KORA Bericht Nr. 19 *e*

Juni 2004
ISSN 1422-5123

Status and conservation of the Eurasian lynx (*Lynx lynx*) in Europe in 2001

KORA

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KORA Bericht Nr. 19 englisch:
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Bearbeitung
Adaptation
Editorship

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Source
Source

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Titelzeichnung
Frontispiece
Cover drawing

Jacques Rime

Online Version ELOIS (Eurasian Lynx Online Information System for Europe):
http://www.kora.unibe.ch/en/proj/elois/online/index.html

The report is also available on CD-Rom at KORA (details see above).

Anzahl Seiten/Pages: 330
ISSN 1422-5123

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to whom we thank very much for their collaboration

This report is also available online as ELOIS (Eurasian Lynx Online Information System for Europe:
http://www.kora.unibe.ch/en/proj/elois/online.index.html
or on CD-Rom

This status report inclusive ELOIS was possible thanks to financial assistance from WWF Switzerland

We suggest to cite the country reports as chapters like:
Bego, F. & Zoto, H. 2004: Albania. In: Status and conservation of the Eurasian lynx (*Lynx lynx*) in Europe in 2001. Ed. by M. von Arx, Ch. Breitenmoser-Würsten, F. Zimmermann and U. Breitenmoser, KORA Bericht No. 19.

Table of contents

1. Introduction

In the year 2000, the Council of Europe published action plans for the conservation of all of Europe's large carnivore species. These plans, compiled under the guidance of the Large Carnivore Initiative for Europe (LCIE), were thoroughly reviewed by experts, the Bern Convention Contracting Parties, the European Commission and EU governmental experts. The action plans list conservation activities proposed for each range country, and national institutions are encouraged to develop national management or conservation plans, and to establish international co-operation between countries sharing populations. To do so, GOs and NGOs involved in the development of conservation concepts need up-to-date information allowing them to look beyond national borders. With this update of the lynx status report for Europe west of Russia, we want to provide such information. The Action Plan for the Conservation of the Eurasian Lynx in Europe (BREITENMOSER *et al*. 2000) was based on data up to 1995. This new report presents data up to 2001 (with some more recent observations), allowing seeing what has changed – and what has not. Different to prior status reports, we try an assessment of the populations. Obviously, conservation and management units are the countries (or even administrative units of the countries). The biological units, however, are the populations, and for a sound conservation and management, we must adjust national strategies to the viability of the population as a whole. In most of the cases, a metapopulation approach would be the adequate conservation concept. Several of the European lynx populations or subpopulations are threatened, and some of them will only survive if neighbouring countries work closely together. This report hopefully helps to focus on the populations.

The Eurasian lynx (*Lynx lynx*), once widespread across Europe, has reached the minimum of its historic distribution on this continent during the first decades of the 20th century. Around 1950, the general downward trend came to a halt. On one hand, the ecological conditions for the presence of the species started to improve, as large scale deforestation stopped and roe deer as the most important prey species made a never-seen comeback across Europe. On the other hand, human attitudes changed: Lynx was granted legal protection, or at least a controlled hunting aiming for the management rather than the eradication of the species. In the 1960s and 1970s, lynx became a subject of first publications. The obvious recovery of the species in Scandinavia – mainly Sweden – led to first research projects. An expansion of the species' range in the north-western Carpathians prompted several publications, and re-introduction attempts in several Alpine countries triggered increasingly public awareness.

In those years, a first series of reports on the status of the species in Europe were compiled and published. On request of the World Conservation Union (IUCN) and the World Wide Fund for Nature (WWF), a group of wildlife biologists under the lead of Josef Kratochvil reviewed the history of the lynx in Europe (KRATOCHVIL *et al*. 1968a) and its contemporary status in the range countries (KRATOCHVIL *et al*. 1968b). About ten years later, SMIT & VAN WIJNGAARDEN (1976) produced a report in behalf of the Council of Europe. Then, as a result of the re-introductions of lynx in Germany, Austria, and France, three symposia were organised. The respective proceedings (WOTSCHIKOWSKY 1978, FESTETICS 1980, and KEMPF *et al.* 1979) reviewed the recent status of the species in Europe. Again ten years later, BREITENMOSER & BREITENMOSER-WÜRSTEN (1990) compiled, in behalf of the Bern Convention Secretary, data on the status of the lynx in all Council of Europe member states by means of a questionnaire. This inquiry was repeated five years later. The results were however not immediately published, as at that time, the Large Carnivore Initiative for Europe (LCIE) started to work on Conservation Action Plans for all of Europe's large carnivores. The report, a joint endeavour of WWF and the Council of Europe/Bern Convention, was finally published as the Action Plan for the Conservation of the Eurasian Lynx in Europe ("European Action Plan", BREITENMOSER *et al.* 2000).

This present report is an update of the 1995 inquiry. As in the 1990 and 2000 reports, lynx experts in all European range countries (see Contacts) have been asked to provide information by means of a standardised questionnaire. This questionnaire (see Appendix) was altered from the earlier ones, mainly to make it more compatible with the standards used for the Species Information Service (SIS) presently built up under the lead of the IUCN. The data gathered are presented in a very strict, standardised form for each country, in order to allow a straightforward comparison of information. The report should present what is known, but also disclose what is not known. We chose the form of a status report rather than an action plan, although for each country, urgent conservation actions as proposed by the contacts are listed (Table 8 of the country reports).

In addition to the country reports, we try to make an assessment of the populations. There is not a single lynx population in Europe, which is or will be restricted to one country alone. All populations we can today consider as viable expand across international borders and hence require an international approach in practical management. None of the isolated occurrences within the boundaries of one country is viable in the long-term. Such occurrences should be considered under a metapopulation concept, and will be, as a consequence, subpopulations of a distribution area stretching over several countries. For the identification of the populations or metapopulations, we followed largely the European Action Plan 2000. Some of the metapopulations include several separated subpopulations belonging to the same habitat region (e.g. the Alps), other areas were, for practical reasons, split into two or several populations, although there is no interruption in the distribution of the species today (e.g. the Nordic and the Baltic populations). In some cases, as for the separation of the Dinaric and the Balkan populations, we have based our decision on taxonomic considerations as explained in chapter 2.2.

The report presents all European countries west of Russia. We have however considered Russia for the distribution map of the species in Europe. Russian colleagues have recently published an extensive review of the situation of the species in Russia and the states of the former USSR (MATYUSHKIN & VAISFELD 2003). All data concerning Russia were taken from this book. Furthermore, we have not considered the historic range countries where the species is presently extinct (including Turkey, where the species still exists in the Asian part of the country). There were some anecdotal reports on lynx observation in recent years even outside the range countries as defined for this report, e.g. from Belgium, Denmark, the Netherlands and England. We did not consider such reports, as no reliable information is available and the observations most likely stem from captive bred lynx escaped or released to the wild.

The European Lynx Online Information System (ELOIS) is directly accessible through the homepages of the LCIE (www.large-carnivores-lcie.org) and KORA (www.kora.unibe.ch). Furthermore, the status report is published as KORA Bericht No. 19 (PDFs available on the KORA website or on CD ROM). Ordering information is to be found on the websites of the LCIE and KORA.

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2. Species information

This chapter provides background information relevant to the conservation and management of the Eurasian lynx in Europe. It summarises the species' phylogeny, biology, morphology and ecology and its relation to humans, but neither exhaustively nor in a fully referenced form. The information is taken from introductory chapters of the European Action Plan (BREITENMOSER *et al*. 2000), with some updates from the newer scientific literature. Several monographs, both scientific and popular, are today available in various languages – none of them in English, but SUNQUIST & SUNQUIST (2002) provide a brief overview of the species with a good list of references.

2.1. Description and morphology

Fig. 2.1. Eurasian lynx, subspecies *L. l. carpathicus* in the Swiss Alps. The picture was taken by means of a camera trap used for a monitoring programme. (© KORA)

The Eurasian lynx (*Lynx lynx* Linnaeus, 1758; order Carnivora; family Felidae) is the third largest predator in Europe, after the brown bear and the wolf. It is the largest felid of our continent, twice the weight of the Iberian lynx (*Lynx pardinus*) and 3-4 times that of the wildcat (*Felis silvestris*). The appearance of the lynx is very characteristic (Fig. 2.1); it has long legs and large feet, a round head with a short neck, triangular ears with black tufts, and a short black-tipped tail. The flared facial ruff is often very prominent.

The claws are sharp, strong, and hooked; especially the claws of the front feet are perfect tools to seize prey. The claws are retractile to keep them sharp, and hence they do normally not mark in the footprint (Fig. 2.2).

Fig. 2.2. Lynx tracks. (© F. Zimmermann, KORA)

All lynxes belong to the spotted cats. However, pelt colour is very variable within and between different parts of the distribution range. The coat is greyish with different tints (rusty, yellowish, or reddish) at the back and flanks, but whitish at the belly. There are four major coat patterns: Large spots, small spots, rosettes, and unspotted (Fig. 2.3; THÜLER 2002).

Fig. 2.3. Types of pelt pattern of Eurasian lynx as identified by THÜLER (2002): (a) large spots, (b) small spots, (c) rosettes, (d) unspotted. (© KORA)

Sexual dimorphism is pronounced in lynx, males being larger than females. Lynx from northern and eastern regions are larger than individuals from more southern latitudes or the west. This general pattern is however blurred by the differences between subspecies. Lynx from the Carpathians, for example, are relatively large, although they belong – within the species' total range – rather to the western and southern parts of the species' area. Body mass of adults ranges between 12-35 kg (information about weights of lynx over 40 kg are doubtful). Total body length is 70-130 cm; shoulder height about 65 cm.

Fig. 2.4. Skull of an adult male lynx from the Swiss Alps. (© Ch. Breitenmoser-Würsten, KORA)

The snout is short, giving the skull a round and high shape (Fig. 2.4), granting a high biting force of the canines. The intermediate part of the skull between the facial part and the brain-case is very small, and the skull crests most often poorly developed. The mandible is short and massive with a wide ramus and strong processes. Lynx have 24 deciduous and 28 permanent teeth. The dental formula is:

$$I\ \frac{3}{3}\ C\ \frac{1}{1}\ P\ \frac{2}{2}\ M\ \frac{1}{1} = 28$$

2.2. Phylogenetic history and subspecies

The lynx-like cats are united in one genus (*Lynx*) with four species (*lynx*, *pardinus*, *rufus*, and *canadensis*). They occur nowadays in the northern hemisphere only: *L. lynx* and *L. pardinus* in the Palaearctic, *L. rufus* and *L. canadensis* in the Nearctic. *Lynx pardinus*, the Iberian lynx, was always restricted to the Iberian Peninsula south of the Pyrenees, whereas the entire remaining area in the Old World from the Atlantic coast in Europe to the Pacific Ocean in the Far East is generally regarded as the area of the Eurasian lynx (*Lynx lynx*). Over such an extended range, stretching not only from west to east, but also from south to north across several climatic zones and different habitats, a differentiation on the level of subspecies is to be expected, not only due to the geographic (and ecological) distance, but also as a consequence of the repeated isolation and merging of sub-areas during the Pleistocene glaciations. The lynx distribution during the last ice age and the subsequent recolonisation of Europe has to be considered for the reconstruction of the (pre)historic range as well as for the possible differentiation of subspecies. Morphologic differences and palaeontologic and zoo-geographic considerations (MIRIC 1974, MIRIC 1978, MATJUSCHKIN 1978, WERDELIN 1981, HEMMER 1993, HEMMER 2001, MATYUSHKIN & VAISFELD 2003) are today complemented with genetic findings (HELLBORG *et al*. 2002, BREITENMOSER-WÜRSTEN & OBEXER-RUFF 2003, RUENESS *et al*. 2003), but there is no final agreement on the classification of subspecies yet. From all these works, we compile what we believe to be at present the best possible interpretation of the distribution of recent subspecies in Europe (Fig. 2.5).

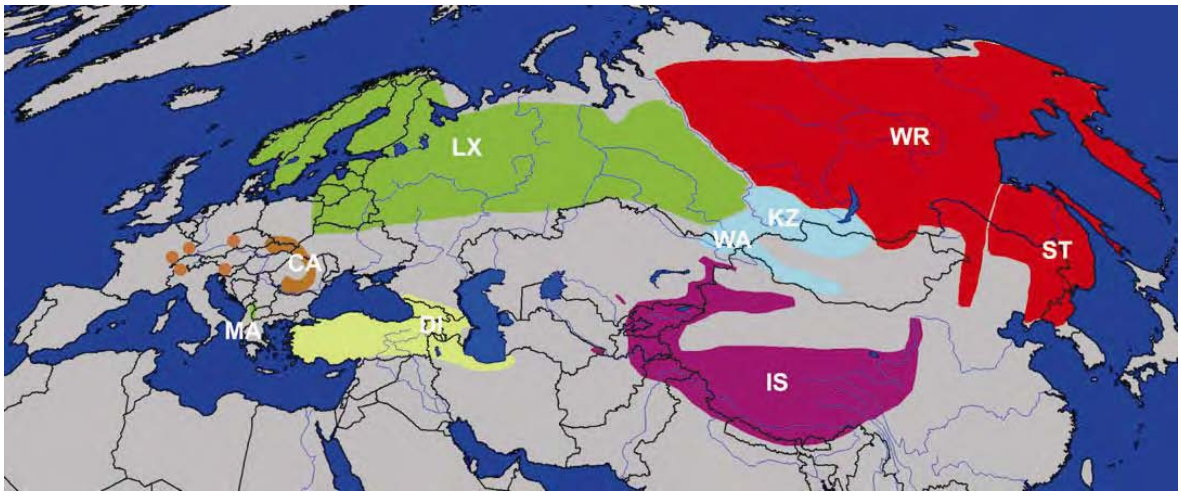

Fig. 2.5. Distribution of subspecies of the Eurasian lynx (*Lynx lynx*): LX: *lynx* (nominate form, northern Europe and western Siberia), CA: *carpathicus* (Carpathians), MA: *martinoi* (Balkan), DI: *dinniki* (Caucasus), IS: *isabellinus* (Central Asia), WA: *wardi* (Altai), KY: *kozlovi* (Sajan), WR: *wrangeli* (eastern Siberia), ST: *stroganovi* (Russian Far East). Brown dots: re-introduced populations in Europe (*carpathicus*). The area of *dinniki* shows the historic range; the present distribution is not known, but strongly reduced and scattered. The distribution of *isabellinus* is proximate. Recent genetic works suggest that there is a marked differentiation within the range of *lynx*. In Europe, the evolutionary history of the species is distorted by human-made fragmentation and bottlenecks.

Assuming that the lynx' ecology during the late Pleistocene was not completely different from the recent species (chapter 2.4), we can speculate that the recolonisation followed the expansion of forests and prey. Some regions

that we today intuitively regard as “good” lynx habitat were also so during the late Pleistocene, other areas however were not. The Alps, for instance, were entirely glaciated and no living space for lynx. This mountain range was likely recolonised from both opposite ends, and the now “homogenous” habitat complex is actually the suture of two isolated Late Pleistocene habitat patches, so called glacial refuges. In contrast, the Carpathians were a forest refuge during the last ice age (BURGA & PERRET 1998), and provided probably a better lynx habitat than the surrounding cold steppe plains. Parallel to the “natural” recolonisation, large scale human activities such as deforestation have had an impact on the distribution of large mammals in Europe for at least 5000 years. Human-caused extinction or near-extinction, genetic bottlenecks and recolonisation – whether natural or artificial – have altered not only the distribution, but also the genetic set-up of what may have been the original arrangement of subspecies. As an example, HEMMER (1993) proposes that lynx recolonised Scandinavia in the Holocene from the south (Denmark) and from the north (Finland). The genetic pattern of the recent lynx populations (Fig. 2.6) does not support Hemmer’s hypothesis. This is however no proof that Hemmer was wrong; the reduction of the lynx area and the subsequent recovery (JONSSON 1983) may have camouflaged phylogenetic differences within Scandinavia.

