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# Preliminary brown bear survey in southeastern Albania

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***Abstract:*** The political isolation during the communist regime and the economic crisis that followed its downfall adversely affected the conservation of brown bears (*Ursus arctos*) in Albania. In 2008–2009 we conducted questionnaires and field surveys in southeastern Albania to determine the presence of bears and evaluate bear–human interactions, and on-site inspections to record the status of bears held in captivity. We recorded bears mainly in the eastern and southeastern part of the study area and documented wide-scale bear–human conflicts, which often resulted in the killing and a generally negative public perception of bears. We documented 25 bears in captivity, often under marginal welfare conditions and noted wild-born cubs that were maintained in captivity to meet the demand for captive bears. We recommend additional studies to better evaluate brown bear status; nation-wide education on species conservation needs and how to mitigate negative interactions; and efforts to improve welfare of bears in captivity.

***Key words:*** bear–human interactions, brown bear, conservation, Dinaric–Pindos region, distribution, *Ursus arctos*, welfare

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## Introduction

The brown bear (*Ursus arctos*) is a key species for biodiversity of the Holarctic region (Servheen et al. 1999, Ray et al. 2005, Korsten et al. 2009) and often functions as a flagship species, capable of attracting attention and resources for conservation because of its charismatic and iconic nature (Simberloff 1999). Science-based information on bear populations and their status exists in most European countries (Zedrosser et al. 2001). A notable exception is Albania, which during times of political isolation during the communist regime and the current economic crisis in Europe has produced little reliable information on the status of brown bears in the country. Bears in Albania belong to the Dinaric–Pindos population, which ranges from Slovenia in the north to Greece in the south (Linnell et al. 2008). The estimated population size of bears in the country is 180–200 individuals (Kaczensky et al. 2013); however, the reliability of this estimate is unknown. It is believed that the bear population in Albania is currently declining because of ongoing habitat destruction and high human-caused mortality (i.e., mainly poaching; Zedrosser et al. 2001, LCIE 2005, Korro et al. 2010). Bears are legally protected in Albania, and a national Action Plan for the species was adopted by the Ministry of Environment, Forests and Water Administration in 2007 (Bego 2007). However, this plan has not been fully implemented and no management efforts or monitoring system is in place, while at the same time indications of illegal trophy hunting and capturing wild bears for exhibition or as pets exist (Godes 1997, Korro et al. 2010). The magnitude of these conservation and welfare issues is unknown.

Given the limited published information concerning brown bears in Albania, we conducted a preliminary survey to collect baseline information on the status of brown bears in southeastern Albania. We collected information on the presence of bears and their interactions with humans, and recorded the minimum number known of captive bears and their potential origin. We used this information to formulate research and management actions to facilitate effective conservation of brown bears in Albania.

## Study area

Albania is a mountainous country in southeastern Europe with a warm Mediterranean climate. We conducted this study in administrative districts in southeastern Albania that contained vegetation communities (i.e., areas including deciduous and coniferous forests, crops, pastures, orchards and scrublands) considered suitable for bears (Posillico et al. 2004). The study area (approx. 2,000 $km^2$) is estimated to represent approximately one-third of the total landscape considered suitable for bears in Albania.

## Methods

We applied 3 methods to record the presence of bears in the study area. We conducted a questionnaire survey (2008–2009) on bear presence and bear–human interactions among randomly selected male residents. We interviewed male residents because, due to cultural and social circumstances, they are the ones generally involved in outdoor activities and were considered the most knowledgeable in regard to the status of bears in our study area. The questionnaire consisted of 35 questions organized in 4 groups: (1) information about the respondent profession and place of residency; (2) information about the presence of bears in the area, including bear presence, residency status (i.e., permanent, seasonal, or sporadic), and records of reproduction; (3) information on bear–human interactions in the area, including occurrence of bear damage, types of damage, human response to purported nuisance bears, average frequency of bear damage incidents per year, main season of bear damage, locations affected by bear damage, most recent occasion of bear damage, mitigation measures applied, cases of bear aggression toward humans, and cases of deliberate killing of bears; and (4) information on the human perception of bears in the region (i.e., dangerous vs. not dangerous, harmful vs. not harmful, shy vs. not shy, aggressive vs. not aggressive), the attitude toward ''dancing'' bears (i.e., positive vs. negative), and the attitude toward bears held as pets in restaurants (i.e., positive vs. negative). We asked people to point out on a map the locations of damage by bears to human property, aggressive interactions of bears toward people, and where illegal killings of bears had occurred. During the interviews, we received detailed information on bear damage, aggressive incidents, and deliberate killings of bears, which enabled us to evaluate whether $\geq$2 respondents were referring to the same case. Chi-square goodness-of-fit tests were used to check whether the observed frequencies of respondent professions and places of residency differed significantly from the expected frequencies. Also, a Wilcoxon $W$-test was performed to evaluate the significance of reported attitudes toward bears in the region. The questionnaires were carried out in 8 administrative districts in southeastern Albania, and each district was considered a sampling unit.

