

Status and management of brown bears in Turkey

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Abstract: The brown bear (*Ursus arctos*) is the largest carnivore in Turkey. Its present distribution is mainly confined to the intact natural habitats of the Black Sea and Eastern Anatolian regions. Forest fragmentation and direct persecution by humans have resulted in population declines in other regions during the last 50 years. Human–bear conflicts are more often observed in the eastern Black Sea than other areas within Turkey, but the species does not seriously threaten humans in Turkey. Turkish authorities have not kept records of bear damage, but depredation has mainly occurred on cattle and sheep. The brown bear has a more positive image among the local people than the wolf (*Canis lupus*). Brown bears are a protected species, but protected areas in Turkey are too small to provide a refuge for the species. Priority actions for the conservation of brown bears in Turkey are legislation development and implementation, research on population status and range, expansion of current protected areas, and identification of new ones. Public awareness and capacity building of the local authorities on theoretical and practical aspects of wildlife management, such as designing surveys, collecting systematic data, analyzing and reporting data, and brown bear handling techniques, will also play a critical role.

Key words: brown bear, conservation, distribution, management, status, Turkey, *Ursus arctos*

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Turkey is located between Europe and Asia and has a total land mass of 780,576 km². The Black, Aegean, and Mediterranean seas surround a substantial part of Turkey. Despite the existence of broad plains and plateaus, Turkey's topographic structure is highly mountainous, with an average altitude of 1,130 m. Turkey has one peak >5,000 m, 3 >4,000 m and 129 peaks >3,000 m.

Turkey has several species of large carnivores that are ecologically, economically, and scientifically important in addition to the brown bear, including wolf, striped hyena (*Hyaena hyaena*), Eurasian lynx (*Lynx lynx*), and caracal (*Caracal caracal*) (Can 2002). The Caspian tiger (*Panthera tigris virgata*) and the Anatolian leopard (*Panthera pardus tulliana*) are big cats that once had a wider distribution in the country. The Anatolian leopard is now listed as critically endangered according to World Conservation Union (IUCN 2003). The large herbivore species which form the prey base for carnivores are red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), goitered gazelle (*Gazella sub-*

gutturosa), chamois (*Rupicapra rupicapra*), wild goat (*Capra aegagrus*), mouflon (*Ovis orientalis*), and wild boar (*Sus scrofa*) (Swift and Holloway 1967; Huş 1974; Turan 1984; Üstay 1990; Demirsoy 1996; Shackleton 1997; Can 2001; M. Pani, 1998, Wildlife ecology planning and management project final report, UNDP/FAOProject TUR/96/003/A/01/12.23, Ankara, Turkey).

Information is lacking on populations and the exact distribution for the majority of large mammals in Turkey. Similarly, basic information on brown bear in Turkey is very limited: Turkey is not even mentioned in recent compilations or action plans for brown bears worldwide (Servheen et al. 1999, Swenson et al. 2000, Zedrosser et al. 2001). We summarize the present knowledge of brown bears and their conservation needs in Turkey.

Methods

We developed a questionnaire and sent it to local Ministry of Forestry offices and military offices in provinces of Turkey. The questionnaire requested information on bear presence (sightings, feces, feeding or resting signs, tracks). A total of 506 questionnaires were distributed in 28 of Turkey's 81 provinces. In 23 of the 28 provinces where the questionnaires were distributed,

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informal follow-up interviews were held with 191 people (Ministry of Forestry personnel, military personnel, hunters, and citizens). Selected sites were visited to validate the information from the interviews and to search for brown bear sign. Administrative personnel of the General Directorate of National Parks and Game Wildlife of the Turkish Ministry of Forestry ("Directorate", hereafter) were also interviewed about organizational, functional, and legal issues of wildlife protection, management, and conservation. We used numerous maps of Turkey (maps on various scales, forest maps, and maps of roads and human settlement patterns) to infer brown bear distribution relative to habitat availability, habitat connectivity, and extent of human inhabitations and resultant biotic pressures, and to prepare an approximate distribution map for the brown bear in Turkey.