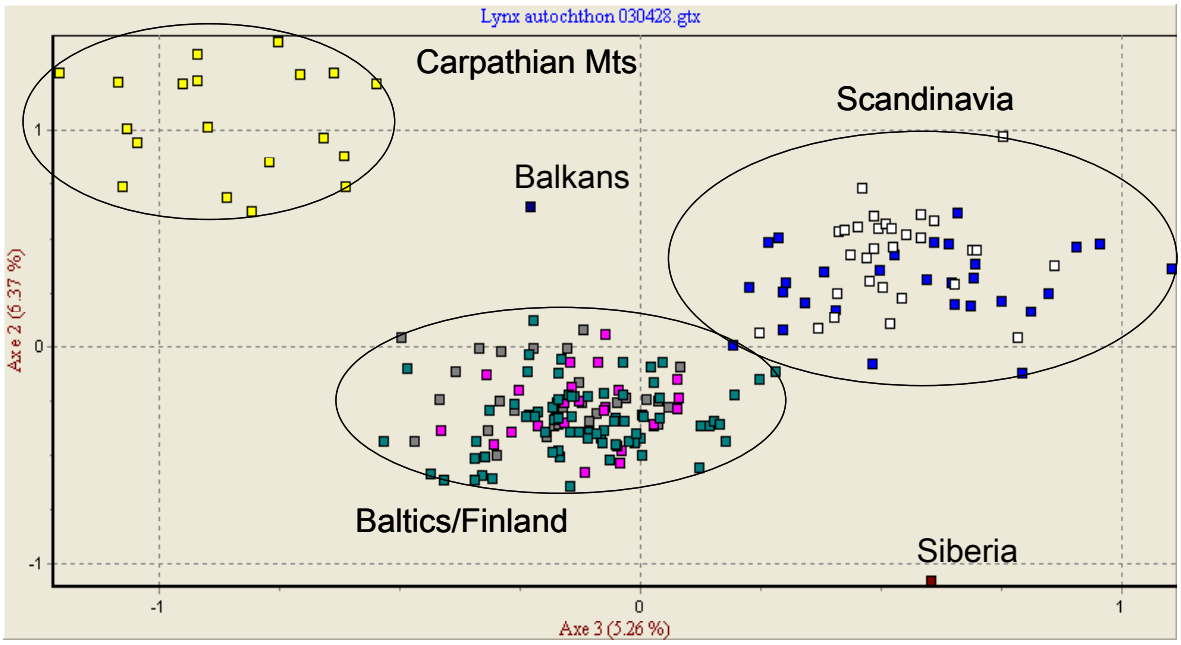

Fig. 2.6. Genetic differentiation of lynx in Europe (BREITENMOSER-WÜRSTEN & OBEXER-RUFF 2003). Preliminary genetic analyses confirm the subspecies status of the lynx from the Carpathians, depict a marked difference between the Scandinavian and the Finnish-Baltic populations, and indicate – with one specimen only – the special status of the Balkan population.

Considering all these aspects, we suggest to adopt the following subspecies of *Lynx lynx* in Europe for conservation purposes (Fig. 2.5): 1. Northern lynx (*L. l. lynx*), including the Fennoscandic, the Baltic and the Russian populations; 2. Carpathian lynx (*L. l. carpathicus*) in the Carpathian Mountains; and 3. Balkan lynx (*L. l. martinoi*), restricted to the south-western Balkan, mainly Albania and FYR Macedonia. Obviously, the extinct lynxes of the western Alps and the Pyrenees (referred to as *L. l. spelaeus*) were distinct. This form may have stretched from the Apennines (the place of origin) as far north-east as Scotland. HEMMER (2001) argued that the cave lynx was rather a species (*L. spelaeus*) than a subspecies, spreading from the Italian refuge after the last ice age and forming a distribution range between the Eurasian lynx (*L. lynx*) and the Iberian lynx (*L. pardinus*); but this hypothesis needs verification.

Lynx for the re-introductions in the Alps, the Vosges, the Dinaric, and the Bohemian-Bavarian Mountains were taken from the Carpathian population; other occurrences are of unknown origin or – as in the German Harz Mountains and the Kampinoski national park in Poland – a mixture of zoo animals of very diffuse origin (see chapter 2.3). From the preliminary genetic analysis (Fig. 2.6), the differentiation of the European lynx populations is obvious. As this differentiation is not only the result of human-made fragmentation of the area, but reflects the phylogenetic history and local adaptations, we recommend careful selection of animals or source populations for further re-introductions. Furthermore, crossbreeding of subspecies in European zoos should be avoided. Certain subspecies of lynx (e.g. the highly threatened Balkan lynx, *L. l. martinoi*, or the Caucasus lynx, *L. l. dinniki*) would be in need of a conservation-breeding programme. The present situation in European zoos, however, is marked by crossbreeding and inbreeding (chapter 2.3).

2.3. Eurasian lynx in captivity in Europe

Until recently, the European Association of Zoos and Aquariums (EAZA) kept no studbook for the Eurasian lynx. As an increasing number of lynx from zoos were released to the wild in re-introduction programs (Kampinoski in Poland, Harz in Germany), the necessity for a better management of the species and hence a studbook became evident. Another argument for a more sensitive breeding of lynx in European zoos is the fact that not all subspecies of *Lynx lynx* have the same conservation status. The EAZA decided to start a studbook for the Eurasian lynx in 2002. The status data, collected through the most recent EAZA Taxon Advisory Group Survey, were used as starting point for the studbook. Intensive investigations by the studbook keeper Lars Versteege allowed completing many of the missing data (VERSTEEGE 2003). Additionally, historical data were collected from the participating institutions. After a full year of research, the following data were available for 2002 (Table 2.1):

Tab. 2.1. Number of Eurasian lynx (*Lynx lynx*) in European zoos in 2002. The numbers in brackets represent males.females.sex unknown. Identification of the subspecies see Chapter 2.2 and Fig. 2.5.

Taxon	# Individuals 1.1.2002	# Individuals 31.12.2002	# Institutions
L. l. lynx	89 (38.47.4)*	89 (34.49.6)	31
L. l. kozlovi	3 (1.2)	2 (1.1)	3
L. l. wrangeli	50 (19.31)	50 (19.31)	20
L. l. carpathicus	30 (16.14)	31 (16.15)	13
L. l. wardi	3 (1.2)	3 (1.2)	1
L. lynx ssp.	112 (56.56)	116 (60.56)	49
Hybrid	27 (14.13)	27 (15.12)	12
Total	310 (144.162.4)	318 (143.165.6)	129

The numbers in Table 2.1 represent only a part of lynx in captivity in Europe, as only EAZA member zoos were included. An unknown, but huge number of small animal parks and private facilities have lynx. In Switzerland, only 3 of 18 facilities known to keep lynx in the year 1998 were EAZA members (E. GAUTHIER, pers. comm.). After a lynx of unknown origin had been killed in the south-eastern Black Forest, THOR & PEGEL (1992) investigated on captive breeding facilities for lynx and found 8 only in the district of Freiburg (Baden-Württemberg, Germany). These two anecdotal remarks illustrate how large the breeding potential for Eurasian lynx in captivity is, and that the possibility of lynx to escape or to be intentionally released is considerable. All guidelines for the re-introduction of animals (e.g. IUCN 1987, 1998) reject clandestine releases, and the use of hybrids, and warn about the use of captive bred animals. In this respect, the scientifically lead and organised zoos have an apparent responsibility. After the first year of EAZA's data collection, a few things became very clear:

- not all today recognised subspecies are represented. Especially the rare and endangered ones are missing in European zoos;
- a fair number of animals have ancestry in different subspecies;
- a large proportion of animals is of unknown taxonomic origin;
- there is nowadays very little reproduction in the 129 institutions. In 2002, only eight kittens were born, four of them were hybrids.

The assignment of the animals to a subspecies was done by the zoos and is not always based on knowledge of the history of the animals. A screening of the captive population will be necessary to ensure its proper management in regard to the subspecies in the future. This would allow to set some priorities for breeding of Eurasian lynx in European zoos and to concentrate the breeding efforts on the vulnerable or endangered subspecies.

2.4. Biology and life history

Habitat: The lynx inhabits forested areas is most of its range. Only the Central Asian subspecies *L. l. isabellinus* lives in a treeless environment. In Europe, the lynx used to live in all types of forest from the Mediterranean hard-leaved forest to the northern boreal forest. Today, the lynx is restricted to the remaining large forest complexes of the continent. One important prerequisite for the recovery of the species was the expansion of forest in Europe during the 20th century.

Land tenure system: Lynx are solitary living animals, except for females and the young of the year. Both males and females occupy individual home ranges ("territories"), which they mark with gland secretions, urine and maybe faeces. The females choose their territories according to prey and habitat resources they need to rise the

kittens, the males set up their territories to grant access to females. The home ranges of the males are larger than those of females; they monopolise one or two, rarely more females. Consequently, home ranges of males overlap to a certain extent, whereas ranges of females overlap only slightly, and sometimes do hardly touch. In Scandinavia, some mothers were observed to have totally overlapping home ranges with their daughters. Home range sizes vary considerably depending on habitat type, composition of prey community, and availability of prey. Furthermore, reported home range size depends to a large extent with the method and duration of investigations. According to the literature, individual home range size ranges from 25-2000 km^2. Studies based on telemetry have brought precise estimates of home range size of lynx in Europe: 180-2780 km^2 for males and 98-759 km^2 for females. The highest values were found in the northern or mountainous regions of Scandinavia. There is little seasonal variation in the home range size of males, but females occupy very small home ranges while nursing kittens (late spring to summer). In Scandinavia, female lynx roamed over 33-100 km^2 during the first eight weeks following birth, and then extended their home ranges gradually until winter. Mean distances travelled by lynx per night ranged from 1-45 km. The highest movement activities are observed in males during the mating season. Females with kittens, on the other hand, usually travel over short distances. When a lynx has a fresh kill, it stays in its proximity for several days. The activity pattern is determined by sunrise and sunset. Lynx are mainly active at dusk and at night, and rest during daytime (Fig. 2.7), except for the rutting period when lynx are active also during daytime.

Fig. 2.7. Carpathian lynx resting on a rock in dense cover during daytime. (© U. Breitenmoser, KORA)

Feeding ecology: Prey of lynx ranges from mouse to moose. However, the main prey of lynx are small ungulates and hares. The genus *Lynx* is generally specialised in hunting lagomorphs, the Eurasian lynx, however, has evolved into a hunter of small ungulates in many parts of its range, most prominently in Europe. Only in north-eastern Europe, mountain hares are the main prey. From the ungulate guild, lynx select the smallest species: roe deer (Fig. 2.8), chamois, musk deer. In northern Scandinavia, semi-domestic reindeer are in some areas the most frequent prey. Larger ungulates such as red deer, moose, or wild boar will sporadically fall prey to lynx. In areas with low ungulate availability, lagomorphs, birds and rodents can be an essential prey part of lynx. Lynx diet varies seasonally; small prey and young ungulates are killed mostly in late spring and summer. Depredation on livestock (sheep, goats, poultry) occurs occasionally, but more frequently in Norway (see country report and chapter 2.5).

Fig. 2.8. Roe deer (*Capreolus capreolus*) is the lynx' main prey in Europe. The lynx kills with a bite to the throat and starts to eat at a hindquarter. (© U. Breitenmoser, KORA)

A lynx's consumption rate averages 1-2.5 kg of meat per day. Wherever lynx prey on large ungulates (red deer, wild boar), the youngest prey category is selected. In roe deer, however, which has the same body mass as the predator, all age and sex categories are preyed upon. The impact of lynx on prey populations has been widely and controversially disputed. Lynx do not eradicate their prey, but in marginal habitat or in specific situations, the predation impact can be considerably. There is increasing evidence on lynx-prey relationships from scientific studies, but it is still difficult to fit all the local and temporal studies into one general picture. At the edge of the roe deer's range in northern Europe, lynx were able to kill 30% of the roe deer population on a yearly basis. In Switzerland, re-introduced lynx were able to considerably reduce roe deer or chamois abundance in a certain situation. The system can be very dynamic. In the north-western Swiss Alps, lynx killed only 6-9% of the roe deer population in the mid-1980s; about ten years later, the predation impact in the same area was estimated to be 36-39%. In Poland up to 36% of roe deer and 13% of red deer were taken by lynx. The influence of lynx predation on a local ungulate community depends on the structure of the prey community, age and sex structure of the ungulate population, number and social structure of the lynx population, other causes of mortality and abiotic factors. It is today evident that lynx can show a considerable numerical and functional response to changes in prey abundance and availability, and that consequently, lynx predation is an important factor shaping the density, the distribution, and the behaviour of the main prey species.

Reproduction and mortality: Mating takes place from February to mid-April. Males follow the females to check their reproductive status. Lynx have induced ovulation. Oestrus lasts about three days, and a male accompanies the female all that time, and they copulate often. Birth takes place after 67-74 days, usually in late May. Litter size varies from 1-5, but most often, 2-3 kittens are born. A newborn lynx cub weighs about 300 g. Kittens follow their mother until the next mating season (Fig. 2.9). They leave the mother at an age of 10 months, when they have a weight of 9-14 kg. Females are sexually mature at the age of two years, whereas males usually mate for the first

time when they are three years old. Lynx can be sexually active for a relatively long time; in nature, females reproduced at least until 14 years and males until 16-17 years.

Fig. 2.9. Female lynx with young (just before separation) in the Swiss Jura Mts.
(© F. Zimmermann, KORA)

The lynx has no natural enemies. Sporadic cases of lynx killed by wolves, wolverines, and tigers have been reported. A large prey animal – e.g. a chamois with its sharp hooked horns – can also fatally injure a lynx during the hunt. Lynx can suffer from various parasites and diseases, such as rabies, sarcoptic mange or parvovirus. The natural mortality among juvenile lynx is high, at least half of them do not reach adult age. Currently, the main mortality factors are man-caused such as traffic accidents, poaching or over-hunting. In nature, lynx were reported to live up to 17 years, whereas in captivity, they can reach an age of 25 years. The medium age of resident animals in a population is however much lower, about 4-5 years.

Demography and population dynamics: Under natural conditions, lynx density depends on prey availability and is limited through social interactions among lynx. There is no evidence for the widespread belief that the number of lynx is inversely correlated with the number of wolves in the area. In the cultivated landscape, man is the ultimate limiting factor of lynx density. In Poland, lynx density (adults) ranged 1.9-3.2 indiv./100 km^2 (2.8-5.2 indiv./100 km^2 including kittens). In Switzerland, density of independent individuals ranged 0.94-2.10 indiv./100 km^2. In southern Norway, an area with a low roe deer abundance, a density of 0.25 indiv./100 km^2 has been found. In a newly occupied area in south-central Sweden, lynx density was estimated to be around 1 indiv./100 km^2. In Poland, sex ratio in the lynx population was 1:1. Adult males constituted 29% of all lynx, reproducing females 23%, kittens 35%, and subadults 12%. These numbers were found in field studies using radio-telemetry and other sophisticated methods such as camera trapping. When densities are calculated from the number of lynx estimated and the area occupied, densities can be considerable higher (see country reports). However, such high densities may rather be the consequence of an improper census method.

2.5. Lynx and humans

The lynx was and is less known and therefore even more mythical than other large carnivores, such as wolf and brown bear. The elusive cat had the reputation to be a ferocious and merciless killer, probably because of the typical silent and “unaffected” behaviour of the cats. Today, in most areas where several large carnivores coexist with humans, the lynx is seen as a minor problem compared to the other predators. Lynx are no danger for people. Contrary to brown bear or wolf, there are not even anecdotes about man-eating lynx, though in old hunting books, the lynx is said to be dangerous when wounded. The very few cases where lynx have injured humans were all accidents with wounded, captured, or rabid lynx (one incident reported from Slovenia). There is no reliable report of a spontaneous attack of a lynx; even females pushed away from their litters do not defend their cubs. They will, however, attack dogs approaching the kittens, even if people accompany the dog. The general change in human attitudes to nature in general and towards carnivores in particular has also rehabilitated the lynx. According to inquiries in western European countries, majorities of 70-80% have welcomed the return of the lynx. However, most of the modern city dwellers do not live in and from the nature, and have a more idealistic view of wild animals than the rural people. Traditional land users may still have a negative attitude towards lynx, which roots mainly in two conflicts: hunters blame the lynx for reducing game abundance and availability, and livestock breeders fear attacks on their herds.

All reviews of depredation by lynx concluded that livestock losses to lynx are relatively low compared with those to other large predators, and that in most European countries, the lynx is not regarded as a major problem to livestock husbandry (see KACZENSKY 1996, 1998, 1999). The exception is Norway, where the number of sheep killed by lynx has steadily increased over the past years and reached some 7'000-10'000 from 1996-2001 (see country report). The second most important loss was reported from France, where 214 sheep were killed in the Jura Mountains in 1999.

Depredation on sheep (Fig. 2.10) is a consequence of unattended pasturing in carnivore habitat. This form of sheep husbandry is typical for regions where large predators were absent or scarce for a long time. In the reintroduced lynx populations in the Swiss Alps or in the French Jura Mountains, depredation caused severe public conflicts, although the number of sheep killed by lynx were low compared to the total losses to other causes. The problem was more psychological: farmers had lost the tradition of coexistence with large predators and did not accept the lynx as part of the natural system. A problem specific to Norway, Sweden, and Finland is the predation of lynx on semi-domestic reindeer. In 2001, 127 reindeer were compensated as lynx kills in Finland; in Sweden there are yearly losses of around 20'000-40'000 reindeer. In Norway, depredation on reindeer is extensive as well, however, there are no detailed data available (see country reports). In Sweden, the state no longer compensates owners for the loss of semi-domestic reindeer to lynx. Instead, the local reindeer management association receives a payment for each confirmed presence of a family of lynx on its grazing area.

Fig. 2.10. Lynx on a killed sheep. In countries where the tradition to coexist with large carnivores was never lost, lynx depredation is not considered a problem. Where lynx have recently recovered, however, depredation often leads to controversies. (© Peter Zysset)

In all European countries were depredation by lynx occurs, compensation schemes have been implemented to mitigate the conflict with livestock breeders. This is a measure not only meant to support the acceptance of lynx, but also because there is today a general agreement that those who live with the large carnivore – protected by national laws and international treaties – should not need to suffer financial losses.

