTERNATIONAL COOPERATION

With the ratification of the international treaties described in Chapter 3.1., Romania has committed to follow their provisions and this Management and Action Plan confirms its commitment to all of the provisions related to brown bear population conservation. On the global and/or European scale this means harmonization with the guidelines for conservation of the species in a “favorable conservation status”, in as high numbers as possible and over as large areas as possible, but in coexistence with local residents. The Plan will also respect the provisions related to habitat conservation and international trade of bears or parts of their bodies.

The Romanian brown bear population is part of a population which we share with Ukraine, Poland and Slovakia. There are no obstacles to the free movements of bears between these countries and such a situation will also be ensured in the future. With an understanding that the actions of bear population management in Romania can influence the bear populations in neighboring countries, Romania has committed also under the umbrella of the “Carpathian Convention” to such management that will keep our population in balance – so that approximately equal bear migrations across the borders in both directions can be expected. Romania expects a similar approach to bear management from the neighboring countries and will support Ukraine in the efforts related to bear management.

Scientific knowledge on Romanian bears will be available to experts in the neighboring countries. This Plan encourages cooperation between researchers, in the sense of harmonizing research and monitoring methods to enable comparisons and supplement results. This is especially important for monitoring, genetics and radio telemetry studies.

15. INTERVENTION GROUPS

Starting from 1996, ICAS Wildlife Unit set up an intervention group, formed by 6 persons, which had tens of interventions all around the Carpathian range. In 2004 there were 20 interventions. Also, in 2004 started the trainings for the national level intervention groups. The intervention groups consist of 40 to 50 trained and equipped professionals located all over the country (we form a group in each county with substantial bear presence). They will have to visit each location in which there has been: exceptional damage caused by bears, an accident or a death of a bear and,

especially, a problem bear occurrence. The intervention group has to be contacted for all procedural issues, especially in cases where a bear is attacking a human. The group is equipped with a dart gun, (20 new dart guns were bought in 2004) a rubber bullet firing gun and noise producing bullets, as well as traps for capturing live bears. An intervention team should include at least two persons from the intervention group. Members of the intervention group must go as rapidly as possible to all cases where a bear is in danger (e.g. in a poacher's snare) or when a bear causes conflicts with the activities of humans.

We will attempt to cure the problem bears of their bad habits by frightening. Where this is not effective other options will be employed, such as: capturing and marking problem bears (for easier tracking of the bear's behavior), translocation, placing in captivity (if there is the possibility), and as a final resort – culling of the animal. The members of the intervention group will be appointed by the competent authorities, which at the same time, will act as a mediator for the information transfer between the intervention group and the public. The members of the group will, in cooperation with the hunting unit leaseholders, evaluate the situation and make a decision about the intervention.

It is important to show to the local inhabitants that, in cases of dangerous situations with bears, they are not left alone. The intervention group will operate according to a protocol. It will try to prevent situations that result in the occurrence of problem bears and orphan cubs.

16. FUNDING FOR THE IMPLEMENTATION OF THE ACTION PLAN

16.1. Domestic sources:

- The state budget of Romania, from the portion ensured assigned for the competent ministries;
- National Forest Administration resources;

- Local and regional administration resources;
- Scientific and academic institution resources;
- Romanian Hunting Association resources;
- Other sources.

16.2. Foreign sources:

- The European Commission – through programmes such as LIFE – for certain years and for certain projects;
- Foreign donations;
- Other sources.

17. IMPLEMENTATION AND REVISIONS OF THE PLAN

The Ministry of Agriculture, Forestry and Rural Development and the Ministry of Waters and Environmental Protection have formed a committee for the elaboration of the Brown Bear Management Plan for Romania and the Brown Bear Management Action Plan.

This committee will carry out revisions of the management plan and the action plans, as well as amend the plan and produce any necessary reports. The revisions of the plan and the action plans will be open to the interest groups and the general public and their comments and proposals. The committee will form smaller functional units to help facilitate the implementation of the plan, as well as in urgent cases (e.g. problem bears, attacks on humans and livestock, diseases). These units will work in constant collaboration with the local administration, different interest groups, hunting unit leaseholders and others. The last meeting was in 09. February 2005 when the following actions were agreed by the participants:

Action Plan / February – 2005

I. Actions with general character:

- Decisions have to be based on scientific data in wildlife management in general and in population management especially;
- Elaboration of the National Strategy for the Management of the Game Species in Romania;
- Elaboration of Management and Action Plans on other species and species groups;
- Informing public opinion about the implementation of the management measures, including the transparency of data.

Actions regarding the estimation of Brown bear population:

- Basic methods regarding the population size estimation are: foot prints measurement, reproductive units and direct observations methods (including the existent feeding sites) Starting from spring 2005 this method become compulsory for estimation of bear population in Romania. (M.O.)
- Supplementary information regarding population size estimation of Brown bear will be delivered by: the radio telemetry activities, genetic analysis, and natural structure analysis. Researches on bear population using telemetry were done and are on going in different institutions and organizations. (Forest Research Institute – Wildlife Unit, Forest University, Environmental Agency, NGO-s.)
- In respect to ensure transparency in the estimation process, it is essential the involvement of the civil society representatives in brown bear estimation activity. All environmental NGO and institutions which express their interest in brown bear population estimation were invited to participate to the process.
- Estimations will be made considering the population structure on age and sex ratio, Information regarding this aspects were included in the data collection files.
- In estimating process is essential the quality of the personal and the quality of the field data collection. Training of all participants in the collection of data starts in 2005 and will continue in the next years.