To offer support for the information on bear presence received from the questionnaire survey, we attempted to homogeneously survey forestry roads in the study area during spring (Apr–May) in both 2008 and 2009 to collect direct (i.e., observations, dead individuals) and indirect signs of bear presence (i.e., tracks, scats, feeding signs). This approach has been used successfully to survey bear populations in southern Europe (Clevenger et al. 1997, Karamanlidis et al. 2014). Because of the large size of the study area and the short period of suitable weather conditions, priority was given to survey as much suitable bear habitat as possible, and thus we inspected each road only once during the study period.

We surveyed the electricity and telephone pole network (hereafter, power poles) in the study area for signs of bear marking behavior (i.e., hair, bite marks, tracks). We used power poles with signs of bear presence to establish hair traps using barbed wire (Kendall and McKelvey 2008). These hair traps were inspected once per month from April to July and in November 2008, and from March to September 2009. This method has been successfully used to monitor bear populations in neighboring countries (Karamanlidis et al. 2007, 2010). We analyzed hair samples in a lab (Wildlife Genetics International, Nelson, British Columbia, Canada) that specializes in non-invasively obtained samples using the protocol developed by Karamanlidis et al. (2010). The combination of interviews with local people and ground-truthed surveys is suitable for detecting bears and can yield accurate distribution maps (Liu et al. 2009).

We assessed the number and location of captive bears by talking to the general public and requesting information from public authorities (i.e., representatives of the Forestry Department, veterinary authorities, etc.) and verified all reports of bears in captivity by site inspections. We carried out these

