

## The lynx in the Balkans – a summary of present knowledge

Christine Breitenmoser-Würsten<sup>1</sup> and Urs Breitenmoser<sup>1,2</sup>

<sup>1</sup> KORA, Thunstrasse 31, 3074 Muri b. Bern, Switzerland, eMail [ch.breitenmoser@kora.ch](mailto:ch.breitenmoser@kora.ch)

<sup>2</sup> Institute of Veterinary-Virology, Veterinary Faculty, University of Bern, Länggass-Str. 122, 3012 Bern, Switzerland, eMail: [breitenmoser@ivv.unibe.ch](mailto:breitenmoser@ivv.unibe.ch)

### 1. History of the Balkan lynx population

According to sparse documents from the 17<sup>th</sup> and 18<sup>th</sup> centuries and information from the 19<sup>th</sup> century, the lynx was still present on the whole Balkan Peninsula at the beginning of the 19<sup>th</sup> century. The extermination of the lynx in the Balkans started only in the 18<sup>th</sup> century, whereas in Western Europe this process had already started in the 16<sup>th</sup> century. In the Balkans, extermination started after the liberation from Turkish supremacy (Mirić 1974). The human population started to increase and with it logging and overhunting. Predators were persecuted as pests. The years when the last lynx were killed in the different areas show the development of the disappearance of the lynx in the Balkans (Table 1). Some areas were only liberated from the Turks in the 20<sup>th</sup> century, and there the lynx still exists today: western FYR of Macedonia, eastern Albania and Kosovo.

### 2. Distribution of the remnant Balkan lynx population in the 1970s

The remaining lynx population in the Balkans experienced a severe bottleneck in 1935–1940 with an estimated number of 15–20 individuals left. The decrease had started in the 1850s. After the Second World War, the population started to recover again, especially in Kosovo and the FYR of Macedonia (Mirić 1981). In the 1960–70s, it also reappeared in Montenegro. The population estimates vary from 200–300 for Yugoslavia in 1974–1977 with an additional 100 individuals in Albania and Greece (Mirić 1978), to 280 lynx living in the Balkans in 1974 (120 in the FYR of Macedonia, 70 in Kosovo, 10 in Montenegro and the rest in Albania; Mirić 1981). The distribution of the lynx in the mid-1970s is summarized in Fig. 1. Mirić (1974) interpreted the rapid recovery in the 1950s as a consequence of the strong reduction of the wolf population in 1952 and

**Table 1.** Extinction of lynx in various areas of the Balkans (after Kratochvil *et al.* 1968, Mirić 1974, 1981) and the reappearance of the species (Mirić 1981 and this report).

Area/country	year last lynx killed	observed	year lynx reappeared	reason for recolonization (Reference)
Slovenia	1887	1908	1973	re-introduction (Čop & Frkovic 1998)
Croatia	1886	1903	1975	immigration from the re-introduced lynx in Slovenia (Čop & Frkovic 1998)
Bosnia & Hercegovina WE	1886 1911	1911	1980	immigration from the re-introduced lynx in Slovenia (Saldo, this report)
Montenegro	1913		1960–70s	immigration from neighboring areas (Kosovo, Albania; Mirić 1978, 1981)
FYR of Macedonia E	after 1924		–	no recolonization of this area
E Serbia, FRY	1893	1904	1983	immigration from the Romanian Carpathian Mts. (Paunovic <i>et al.</i> , this report)
S Serbia, FRY	??	1902	1946–52	immigration from FYRoM and Kosovo (Mirić 1978)
Bulgaria	1935	1941	1990s	unconfirmed observations at the border to Yugoslavia – western Stara Planina; (Zlatanova <i>et al.</i> , Spassov <i>et al.</i> , this report)
Greece	1958		1990s	some individuals from FYRoM/ Albania might move occasionally into Greece (Panayotopoulou, this report)