The more difficult problem both to assess and to handle is however the conflict with hunters. Although there is – not surprisingly – very little confirmed information available, most of the contacts who have contributed to this status report believe that illegal killings are the main cause of mortality (see country reports), and that illegal killings are related to the competition between the human hunter and the cat. CERVENY, KOUBEK & BUFKA (2002) have provided interesting data on this problem for the Bohemian population (see country report Czech Republic). To mitigate the conflict, it was suggested to allow for a limited harvest of a lynx population as soon as its status would allow for it. There is, so far, no evidence that legal hunting has stopped illegal killing. On the other hand, there is certain indication that, after lynx hunting was banned, illegal killings have increased, and the inquiry done by CERVENY, KOUBEK & BUFKA (2002) revealed that the strict legal protection could be a source of conflict itself. Wherever legally protected lynx and humans hunt for the same game animals, conflicts arise, and the shared use of resources calls for compromises.

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3. Material and methods

The **aims of the current survey** were:

- to update the status report for the years 1996-2001
- to show trends compared to former surveys
- to incorporate IUCN criteria and SIS authority files
- to compile the country surveys into population assessments

To achieve these goals, the following approach was chosen:

Contacts:

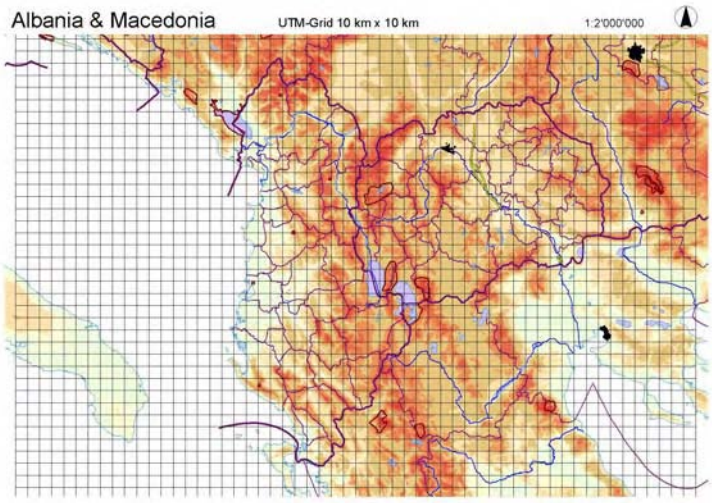
In each of the European countries west of Russia with recent occurrences of the Eurasian lynx (*Lynx lynx*), a wildlife expert assumed to have the relevant information for 1996-2001 was asked to participate in the inquiry. These were either individuals who have already taken part in the 1995 inquiry (BREITENMOSER *et al.* 2000), personal contacts or scientists known from their publications. After acceptance, the contacts were provided with a questionnaire and raster maps (see below). If necessary, the contacts themselves asked for the assistance of additional experts to get all information required. Russia has not been included in the survey, but information to complete the distribution map was taken from MATYUSHKIN & VAISFELD (2003).

Questionnaire:

The contacts filled in an extended questionnaire for each country. The questionnaire (a MS Word or RTF file) covered subjects like as status, distribution and development of the lynx population(s) within the country, legal situation, harvest and losses of lynx, depredation on livestock, major threats to the population(s), conservation measures, and a judgement of the population(s) (see Appendix). Threats, conservation measures, and criteria for the judgement were adopted from the IUCN Species Information Service SIS, and the IUCN Red list, respectively (see reference file countries). For all countries hosting parts of different populations, the contacts were requested to provide information wherever possible for each population rather than for the whole country. The definition of the populations were taken from the Eurasian Lynx Action Plan (BREITENMOSER *et al.* 2000, see also “Introduction”).

Raster maps:

We used raster maps to describe the distribution of lynx rather than contour maps because experience from the former inquiry had shown that raster maps produce better results: (1) raster maps are easier to standardise because the rules are very simple and straight forward; (2) raster maps give a more coherent picture for trans-border populations because the contacts must make a decision for each square covering the whole country; and (3) raster maps allow for a minimum differentiation within the area occupied. Raster maps can furthermore be transferred into habitat maps and potential distribution maps by means of a GIS habitat model. The disadvantage, however, is that the size of the grid cell produces a certain diffuseness at the border of the distribution area, and that it is time consuming for the contacts to fill in the map.

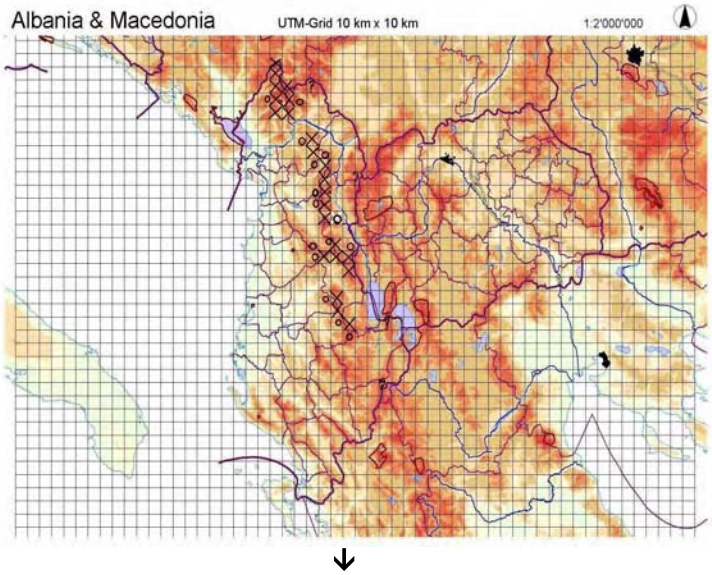


The contacts were provided with raster maps of 10x10 km, produced with a Geographical Information System (GIS; ArcView 3.3) with the following features:

- Projection: Transverse Mercator, Clarke 1866, with the respective Central Meridian.

- Digital background data: Bartholomew Euro Maps.

- Layers used: contour, coastline, international and major national boundaries, urban areas, motorways, lakes, large rivers, canals, and national parks (definitions & legend see Appendix).

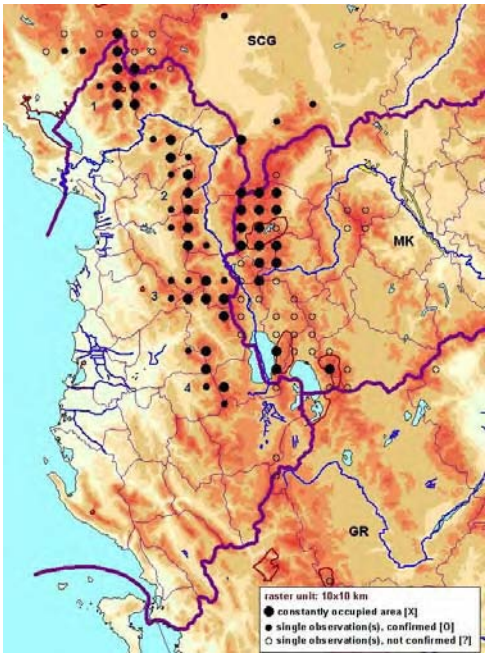


For each grid cell the contacts indicated presence of lynx according to the most recent information available. The following options were given:

[X] = <u>constantly occupied area</u>
(More than 50% of the cell are within the area constantly occupied by lynx, exclusive parts of the cell in a neighbouring country, a lake or a built-up area.)

[O] = <u>single observation, confirmed</u>
(One or more observations – direct observations, tracks, kill, dead lynx – have occurred in the most latest year. The observation is trustworthy.)

[?] = <u>single observation, not confirmed</u>
(doubtful or not confirmed information)



The data provided by the contacts were transferred into an ArcView project, allowing for further analysis on the population level (see reference file populations and population reports). Final maps (←)

Compilation and analysis of the information:

An MS Access database was established to compile all data and information from the questionnaires. Uncertainties were cross-checked with the respective contacts. We produced standardised country reports (see reference file countries), and assessed the status and distribution of the lynx within each country from the report, the scientific literature available, and considering the reports from neighbouring countries in the case of cross-border populations. Data and information of the country reports were then compiled and summarized into population reports (see reference file populations). To disclose trends, information from the former inquiry (covering the years 1990-1995; BREITENMOSER *et al.* 2000) was included. For the population assessment, we considered additional information from the literature, consistencies and discrepancies, respectively, between countries, a judgement of the risk of extinction according to IUCN criteria, and finally recommended conservation or management measures. These recommendations are a mixture of the combined judgement of the contacts for each country sharing the population and the personal assessment of the editors of the whole report.

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MATYUSHKIN, YE.N. & VAISFELD, M.A. (Eds.) 2003: The Lynx – Regional Features of Ecology, Use and Protection. Moscow Nauka 2003: 527 pp.

3.1. Reference file countries

All data and information presented in the country reports were provided by the respective contacts, which sign as authors for the respective chapters. Explanations, remarks or additional information by the editors are indicated. The calculations and supplements for each country were made in a very standardised way (see below). Whenever possible and functional, data is given per population. Therefore, the length of the reports varies with the number of lynx populations/occurrences within the country. The assessment at the end of each report was compiled by the editors, but approved by the country contacts. It is the result of a review of the data quality and quantity and of a comparison (consistency or discrepancy of information), and incorporates additional information found in scientific publications and "grey" literature. The following descriptions are numbered in accordance with the subjects in the country reports.

Basic information on the country (area, forest coverage and human population) is taken from the FAO (Food and Agriculture Organization of the United Nations) statistical databases (http://apps.fao.org/default.htm). The country abbreviations were taken from the ISO two letter code (except Serbia and Montenegro whose political status has changed during the time of the survey).

1. Lynx distribution within the country:

Map: Background data and legend see "Material and methods" and Appendix, respectively. The sector presented always includes part of the neighbouring countries, especially in the case of cross-border population distribution areas. The scale of the maps varies according to the country size; the raster unit however is always the same (10x10 km). Where countries do not share the same UTM zone, the distribution along border areas might seem distorted.
The lynx distribution map for western Russia was produced according to MATYUSHKIN & VAISFELD (2003) and reflect lynx densities (>0.5 lynx/100 km² = [X], <0.5 lynx/100 km² = [O]). For practical reasons, a raster of 20x20 km is used to indicate the distribution in Russia.

2. Lynx population(s):

Lynx distribution (area) = number of raster units per distribution category (one raster = 100 km²). The categories are: [X] = constantly occupied area, [O] = single observation(s), confirmed, and [?] = single observation(s), not confirmed (see also map).

The share of the distribution area is the relative portion of the lynx distribution area (percent [X] & [X+O]) compared to the total size of the respective country.

For the calculation of the population density, the average population estimation for 1996-2001 and the constantly occupied distribution area [X] have been considered. The area of occasional lynx presence [O] has not been included as these are most probably dispersing or transient animals not contributing to the reproduction of the population (LINNELL *et al*. 1998).

3. Population size:

Contains exclusively information provided by the contacts. If alternative or divergent estimations for the same period were published, it was mentioned in the assessment.

4. Legal situation, harvest and losses of lynx:

The significance of the three international treaties relevant for the lynx in Europe (Table 4.1) for the individual countries was cross-checked with information provided by the respective treaty power:

- EU Habitat Directive (http://europa.eu.int/comm/environment/nature/);
- Bern Convention (Council of Europe) (http://www.nature.coe.int/english/cadres/bern.htm); and
- CITES (http://www.cites.org).

The yearly relative loss of the population (Table 4.3) has been calculated from the population estimation and the known losses for the respective year. If there were no annual population estimates available, the nearest number, as indicated by a footnote, was taken for the calculation.

In contrast to the population density where only the constantly occupied area has been considered (see point 2), the occasionally occupied area has been included to calculate the known mortality (yearly average) per distribution unit (100 km²), as dispersing or transient animals, which make up the [O]-part of the distribution area (LINNELL *et al*. 1998), are particularly vulnerable (see Species Information: Biology and life history).

5. Depredation:

Contains exclusively information provided by the contacts.

6. Major threats to the lynx population(s) in the country:

To ensure compatibility, the list of potential threats to the lynx populations has been derived from the IUCN/SSC Species Information Service (SIS: http://www.iucn.org/themes/ssc/programs/sisindex.htm). Only threats supposed to be relevant for the Eurasian lynx have been retained for the questionnaire (for the whole list of threats offered by the SIS see: http://iucn.org/webfiles/doc/SSC/RedList/AuthorityF/threats.rtf):

Threat Category	**Threat**	*SIS no.*
Habitat loss / degradation (human induced):	Agriculture	*1.1.*
	Extraction of wood	*1.3.3.*
	Infrastructure development: Industry	*1.4.1.*
	Infrastructure development: Human settlement	*1.4.2.*
	Infrastructure development: Tourism / recreation	*1.4.3.*
	Infrastructure development: Road building	*1.4.4.*
Harvest:	Legal hunting & trapping	*3.*
Persecution:	Shooting	*4.1.2.2.*
	Trapping / snaring	*4.1.2.1.*
	Poisoning	*4.1.2.3.*
Traffic:	Vehicle and train collision	*4.2.2.*
Natural disasters:	Storms / flooding	*7.2.*
	Wildfire	*7.4.*
	Avalanches / landslides	*7.6.*
Changes in native species dynamics:	Competitors	*8.1.*
	Prey / food base	*8.3.*
	Pathogens / parasites	*8.5.*
Intrinsic factors:	Limited dispersal	*9.1.*
	Poor recruitment / reproduction / regeneration	*9.2.*
	High juvenile mortality	*9.3.*
	Inbreeding	*9.4.*
	Low densities	*9.5.*
	Skewed sex ratios	*9.6.*
	Slow growth rates	*9.7.*
	Population fluctuations	*9.8.*
	Restricted range	*9.9.*
Human disturbance:	Recreation / tourism	*10.1.*
	Research	*10.2.*
	War / civil unrest	*10.3.*
	Transport	*10.4.*
Other:	(specify)	*11*

7. Conservation measures

The procedure for the conservation measures was the same as for the threats (point 6). A selection of applicable measures was gathered out of the SIS list (http://iucn.org/webfiles/doc/SSC/RedList/AuthorityF/consactions.rtf):

Measure category	**Measure**	*SIS no.*
Policy-based actions:	Management plans	*1.1.*
	Legislation on an international level	*1.2.1.1./1.2.2.1.*
	Legislation on a national level	*1.2.1.2./1.2.2.2.*
	Legislation on a regional level	*1.2.1.3./1.2.2.3.*
	Public involvement	*1.3.*
Communication and Education:	Formal education	*2.1.*
	Awareness	*2.2.*
	Capacity-building / Training	*2.3.*
Research actions:	Taxonomy	*3.1.*
	Population numbers and range	*3.2.*
	Biology and Ecology	*3.3.*
	Habitat status	*3.4.*
	Threats	*3.5.*
	Uses and harvest levels	*3.6.*
	Conservation measures	*3.8.*
	Monitoring / Trends	*3.9.*
	Genetic status	*not in SIS*
	Human attitude / Human dimensions	*not in SIS*
Habitat and site-based actions:	Maintenance / Conservation	*4.1.*
	Restoration	*4.2.*
	Corridors	*4.3.*
	Identification of new protected areas	*4.4.1.*
	Establishment of protected areas	*4.4.2.*
	Management of protected areas	*4.4.3.*
	Expansion of protected areas	*4.4.4.*
	Community-based initiatives	*4.4.5.*
Species-based actions:	Re-introductions	*5.1.*
	Sustainable use / Harvest management	*5.3.*
	Recovery management	*5.4.*
	Disease, pathogen, parasite management	*5.5.*
	Limiting population growth	*5.6.*
	Captive breeding / Artificial propagation	*5.7.1.*
	Genome resource bank	*5.7.2.*
Other:	(specify)	*6*

The columns “in place” and “needed” as provided by the SIS were refined to “lacking/proposed”, “drafted/ratified”, and “implemented/applied”.

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

The contacts were requested to judge the population(s) in their country according to the IUCN Red List Criteria (http://www.redlist.org/info/categories_criteria.html). A reduced choice of criteria was offered (extinct, endangered, vulnerable, least concern, and data deficient). Often, the judgements turned out to be more a subjective point of view.

The most urgent actions needed are recommendations of the contacts.

9. Projects:

Contains exclusively information provided by the contacts.

10. Contact:

Name, post and e-mail address of the main contact(s) and their collaborator(s).

Country assessment:

The assessments were complied by the editors from information provided by the country contacts and considering additional information from neighbouring countries or the literature. Further information see introductory remarks.

References:

List of scientific publications and “grey” literature (also found in the internet) used for the assessment.

References for this file:

Bern Convention (Council of Europe): http://www.nature.coe.int/english/cadres/bern.htm

CITES: http://www.cites.org

EU Habitat Directive: http://europa.eu.int/comm/environment/nature/

FAO (Food and Agriculture Organization of the United Nations) statistical databases: http://apps.fao.org/default.htm

IUCN Red list: http://www.redlist.org/info/categories_criteria.html

IUCN SIS general: http://www.iucn.org/themes/ssc/programs/sisindex.htm

IUCN SIS Authority files: http://iucn.org/webfiles/doc/SSC/RedList/AuthorityF/threats.rtf (threats) and http://iucn.org/webfiles/doc/SSC/RedList/AuthorityF/consactions.rtf (conservation measures)

LINNELL, J.D.C., SWENSON, J.E., LANDA, A., KVAM, T. 1998: Methods for monitoring European large carnivores - A worldwide review of relevant experience. NINA Oppdragsmelding, 549: 1-38.

MATYUSHKIN, YE.N. & VAISFELD, M.A. (Eds.) 2003: The Lynx – Regional Features of Ecology, Use and Protection. Moscow Nauka 2003: 527 pp.