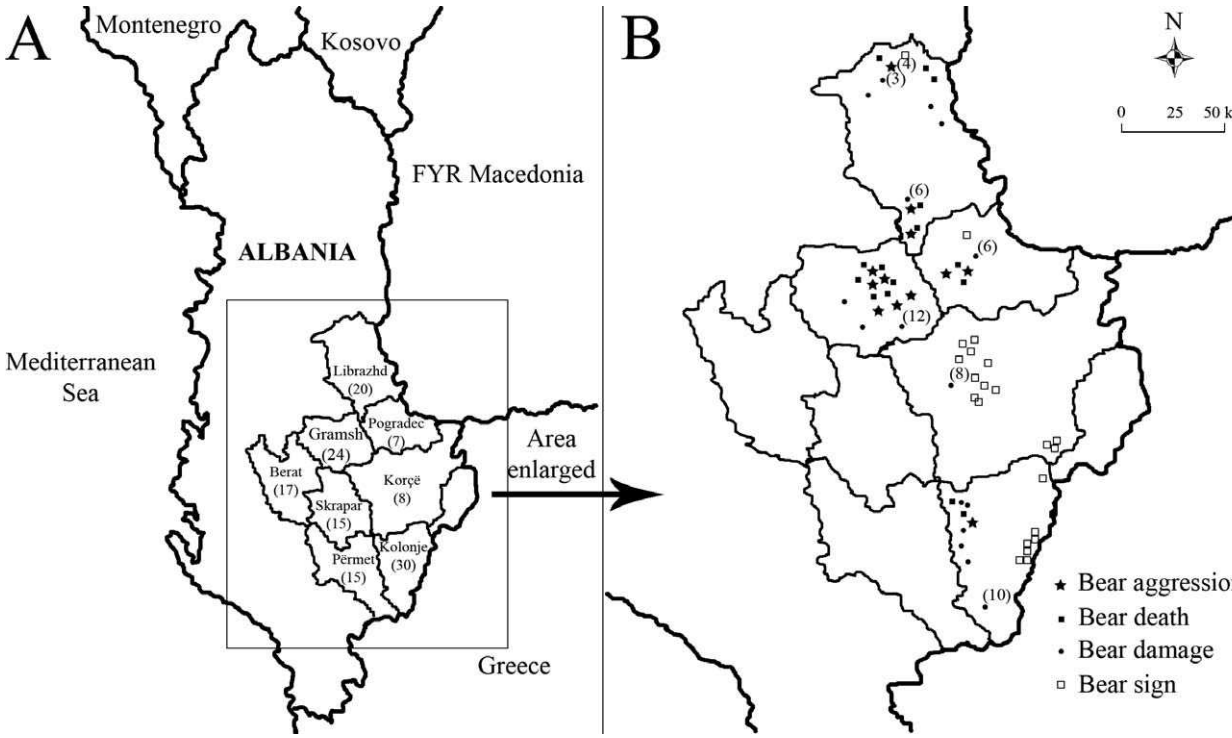


**Fig. 1. (A) Map of Albania indicating the study area where we conducted questionnaires and field surveys in southeastern Albania to determine the presence of bears and evaluate bear–human interactions, and on-site inspections to record the status of bears held in captivity, during 2008–2009. Numbers in parentheses indicate the number of questionnaires carried out in each of the 8 administrative districts in the study area. (B) Close-up of the study area indicating the locations where cases of bear aggression, illegal killings of bears, and bear damage to human property were recorded during the questionnaire survey. Numbers in parentheses indicate a location where more than one case of bear evidence was recorded. The close-up presents also the locations where bear signs were recorded during the field and power pole surveys. Survey efforts were opportunistically focused on high-suitability areas and to confirm bear presence from questionnaires.**

inspections throughout the entire country and also collected information on the sex, age, and area of origin of captive bears.

## Results

We carried out 136 questionnaire surveys in 8 administrative districts in southeastern Albania (Fig. 1A). Most people interviewed were older men (i.e., >50 yr of age) and they worked in rural professions such as farming, livestock breeding, or sheepherding (68%; Chi-square goodness-of-fit test, $\chi^2 = 10.318$, 1 df, $P = 0.001$). Also, most (81%; $\chi^2 = 28.676$, 1 df, $P \leq 0.001$) of them claimed to be living or working within a 25-km radius of permanent bear presence. However, in the northeastern and eastern-most districts of the study area (i.e., Librazhd, Pogradec, Korçë, Kolonje, and Përmet) 96–100% of the people interviewed suggested a seasonal or permanent bear presence, while in the western-most districts (i.e., Gramsh, Skrapar, and Berat) this percentage was lower (i.e., 53–79%). Bear reproduction was reported from all districts, with the exception of the western-most district of Berat. Also the reports of the occurrence of bear-caused damage were greatest in the northeastern and eastern-most districts (i.e., Librazhd, Pogradec, Korçë, Kolonje, and Përmet), where 80–100% of the people interviewed reported bear damage, in contrast to the western-most districts (i.e., Gramsh, Skrapar, and Berat), where only 35–70% of the people interviewed reported bear damage. The damage reported was primarily crops (45%), but damage to livestock (33%) and beehives (22%) was also reported. During the interviews, we recorded 55 locations where bear damage to human property had occurred, 15 cases of

bear aggression toward humans, and 15 cases of illegal killings of bears (Fig. 1B). All these negative interactions occurred during the 3 years previous to administration of the questionnaires. The respondents generally had a negative perception of bears; bears were considered dangerous (56%) and harmful (62%), but not aggressive (60%). Respondents in the northeastern and eastern-most parts of the study area (i.e., the areas with the most bear-caused damage) generally had a more negative perception of bears. Most respondents did not approve of bears being held in captivity for exhibition purposes or as pets (89%; Wilcoxon $W = 36.0$, $P = 0.001$).

We surveyed about 500 km of forestry roads in the study area and recorded 15 signs of brown bear presence (11 tracks, 2 scats, and 2 dead animals; Fig. 1B). We collected genetic samples of the dead animals; however, those samples did not provide enough DNA for further genetic analysis because of their advanced stage of decomposition.

We inspected 29 wooden power poles and recorded evidence of bear marking and rubbing activity on 7 of them (Fig. 1B). We installed barbed-wire hair traps on all 7 power poles and inspected them 84 times during the study. We recorded bear presence at the hair traps 11 times and collected 12 hair samples. The majority ($N = 7$) of the hair samples were collected in April and May. Genetic analysis of these samples indicated the presence of at least one male and one female bear in the study area.

We evaluated 35 reports of bears in captivity and verified the presence of 25 animals in captivity throughout Albania, as private pets ($N = 8$), as "photo" bears ($N = 1$), or at restaurants ($N = 16$). We recorded bears of all age classes (i.e., 28% cubs-of-the-year and yearlings, 20% subad, 52% ad). Based on the information provided by the people questioned, most (68%) of these animals originated from the wild, from Albania.

