

## CONSERVATION STATUS OF THE CRITICALLY ENDANGERED BALKAN LYNX IN ALBANIA AND MACEDONIA

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### ABSTRACT

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The ecology, status, and conservation needs of the critically endangered Balkan lynx are not well understood. Therefore, there was a need to conduct a baseline survey in the potential lynx range in Albania and Macedonia. The aim of the baseline survey was to assess the distribution and relative abundance of lynx and other large carnivores as well as potential prey species (wild ungulates, lagomorphs and tetraonids) by means of interview techniques.

Surveys were conducted in previously selected villages in western Macedonia and in the northern and eastern parts of Albania. The set-up of the questionnaire, sampling areas and target profiles of interviewees were defined in order to cover the entire potential range and to focus on key informants. Study areas were defined using 10x10 km grid maps of both countries. In total, 64 grid cells for Macedonia and 67 grid cells for Albania were selected as known and potential lynx distribution areas. In each cell, at least one village was randomly selected to be visited.

In Macedonia, a total of 154 villages were visited and 560 persons were interviewed. According to the results of the questionnaire survey, lynx presence was confirmed for the areas of Mavrovo NP and Stogovo-Karaorman Mts. Moreover, certain indications for lynx presence appear in the areas of Shar Planina Mt, Ilinska-Plakenska Mts and Jablanica Mt. In Albania, 320 questionnaires were completed in 91 villages. Lynx presence was only confirmed for the area of Eastern Albanian Alps (Prokletije Mountains) and Shebenik-Jabllanica region.

### Introduction

The Balkan's largest felid *Lynx lynx martinoi* (Mirić 1978) is the least known of the large carnivores in the Balkans. However, its existence through the ages in the Balkan Mountains has always been considered as a symbol of wilderness and it has become a national flagship species. Due to that, lynx is a strictly protected species in both Macedonia and Albania, and its protection is regulated with the law on hunting and fauna protection No. 7875/1994 in Albania and with the law of Nature Protection (Official Gazette of RM 67/04) in Macedonia. Official-

ly, it is hoped that the adequate implementation of these laws will ensure the survival of the species for the future. But what is the situation on the ground? The turbulent transition of the Western Balkan countries and the resulting socio-economic consequences has not permitted the effective implementation of nature conservation laws. The large unemployment rate, an unsustainable exploitation of natural resources (timber and game), and uncontrolled poaching can potentially have severe impacts on vulnerable species. This difficult situation has not permitted any increase of the Balkan lynx population despite its protection. In fact, the expert assessments

of population size indicate a decrease (Mirić 1981). Although there is little hard data, expert assessments places the combined population of Albania, Macedonia and Montenegro to be under 100 individuals (von Arx et al. 2004; Breitenmoser et al. 2005).

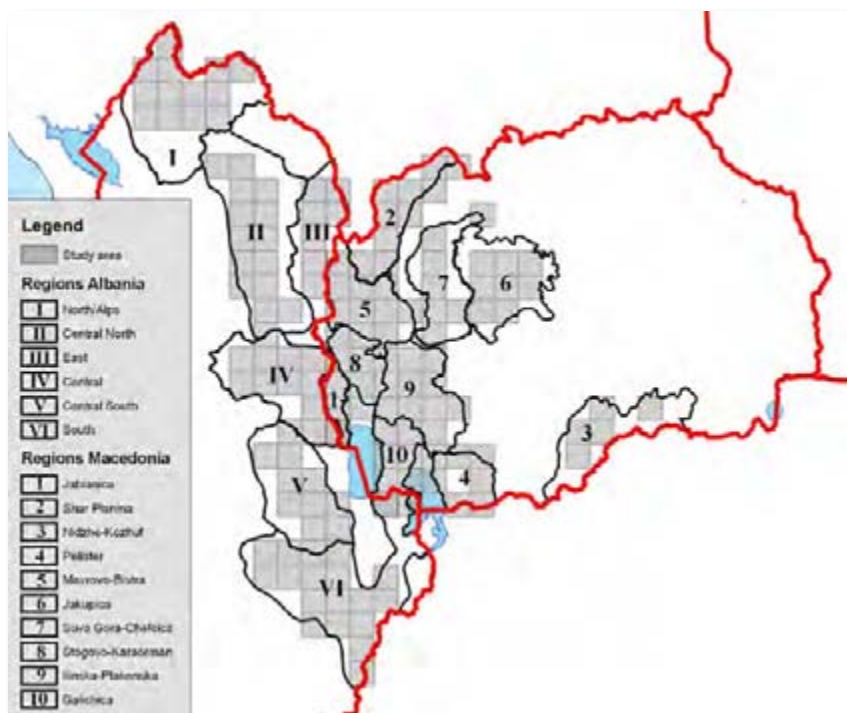
To ensure the survival of the Balkan lynx, a recovery programme started in 2006 ("Balkan Lynx Recovery Programme", BLRP) (Breitenmoser et al. 2008). The lack of knowledge and information about lynx ecology, population status, distribution and trend was evident at the beginning of the project. All the published data available (Micevski 1997, Grubac 2000, Hristovski 2001) was based on unconfirmed observations and is nowadays out of date. Therefore, there was an urgent need for the collection of reliable and up-to-date data for the purpose of the project.