1953 in this area. Fengewitsch (1968) estimated a population size of 60–70 animals in 1958 that increased to 80 individuals in 1963. For Kosovo and the western FYR of Macedonia, it could have been as little as 30–40 animals (Festetics 1980). Bojovic (1978) estimated the area occupied in the 1970s at 6000 km<sup>2</sup> for the FYR of Macedonia, Kosovo, Serbia and Montenegro with additionally 2000 km<sup>2</sup> in Albania and Greece. His population estimate for the former Yugoslavia was 220–250 individuals (85–100 in Kosovo, 120–130 in the FYR of Macedonia, and 15–20 in Montenegro). Although the lynx has been protected since 1947, numerous illegal killings occurred (Bojovic 1978). Since the Second World War, two killings are known from Montenegro, 27 from Kosovo (6 of the lynx are in a museum) and 40 from the FYR of Macedonia (8 of them in a museum).

The development of the lynx population is not well documented for all areas. There is very little information on the lynx in Kosovo for the 19<sup>th</sup> century, but numerous data for the 20<sup>th</sup> century up to the 1970s (Mirić 1981). The records of the period 1970–1975 are concentrated along the Sara Mountains, its northern foothills and the Prokletija Mountains in southwestern Kosovo. In the Prokletija Mountains, the lynx had been exterminated by 1940, but came back in the mid 1950s (Mirić 1978). Mirić (1963) reported about 30 lynx living in 1955 in the mountains surrounding the Metohia Basin and west of the Vardar River in the FYR of Macedonia. Due to strict protection, the number again reached 50–70 individuals at the end of the 1960s and 120 individuals by 1974 (Mirić 1978). Distribution was concentrated in the northwest of the country (Sara, Korab, Bistra, Stogovo and Jakupica Mountains). In the south (Karaorman, Jablanica, Pelister and Nidze), the lynx was quite rare.

From the FYR of Macedonia, information was also only available for the 20<sup>th</sup> century. East of Vardar, 5 lynx or more were killed from 1924–1927. Today, there are no lynx in this area. West of Vardar, the lynx has always been present in the mountainous areas. The numbers were even more important than in Kosovo (Mirić 1974). The highest densities were reached in the area of the river Radika (Mirić 1981).

Information on the lynx in Albania was even less. Mirić (1974) cited records from 1896 and 1912 for Ljuma. He indicated that more recently lynx were only living in the mountainous areas of eastern Albania, but the number of individuals was considerable (Mirić 1978).

From Montenegro, the lynx had disappeared by 1913. The last animals were killed in the Bjeasnica Mountains. It only came back in the 1960s and 1970 through individuals immigrating from Kosovo and Albania. The first animals appeared in the Prokleija Mountains. Later the lynx reached the Komovi (1974) and 1976 the Burenj Mountains. (Mirić 1978).

For Greece, Mirić (1974, 1981) indicated only scat-

tered observations for the Pindos Mountains and at the border to Yugoslavia after 1950.

### 3. Recent reports on the Balkan lynx population

#### 3.1. Council of Europe Report

(Breitenmoser & Breitenmoser-Würsten 1990)

At the time when this first report on the status, conservation needs and reintroduction of the lynx in Europe was produced, no information from Albania was available, and for Yugoslavia only a contact with J. Čop from Slovenia existed. The information in this report was therefore mainly compiled from the literature mentioned above. The Balkan lynx population was considered as endangered. Because of the lack of information a close monitoring was recommended.

#### 3.2. Report on the situation of the lynx in Albania

(Th. Kominos 1994, update 1997, unpubl.)

Th. Kominos, Greece, visited Albania in January 1994 and was in contact with F. Bego and N. Peja from the University of Tirana. He compiled a short report about his visit. The most important information is summarized here.

Lynx hunting has been banned since 1980. Up to then, the government bought the furs and kept most of them in the warehouses of Durres. Lynx have disappeared from two areas since the 1950s. One is a flat area in the north, and the other a mountainous region near the border with Greece in the south. A government report of 1993 mentions two areas in Albania with lynx occurrence. The first one is on the border with Montenegro in the area of Vermosh, and the second is Mirdita located in the centre of the country north of Tirana. The major problems in Albania are poaching and habitat destruction.