Results

Distribution of the brown bear population

According to the Directorate, the brown bear is continuously distributed throughout the Black Sea region from Bolu to Artvin. The eastern Black Sea region probably supports the largest brown bear population in Turkey (Emin Nasuhoğlu, Directorate, Ankara, Turkey, personal communication, 2000). In general, the distribution of brown bears is confined to the forest and intact natural habitats of Ankara, Antalya, Artvin, Bingöl, Bitlis, Bolu, Bursa, Çanakkale, Çankırı, Elazığ, Erzurum, Giresun, Gümüşhane, Hakkari, Isparta, Kars, Kastamonu, Malatya, Muğla, Muş, Ordu, Sakarya, Siirt, Sivas, Şırnak, Tokat, Trabzon, Tunceli, Van, and Zonguldak regions (Fig. 1).

Habitat type and quality are presumably key factors influencing brown bear distribution. Important habitat for brown bears is provided by broad-leaf deciduous and conifer forests in the Black Sea region from 500 to 1,500 m; humid and sub-humid coniferous forests in the high mountains of northeastern Turkey from 1,000 m to 2,000 m; dry oak (*Quercus* spp.) and pine (*Pinus nigra*, *P. sylvestris*) forests in the hinterlands of the Black Sea from 500 to 1,500 m; and dry forests of East Anatolia from 850 m to 2,700 m. Lower Mediterranean belt forests from 800 m to 1,500 m, Mediterranean mountain forests from 500 m to 2,000 m, and dry black pine (*P.*

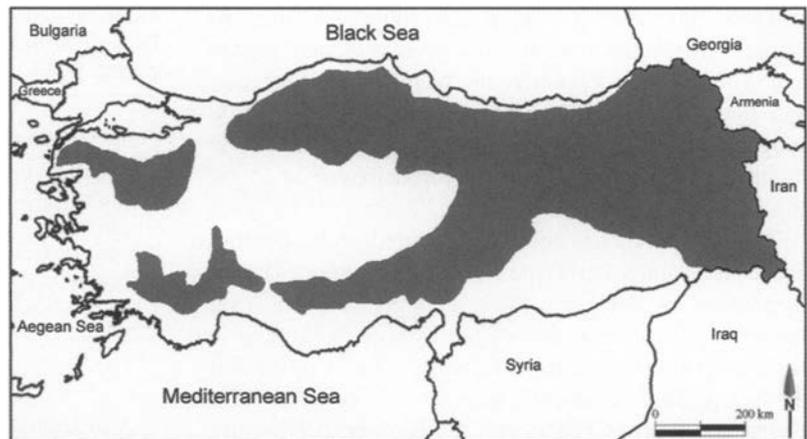


Fig. 1. Approximate distribution of brown bear in Turkey, 2003. All shaded areas do not necessarily contain brown bears.

nigra), oak, and juniper (*Juniperus excelsa*) forests ranging from 1,000 m to 1,500 m are also important potential habitat.

The forested areas in eastern Turkey are less continuous than in the Black Sea region. Therefore, functional habitat in the former is separated into more or less isolated areas with some inter-connectivity. Bear populations in eastern Turkey may be divided into several sub-populations. Distinct populations may have formed in western Turkey because forest corridors have become unusable as a result of human activities. There are no reliable population estimates for brown bears in Turkey.

Legal status and management

The Directorate is in charge of protection, management, and conservation of wildlife in Turkey, including the brown bear. The Land Hunting Law of 1937 (Official Gazette of Turkish Republic 1937) constitutes the legal basis for all wildlife management, protection, and conservation activities. According to the Land Hunting Law, the brown bear is not listed as a pest species (as are the wolf, hyaena, leopard, and tiger), but rather as a protected species. However, the Directorate may allow recreational hunting of brown bears for a fee. The Central Hunting Commission, which meets annually to determine hunting regulations for Turkey, set the brown bear hunting fee at \$US 2,000 for 2002 with a fine of 4,500,000,000 Turkish lira (~\$US 3,000 at the 2002 exchange rate) for illegal hunting of brown bears (Turkish Ministry of Forestry 2002). According to the authorities, hunting of bears should be permitted to control damage to beehives and crop depredation.

There are officially about 2.5 million hunters in Turkey. One needs to be at least 18 years old and possess a license to hunt. Recently, the Ministry of Education and the Ministry of Forestry started a joint education program for those who want to become a hunter. New hunting licenses are issued after successful completion of the training program.