A baseline survey was foreseen as a first task in the project to assess the status of the Balkan lynx. In an attempt to rapidly collect knowledge about wildlife from the local people, interviews were carried out from July 2006 to June 2007 in eastern Albania and western Macedonia (possible areas of lynx distribution).

### Materials and methods

A questionnaire was specially designed for the needs of the baseline survey. It was developed at a joint project meeting in Peshtani, Macedonia, in June 2006, and was later translated into the Macedonian and Albanian languages. The questionnaire contained 50 questions divided in six groups. The

first group of questions concerned the presence and distribution of large mammal species during the last 5 years. The second group was related to conflicts between large carnivores and humans as well as human attitudes towards large carnivores. Detailed information about livestock husbandry and the damage compensation system was requested through the third group of questions, while information about socio-economic aspects of the villages was collected with the fourth group of questions. The fifth and the sixth group of questions were related to the general characteristics of the interviewed person and the village. This publication aims to provide an overview of the most important results from the analysis of the first group of questions (wildlife status). The results from the analysis of the second group questions about human-large carnivore conflicts are presented in a separate publication (Keçi et al. 2008). The questionnaire was focused on key-informants of varying backgrounds including: hunters, game wardens, foresters, shepherds, livestock breeders, beekeepers, cafeteria or market owners, and at least two randomly selected people per village. The questionnaire was administered through face-to-face interviews. During the completion of the questionnaires, UTM coordinates were taken from each village with a GPS. In addition, posters and leaflets were given to the interviewed people in order to raise the public awareness and knowledge of lynx biology, ecology and status in Macedonia and Albania. All the data gathered during the baseline survey were stored and analysed in a SQL database in Macedonia and stored in Excel (Microsoft) worksheets and analysed with



**Fig. 1.** Study area of the baseline survey in Macedonia and Albania (grey grid cells), divided by Regions.

Stata 9 (StataCorp) software in Albania.

Apart from the interviews, data was also collected during several field trips to potential lynx distribution areas by means of snow tracking. Some additional valuable data was gained thanks to contributions from knowledgeable people who were willing to share their information with us.

### Study area

The study area was defined using a 10x10 km grid map of the countries. According to previous publications on lynx occurrence and distribution (von Arx et al. 2004), 73 grid cells in Macedonia and 63 in Albania were selected, and in each cell, at least one village was randomly chosen to be visited (Fig. 1).

The defined study area in Macedonia was mainly in the western parts, along the border with Albania, with exceptions of some areas in central and southern Macedonia. In Albania the study area covered the northern and eastern parts of the country, mainly along the border with Macedonia. The whole study area was divided into regions to compare the gained data at this level, too. The borders of the regions were defined according to natural (geographic) and political boundaries. Subsequently, 6 regions were defined in Albania (Northern-Alps, Central-Northern, Eastern, Central, Cen-

tral-Southern and Southern region), and 10 regions in Macedonia (Shar Planina, Jakupica, Suva Gora - Cheloica, Mavrovo - Bistra, Stogovo - Karaorman, Ilinska - Plakenska, Jablanica, Galichica, Pelister, and Nidzhe - Kozhuf region) (Fig. 1).