1997: It seems as if lynx has almost disappeared from central Albania. Its occurrence is now restricted to the border area with the FYR of Macedonia, north of Ohrida lake. The population is estimated at 15 individuals, with some of them moving across the borders to FYR of Macedonia and Kosovo. The Balkan lynx population does not exceed 20–30 individuals in total.

#### 3.3. Large Carnivores on the Balkan and the Dinarids

(Promberger 1997, minutes of a workshop held at the meeting of the LCIE co-coordination group, Vienna 1997)

A workshop on large carnivores on the Balkan and the Dinarids was held in Vienna in spring 1997 as part of the co-ordination group meeting of the LCIE (Large Carnivore Initiative for Europe). It was joined by biologists from Croatia, FYR of Macedonia and Bulgaria. It became clear once more that there is very little information available on the lynx and that the existing numbers and information on distribution are not more than

rough estimates. Hunters, scientists and managers often have insufficient knowledge about the ecology of the species. The population was estimated to be restricted to a few dozens of individuals in Albania, FYR of Macedonia and the south of Yugoslavia. The most important problems were mentioned as: lack of appropriate area management and monitoring, insufficient food supply (FYR of Macedonia) and illegal hunting.

### 3.4. Report on the situation of the lynx in the FYR of Macedonia on behalf of Euronatur

(B. Micevski 1997, unpubl.)

The Bird Study and Protection Society of Macedonia (BSPSM) asked hunters, foresters, shepherds and nature lovers in an area of nearly 500 km<sup>2</sup> about the presence of lynx. The area included the Radika valley and parts of Mavrovo NP. The estimated number of individuals was 54 lynx for the whole study area, corresponding to 12 lynx/100 km<sup>2</sup>. The explanation for this very high density was that a large part of the area was a national park with a high density of prey species and good protection and that the area was the heart of the autochthonous Balkan lynx population. This high density is in a sharp contrast with all other population estimates.

### 3.5. European Lynx Action Plan

(Breitenmoser *et al.* 2000)

In the European Lynx Action Plan – a document prepared within the framework of the Large Carnivore Initiative for Europe (LCIE) and published under the Council of Europe – information has been gathered by means of a questionnaire. According to expert knowledge, the Balkan lynx population spreads over an area of 1600 km<sup>2</sup> today and consists of 50 lynx. The status, distribution and number of lynx in the Balkan lynx population are considered unclear. However, it is judged as the most threatened autochthonous lynx population in Europe and should be given every priority in conservation.

## 4. Summary of the present situation

The situation of the Balkan lynx seems to have changed again very dramatically since the evaluation by Mirić in the 1970s. The recovery of the population that had occurred after the second world war, has obviously already been stopped in the 1980s. During the last 10–15 years, there has probably been an important decline of the Balkan lynx population. If we believe in numbers, the population in the FYR of Macedonia has declined from 120 to 30–35 lynx, and in Albania from some 80 to 20–25 (Table 2). Th. Kominos (1997) even stated, that there might be as few as 15 lynx left in Albania.

For the region of Kosovo, Metohija and Raška County, Grubač (2000) estimated 22–27 individuals for

the period of 1990–1999. He was afraid that the population might have dropped to as few as 12–18 individuals due to the war in 1999.

The distribution area would have experienced a drastic reduction (Map 1) from 8000 km<sup>2</sup> in the 1970s (Bojovic 1978) to 1600 km<sup>2</sup> today (Breitenmoser *et al.* 2000). As there is little field experience with lynx on the Balkans, it is very hard to judge all these numbers. However, there is no doubt that the Balkan lynx population is heavily threatened, as the population has decreased everywhere where population trend information is available (Table 2). Only the populations of Bosnia & Herzegovina and the one in eastern Serbia are increasing and expanding. Both are not part of the autochthonous population. In Bosnia & Herzegovina, lynx immigrated from the re-introduced population of Slovenia, and in eastern Serbia lynx are immigrating from the Carpathian Mountains of Romania.