The Directorate has been trying to update its structure and establish large herbivore censuses throughout Turkey (beginning in 2000), but these attempts have not been coordinated with censuses of the carnivores. Turkey is a member of the Bern Convention, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the Biological Diversity Convention, all of which are relevant to brown bear. There is neither a management plan nor a monitoring program for brown bears in Turkey.

Presence of brown bears in protected areas

About 3.6 million ha of land that has been set aside for conservation provide direct and indirect protection to large carnivores and brown bears in Turkey (Table 1). According to the Central Hunting Commission and Forest Law (No. 6831), hunting is forbidden in national parks, nature reserves, nature parks, protection forests, and wildlife protection areas. Therefore, brown bears in those areas have additional protection. Today, brown bears occur in 15 of Turkey's 33 national parks (Fig. 2). However, these protected areas are generally too small to act as refuge areas for large carnivores such as the brown bear.

Major threats

Brown bears in Turkey are threatened by habitat loss and degradation, and persecution by humans because of damage to beehives and livestock. Forests constitute approximately 20.7 million ha in Turkey (26.8% of the country). Of these forests, 10.5 million ha (51%) are considered to be productive, whereas the remaining 10.2 million ha of forests are unproductive or degraded due to excessive exploitation. Presently, 49% of Turkish forests are heavily degraded (Kaya and Raynal 2001). Undisturbed forests are about 2.5% of the total forest area, and some of these forests exist outside protected areas (Kalem 2000). Brown bear populations in Turkey are most likely negatively affected by large-scale forest fragmentation and degradation that has occurred during the last 50 years. However, the former large-scale clear-cutting system has recently been changed to narrow and small-scale shelter-wood systems (Muthoo 1997).

Table 1. Number and size of conservation areas in Turkey which may provide habitat for large carnivores, 2003.

Protected area	Number	Total area (ha)	Extent of country (%)
National Parks	33	686,631	0.88
Nature Reserves	35	83,023	0.1
Nature Parks	17	69,505	0.09
Wildlife Protection Area	107	1,614,899	2.07
Protection Forests	53	365,884	0.47
Total		2,819,942	3.61

Although survey respondents did not report poaching of brown bears, interviews with local people suggested that brown bear populations in the western and eastern Black Sea regions are poached for bear fat, which is believed to be of medicinal value. The illegal kill rate of brown bears is unknown, but it is reported that poaching exists in the Black Sea region. There is no reliable information from eastern Turkey because the region is remote, characterized by rugged mountainous terrain, and very difficult to police.

The ongoing Baku–Tbilisi–Ceyhan crude oil pipeline project (a large-scale, international project starting in Azerbaijan and passing through Georgia and Turkey) is notable because the pipeline route passes through the provinces of Kars, Erzurum, and Erzincan, which include remote and intact mountainous habitats for brown bears. Hunting for wild boar with dogs is the most frequent type of hunting, and bears are killed occasionally during those hunts. However, such kills are hidden in the villages because the animal is under protection. Illegal killing may also occur unintentionally when bears are killed by snares set illegally for wolves, red deer, and roe deer, or by poisoned baits illegally set for wolves and lynx.

Brown bears, livestock, and humans

Bear attacks on humans have been reported in Trabzon and Rize, but no official records are kept by authorities (E. Nasuhoğlu, personal communication, 2000). Communication with local forestry and military personnel suggested that most of the bear attacks on humans in the Black Sea region result from close encounters with mother and cubs. According to some local people, brown bear damage to livestock appears to be much less common than damage caused by wolves. Although there are no records kept on damage to livestock by bears, local people have reported that brown bears prefer sheep and cattle as domestic prey. Sheep husbandry generally lacks protective measures,