### Results

By the end of the baseline survey we had covered almost all the areas as planned with some exceptions of very remote or uninhabited areas. We had a total of 873 interviews (320 in Albania, 553 in Macedonia) conducted in 245 villages (96 in Albania, 149 in Macedonia).

#### Lynx presence

The lynx and prey presence was assessed according to the relative number of positive answers per 10x10 km grid cell. While making the criteria, we decided that more than 50% positive answers indicates a good (probable) presence, less than 50% indicates a possible presence, and no positive answers indicates that the species is not present in that grid cell.

In general, the questionnaires indicated that lynx only have a scarce presence in most of the investigated areas, and in some grid cells people think that lynx is not present at all (Fig. 2). Only in a few areas (the darkest coloured grid cells in Fig. 2), are

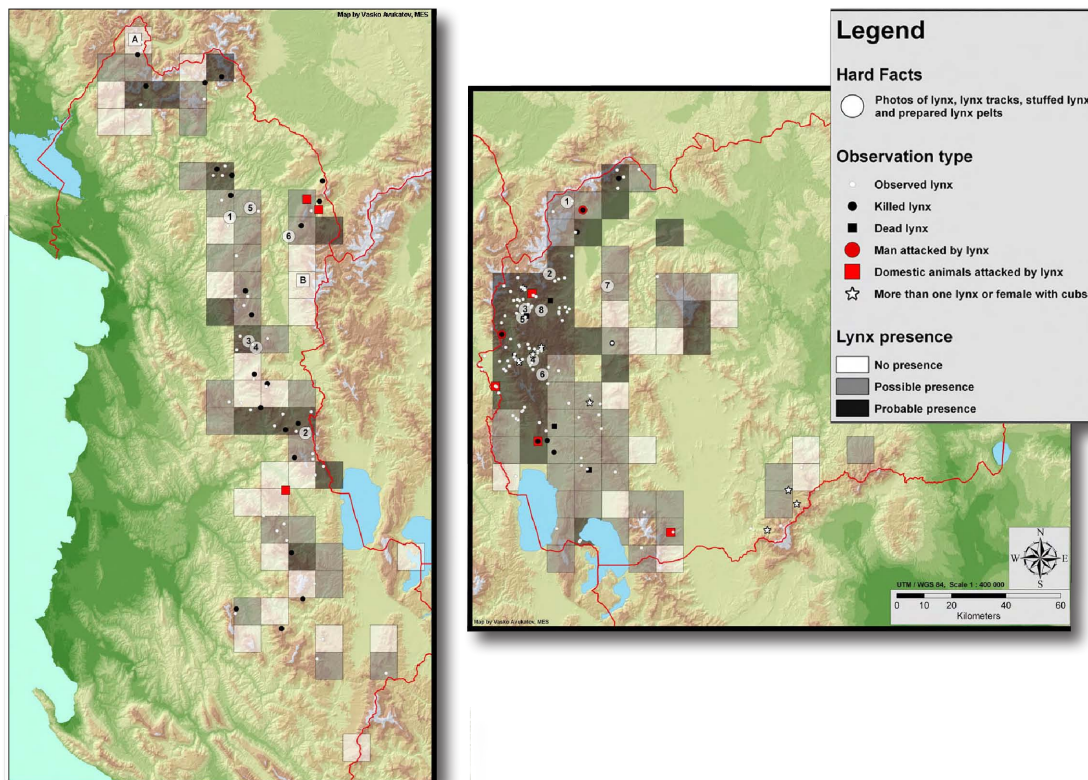


Fig. 2. Lynx presence and different types of lynx observations in the survey area.

these indications of a good lynx presence. These places are within the Mavrovo NP in Macedonia, and the Albanian Alps and the Martanesh-Shebenik area of Albania.

According to the results, there are all together indications of a probable presence of the Balkan lynx in 37 of 136 grid cells and a possible presence in 62. Lynx appear to be absent from 37 grid cells (Tab. 1).