## References

- Bojovic, D. 1978. Der autochtone Luchs in Jugoslawien – Verbreitung, Bestand und Tendenz. In: Der Luchs – Erhaltung und Wiedereinbürgerung in Europa. U. Wotschikowski, Ed. Bernhard, Mammendorf, pp. 25–28.
- Breitenmoser, U. and Breitenmoser-Würsten, Ch. 1990. Status, conservation needs and reintroduction of the lynx (*Lynx lynx*) in Europe. Council of Europe, Nature and Environment Series, No. 45, 47 pp.
- Breitenmoser, U., Breitenmoser-Würsten, Ch., Okarma, H., Kaphegyi, T., Kaphegyi-Wallmann, U. and Müller, U. 2000. Action plan for conservation of the Eurasian lynx (*Lynx lynx*) in Europe. Council of Europe, No. 112, 76pp.
- Čop, J. and Frkovic, A. 1998. The re-introduction of the lynx in Slovenia and its present status in Slovenia and Croatia. *Hystrix* 10: 65–76.
- Fengewitsch, H.J. 1968. Grossraubwild in Europas Revieren. BLV Verlag München.
- Festetics, A. 1980. Die Verbreitung des Luchses in Europa. In: Der Luchs in Europa – Verbreitung, Wiedereinbürgerung, Räuber-Beute-Beziehung. A. Festetics, Ed. Kilda Verlag, Graven, pp. 89–160.
- Grubač, B.R. 2000. The lynx, *Lynx lynx* (Linnaeus 1758) in Serbia. *Protection of nature* 52: 151–173.
- Kratochvil, J. 1968. The lynx population in Yugoslavia. In: Recent distribution of the lynx in Europe. J. Kratochvil *et al.* (eds). *Acta sc. nat. Brno* 2: 71–74.
- Mirić, D. 1963. Written communication on the occurrence of lynx in Yugoslavia.
- Mirić, D. 1974. Verbreitung des Balkanluchses in der Vergangenheit und heute. *Bulletin du muséum d'histoire naturelle, Belgrade, Série B, Livre 29*, pp. 51–99.
- Mirić, D. 1978. Ausrottungsgeschichte des Luchses auf der Balkanhalbinsel. In: Der Luchs – Erhaltung und Wiedereinbürgerung in Europa. U. Wotschikowski, Ed. Bernhard, Mammendorf, pp. 19–23.
- Mirić, D. 1981. The lynx populations of the Balkan Peninsula. Beograd, Serb. *Acad. Sciences and Arts, Separate edition. DXXXIX*, 154 p. (in Serbian)
- Promberger, C. (Ed) 1997. Large carnivores on the Balkans and the Dinarids. Proceedings from a workshop in Vienna, Austria, held on 26 April 1997.