3.2. Reference file populations

The population reports are compiled from data in the country reports (1996-2001, provided by the respective contacts), from the scientific literature and from information from the former inquiry (1990-1995, published as "Action plan for the conservation of the Eurasian lynx in Europe", BREITENMOSER *et al.* 2000). The definition of the populations are explained in the chapter "Introduction". The assessments at the end of the reports reflect the editors' point of view. They incorporate further information from scientific publications and the "grey" literature, comments regarding the consistency of knowledge between countries sharing the population, a judgement of the population, and conservation/management recommendations. The following descriptions are numbered in accordance with the subjects in the population reports.

1. Description:

Map: Background data and legend see "Material and methods" and Appendix, respectively. The sector presented usually includes part of neighbouring populations. The scale of the maps varies according to the expansion of the population; the raster unit is always the same (10x10 km). Where countries sharing a population do not have the same UTM zone, the distribution along border areas might seem distorted.

For the Nordic and the Baltic population, the distribution of the species in Russia is important. As Russia was not included in the inquiry, the respective distribution map was produced according to MATYUSHKIN & VAISFELD (2003). The map reflects lynx densities (>0.5 lynx/100 km² = [X], <0.5 lynx/100 km² = [O]). For practical reasons, a raster of 20x20 km is used to indicate the distribution in Russia.

The spatial trend is derived from information in the country reports and from comparisons with the previous report (BREITENMOSER *et al*. 2000).

2. Status and trend:

2.1. Extension: Lynx distribution area = number of raster units per distribution category (one raster = 100 km²). The categories are: [X] = constantly occupied area, [O] = single observation(s), confirmed, and [?] = single observation(s), not confirmed (see also map).

To assess the fragmentation of the populations (2.2), raster with no confirmed lynx presence [?] and isolated raster with confirmed single observation(s) [O], were removed. The remaining areas were merged and dissolved, using the "GeoProcessing Wizard" tool in Arc View and the extension "Dissolve Adjacent Polygons" (> smallest adjacent polygon > share common point vertex), respectively. We then calculated the number of remaining patches, mean patch size and range (minimum to maximum), and mean nearest distance between patches (= mean of the smallest distances of each patch to all other patches).

Population size (Table 2.3), management (2.4), harvest & losses (2.5), and depredation (2.6.) summarise information from the country reports (1996-2001) and the Eurasian Lynx Action Plan 2000 (1990-1995, BREITENMOSER *et al.* 2000). For the calculation of the lynx density (Table 2.3) see reference file countries.

3. Threats:

The table of threats corresponds to the one provided in the country reports. To ensure compatibility, the list of potential threats to the lynx populations has been derived from the IUCN/SSC Species Information Service (SIS: http://www.iucn.org/themes/ssc/programs/sisindex.htm). Only threats potentially relevant to the Eurasian lynx have been selected (the whole list of threats offered by SIS see: http://iucn.org/webfiles/doc/SSC/RedList/AuthorityF/threats.rtf):

Threat Category	**Threat**	*SIS no.*
Habitat loss / degradation (human induced):	Agriculture	*1.1.*
	Extraction of wood	*1.3.3.*
	Infrastructure development: Industry	*1.4.1.*
	Infrastructure development: Human settlement	*1.4.2.*
	Infrastructure development: Tourism / recreation	*1.4.3.*
	Infrastructure development: Road building	*1.4.4.*
Harvest:	Legal hunting & trapping	*3.*
Persecution:	Shooting	*4.1.2.2.*
	Trapping / snaring	*4.1.2.1.*
	Poisoning	*4.1.2.3.*
Traffic:	Vehicle and train collision	*4.2.2.*
Natural disasters:	Storms / flooding	*7.2.*
	Wildfire	*7.4.*
	Avalanches / landslides	*7.6.*
Changes in native species dynamics:	Competitors	*8.1.*
	Prey / food base	*8.3.*
	Pathogens / parasites	*8.5.*
Intrinsic factors:	Limited dispersal	*9.1.*
	Poor recruitment / reproduction / regeneration	*9.2.*
	High juvenile mortality	*9.3.*
	Inbreeding	*9.4.*
	Low densities	*9.5.*
	Skewed sex ratios	*9.6.*
	Slow growth rates	*9.7.*
	Population fluctuations	*9.8.*
	Restricted range	*9.9.*
Human disturbance:	Recreation / tourism	*10.1.*
	Research	*10.2.*
	War / civil unrest	*10.3.*
	Transport	*10.4.*
Other:	(specify)	*11*

The information per country was adopted to the population level. To evaluate if the single threats are relevant for the population, a “XX” was set when the contacts of the countries sharing the main range of the population ticked off the respective threat. An “X” indicates that only part of the population (e.g. one country having a high percentage or several countries with small percentages of the population range) is affected by this threat. As this is a relatively obstinate way to determine threats to a population, the threats were again discussed in the assessment.

4. Population assessment:

The population assessments were compiled by the editors (see introductory remarks). The judgement of the populations base on the “Guidelines for Application of IUCN Red List Criteria at Regional Levels” (IUCN 2003).

5. References:

Scientific publications and “grey” literature (also reports found in the internet) used for the assessment.

6. Contacts:

Name, post and e-mail address of the main contact(s) and their collaborator(s) in the countries.

References for this file:

IUCN 2003: Guidelines for Application of IUCN Red List Criteria at Regional Levels. Version 3.0. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK: 1-27. (http://www.iucn.org/themes/ssc/redlists/regionalguidelines.htm)

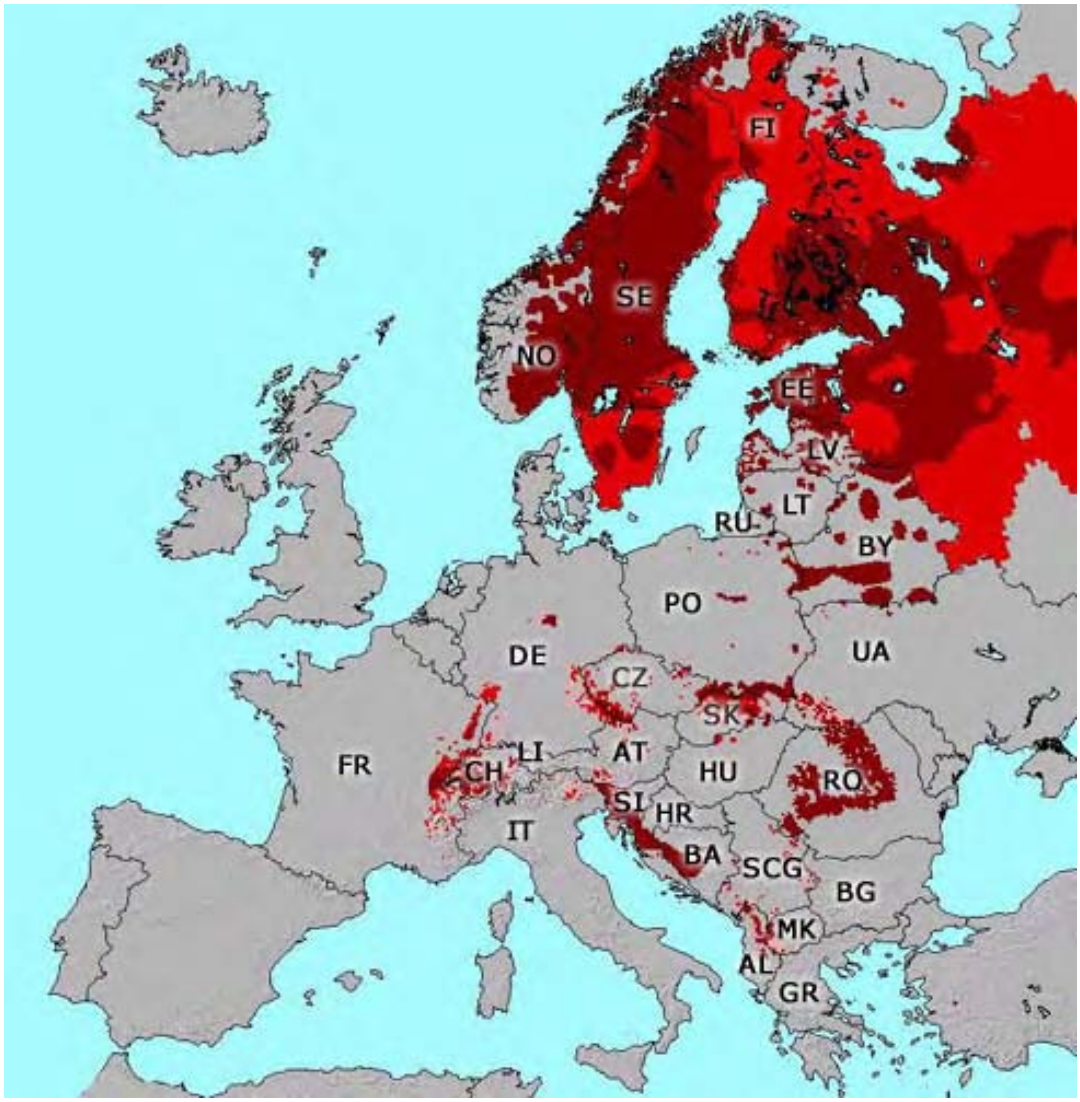
IUCN SIS general: http://www.iucn.org/themes/ssc/programs/sisindex.htm

IUCN SIS Authority files: http://iucn.org/webfiles/doc/SSC/RedList/AuthorityF/threats.rtf (threats)

BREITENMOSER, U., BREITENMOSER-WÜRSTEN, CH., OKARMA, H., KAPHEGYI, T., KAPHEGYI-WALLMANN, U., & MÜLLER, U. M. 2000: Action Plan for the Conservation of the Eurasian Lynx (*Lynx lynx*) in Europe. Nature and environment No. 112, Council of Europe Publishing, Strasbourg: 1-70.

MATYUSHKIN, YE.N. & VAISFELD, M.A. (Eds.) 2003: The Lynx – Regional Features of Ecology, Use and Protection. Moscow Nauka 2003: 527 pp.

4. Countries


FI
SE
NO
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LV
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RU
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CH
FR
HU
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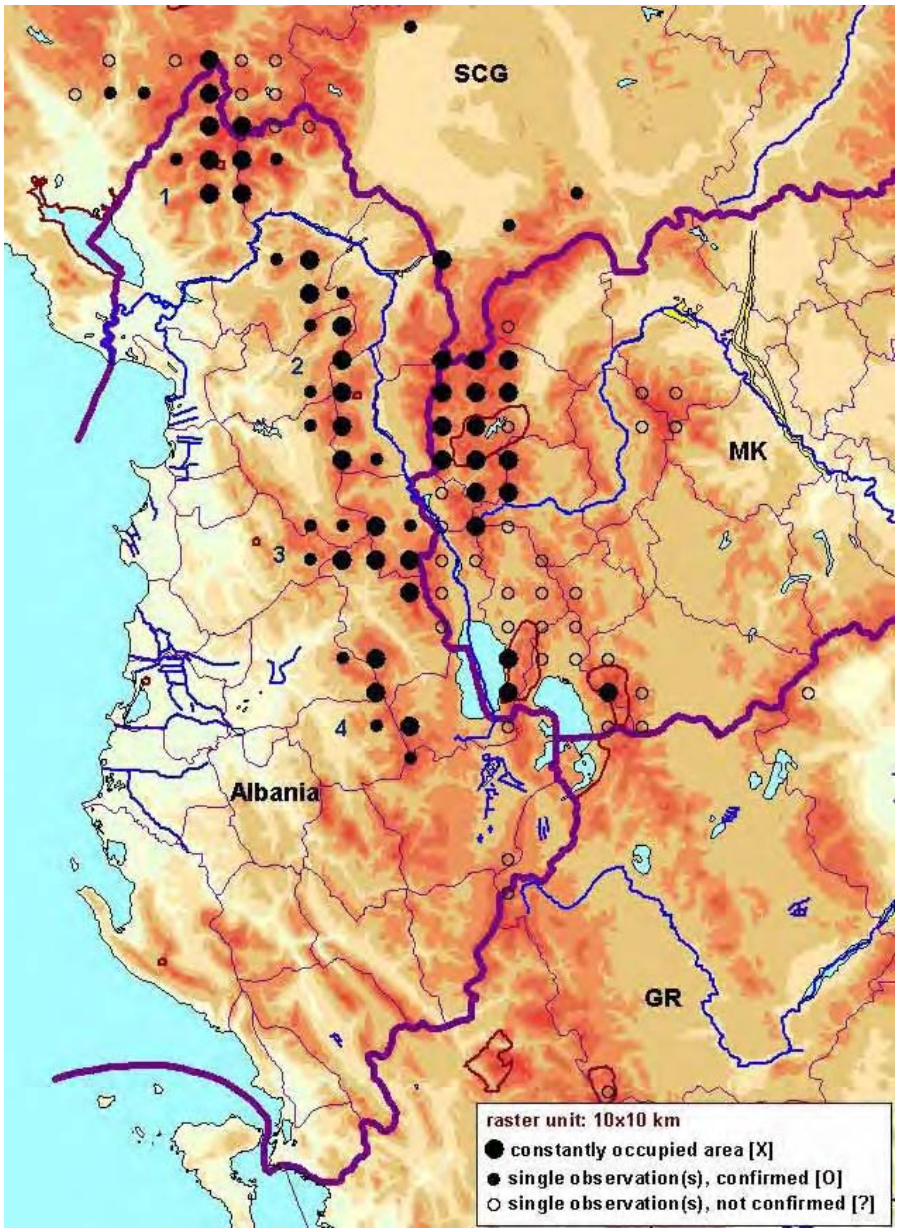
SI
HR
IT
BA
SCG
BG
MK
AL
GR

Albania (AL)

Ferdinand BEGO & Haki ZOTO

Area: 28'748 km²
Forests & Woodland: 36.2 % (2000)
Human population: 3'510'484 (2001)
Population density: 122.1 / km²

1. Lynx distribution in Albania in 2001:



Geographic range of the population(s)

Balkan population: 1. Albanian Alps (Vermosh, Bjeshket e Namuna, Theth, Shale), 2. Central North & Central (Iballe, Munelle, Tuç, Lure-Balgjaj-Allamani), 3. Central East (Martanesh, Çermenike, Golloborde, Shebenik-Jabllanice), 4. Central South (Shpati, Polis, Guri Zi, Valamare).

Methods: sightings & signs, snow tracking, inquiry, lynx mortality

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Balkan	15-25	2'300	1'500	500	3'800	8 /13.2	0.65-1.09
Total	*15-25*	*2'300*	*1'500*	*500*	*3'800*	*8 / 13.2*	*0.65-1.09*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Balkan	2000	**15-25**		Data collected by the Museum of Natural Sciences, Tirana University do not allow for annual estimation, but give an idea about the distribution range and a rough estimation.	**unknown**
Ø 1996-2001		**15-25**			

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Balkan	Data collected by the inventory work organised by the DFSs of the GDFP.	-
Institution	District Forest Services (DFSs) of the General Directorate of Forest and Pastures (GDFP)	-

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

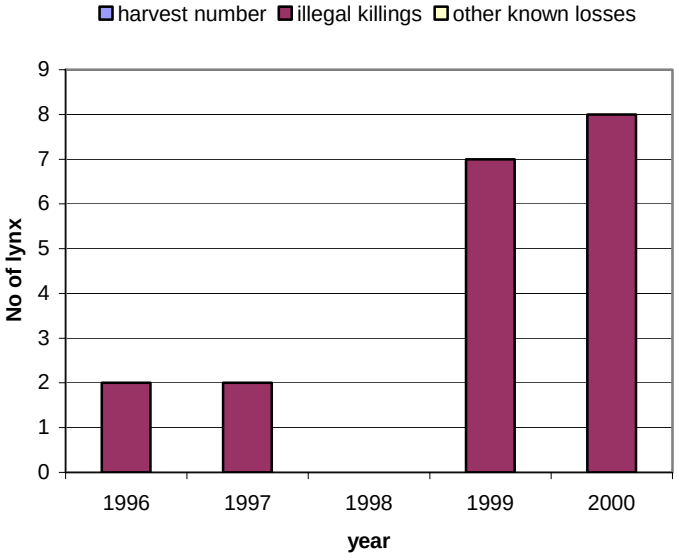
EU Habitat Directive	Bern Convention	CITES
-	ratified 1999	-

4.2. Legal status

Lynx has been fully protected by law since 1994.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Balkan	1996	-	0	0	2	0	0	0	0	0	*2*	*~10*
	1997	-	0	0	2	0	0	0	0	0	*2*	*~10*
	1998	-	0	0	0	0	0	0	0	0	*0*	*0*
	1999	-	0	0	7	0	0	0	0	0	*7*	*~35*
	2000	-	0	0	8	0	0	0	0	0	*8*	*~40*
	2001	-	no data available								*n.a.*	*n.a.*
Total 1996-2000		*-*	*0*	*0*	*19*	*0*	*0*	*0*	*0*	*0*	*19*	*-*
Yearly Ø		*-*	*0*	*0*	*3.8*	*0*	*0*	*0*	*0*	*0*	*3.8*	*~19*
Known mortality / 100 km² [X+O]		*-*	*0*	*0*	*0.1*	*0*	*0*	*0*	*0*	*0*	*0.1*	*-*



Number of known losses to the Balkan lynx population in Albania from 1996-2000 (for 2001 no data available).