**Tab. 1.** Lynx presence in the survey area by number of grid cells

	MK	AL	Total
Probable presence	25	12	37
Possible presence	36	26	62
No presence	12	25	37
Grid cells surveyed	73	63	136

### Lynx trends

The assessment of the lynx trend was made according to the personal judgment of the interviewees on the population development over the last 5 years and analyzed per grid cell. In the cases where 75% or more of the interviewees within a grid cell agreed that the population was either increasing, decreasing, or stable, it was considered as strong evidence for that population trend. Evidence was considered to be weak when from 50% to 75% of the interviewees had the same judgment for the trend, while in all other cases the trend was regarded as non-assessable.

In almost 2/3 of the whole survey area the lynx trend was either non-assessable or there was insufficient data (Fig. 3). In the remaining areas it was either strongly or slightly decreasing. Across the whole survey area the only slight report of an increase was found for two grid cells in the Albanian Alps, North Albania.

### Distribution of potential lynx prey

The potential lynx prey was also a subject of investigation in the frame of the baseline survey. The questionnaire contained questions about the distribution of several species that, according to the literature, can be considered as a potential prey for the Balkan lynx. Roe deer (*Capreolus capreolus*), chamois (*Rupicapra rupicapra*) and brown hare (*Lepus europaeus*) were thought to be probably the most important lynx prey species. Joint maps were produced showing both the lynx and prey distribution in the survey area for a better visual overview of the relation between the distribution of these prey species and lynx.

There is a very good evidence of roe deer occurrence in the grid cells where lynx are also present. With the exceptions of a few grid cells in the Albanian Alps, Central-North and East regions of Albania where roe deer is scarcely present, the population of this species can be considered as widespread (Fig. 4).



**Fig. 3.** Trend of the lynx population according to the interviewees.

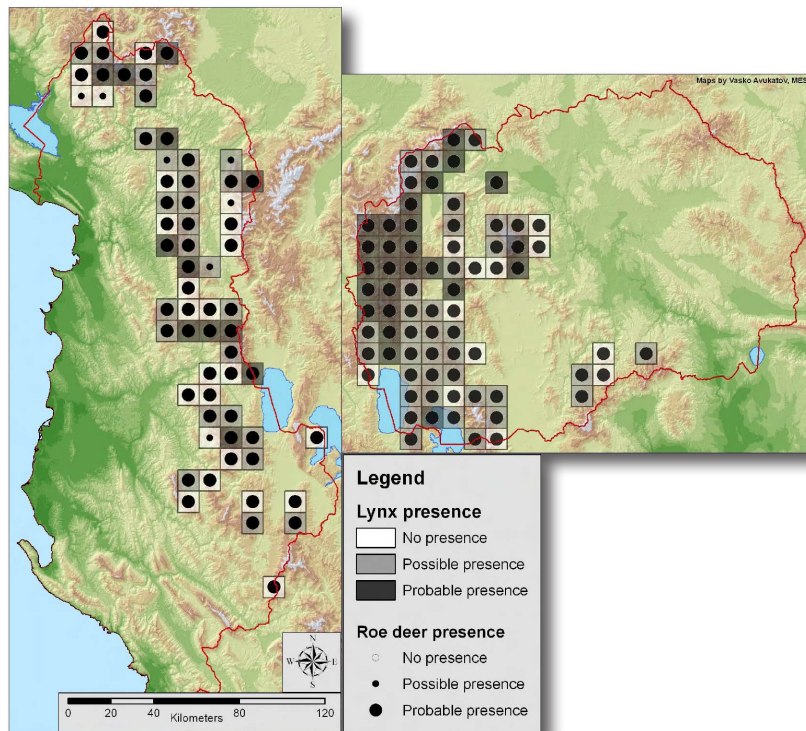


Fig. 4. Lynx and roe deer presence in the study area.