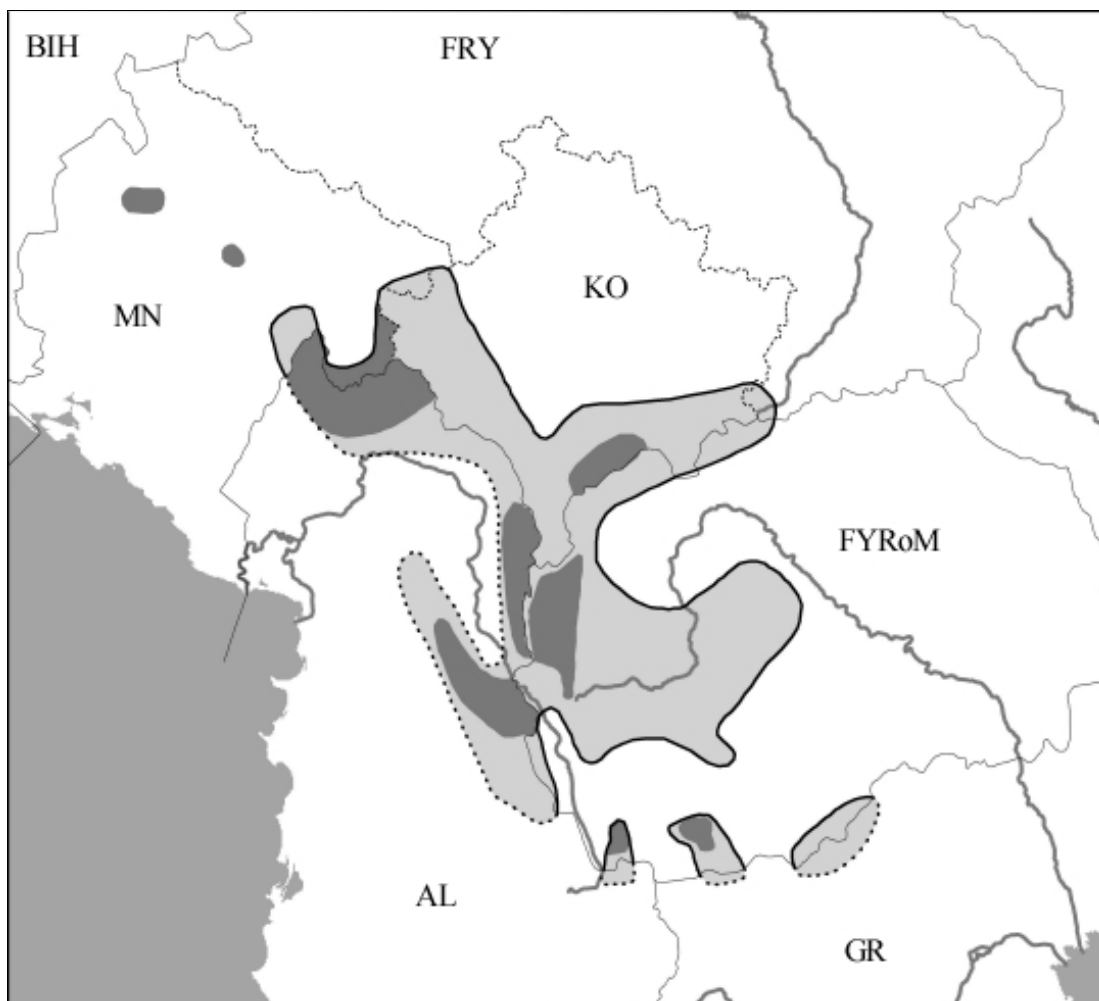
**Table 2.** Population trend, current estimated population size and development of the area occupied by lynx in the Balkans. Bosnia & Herzegovina does not share the autochthonous lynx population, but the country is at the southern expansion front of the re-introduced population of Slovenia. The population trend is indicated according to expert knowledge in this report.

Country	Population size in the 1970s (Mirić 1981)	Population size in 2000 (this report)	Population trend	Development of the area occupied
Bosnia & Herzegovina		?	increasing	increasing
Montenegro	10	?	?	?
Kosovo	70	?	?	?
FYR of Macedonia	120	30–35	decreasing	decreasing
Albania	80	20–25	decreasing	decreasing
E Serbia, FRYugoslavia	–	?	increasing	increasing
S Serbia, FRYugoslavia	?	12–18 <sup>1</sup>	decreasing	decreasing
Greece	0	0	sporadic observations <sup>2</sup>	–
Bulgaria	0	0	sporadic observations <sup>3</sup>	–

<sup>1</sup> according to Grubač (2000)

<sup>2</sup> of animals most likely roaming in from FYR of Macedonia or Albania;

<sup>3</sup> animals probably from the expanding population in eastern Serbia (origin Carpathian Mts. of Romania)



**Map 1.** Distribution of the Balkan lynx population in the 1970s (light grey shaded; after Mirić 1981) and today (dark grey shaded surface; compilation of the information from this report). Thin solid lines: international boundaries, thin dashed lines: national boundaries, thick solid lines: major rivers.