## Discussion

We present the results of the first field survey on brown bear presence in southeastern Albania. Accurate information on species occurrence is important in understanding population dynamics and thus is indispensable in effective conservation planning (Rondinini et al. 2006). The combined results of the questionnaire and field surveys indicate a higher presence of bears in the northeastern and southeastern part of the study area, along the borders with the neighboring countries Former Yugoslav Republic [FYR] of Macedonia and Greece, and lower presence of bears toward the west and southwest of the study area (Fig. 1B). However, because of the low number of bear signs recorded in the field, these results must be viewed with caution and additional field work is required to create a more accurate distribution map of the species in the country.

The use of power poles for monitoring bear populations has been used successfully in neighboring countries such as FYR Macedonia and Greece (Karamanlidis et al. 2010, 2014). However, this method was not successful in Albania because most of the power poles are made from concrete. Alternative methods for monitoring bear status in Albania should be pursued and could include traditional sign surveys (Kendall et al. 1992), and/or genetic data obtained from the collection of scat samples (Bellemain et al. 2005, Skrbinšek et al. 2010) or from hair samples collected from rub trees (Latham et al. 2012).

Bear–human conflicts are common throughout the entire range of brown bears (Zimmerman et al. 2003, Gunther et al. 2004, Rondinini and Boitani 2007), and can pose a serious threat to the conservation of the species (Swenson et al. 2000). The questionnaire survey indicated widespread bear–human conflicts, including agricultural damage and deliberate killing of purported nuisance bears. Our results are in general accordance with those of a previous questionnaire survey in the study area regarding bear–human interactions (Godes 1997), as well as in the northern part of Albania (Keçi et al. 2008) and neighboring Greece (Karamanlidis et al. 2011).

The perception of and the attitude of questionnaire respondents toward bears was mainly negative; however, the majority of respondents were older local men working as farmers or livestock breeders. This population group is generally the most negative toward large carnivores (Bjerke and Kaltenborn 1999), and the extrapolation of their attitudes to the general public is likely questionable. However, despite their negative perception of bears, most respondents were not in favor of holding wild bears in captivity. This result was in contrast to a previous study in the area, where most respondents did not express negative feelings toward keeping animals in captivity or for exhibition purposes (Godes 1997), indicating a positive change in this conservation and welfare issue. Our results also differ from the more

positive attitudes of people in northern Albania toward bears (Keçi et al. 2008, Trajce 2010). It is unclear whether these differences are due to different methodological approaches (i.e., how the questions in the interviews were formulated) or are due to actual regional differences in the attitudes of Albanians toward bears.

Keeping brown bears in captivity as pets, for subsistence (e.g., dancing bears; Koene 1994, Seshamani and Satyanarayan 1997), or for revenue (e.g., bile extraction; Servheen 1999) is an important conservation and welfare issue that can have negative impacts on wild bear populations (Garssen 2006). The results of our study, as well as results of a subsequent survey in Albania (Korro et al. 2010), suggest a relatively high number of privately owned captive bears. We were unable to obtain genetic samples from captive bears, but most private bear owners claimed their bears were from Albania. Only one animal was described as being born in captivity. This suggests that poaching wild females to capture the cubs as pets occurs in Albania; however, the magnitude and conservation impact on the wild bear population remains unknown.

## Recommendations

Though based on limited field data, our results suggest that brown bears in Albania face numerous conservation challenges, and therefore actions are needed to safeguard the future of the species in the country. We recommend the following priority research and management actions, which are in accordance with the high-priority actions of the National Action Plan (Bego 2007):

1. The current lack of reliable data on the status of brown bears in Albania hinders the development of an effective conservation strategy for the species. Given the limited financial resources available for surveying bears in Albania, we suggest prioritizing the creation of a fine-scale distribution map derived from on-the-ground surveys and questionnaires, which could serve as a baseline for population trend monitoring (Liu et al. 2009).
2. Considering the endangered status of brown bears in Albania and the numerous threats and problems of their coexistence with humans documented during our study (i.e., damage to human property, illegal killing of purported nuisance bears, bears in captivity), an environmental education campaign presenting information that highlights the important ecological role of bears and introduces alternative and effective methods of mitigating the negative effects of bear interactions, appears as a conservation priority. Such a campaign should be carried out on a national scale and target people in the rural as well as the urban parts of the country. Environmental education programs are an integral part of bear conservation and management and have been used to reduce bear–human conflicts (Gore et al. 2006) and promote coexistence between bears and humans (Morgan et al. 2004).
3. A thorough investigation of the issue of captive bears in close cooperation with relevant authorities is needed before initiating potential confiscation of these animals and the costly creation of a Bear Sanctuary (Garssen 2006). Similar sanctuaries have been used to solve this problem in Greece (ARCTUROS 2013) and Bulgaria (Four Paws 2013), while at the same time contributing to the environmental sensitization of local citizens.

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