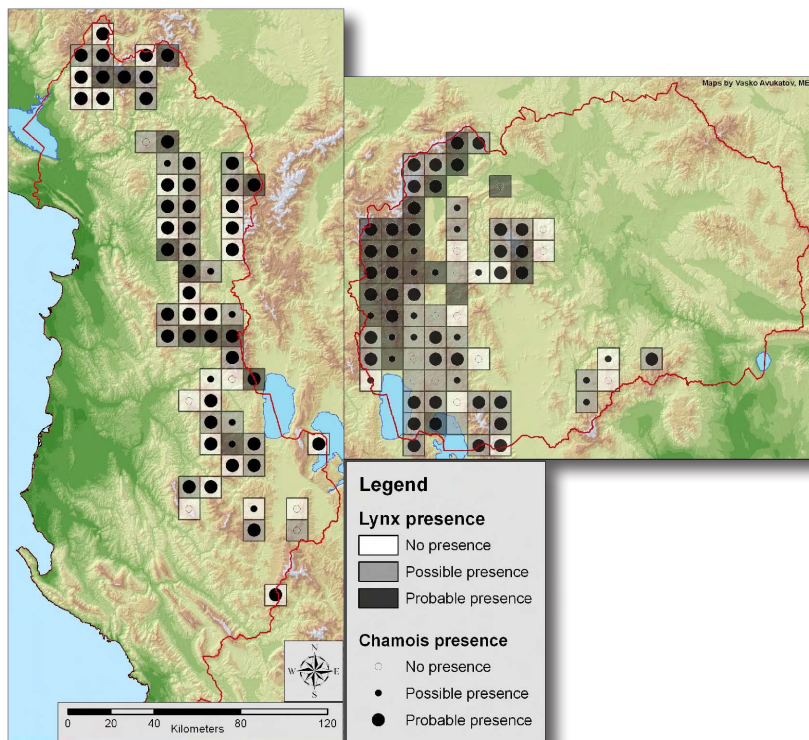
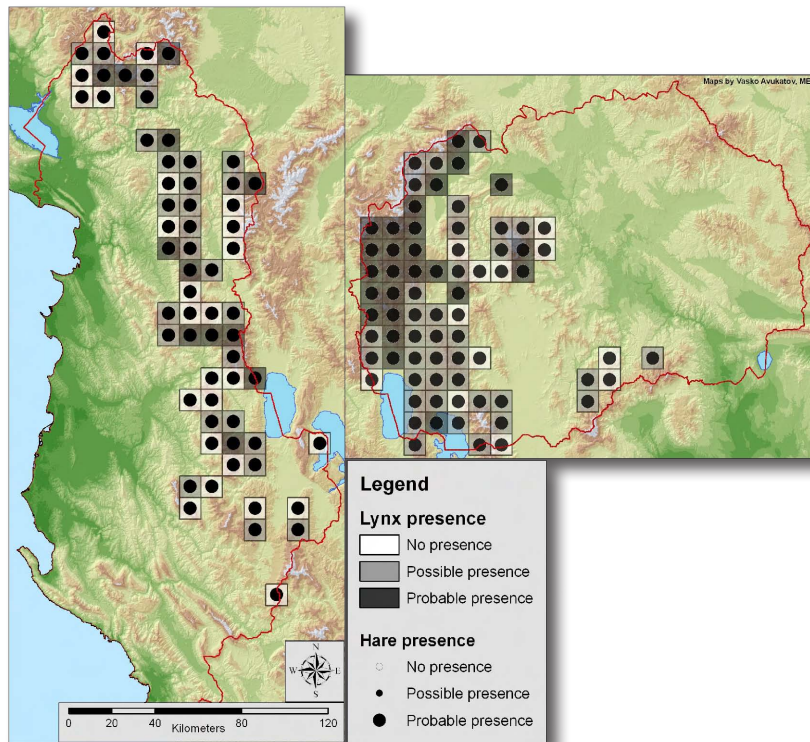


Fig. 5. Lynx and chamois presence in the study area.

Chamois are much less widely distributed than roe deer. In the Central-North and South regions of Albania and in the Suva Gora–Cheloica, Ilinska–Plakenska, Galichica and Pelister regions of Macedonia where lynx is likely to be present, chamois seem to be absent (Fig. 5).

Brown hare and lynx distributions can be compared on Fig. 6. Brown hare is the prey animal with the widest distribution among the three (roe deer, chamois and brown hare) prey species.

Potential prey species seem thus to be widely distributed throughout the whole survey area with



**Fig. 6.** Lynx and hare presence in the study area

the brown hare having the largest distribution range followed by roe deer and chamois.