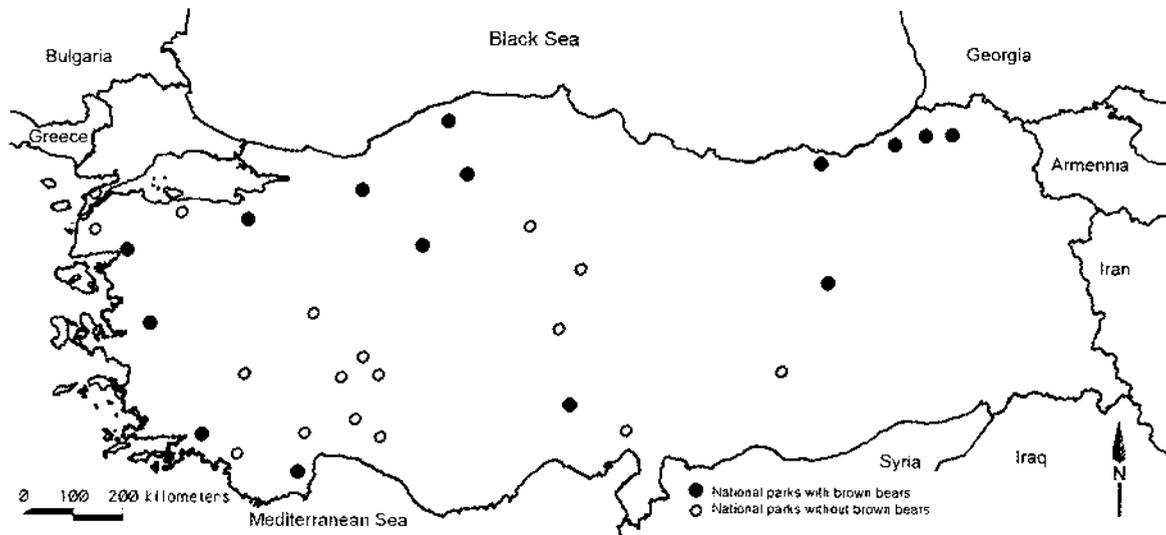


Fig. 2. Presence of brown bears in national parks in Turkey, 2003.

and herds are unattended most of the time. Unlike in Europe, where extermination of bears was often encouraged as a means of eliminating livestock depredation, no bounties have been organized by the state for brown bears in Turkey. There is no compensation for damage caused by brown bears in Turkey.

Discussion

Population threats

Mursaloglu (1989) stated that measures are very effective in protecting wildlife in Turkey. However, in reality, wildlife has been of concern only to hunters who kill and use wildlife in Turkey (Swift and Holloway 1967). Excessive hunting is a serious threat to wildlife in Turkey (Swift and Holloway, 1967, Pani unpublished report 1998, Can 2001). Law enforcement capacities of the local authorities are minimal, and field staff spends most of their time on forestry activities rather than conducting regular anti-poaching patrols.

Habitat threats

Turkey's human population has increased from 13 million in the 1920s to approximately 62 million in 1997. This has put tremendous pressure on land, water resources, and the environment. The combined effects of rapid urbanization and industrialization and associated economic activities have resulted use of natural resources above sustainable levels. About 99% of the forests in Turkey are owned by the state and nearly

150,000 km of forest roads have been constructed since 1974, with a further 4,000 km planned for each year until 2010 (Muthoo 1997). According to Pani (unpublished report 1998), habitat loss is increasing due to unsustainable forestry practices and unsustainable development in some areas.

Nevertheless, in some areas such as the Küre Mountains in Kastamonu, the human migration rate to larger towns and cities is high and there is more space available for brown bears than 20 years ago. The same applies to many areas in eastern Turkey, where people have moved to larger towns to find better jobs and living conditions. Habitat degradation is largely a result of human dependency on forests for fuel wood, extraction of other forest products, and extensive livestock grazing.

Legal status and management

The Land Hunting Law of 1937 determines all wildlife protection conservation and management issues. The current hunting law is quite old and lists wolf, striped hyena, and leopard as pest species. Legal responsibilities often overlap between governmental offices; there is no legal mandate for institutions responsible for environmental issues. A new hunting law is currently being developed in Parliament, but these considerations have not been taken into account in the new proposal. At present, although the Ministry of Forestry is the major governmental organization dealing with wildlife protection, conservation, and management, the Ministry

of Environment is also responsible for legal issues of wildlife. There is very little coordination between these organizations, although plans exist to restructure these ministries as a single ministry.