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	**Regional level**	
Balkan	General Directorate of Forest and Pastures (GDFP)	District Forest Services (DFSs)	(Some efforts were made but a lynx conservation action plan is not yet prepared.)

5. Depredation:

→ No known depredation losses due to lynx in Albania from 1996-2001. There are no compensation systems applied in the country. Flocks are guarded by sheep guarding dogs.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Balkan	Agriculture Extraction of wood Infrastructure development: Industry Infrastructure development: Human settlement Legal hunting & trapping Shooting Trapping / snaring Poisoning Pathogens / parasites Limited dispersal	Agriculture Extraction of wood Shooting Trapping / snaring Competitors Prey / food base Limited dispersal Poor recruitment / reproduction / regeneration High juvenile mortality Low densities Skewed sex ratios (?) Slow growth rates Restricted range	Agriculture Extraction of wood Infrastructure development: Tourism / recreation Infrastructure development: Road building Shooting Trapping / snaring Competitors Prey / food base Limited dispersal Poor recruitment / reproduction / regeneration High juvenile mortality Low densities Skewed sex ratios (?) Slow growth rates Restricted range Recreation / tourism Transport

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Legislation on a national level			X
Legislation on a regional level			X
Public involvement	X		
Formal education	X		
Awareness	X		
Capacity-building / Training	X		
Taxonomy			X
Population numbers and range		X	
Biology and Ecology	X	X	
Habitat status			X
Threats			X
Conservation measures	X		
Monitoring / Trends	X		
Genetic status	X		
Human attitude / Human dimensions	X		
Maintenance / Conservation	X		
Restoration	X		
Corridors	X		
Identification of new protected areas		X	

Conservation measure (cont.)	Lacking / proposed	Drafted / ratified	Implemented / applied
Establishment of protected areas	X	X	X
Management of protected areas	X	X	
Expansion of protected areas	X	X	
Community-based initiatives	X		
Re-introductions	X		
Sustainable use / Harvest management	X		
Recovery management	X		
Disease, pathogen, parasite management	X		
Limiting population growth	X		
Captive breeding / Artificial propagation	X		
Genome resource bank	X		

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Balkan	endangered	• Law enforcement • Species recovery action plan • Monitoring and professional training • Awareness raising

9. Projects:

→ No current projects.

10. Contact:

Population	Name	Address
Balkan	Ferdinand BEGO	Tirana University, Museum of Natural Sciences, Rruga e Kavajes no. 132, Tirana, AL e-mail: ferdibego@albaniaonline.net
Collaborator:	Haki ZOTO	General Directorate of Forest and Pastures, Tirana, AL

Country assessment:

Albania hosts at present the largest distribution area of the critically endangered Balkan lynx population. The lynx in Albania is currently distributed over four small nuclei in the north and east of the country. The two southernmost are actually supposed to be the more important ones - although they are smaller - due to the relatively large areas of still well preserved high mountain forests (BEGO 2001). The network of protected areas as proposed by the Biodiversity Strategy and Action Plan 1999 (and approved by the Council of Ministers in 2000, F. BEGO, pers. comm.) intends to cover much of the current lynx range (mainly in the form of national parks and landscape

protected areas). A few protected areas are planned along the border to FYR Macedonia, where the main Macedonian lynx range lies, too. However, most of the proposed areas are small, and some areas within regions of lynx occurrence will not be protected. The connection between the four distribution nuclei including the one in FYR Macedonia should have highest priority, as it actually seems that the already small Balkan population is furthermore fragmented (see population report). Therefore, a habitat suitability study should be carried out. The Drin valley, densely populated and dammed up over long stretches, is a potential barrier separating the northern Albanian and the Macedonian occurrence from the central and southern Albanian nuclei. Possible corridors need to be identified and secured.

It is only since 1990 that Albania has started to participate in international environmental organisations and signed international conventions (MAZREKU 2002). Since 1994, lynx is fully protected by the "Law on Hunting and Wildlife Protection" (BEGO, PEJA & PLLAHA 2002). Nevertheless, law enforcement is insufficient: Between 1996 and 2000, at least 19 lynx have been illegally killed (Table 4.3)! Regarding the estimated population size and its conservation status, this number is tremendous (yearly 10-40% of the Albanian population), and activities to prevent further killing of lynx should immediately be taken. The lynx' prey (roe deer, chamois) are neither allowed to be hunted due to their own low numbers, but suffer from illegal killings as well (BEGO, PEJA & PLLAHA 2002). Prey impoverishment strongly affects lynx.

Illegal killing, insufficient prey base and probably habitat degradation and increasing fragmentation (currently, several main roads and highways are under construction: BEGO, PEJA & PLLAHA 2002; homepage of the Office for South East Europe: www.seerecon.org/infrastructure/projects/index.html) are the main threats for the lynx in Albania. The identification of additional threats listed in Table 6 might be guesses because research is more or less missing. Therefore, we do not consider questions like habitat status, threats and taxonomy (Table 7) as finally being answered yet.

Albania has a relatively high human population density (around 122/km²), given the fact that a high percentage of people is living in rural areas (53.5% in 1998, although decreasing since 1991), especially in the mountains (BEGO, PEJA & PLLAHA 2002). For the conservation of the lynx (and other large carnivores), measures based on and involving the local community are therefore very important and should be improved to reduce conflicts.

In the Biodiversity Strategy and Action Plan of Albania from 1999 lynx was declared as one of the priority mammal species, for which a Species Action Plan is required to be prepared within two years and then immediately implemented. This has, however, not happened yet to our knowledge. For the conservation of the Balkan population it would be important not to have national strategies only (which is an important first step), but also to promote international co-operation and a cross-border conservation strategy. The strong decline in Albania, that has been noticed since 1970 (BEGO 2001) has to be halted and reversed, as the occurrences in this country are very important for the survival of the whole population.

References:

BEGO, F. 2001: Existing knowledge on the status and distribution of the lynx in Albania. The Balkan Lynx Population - History, Recent Knowledge on its Status and Conservation Needs. Ed. by Ch. Breitenmoser-Würsten and U. Breitenmoser, KORA Bericht No. 7: 18.

BEGO, F., PEJA, N. & PLLAHA, S. 2002: Large Carnivores in Albania (Bear, Lynx and Wolf). In: Arcturos 2002: Protected Areas of the Southern Balkans – Legislation, Large Carnivores, Transborder Areas. Hellenic Ministry of the Environment, Physical Planning, and Public Works: 73-81.

BREITENMOSER, U. , BREITENMOSER-WÜRSTEN, CH., OKARMA, H., KAPHEGYI T., KAPHEGYI-WALLMANN, U. & MÜLLER, U. 2000: Action Plan for the Conservation of the Eurasian lynx in Europe (*Lynx lynx*). Nature and environment No. 112, Council of Europe Publishing: 1-70.

MAZREKU, E. 2002: Legal issues concerning the implementation of conventions and EU Directives in the field of biodiversity protection in Albania. In: Arcturos 2002: Protected Areas of the Southern Balkans – Legislation, Large Carnivores, Transborder Areas. Hellenic Ministry of the Environment, Physical Planning, and Public Works: 11-18.

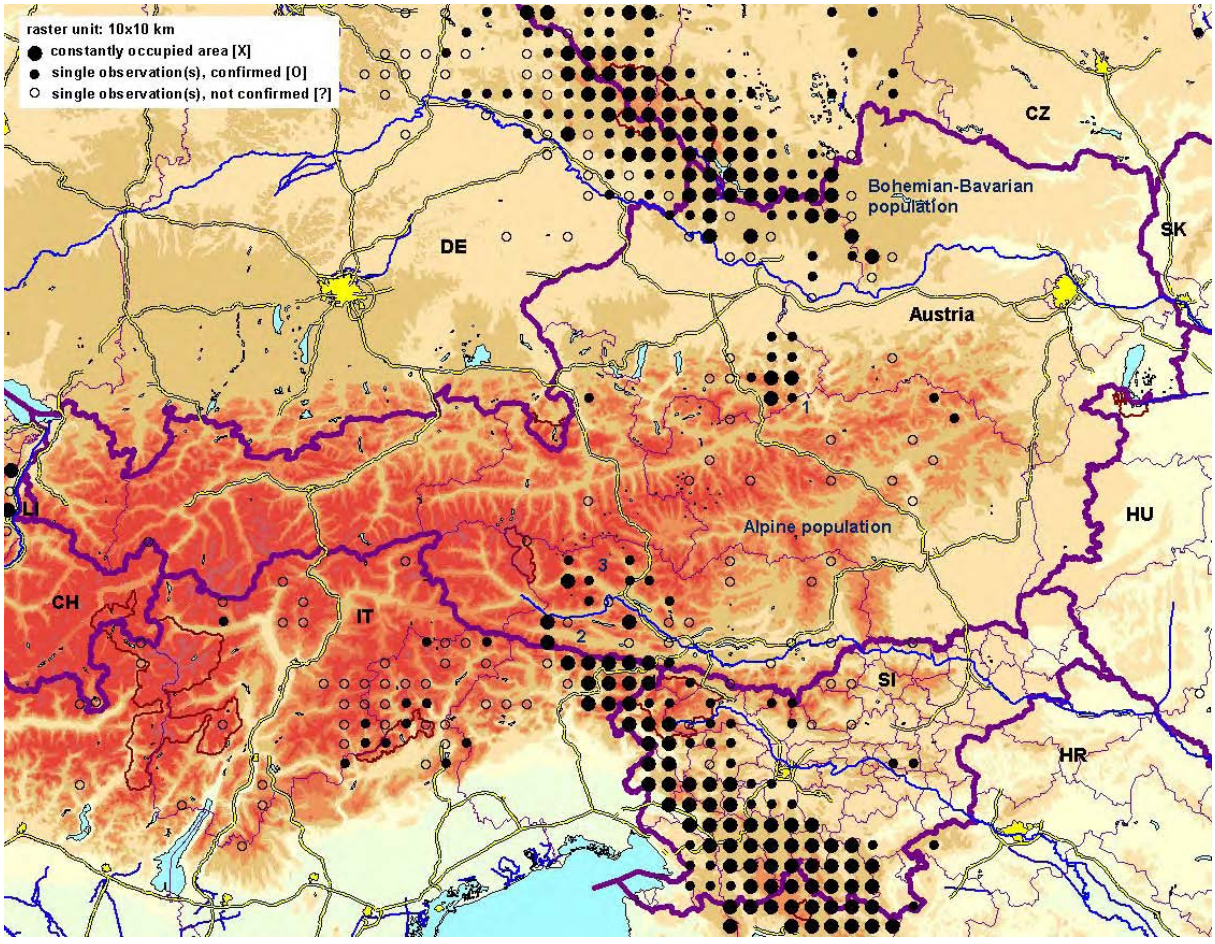
Office for South East Europe, European Commission, The World Bank: http://www.seerecon.org/infrastructure/projects/index.html

Austria (AT)

Jens LAASS, Thomas ENGLEDER, Thomas HUBER, Christian FUXJÄGER & Martin FORSTNER

Area: 83'858 km²
Forests & Woodland: 47.0 % (2000)
Human population: 8'150'835 (2001)
Population density: 97.2 / km²

1. Lynx distribution in Austria in 2001:



Geographic range of the population(s)

Alpine population: Northern Kalkalpen (1), Upper Carinthia (2), Niedere Tauern (3). In Carinthia in contact with the lynx population of north-eastern Italy and Slovenia.

Bohemian-Bavarian population: Böhmerwald, Mühlviertel, Waldviertel.

Methods: sightings and signs, snow tracking, inquiry. (Monitoring system is not completely established, data from the states of Niederösterreich, Salzburg and Tyrol are missing. For parts of the other states, data are very weak as the monitoring depends on unsolicited reports collected by local hunters' associations.)

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Alpine	17	700	1'600	3'300	2'300	0.8 /2.7	- [a]
Boh.-Bav.	6	1'700	600	1'200	2'300	2 /2.7	0.35
Total	*23*	*2'400*	*2'200*	*4'500*	*4'600*	*2.9 /5.5*	-

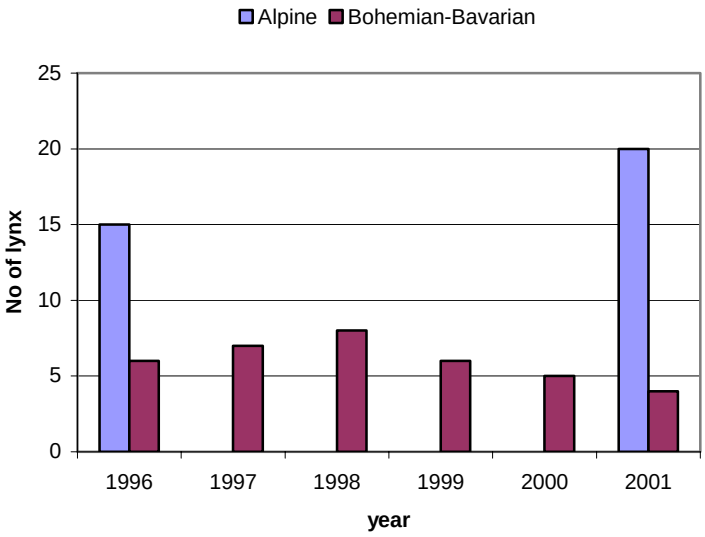
[a] quantity and quality of the data are not sufficient to allow for density estimations

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Alpine	1996		**15**	Estimates based on SCALP 3 category* only! Educated guess.	**(inconsistent)** [a]
	2001		**20**		
Bohemian-Bavarian	1996		**6**		**decreasing** [b]
	1997		**7**		
	1998		**8**		
	1999		**6**		
	2000		**5**		
	2001		**4**		
Ø Total 1996-2001			**17+6**		

[a] increasing in the Northern Kalkalpen, unknown for Styria, stable at low densities for Carinthia
[b] Increasing and expanding until 1999, since then decreasing tendency. The same is true for the Czech Republic and in Bavaria. Most of the animals use areas in the Czech Republic as well.
* [= wild prey remains, scats and tracks reported by the general public as well as all sightings and vocalisations, e.g. signs that cannot be verified, MOLINARI-JOBIN *et al.* 2003; Eds.]



Number of lynx for the Alpine and Bohemian-Bavarian population in Austria from 1996-2001.

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Alpine / Boh.-Bav.	-	Kills found, sightings and track observations, educated guess.
Institution	-	see contacts for this report

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
ratified 1995	ratified 1983	ratified 1982

4.2. Legal status

Lynx is fully protected by law.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Bohemian-Bavarian	1996	-	0	0	0	0	0	0	0	0	*0*	*0*
	1997	-	0	0	0	0	0	0	0	0	*0*	*0*
	1998	-	0	0	0	0	0	0	0	0	*0*	*0*
	1999	-	1	0	1	0	0	0	0	0	*2*	*33.3*
	2000	-	0	0	1	0	0	0	0	0	*1*	*20*
	2001	-	0	0	0	0	0	0	0	0	*0*	*0*
Total 1996-2001		-	*1*	*0*	*2*	*0*	*0*	*0*	*0*	*0*	*3*	-
Yearly Ø		-	*0.17*	*0*	*0.3*	*0*	*0*	*0*	*0*	*0*	*0.5*	*8.3*
Known mortality / 100 km² [X+O]		-	*0.01*	*0*	*0.01*	*0*	*0*	*0*	*0*	*0*	*0.02*	-

→ No known losses to the Alpine population from 1996-2001.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Alpine / Bohemian-Bavarian	none	Hunting associations: Lynx is a (protected) game species and the respective owners of the hunting grounds are responsible for the management of the species. The management is supervised by the states (Bundesländer), which have the legal power over all game species.	(PACS: MOLINARI-JOBIN *et al.* 2003)

5. Depredation:

5.1. Depredation losses & compensation paid

Population	Year	Sheep	Goat	Reindeer	Other species	Total	Compensation (in Euro)	Compensation other predators
Alpine / (Boh.-Bav.)	1996	2	0	-	2	4	240 €	3'270 €
	1997	3	0	-	0	3	360 €	8'721 €
	1998	6	0	-	1	7	780 €	7'776 €
	1999	4	0	-	(1)	5	360 €	7'849 €
	2000	2	0	-	0	2	220 €	3'634 €
	2001	9	0	-	2	11	1'020 €	3'500 €
Total 1996-2001		*26*	*0*	-	*6* [a]	*32*	*2'980 €* [b]	*34'750 €* [c]

[a] fallow deer, 1 cow in 1996
[b] estimates only, exact numbers not available
[c] brown bear only

5.2. Regional & seasonal differences

There are very few sheep kept in the area of the Bohemian-Bavarian population; one fallow deer in 1999 was the only damage compensated in the area of the Bohemian-Bavarian population. All other damages occurred in the area of the Alpine population.

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
Alpine / Boh.-Bav.	Assurance	Hunters' associations' assurance	Verified by persons trained in identifying lynx kills (training courses in some cases date back many years), partly veterinarians.
	The hunters' associations of Oberösterreich (since 1999) and Niederösterreich (since 2003) pay refunds for killed roe deer to the concerned hunting ground.		

5.4. Prevention

Population	Prevention methods	Legal measures	Illegal actions
Alpine / Boh.-Bav.	none	No cases of extensive damage done by lynx known that would have required actions.	Illegal shooting of the animal?