II. Actions regarding Brown bear habitat conservation in Romania:

- Scientific studies for habitat utilization, home range and ecological characteristics of the bear population in different conditions in Romania.
- Zoning of Romanian territory for the suitability of bears and calculation of the “optimum bear number” for ecological, economical and social point of view was done each 10 years.

- Avoidance of bear habitat fragmentation and degradation. All infrastructure development has an environmental impact assessment study approved by the Environmental Protection Agency.
- Mitigation measures for the highways (infrastructure) building. Impact assessment study proposes mitigation measures for the barrier effect of the high ways. These will be approved and promoted by the Environmental Protection Agency
- Building of an ecological network in Romania, based on special area of protection for large carnivorous; There were research done in order to establish an ecological network based on large carnivore in a Pin Matra Project. The results were promoted by the Ministry of Environment and Water Management.
- Complementary food will be a management tool to reduced conflicts with other humans sectors of activities;(MO)
- Biotopes food offer conditions can be substantial improved by reintroducing or maintain the important trees and fruit bushes from “food offer” point of view. In this sense MAPDR recommends this measure to the administrators of wildlife management units. All wildlife management units have a management plan which includes habitat improvement measures.
- Wildlife management must be harmonized and integrated with forestry management and the principles of nature conservation will be considered priority. This action will be implemented by the Ministry of Agriculture, Forestry and Rural Development
- To respect the sanitary-veterinary rules for all the activities connected with bear management; sanitary veterinary low implement this measures. National Sanitary Veterinary Agency is responsible for implementation.
- To harmonize legislation regarding bear statute.

III. The measures regarding **prevention and reduction of conflicts** between human activity and bear population represents an essential feature of species management in Romania. The specialists involved in bear management concluded that the following actions are priorities:

- Introduction of efficient preventives measure in the urban and periphery areas in order to avoid bear presence in or in the nearby of localities, with the support of local population. Local Wildlife Management Authorities and Local Authorities are responsible for the implementation of this measures.
- Conflicts typology studying and the elaboration of some standard measures and procedures which can prevent and reduce the incidence of these conflicts (including the opportunity of the complementary food administration).
- Elaboration and introduction of conflicts management plans;
- In the case of seriously incidents, is necessary to remove the “problem” bear.
- Informing public opinion as well as the active involving the NGO’s in this process.
- The introduction of bears proof containers at the garbage.
- Funds must be used for implementation of measure of prevention of the damages first and after for damages compensation.
- Harvest extraction must be realized in order to keep the natural structure of the population and this will be a management objective which will contribute in active mode to conflicts reduction.

IV. The **control actions for bear population size:**

- Practicing traditional methods of hunting permitted by the law.
- Prohibited prices for the hunting of dominant males in order to maintain the natural structure of the population.
- Data collection on standard forms, recording and collecting biological samples. (premolar, hear, muscles, diaphragm tissue)
- Structuring of harvest cotta;
- The involvement of National Commission for Trophy Evaluation.
- Transparency for harvest cotta and the way of its establishment.



A scientific working group for bears in Romania was establishing with the following institutions represented:

- Ministry of Agriculture, Forests and Rural Development.
- Ministry of Environmental Protection and Water Management.
- Romanian Academy of Science.
- Research Institute for Wildlife.
- Faculty for Forest and Wildlife Management
- Environmental Coalition of NGO – Natura 2000.
- National Forest Administration – ROMSILVA.
- Hunting Association.

ACTION PLAN OF BROWN BEAR POPULATION FROM ROMANIA

Basic principles:

- The maintain a viable population of Brown bear in a sustainable manner, capable to carry out its ecological role in all ecosystems that offer proper conditions for this species existence.
- Optimum ecological, social and economical effective of Brown bear population is around 4.000 individuals, and the favorable habitat is around 70. 000. Km2. (last analysis of habitat suitability was done in 2005).
- Brown bear population structure is very important and monitoring is necessary in order to establish management measures.