The general approach in Turkish legislation is to protect natural resources without specific reference to sustainability. Lack of such legislation particularly effects *in situ* conservation of large areas of important biodiversity outside of protected areas. International pressure to include environmental approaches in legislation has prompted rapid introduction of complex concepts without supporting legal implementation mechanisms, institutional mandates, and support facilities. Inadequate harmonization of national legislation with international laws and conventions causes conflicts because supporting implementation regulations are lacking. Although Turkey has numerous laws, regulations, and programs that favor conservation, implementation of these guidelines requires increased commitment and vigilance (Kaya and Raynal 2001).

Brown bears, livestock, and humans

In general, brown bears do not have as bad an image as the wolf has in Turkey, and the general feeling about bears among local people, including forestry personnel, is positive. Villagers live in dispersed locations in Turkish forests, especially in the eastern Black Sea region, which leads to bear-human conflicts. Most reports of livestock killing by brown bears come from central Anatolia, but depredation due to livestock being unguarded is infrequent.

Translocation of problem brown bears is rarely used in Europe (Linnell et al. 2002), and it is not currently an option for Turkey because there are no trained personnel. Little is known about public attitudes toward brown bears on a European level, but some national surveys have shown that people from the countryside are generally more negative than urban dwellers, and young age and higher education are often associated with a more positive attitude toward bears (Swenson et al. 2000). The same probably applies to Turkey.

There have been no programs for public awareness or education, although this is an important component of any conservation initiative. Educational and public awareness programs play a crucial role for reaching management objectives; therefore, WWF Turkey and the World Society for the Protection of Animals (WSPA) is working on an education program on brown bears in Turkey which may strengthen the environmental conscience of the public and may stimulate the local authorities to show interest in bear research and

management. The limited capacity of the local authorities creates a new niche and opportunities for wildlife research and conservation organizations in Turkey.

Conservation recommendations

Because Turkey is a European Union candidate country, national authorities should consider implementing management and monitoring programs similar to those present in many European Union member countries. Because >80% of the national parks with brown bear populations are <500 km², we recommend that new protected areas be declared and the existing protected areas where brown bears live be expanded. The Directorate administrators should encourage their staff to record damage caused by large predators, including brown bears. Similarly, the Directorate should conduct anti-poaching activities, and local authorities should keep records of poaching activities.

Current forest management plans do not consider the presence of brown bears and other wildlife species; therefore, the effects of forestry practices on wildlife need to be evaluated and forest management plans revised accordingly. The Directorate should evaluate the current road and dam plans of the State Water Works (DSİ), the Ministry of Energy, and the Ministry of Transportation in eastern Turkey. A status survey for brown bears is urgently needed in eastern Turkey along the route of the Baku-Tbilisi-Ceyhan crude oil pipeline project. The sites that will be affected by this pipeline construction should be strictly monitored and the potential impact of the pipeline construction to brown bear populations should be studied.

The serious conflict between brown bear and humans in eastern Turkey might be addressed with a compensation system in areas where brown bears damage beehives. However, traditional methods such as placing the beehives on platforms or the use of electric fences should be tried to limit brown bear damage. The native dog breeds of Kangal and Akbaş have been used for livestock guarding in some parts of Turkey, and because local people consider Kangal and Akbaş effective against large carnivores, these breeds might limit the brown bear-human conflict in Turkey. If necessary, the Directorate should cooperate with veterinary faculties to establish a breeding program for Kangal so that Kangal pups can be provided to local communities with conflict with brown bears.

We recommend that the Directorate establish, train, and support a well equipped carnivore damage prevention team. Special fieldwork allowances should

also be arranged to encourage the team members. The carnivore damage prevention team should work to limit brown bear–human conflicts and should consider and implement management alternatives such as removal, translocation, and aversive conditioning, depending on the severity and circumstances of the situation. A compensation program should also be established and the work of the carnivore damage prevention team should be supported with a public awareness and education program.

Scientific research is needed on brown bear range and habitat use. Field surveys and monitoring systems are practically non-existent for large carnivores as well as brown bears, even in protected areas in Turkey. Because Turkey is a European Union candidate, national authorities should use this opportunity to appear committed to achieve the conservation goals set in both the European and International legislation.

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