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Alpine	Infrastructure development: Human settlement Infrastructure development: Tourism / recreation Infrastructure development: Road building Shooting Vehicle and train collision High juvenile mortality Low densities Skewed sex ratios Other: hunters' attitude	Infrastructure development: Human settlement Infrastructure development: Tourism / recreation Infrastructure development: Road building Shooting Vehicle and train collision High juvenile mortality Low densities Skewed sex ratios Population fluctuations Recreation / tourism Other: hunters' attitude	Infrastructure development: Human settlement Infrastructure development: Tourism / recreation Infrastructure development: Road building Shooting Vehicle and train collision Limited dispersal High juvenile mortality Low densities Skewed sex ratios Population fluctuations Recreation / tourism Other: hunters' attitude
Bohemian-Bavarian	Infrastructure development: Human settlement Infrastructure development: Tourism / recreation Infrastructure development: Road building Shooting Trapping / snaring Vehicle and train collision High juvenile mortality Low densities Other: hunters' attitude	Infrastructure development: Human settlement Infrastructure development: Tourism / recreation Infrastructure development: Road building Shooting Trapping / snaring Vehicle and train collision High juvenile mortality Low densities Population fluctuations Recreation / tourism Other: hunters' attitude	Infrastructure development: Human settlement Infrastructure development: Tourism / recreation Infrastructure development: Road building Shooting Vehicle and train collision Limited dispersal High juvenile mortality Low densities Population fluctuations Recreation / tourism Other: hunters' attitude

Comment: The main threat for the lynx in Austria is poaching!

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans	X		
Legislation on an international level		X	
Legislation on a national level	X		
Legislation on a regional level			X
Public involvement	X		
Formal education	X		
Awareness	X		X
Capacity-building / Training			X

Conservation measure (cont.)	Lacking / proposed	Drafted / ratified	Implemented / applied
Taxonomy	X		
Population numbers and range		X	
Biology and Ecology	X		
Habitat status			X
Threats	X		
Uses and harvest levels	X		
Conservation measures	X		
Monitoring / Trends		X	
Genetic status	X		
Human attitude / Human dimensions	X		
Maintenance / Conservation	X		
Restoration	X		
Corridors		X	
Identification of new protected areas			X
Establishment of protected areas			X
Management of protected areas		X	
Expansion of protected areas	X		
Community-based initiatives	X		
Restoration	X		
Sustainable use / Harvest management	X		
Recovery management	X		
Disease, pathogen, parasite management	X		
Limiting population growth	X		
Captive breeding / Artificial propagation	X		
Genome resource bank	X		

Comment: Both populations. There is no wildlife service in Austria; almost no funding available for lynx conservation, management and research.

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Alpine	vulnerable / data deficient	• Increase acceptance of lynx by hunters • Scientific population monitoring • Public awareness • Enforcement of existing laws
Bohemian-Bavarian	vulnerable	• Increase acceptance of lynx by hunters • Scientific population monitoring • Public awareness • Enforcement of existing laws

9. Projects:

Population	Title	Duration	Contact
Alpine	Luchsmonitoring Österreich	2002-	Jens Laass & Thomas Huber, IWJ, BOKU Wien: j.laass@boku.ac.at, am.berg@aon.at
Bohemian-Bavarian	Luchse im Böhmerwald/Mühlviertel	1995-	önj Haslach, Grubberg 17, 4170 Haslach/Mühl: tho.mas@gmx.at (Thomas Engleder)[a]
Bohemian-Bavarian	Luchse im Wald- und Mühlviertel	1999-2004	WWN Forstner, Martin Forstner, Arbesbach, Niederösterreich: wwn.forstner@uta-net.at
Bohemian-Bavarian	Lynx - Bohemia.Bavaria.Austria. Scientific Working Group	2002-	Thomas Engleder: tho.mas@gmx.at

[a] http://web.utanet.at/oenj.haslach/luchs.htm

10. Contact:

Population	Name	Address
Alpine	Jens LAASS	Institut für Wildbiologie und Jagdwirtschaft, Universität für Bodenkunde Wien, Peter Jordan Str. 76, A-1190 Wien e-mail: jens.laass@boku.ac.at
Bohemian-Bavarian	Thomas ENGLEDER	Graben 7, A-4170 Haslach/Mühl e-mail: tho.mas@gmx.at
Collaborators Alps:	Thomas HUBER	Tassach 9, A-9542 Afritz e-mail: am.berg@aon.at
	Christian FUXJÄGER	Nationalparkallee 1, A-4591 Molln e-mail: daten@kalkalpen.at
Collaborator Boh.-Bav.:	Martin FORSTNER	Neustiftstrasse 62, A-3952 Arbesbach e-mail: wwn.forstner@uta-net.at

Country assessment:

Austria is part of two large recovering populations: the Bohemian-Bavarian population (which in future may connect to the Carpathian population; see WÖLFL *et al*. 2001), and the Alpine population, the largest potential lynx population in central-western Europe. The area of future expansion of the Bohemian-Bavarian population in Austria south to the Danube is limited (see map). In the Austrian Alps, however, there is a huge potential for the lynx population to recover. Austria has a share of almost 30% of the Alps (ALPINE CONVENTION), and most of it is suitable lynx habitat. In addition, Austria is, together with Italy, the area where the still small and vulnerable populations in the western and eastern Alps (see population assessment) should merge. The important role Austria would have to play in the recovery of the Alpine lynx population has been stressed by the Pan-Alpine Conservation Strategy for the Lynx (PACS; MOLINARI-JOBIN *et al.* 2003) and in Recommendations No. 89 (2001) and No. 101 (2003) by the Standing Committee of the Bern Convention.

Of the Bohemian-Bavarian population, only a very small part lies within the country. This is, however, an important corridor for the link of the Bohemian-Bavarian population with the occurrences further east (WÖLFL *et al*.

2001). The lynx presence in Austria north of the Danube has recently decreased, a tendency also observed in the Czech Republic and in Bavaria. An agreement between the three countries regarding conservation and management of this population is to be recommended. Cross-border co-operation and exchange of information among the scientists has started some years ago (WÖLFL *et al*. 2001). In the Austrian Alps, lynx observations are very scattered, and there is a discrepancy between the distribution area and the estimated population size (Table 2). As the contacts point out, the monitoring relies upon volunteer work, and the consistency of the data collection and availability is not granted. The known distribution area is supposed to be a minimum estimation, and the actual distribution might be underestimated (HUBER, LAASS & ENGLEDER 2001). Another consequence of the scarce data is that the threats listed under Table 6 base rather on the personal assessment of the contacts than on hard facts.

Austria lacks both, a national lynx conservation strategy and a standardised, countrywide monitoring system. This is partly a consequence of the level of responsibility. While Austria is under the obligation of international treaties, and federal law protects the lynx, it is considered a game species and is therefore managed by the states (Bundesländer). There is, so far, no agreement between the states and the national authorities regarding a lynx conservation and management concept that would consider the national legislation and international obligations.

References:

ALPINE CONVENTION: http://www.conventionalpine.org/page4b_de.htm#A2

Convention on the Conservation of European Wildlife and Natural Habitats, Council of Europe. Recommendation No. 89 (2001) on the conservation of the European Lynx in the Alps: http://www.coe.int/t/e/Cultural_Co-operation/Environment/Nature_and_biological_diversity/Nature_protection/Rec89(2001).asp#TopOfPage

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HUBER, T., LAASS, J. & ENGLEDER, T. 2001: Present knowledge on the distribution of the lynx (*Lynx lynx*) in Austria. *Hystrix* 12 (2): 31-37.

MOLINARI-JOBIN, A., MOLINARI, P., BREITENMOSER-WÜRSTEN, CH., WÖLFL, M., STANISA, C., FASEL, M., STAHL, P., VANDEL, J.-M., ROTELLI, L., KACZENSKY, P., HUBER, T., ADAMIC, M., KOREN, I. & BREITENMOSER, U. 2003: The Pan-Alpine Conservation Strategy for the lynx. Nature and environment No. 130, Council of Europe Publishing, Strasbourg: 1-20.

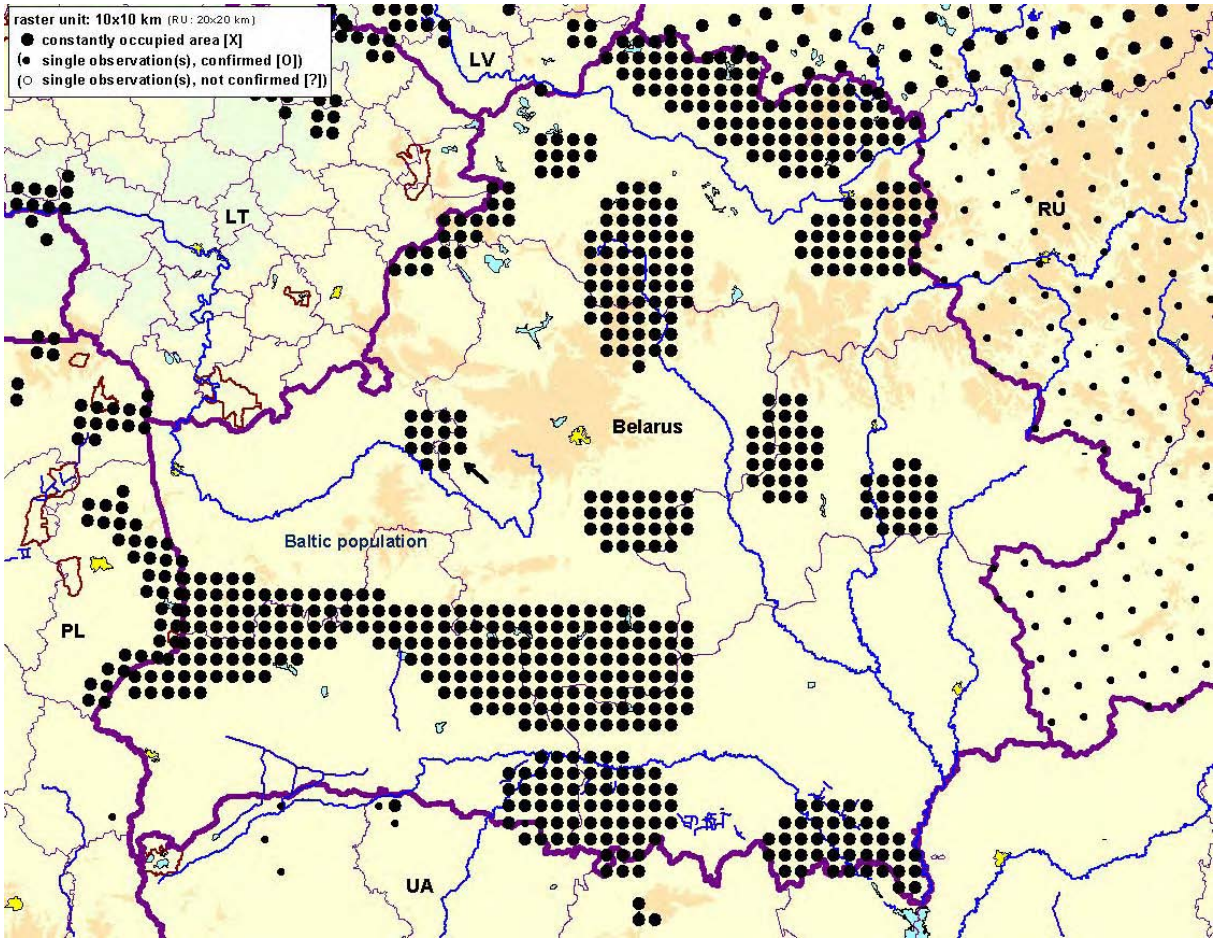
WÖLFL, M., BUFKA, L., CERVENY, J., KOUBEK, P., HEURICH, M., HABEL, H., HUBERT, T. & POOST, W. 2001: Distribution and status of lynx in the border region between Czech Republic, Germany and Austria. *Acta theriol.* 46: 181-194.

Belarus (BY)

Vadim SIDOROVICH

Area: 207'600 km²
Forests & Woodland: 45.3 % (2000)
Human population: 10'350'194 (2001)
Population density: 49.9 / km²

1. Lynx distribution in Belarus in 1995*:



* No current distribution map available; the map shows the distribution range from the 1995 inquiry (BREITENMOSER *et al*. 2000)

Geographic range of the population(s)

Baltic population: No recent reliable information available. The western-central spot in the rather large Naliboki forest (↖) nearly disappeared. This local population of ~80 individuals, decreased to only 0-2 lynx in the last 3 winters. Similar, but less pronounced decline in the bigger spot north of the Naliboki Forest (border area with LT) in winter 2000/01. At the same time, there is evidence that lynx increased in the central north and south-west of Belarus.

Methods: -

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Baltic	n.d.a.	n.d.a.	n.d.a.	n.d.a.	n.d.a.	n.d.a.	n.d.a.
Total	*n.d.a.*	*n.d.a.*	*n.d.a.*	*n.d.a.*	*n.d.a.*	*n.d.a.*	*n.d.a.*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Baltic	1996-2001	**?** [a] (No reliable information available; it is known that quite a lot of changes, mostly negative ones, happened in the population.)			**decreasing**
Ø 1996-2001					

[a] (About 250 lynx according to KOZLO 2003.)

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Baltic	-	-
Institution	-	-

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
-	-	ratified 1995

4.2. Legal status

Lynx has been fully protected by law since 1992. [a]

[a] and included into the Red Book of Belarus since 1993 (category III: endangered species with decreasing population)

4.3. Harvest numbers and other known losses to the population(s)

→ No current information on losses available.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Baltic	Ministry for Natural Resources and Nature Protection of Belarus	none	none

5. Depredation:

→ No information available.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Baltic	Shooting	Shooting	Shooting

7. Conservation measures:

→ No information available.

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Baltic	data deficient	• Get information about the status and distribution of the species • Limit for a felling rate

9. Projects:

→ No current projects.

10. Contact:

Population	Name	Address
Baltic	Vadim SIDOROVICH	Institute of Zoology, Skoring str. 27, Minsk 220 072 e-mail: vadimsid@mustbel.open.by

Country assessment:

In 1995, Belarus had the largest distribution range of all countries sharing the Baltic lynx population (BREITENMOSER *et al*. 2000). The population number, however, probably was (and currently is) smaller than in Estonia and Latvia (see assessment Baltic population). Nevertheless, Belarus is very important for the Baltic population, due to its location between the large Russian population in the east, and the Baltic states, Poland and the Ukraine in the north, west and south, respectively. In all these countries, but especially in Poland and the Ukraine, the lynx populations depend heavily on the situation in Belarus. It is for example known that in the Białowieza Forest, individuals often change between the two countries, in spite of the 2.5 m high border fence (OKARMA 1993, JEDRZEJEWSKI *et al.* 1996). The size of the distribution area on the Belarus side is much larger than on the Polish part of the forest (see map), but most likely, the Polish national park today acts as a source and not vice-versa.

We lack reliable information about the status and distribution of lynx in Belarus. A sound survey therefore is an ultimate prerequisite regarding the definition of any other conservation measures. There are indications that the tendency in both number and range was negative during the past few years (point 1, Table 3.1). A winter route census in 1996 revealed 206 lynx (KOZLO 2003). The author however assumes a number of 250 individuals to be more realistic. It is further assumed that the situation of the lynx is nowadays only safe in northern parts and in the Belovezskaya Puscha (Białowieza), but on the verge of extinction in the rest of the country (KOZLO 2003). The reason for the decline is not known; data on lynx mortality are not available (Table 4.3). However, a high level of poaching is assumed (V. SIDOROVICH, pers. comm., KOZLO 2003). According to KOZLO (2003), since the 1990s the interest in trophies, especially of rare species sharply increased. In the national Red Book, lynx is listed in the category “endangered” with decreasing trend. For 1991-95, KOZLO (2003) was aware of 9 lynx being poached, but the real extent is not known. V. SIDOROVICH (pers. comm.) learnt from talking to local hunters that lynx are mainly killed with the help of dogs, which chase the lynx onto a tree and wait for the hunter to arrive and shoot the animal down.

Lynx in Belarus seem to be in urgent need for a conservation plan. The most urgent actions are (i) to get more and reliable information about numbers, distribution, and losses, (ii) to evaluate threats, and (iii) to define and implement conservation measures. A tight co-operation with the neighbouring countries in regard to the development of a conservation and management strategy is strongly recommended.

References:

BREITENMOSER, U., BREITENMOSER-WÜRSTEN, CH., OKARMA, H., KAPHEGYI, T., KAPHEGYI-WALLMANN, U., & MÜLLER, U. M. 2000: Action Plan for the Conservation of the Eurasian Lynx (*Lynx lynx*) in Europe. Nature and environment No.112, Council of Europe Publishing, Strasbourg: 1-70.

JEDRZEJEWSKI, W., JEDRZEJEWSKA, B., OKARMA, H., SCHMIDT, K., BUNEVICH, A.N. & MILKOWSKI, L. 1996: Population dynamics (1869-1994), demography and home ranges of the lynx in Bialowieza Primeval Forest (Poland and Belarus). *Ecography* 19: 122-138.

KOZLO, P.G. 2003: Byelorussia. In: The Lynx – Regional Features of Ecology, Use and Protection, Ed. by YE.N. Matyushkin & M.A. Vaisfeld, Moscow Nauka 2003: 118-137.

OKARMA, H. 1993: Protection and management of large carnivores (wolf, lynx) in the Bialowieza Primeval Forest, Poland. Seminar on the management of small populations of threatened mammals. Conference Proceedings, Council of Europe, Strasbourg: 47-51.