ACTIONS NAME	IMPLEMENTATION WAY	INSTITUTIONS	FINANCIAL RESSOURSE	IMPLEMENTETION PERIOD
0	1	2	3	4
POPULATION ESTIMATION				
Basic methods for brown bear populatin estimation	The estimation of brown bear population size by: (1) footprints measurement and avoid double registration (2) reproductive units method (3) direct observation to the feeding sites method - it will be realize in spring; - training for methods application; - correlation of estimation results on different hunting areas; - publication the results of estimation for 2005 on MWEM site; - assessment of sex and age population structure; - involve many experts (M.O.292 / 2005. 24.02)	MEWM FRMI MAFRD	MEWM Hunting area administration	Annually in spring
Complementary estimation methods	- radio telemetry method; - genetic analysis; - natural structure analysis; - marking – remarking methods	FMRI and another concerned organization	Projects and another source LIFE projects, CLCP, and others	2000 –

The involvement of NGO's in estimation process	- announcement and involvement of concerned NGO's	MEWM	-	Continuous
HABITATS CONSERVATION				
Prioritary scientific studies	<ul style="list-style-type: none"> - type of habitats use, core areas and corridors - ecological network for L.C.; - size of territory and overlapping; - ecological particularity of population (birth rate, death rate, annual increase, etc); - genetic studies 	FRMI and another institution MEWM	Projects	Continuous
Avoidance of the habitat fragmentation	- all activities with potential negative impact for the bears habitats will be made under supervise and control of MMGA (Low 137/1999 and Low 105/2002)	MEWM	Action beneficiary	Continuous
Actions to diminish the negative effects of railways-roads building.	<ul style="list-style-type: none"> - passing ways, tunnels and viaducts in high way projects; - others measures included on the new road projects 	MEWM Beneficiaries	Action beneficiary	Continuous
Special Areas of Conservation (SAC) for Large Carnivores	<ul style="list-style-type: none"> - establishment of a data base regarding the projects; - GAP analyse of protected areas system reported to the distribution of species; - SAC's establishment; - protected zones for every hunting area 	MEWM and NEPA	LIFE projects, MEWM Projects	- 2007
Supplementary feeding	<ul style="list-style-type: none"> - distance between feeding sites and localities to be over 2 km; - regarding the feeding site it is not allow to be near of protected area; - supplementary feeding is only for prevent conflicts and preserve brown bear population; - evaluation and improvement of brown bear's feeding site 	ITRSV Control	Wildlife management teams	Continuous

Integrate wildlife management in forest management	- the forest studies should integrate wildlife management as well	MAFRD		Continuous
Sanitary-veterinary rules implementation	- sanitary-veterinary certification of supplementary food	MAFRD ANSV		Continuous
Harmonization of the specific legislation	- continuous process based by previous studies	MEWM and MAFRD	RNP AND AGVPS	Continuous
THE PREVENTION AND REDUCTION OF CONFLICTS				
Awareness of the local population	- lifelets, posters, presentations, public conferences, movies, etc.	MEWM Administrators of wildlife management area, NGO Administrators of protected areas	projects	Continuous
Waste management	- deposit places should be to minimum 2 km from villages; - special tanks with no BEAR access to the garbage	Local authorities LEPA	Projects and local source	Continuous
Re-location of nuisance Brown bear individuals		Administrators of hunting funds	Hunting area administrations	Continuous
Tourism regulation in sensitive areas	- forbidden the tourism connected with garbage bears	Local authority		Continuous

Conflicts typology studying and elaboration of measures and procedures which can prevent conflicts	<ul style="list-style-type: none"> - conflicts registration and report them to AEP and ITRSV; - annual analyses of the situation – MEWM and MAFRD; - elaboration of measures which can prevent conflicts; - MEWM, Transilvania University and FRMI 	MAFRD MEWM	Wildlife management areas administration areas Projects	Continuous
Public and NGO's information		Authorities, Education Institutes, NGO, etc.		Continuous
Implementation of preventive measures	<ul style="list-style-type: none"> - special funds for prevention and the compensation of damages 	Wildlife management areas administrations MEWM	MEWM	Continuous
Compensation of damages	<ul style="list-style-type: none"> - compensation for damages must be linked to the effort to prevent damages 	MEWM Hunting area administrations	MEWM	Continuous
CONTROL OF THE POPULATION SIZE				
Hunting practices methods	<ul style="list-style-type: none"> - Traditional methods of hunting allowed by law; - M.O. 126 / 09.02.2005. MAPDR – hunting practice 	MAFRD		Continuous
Data collection and recording and collecting biological samples	<ul style="list-style-type: none"> - data collection on standard forms; - single methodology for samples collection; - conservation measures; - samples analysis M.O. 292/24.07.2005	Wildlife units administrations SVFSNA MEWM MAFRD	FRMI	Continuous

Structure of harvest quotas	<ul style="list-style-type: none"> - measures to maintain the natural structure of population - O.U. 82 / 14. 07. 2005 harvest size and structure - M.O. 788 / 10.08.2005 National Commission for Evaluation 	MEWM MAFRD		Continuous
Involvement of National Commission for Trophy Evaluation	<ul style="list-style-type: none"> - Biological samples and others data related to population structure needed to be analysing by the commission; - M.O. 788 / 10.08.2005 National Commission for Trophy Evaluation 	MAFRD		Continuous
Assurance of transparency regarding the harvest quota, population size, etc.	<ul style="list-style-type: none"> - data regarding harvest quota, population size on the ministry web site or delivered by request 	MEWM MAFRD		Continuous



The Ministry of Agriculture, Forestry and Rural Development and the Ministry of Environment and Water Management are both competent for the implementation of the plan, however, the legal implementation is under the competence of the Ministry of Environment and Water Management The implementation of this plan includes the informing of the public and public participation in the decision making processes.

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