**Hard facts about lynx occurrence**

In addition to the information gathered through interviews, the Balkan lynx teams managed to collect some hard fact data on lynx presence in the survey area. These data are in the form of pictures of lynx tracks in the snow (Fig. 7), of lynx cubs (Fig. 8), of killed lynx (Fig. 9), of stuffed lynx and lynx pelts.

This data can be considered as hard facts and they belong in the first category of data according to the widely used SCALP criteria (Molinari-Jobin et.al. 2003). In total, the hard facts collected during the baseline survey comprise:

- 3 pictures of lynx killed in Macedonia and 6 in Albania since 2000;
- 3 live lynx photographed in Macedonia since 1999;
- 4 lynx tracks found in Macedonia since 2006.

**Discussion**

For the first time a systematic field-based collection of information on the Balkan lynx and its potential prey species has been carried out, covering an area from central, northern and eastern Albania to western and central Macedonia. The data gained represent the local people’s knowledge and opinion



**Fig. 7.** Lynx tracks in snow near Mavrovo dam

about these species and the reliability of this data cannot be scientifically assessed. Still, the questionnaire data contain basic valuable information about the lynx and its potential prey and are a considerable contribution for the further activities in the Balkan Lynx Recovery Programme, namely the development of a conservation strategy for the lynx.

In 2/3 of the survey area the trend of the lynx population could not be assessed as people’s opinions differed enormously. In the remaining area the



**Fig. 8.** Lynx cub photographed on high mountain passage “Jama” south of NP Mavrovo

trend was reported mostly as negative (decreasing) by the interviewees. These results may reflect the real situation considering the rapid increase of poaching reported in the past 15 years. The situation is alarming and actions need to be taken in the nearest future. The resulting lynx presence and our predictions generally overlapped, with some exceptions: more signs of lynx presence were expected in Albania, but the results showed a very fragmented distribution. Although the expectations for the lynx presence in the Macedonian “Pelister” and “Galichica” National Parks were high, the results do not indicate the constant presence of lynx in these protected areas. Mavrovo NP can be considered as a core area of the population of Balkan lynx because of the highest reported presence of lynx for the whole study ar-

ea. From the analysis of the results and conversations in the field, it seems that people have a severe lack of knowledge about lynx biology and its status, although it’s widely considered to be a national flagship species in Macedonia, and appears on one of the most common Macedonian coins.

There seems to be a good presence of potential lynx prey in most of the survey area, especially brown hare and roe deer. Only in some areas in the Central, Central-South and South regions in Albania and Jakupica, Suva Gora–Cheloica and Ilinska–Plakenska regions in Macedonia, were prey species reported as being scarce, which may be a limiting factor for lynx distribution in those areas. On the other hand, our opinion is that the interviewees were too optimistic concerning prey availability considering the massive poaching, habitat fragmentation and habitat degradation, low number of field signs from prey animals and large numbers of lynx competitors (wolves, feral dogs). Therefore, further field investigations are needed. The good lynx presence that came out during this survey in the partly or strictly protected areas is perhaps a result of well preserved habitats and a good prey base.

One of the hardest tasks during the conducting of the questionnaire was to assess and to make criteria for the reliability of the received answers. The answers were often mixed with emotional interpretations, especially those of hunters and farmers, who are often appeared to exaggerate their statements. However, their statements were always taken into consideration.

The collected hard facts are a proof that the Balkan lynx still exists in the survey area (Fig. 7) and that it is successfully reproducing (Fig. 8). However, there was widespread evidence of the illegal killing of lynx in both countries (Fig. 9).



**Fig. 9.** Lynx killed by poachers in Albania.

## Conclusions

We have demonstrated that the Balkan lynx still exists and is successfully reproducing, and that its potential prey base is relatively widely available. However, the Balkan lynx population has a critical status and the general trend appears to be negative. Several main threats can be pointed out: illegal persecution, habitat degradation, decrease of prey populations in Albania and in some areas in Macedonia.

Completing the baseline survey was an important first task of the Balkan Lynx Recovery Programme. We collected, compiled and analyzed a lot of valuable and important data that represents local people's knowledge about large carnivores and their prey. However, original field research is needed to accurately assess the population number, feeding ecology and land tenure system of the Balkan lynx, with the intention to achieve a better understanding of its needs to secure its survival.

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