Bosnia-Herzegovina (BA)

*Vlado SOLDO & Ivica LUCIC**

Area: 51'129 km²
Forests & Woodland: 44.6 % (2000)
Human population: 3'922'205 (2001)
Population density: 76.7 / km²

1. Lynx distribution in Bosnia-Herzegovina in 2001:

Geographic range of the population(s)

Dinaric population: West Bosnia; no subpopulations identified. In all marked areas the lynx is considered to be permanently present. No data available for sporadically present areas. There are no reliable information on the expansion of areas in recent years.

Methods: Information on animal mortality (mostly by hunting), sightings of live animals or spotted foot prints. Data were collected by hunters and foresters.

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Dinaric	40	12'100	0	0	12'100	23.7	0.33
Total	*40*	*12'100*	*0*	*0*	*12'100*	*23.7*	*0.33*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Dinaric	1996		**40**	Best estimate or guess. Legislation on forestry and hunting still missing. This is also the reason why a constant network of information does not exist.	**stable**
	1997		**40**		
	1998		**40**		
	1999		**40**		
	2000		**40**		
	2001		**40**		
Ø 1996-2001			**40**		

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Dinaric	-	The basis of information is animal mortality (mostly by hunting), sightings of live animals and tracks.
Institution	-	Forestry office

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
-	-	-

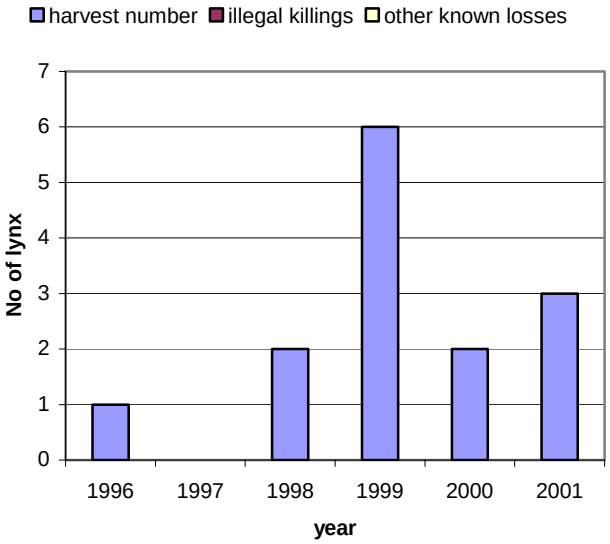
4.2. Legal status

There is no legislation about the lynx status neither in the area of forestry nor of hunting.

Hunting season: open
Yearly quota: none, open
Institution responsible: -
Method quota setting: -

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Quota	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population-n*
Dinaric	1996	no	1	0	0	0	0	0	0	0	0	*1*	*2.5*
	1997	no	0	0	0	0	0	0	0	0	0	*0*	*0*
	1998	no	2	0	0	0	0	0	0	0	0	*2*	*5*
	1999	no	6	0	0	0	0	0	0	0	0	*6*	*15*
	2000	no	2	0	0	0	0	0	0	0	0	*2*	*5*
	2001	no	3	0	0	0	0	0	0	0	0	*3*	*7.5*
Total 1996-2001			*14*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	14	-
Yearly Ø			*2.3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	2.3	5.75
Known mortality / 100 km² [X+O]			*0.02*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	0.02	-



Number of known losses to the Dinaric lynx population in Bosnia-Herzegovina from 1996-2001.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Dinaric	none	none	none

5. Depredation:

→ No depredation losses in Bosnia-Herzegovina from 1996-2001. There are no compensation systems and prevention methods applied in the country.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Dinaric	Legal hunting & trapping Shooting War / civil unrest	Legal hunting & trapping Shooting Vehicle and train collision Prey / food base Transport	Legal hunting & trapping Shooting Vehicle and train collision Prey / food base Population fluctuations Transport

Comment: The population is considered to be low mostly due to hunting and to the low prey availability.

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Legislation on an international level	X		
Legislation on a national level	X		
Management plans	X		

Comment: According to the valid law on hunting, lynx is not protected. Up to date, Bosnia-Herzegovina did not ratify any international agreement in the area of nature protection.

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Dinaric	vulnerable	• Define legal status • Prepare a management plan for lynx • Increase prey density

Comment: Bosnia and Herzegovina is combined of different units with their own laws.

9. Projects:

→ No current projects.

10. Contact:

Population	Name	Address
Dinaric	Vlado SOLDO	J.P. "Sume H-B" Mostar, Hrvatskih branitelja b.b., 88000 Mostar e-mail: vlados@tel.net.ba
Collaborator:	Ivica LUCIC	L.S. Herceg-Bosne Siroki Brijeg, Mihanoviceva b.b., 88000 Mostar e-mail: logotip@tel.net.ba

Country assessment:

In 1980, seven years after the re-introduction in Slovenia, the first lynx tracks were observed in Bosnia-Herzegovina, close to the Croatian border. An expansion along the Dinaric mountain range was observed, but a colonisation of the south-eastern mountains of the country has so far not been noticed (SOLDO 2001). Although the habitat features south-east of the potential distribution seem to be favourable, the Neretva River valley may act as a barrier. Nevertheless, lynx might already be present in the east and south-east as there are confirmed observations in Serbia and Montenegro (Western Serbia occurrence and Balkan population) along the country border. The real distribution in Bosnia-Herzegovina might in fact differ from the one indicated in the map: The area seems to be very uniformly settled. If really constantly occupied, one would rather expect lynx indications also along the mountains on the other side of the border in neighbouring Croatia. Data available is based mostly on hunting data (14 animals between 1996-2001, Table 4.3), and thus the information density is low. A more detailed survey, also covering areas in the south-east, is to be recommended, also in regard to the critical status of the Balkan population (see respective report). Collecting material for genetic analyses from lynx found dead in Bosnia-Herzegovina is to be recommended in order to clarify the taxonomic status of lynx found along the border with Serbia and Montenegro (see respective country report).

Of course, the political and economic situation in Bosnia-Herzegovina is not in favour with conservation concerns. The country consists of two administrative divisions, the Federation of Bosnia and Herzegovina (further divided into 10 divisions) and the Serbian Republic, both with their own laws. Still, there will hopefully soon be a consensus for the implementation of national legislations regarding forestry and hunting. The improvement of the knowledge on the lynx in Bosnia-Herzegovina would allow to set up guidelines for the future existence of the lynx in the country and of the population as a whole, of which Bosnia-Herzegovina shares an important part. A sensible co-operation with Croatia, Slovenia, and Serbia and Montenegro is needed.

References:

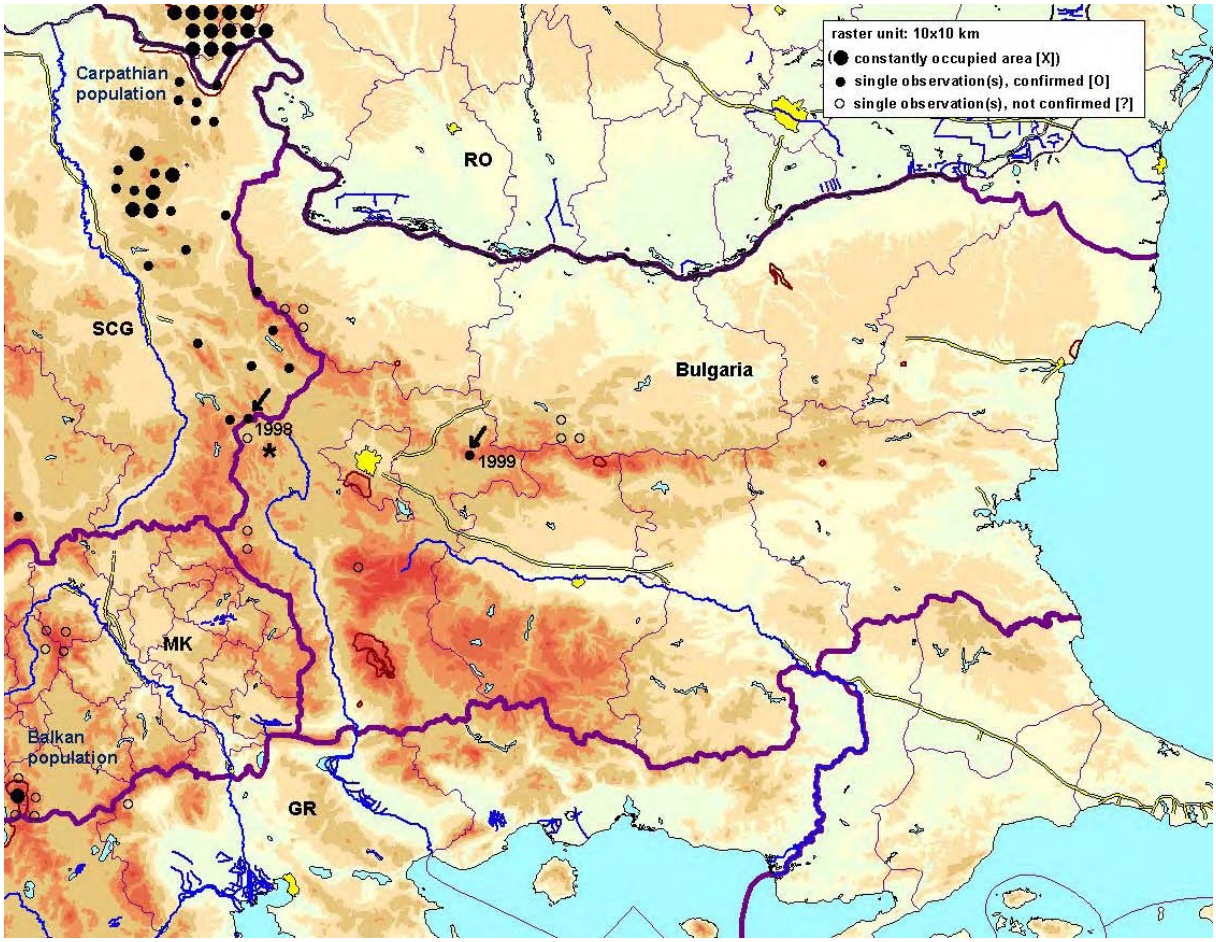
SOLDO, V. 2001: The lynx in Bosnia and Herzegovina. The Balkan Lynx Population - History, Recent Knowledge on its Status and Conservation Needs. Ed. by Ch. Breitenmoser-Würsten and U. Breitenmoser, KORA Bericht No. 7: 6-7.

Bulgaria (BG)

Diana ZLATANOVA & Peter GENOV

Area: 110'910 km²
Forests & Woodland: 33.4 % (2000)
Human population: 7'707'495 (2001)
Population density: 69.5 / km²

1. Lynx distribution in Bulgaria in 2001:



(* new data from March 2003: lynx tracks)

Geographic range of the population(s)

Carpathian population: Scarce data of lynx presence in the western to central Balkan Mountains probably of origin from the Carpathian population. [a]

Balkan population: Unconfirmed data for lynx presence in south-west Bulgaria (Osogovo, Rui, Kraishte, Maleshevska and Vlahina mountains) of possible origin from the Balkan population. [a]

Methods: sightings & signs, unspecific survey, lynx mortality

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Carpathian / Balkan	single individuals	0	200	1'000	200	0 / 0.2	-
Total	*single individuals*	*0*	*200*	*1'000*	*200*	*0 / 0.2*	-

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Carpathian / Balkan	1996-2001	**single individuals**		More frequent reports of lynx presence for the last 5 years probably stand for an increase of lynx number and distribution area in Bulgaria, but this still needs to be proved.	**unknown**

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Carpathian / Balkan	(no official or additional population estimations)	
Institution	1. Ministry of Environment and Waters; 2. National Board of Forests of the Ministry of Agriculture and Forests	-

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

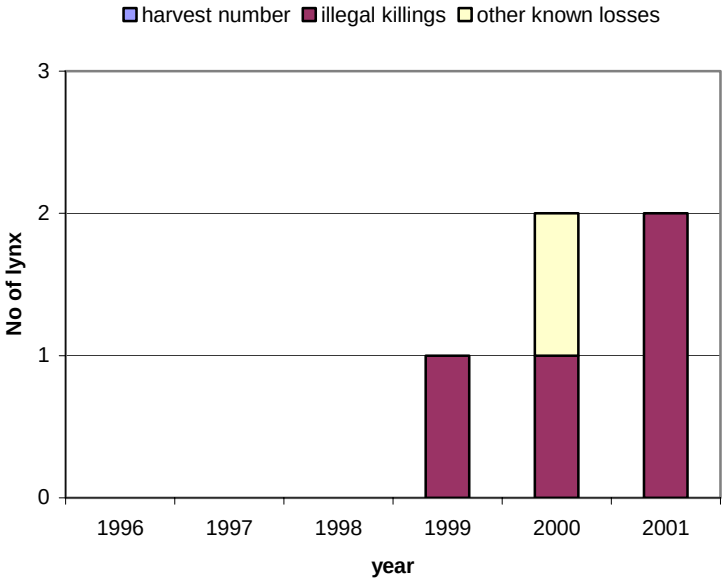
EU Habitat Directive	Bern Convention	CITES
-	ratified 1991	ratified 2001

4.2. Legal status

Lynx is completely protected by law.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Carpathian / Balkan	1996	-	n.d.a.	n.d.a.	n.d.a.	0	n.d.a.	0	0	0	*0*	*?*
	1997	-	n.d.a.	n.d.a.	n.d.a.	0	n.d.a.	0	0	0	*0*	*?*
	1998	-	n.d.a.	n.d.a.	n.d.a.	0	n.d.a.	0	0	0	*0*	*?*
	1999	-	n.d.a.	n.d.a.	1	0	n.d.a.	0	0	0	*1*	*?*
	2000	-	1	n.d.a.	1	0	n.d.a.	0	0	0	*2*	*?*
	2001	-	n.d.a.	n.d.a.	2	0	n.d.a.	0	0	0	*2*	*?*
Total 1996-2001		*-*	*1*	*n.d.a.*	*4*	*0*	*n.d.a.*	*0*	*0*	*0*	5	-
Yearly Ø		*-*	*0.17*	*n.d.a.*	*0.67*	*0*	*n.d.a.*	*0*	*0*	*0*	*0.83*	*?*
Known mortality / 100 km² [X+O]		*-*	*0.09*	*n.d.a.*	*0.34*	*0*	*n.d.a.*	*0*	*0*	*0*	*0.42*	-



Number of known losses to the lynx in Bulgaria from 1996-2001.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	**Regional level**	
Carpathian / Balkan	Ministry of Environment; National Board of Forests, under supervision of the Ministry of Agriculture and Forests.	Regional Inspectorates of the Ministry of Environment, State Forestry Departments.	none

5. Depredation:

5.1. Depredation losses & compensation paid

Population	Year	Sheep	Goat	Reindeer	Other species	Total	Compensation (in Euro)	Compensation other predators
Carpathian / Balkan	1996	1	0	0	0	1	0	n.d.a.
	1997						0	n.d.a.
	1998						0	n.d.a.
	1999	numbers for 1997-2001 are not known					0	n.d.a.
	2000						0	n.d.a.
	2001						0	n.d.a.
Total 1996-2001		*?*	*?*	*?*	*?*	*?*	*0*	n.d.a.

5.2. Regional & seasonal differences

→ Not known.

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
Carpathian / Balkan	(Compensation is currently paid for bear and wolf damages only because of the unclear status of the lynx.)	(1. Within the management areas of game stations by the game stations; 2. Within the management areas of forest or stations by the State.)	No procedures established.

5.4. Prevention

Population	Prevention methods	Legal measures	Illegal actions
Carpathian / Balkan	Livestock guarding dogs for sheep and goats	none	none

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Carpathian / Balkan	Shooting Poisoning Competitors Limited dispersal Low densities Other: illegal trophy hunting	Extraction of wood Shooting Wildfire Competitors Prey / food base Limited dispersal Low densities Other: illegal trophy hunting	Extraction of wood Infrastructure development: Tourism / recreation Shooting Trapping / snaring Poisoning Vehicle and train collision Competitors Prey / food base Limited dispersal (?) Low densities (?) Other: illegal trophy hunting

Comment: The most important threats to the lynx in Bulgaria are currently the rapid decrease of prey base (roe deer and chamois) and the poaching of lynx for trophy.

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans	X		
Legislation on an international level		X	
Legislation on a national level	not in force		
Legislation on a regional level	X		
Public involvement	X		
Formal education	X		
Awareness	X		
Capacity-building / Training	X		
Taxonomy		X	
Population numbers and range	X		
Biology and Ecology	X		
Habitat status			X
Threats		X	
Conservation measures	X		
Monitoring / Trends	X		
Genetic status	X		
Human attitude / Human dimensions	X		
Maintenance / Conservation	X		
Restoration	X		
Corridors	X		
Community-based initiatives	X		
Recovery management	X		
Disease, pathogen, parasite management	X		
Captive breeding / Artificial propagation	X		
Genome resource bank	X		

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Carpathian	data deficient	• Study on dispersal and corridors for migration into the country, trend and threats.
Balkan	data deficient	• Genetic study to clarify taxonomic status, and study on the origin of the current lynx presence in Bulgaria.

Comment: It is urgent to conduct a study on the lynx presence (distribution area) in Bulgaria and the origin of the specimens settled in the country to identify their belonging to one or the other population.

9. Projects:

Population	Title	Duration	Contact
Carpathian / Balkan	Identification of the current conservation status, habitat and prey base availability, and human impact/relationship on the natural recovery of the lynx (*Lynx lynx*), considered as extinct in Bulgaria. (Study proposed but funding not secured yet.)		Diana Zlatanova: zlite@mbox.infotel.bg
Carpathian / Balkan	Field study and elaboration of a National Action Plan for the population of Balkan chamois (*Rupicapra r. balcanica*) in the three National Parks Rila, Pirin and Central Balkan. (Lynx involvement: research on possible lynx presence influencing the chamois population).	2002-2003	Peter Genov, Institute of Zoology, Bulgarian Academy of Science: genov_bg@yahoo.it
Carpathian / Balkan	Research of the wolf (*Canis lupus*) population and its influence on the populations of the other mammal and bird species in Osogovo mountain. (Lynx involvement: research of possible lynx presence and its relation to the wolf as a competitor for prey).	2002	Peter Genov, Institute of Zoology, Bulgarian Academy of Science: genov_bg@yahoo.it

10. Contact:

Population	Name	Address
Carpathian / Balkan	Diana ZLATANOVA	Environmental Education and Research Centre, Sofia Zoo, ul. Srebarna 1, P.O. Box 67, BG-Sofia 1407 e-mail: zlite@mbox.infotel.bg
Collaborator:	Peter GENOV	Institute of Zoology, Bulgarian Academy of Science, ul. Tzar Osvoboditel 1, BG-Sofia 1000 e-mail: genov_bg@yahoo.it

Country assessment:

Officially, the lynx in Bulgaria is considered to be extinct (ZLATANOVA, TZVETKOV & TZINGARSKA-SEDEFCHEVA 2001, DUTSOV, VALCHEV & TSINGARSKA 2002). Until 1940, lynx have inhabited mainly the ranges of south-western Bulgaria: Pirin, Rila, Rhodopi and Stara Planina (ZLATANOVA, TZVETKOV & TZINGARSKA-SEDEFCHEVA 2001). So far, no systematic monitoring exists, data are only occasionally gathered. Nevertheless, especially in recent years,

there were indications of lynx presence mainly reported from local people, and some of them even verified. Around 90% of this information came from the border area to Serbia and Montenegro (Western Stara Planina) (ZLATANOVA, TZVETKOV & TZINGARSKA-SEDEFCHEVA 2001). These findings match well with the data available from the Serbian side of the border (see map). This would however make a Carpathian origin of the Bulgarian occurrences more probable. Astonishing is the confirmed case east of Sofia, from where the only other (unconfirmed) signs are quite far away. However, as these observations are all along the same mountain chain (Stara Planina), they may indicate a further colonisation of the range to the east than expected, yet this needs further investigation.

If we assume that there is no established lynx population in Bulgaria, but only some scattered individuals, the number of illegal killings seems to be extremely high, compared to the same kind of data from e.g. Albania or FYR Macedonia: since 1999, 1-2 lynx per year have become known in Bulgaria (Table 4.3). According to unofficial data, lynx have been killed during the last ten years in Western Stara Planina (ZLATANOVA, TZVETKOV & TZINGARSKA-SEDEFCHEVA 2001). Of course, this is not a good basis for a recolonization of the lynx in Bulgaria. Additionally, the loss of prey base and suitable habitat for lynx has been severe (ZLATANOVA, TZVETKOV & TZINGARSKA-SEDEFCHEVA 2001, DUTSOV, VALCHEV & TSINGARSKA 2002). Considering these conditions, re-introductions, as earlier proposed by the Wilderness Fund (SPASSOV, GEORGIEV & SPIRIDONOV 2001), do not seem to be the most urgent next steps. Bulgaria should, however, prepare for the return of the lynx, either through spontaneous recolonisation or re-introductions. This incorporates improvement of the prey base, public awareness campaigns and clarification of the origin of the lynx occasionally observed.

Genetic analysis of available material is probably one of the most important measures to get started with, because other measures might depend on the results. A natural recolonization from the Carpathians for example seems at the moment to be more likely, whereas an affiliation to the Balkan population would probably require supportive measures (e.g. habitat amelioration) to connect them permanently to other remnants of this population. In both cases, the prey base and habitat should be preserved and illegal killings strictly controlled. Regardless to the origin of the Bulgarian lynx, co-operation with the neighbouring countries is needed in any case.

References:

DUTSOV, A., VALCHEV, K. & TSINGARSKA, E. 2002: Large Carnivores in S.W. Bulgaria. In: Arcturos 2002: Protected Areas of the Southern Balkans – Legislation, Large Carnivores, Transborder Areas. Hellenic Ministry of the Environment, Physical Planning, and Public Works: 95-103.

SPASSOV, N., GEORGIEV, K. & SPIRIDONOV, G. 2001: Brief notes on the status and problems of the lynx in Bulgaria. The Balkan Lynx Population - History, Recent Knowledge on its Status and Conservation Needs. Ed. by Ch. Breitenmoser-Würsten and U. Breitenmoser, KORA Bericht No. 7: 26-27.

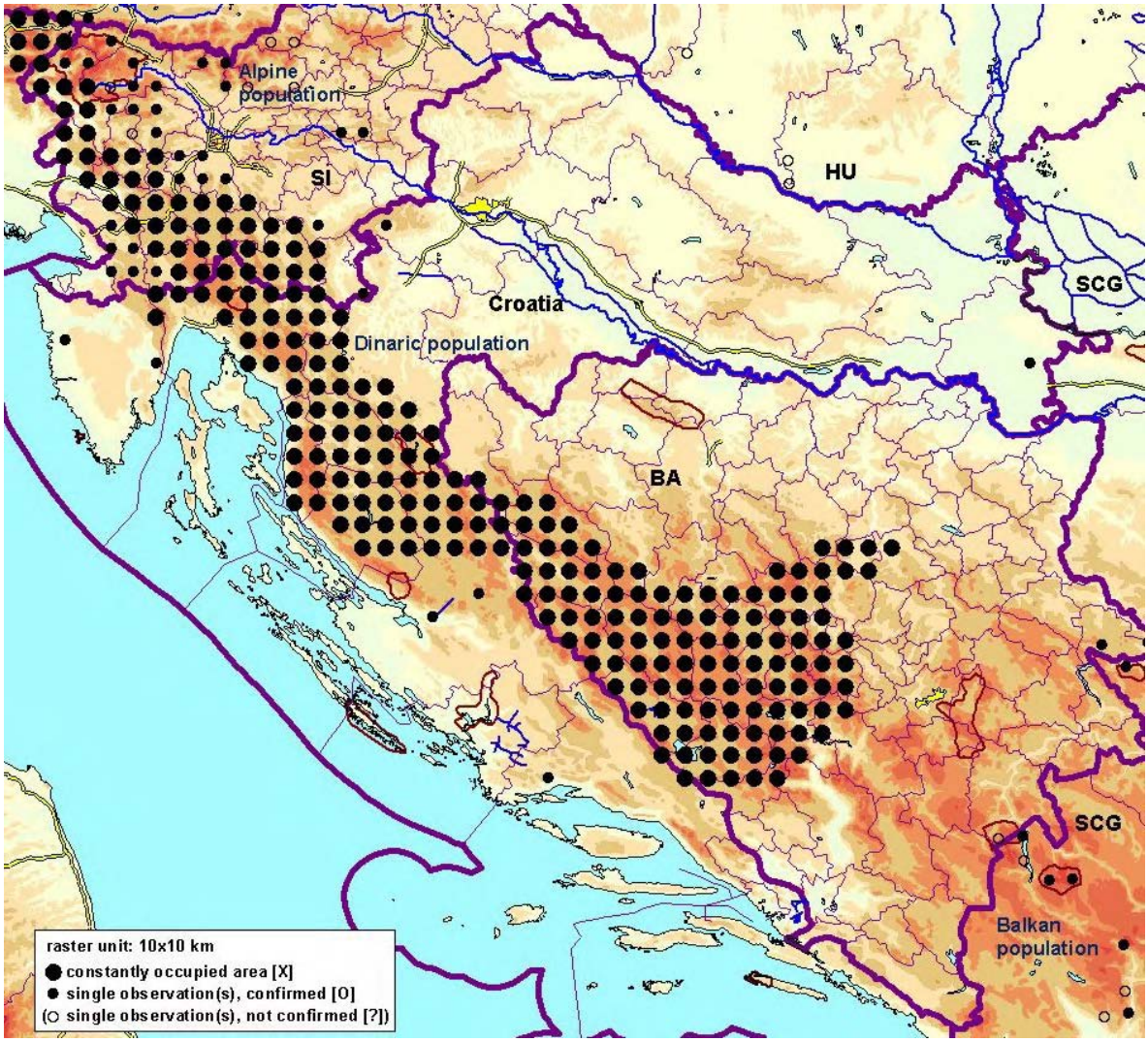
ZLATANOVA, D., TZVETKOV, P. & TZINGARSKA-SEDEFCHEVA, E. 2001: The lynx in Bulgaria: present conservation status and future prospects. The Balkan Lynx Population - History, Recent Knowledge on its Status and Conservation Needs. Ed. by Ch. Breitenmoser-Würsten and U. Breitenmoser, KORA Bericht No. 7: 19-23.

Croatia (HR)

Djuro HUBER, Josip KUSAK & Tomislav GOMERCIC

Area: 56'542 km²
Forests & Woodland: 31.9 % (2000)
Human population: 4'334'142 (2001)
Population density: 76.7 / km²

1. Lynx distribution in Croatia in 2001:



Geographical range of the population(s)

Dinaric population: Gorski Kotar, Lika; no subpopulations.

Methods: sightings & signs, snow tracking, unspecific survey, inquiry, lynx mortality. Major source of distribution data are confirmed sites of dead (mostly shot) animals.

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Dinaric	50	8'400	700	0	9'100	14.9 / 16.1	0.6
Total	*50*	*8'400*	*700*	*0*	*9'100*	*14.9 / 16.1*	*0.6*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Dinaric	1996	**100**		2001: The lower value of this range is more likely.	**decreasing**
	2001		**40-60**		
Ø 1996-2001		**100**	**50**		

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Dinaric	Survey, calculation based on available prey (roe and red deer; estimates by hunting organizations). [a]	
Institution	Ministry for environment and physical planning	Biology department of the Veterinary Faculty

[a] Data used by the Ministry of environment and physical planning are elaborated by the Biology Dep. of the Veterinary faculty.

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
-	ratified 2000	ratified 2000

4.2. Legal status

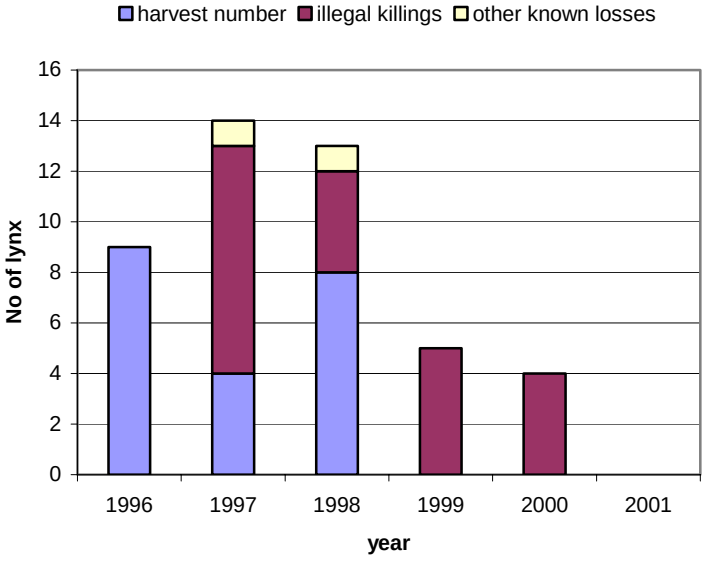
Controlled hunting of lynx until 1998; since then fully protected by law.

Hunting season:	15.11. - 28.02.
Yearly quota:	Until 1998 a yearly quota has been assigned for lynx hunting. Since then no more quotas were allowed. Quotas 1996-98 based on population estimates of 80-120 animals. The suspicion of this estimate was the main reason not to allow quotas after that.
Institution responsible:	Ministry for environment and physical planning. Its "committee for large carnivores" gives advice and the Ministry decides.
Method quota setting:	Questionnaire for game managers.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Quota	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Dinaric	1996	14	9	0	0	0	0	0	0	0	0	*9*	*9*
	1997	4	4	1	0	9	0	0	0	0	0	*14*	*14-28* [a]
	1998	8	8	0	0	4	0	0	1	0	0	*13*	*13-26* [a]
	1999	no	0	0	0	5	0	0	0	0	0	*5*	*5-10* [a]
	2000	no	0	0	0	4	0	0	0	0	0	*4*	*4-8* [a]
	2001	no	0	0	0	0	0	0	0	0	0	*0*	*0*
Total 1996-2001		-	*21*	*1*	*0*	*22*	*0*	*0*	*1*	*0*	*0*	45	-
Yearly Ø		-	*7*	*0.17*	*0*	*3.67*	*0*	*0*	*0.17*	*0*	*0*	*7.5*	*7.5-15* [a]
Known mortality / 100 km² [X+O]		-	*0.08*	*0.00*	*0*	*0.04*	*0*	*0*	*0.00*	*0*	*0*	*0.08*	-

[a] when a population size of 50 - 100 animals is taken



Number of known losses to the Dinaric lynx population in Croatia from 1996-2001.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Dinaric	Ministry for environment and physical planning	none	(2003: Corporative 33 authors (through workshops); not yet published)

5. Depredation:

5.1. Depredation losses & compensation paid

Population	Year	Sheep	Goat	Rein-deer	Other species	Total	Compensation (in Euro)	Compensation other predators
Dinaric	1996	0	0	-	0	0	0 €	0 €
	1997	0	0	-	0	0	0 €	0 €
	1998	0	0	-	0	0	0 €	175'000 €
	1999	} 1	} 10	-	0	} 11	} 720 €	119'000 €
	2000			-	0			96'000 €
	2001	0	0	-	0	0	0 €	160'000 €
Total 1996-2001		*1*	*10* [a]	*-*	*0*	*11*	*720 €*	*550'000 €* [b]

[a] The goats might have been killed by dogs.
[b] The blame for most of the livestock damage is attributed to wolves.

5.2. Regional & seasonal differences

→ None.

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
Dinaric	Compensation payment	The government	Certified "experts" have to confirm on site the damage and the animal species responsible for it. The remains of the killed animal must be present. They follow the description of signs from a special book.

5.4. Prevention

→ None. (It is believed that the recorded illegal killings were to get the trophy and to "protect" the game (roe deer)).

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Dinaric	Infrastructure development: Road building	Infrastructure development: Road building Shooting Vehicle and train collision Prey / food base High juvenile mortality (?)	Infrastructure development: Road building Shooting Vehicle and train collision Prey / food base High juvenile mortality (?) Inbreeding (?)

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans		X	
Legislation on an international level			X
Legislation on a national level			X
Public involvement		X	
Formal education		X	
Awareness		X	
Capacity-building / Training		X	
Taxonomy		X	
Population numbers and range			X
Biology and Ecology			X
Habitat status			X
Threats			X
Uses and harvest levels		X	
Conservation measures		X	
Monitoring / Trends			X
Genetic status		X	
Human attitude / Human dimensions		X	
Maintenance / Conservation			X
Corridors			X
Identification of new protected areas	X		
Establishment of protected areas			X
Management of protected areas		X	
Expansion of protected areas	X		
Community-based initiatives	X		
Sustainable use / Harvest management		X	
Recovery management		X	
Disease, pathogen, parasite management		X	
Limiting population growth		X	

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Dinaric	vulnerable	• Increase of prey availability

Comment: Attempt is under way (through "management plan") to reduce the illegal killings of lynx by allowing a very restrictive yearly quota. There is a hope that quota will facilitate the cooperation with hunters.

9. Projects:

Population	Title	Duration	Contact
Dinaric	Study of fossil and recent large carnivores in Croatia	since 2001	Djuro Huber: huber@vef.hr

10. Contact:

Population	Name	Address
Dinaric	Djuro HUBER	Veterinary Faculty, Heinzelova 55, 10000 Zagreb e-mail: huber@vef.hr
Collaborators:	Josip KUSAK	Veterinary Faculty, Heinzelova 55, 10000 Zagreb e-mail: kusak@vef.hr
	Tomislav GOMERCIC	Veterinary Faculty, Heinzelova 55, 10000 Zagreb e-mail: tomislav.gomercic@zg.tel.hr

Country assessment:

Soon after the re-introduction in neighbouring Slovenia (1973), lynx crossed the border, expanded south and settled along the Dinaric mountain chain. The current distribution indicates that lynx probably inhabits most of the available suitable habitat (see map, but also FRKOVIC 2001). The situation in the southern part seems to be unclear. On one side, there might indeed not have been an expansion further south to Dalmatia (although the area on the same latitude across the border in Bosnia-Herzegovina is indicated as continuously occupied by lynx, but is actually also more mountainous). On the other hand, at least during the war (1991-95) only the northernmost part of Croatia (Istria peninsula and Gorski Kotar) was monitored, and there was no data from the south at that time (COP & FRKOVIC 1998). The monitoring effort in the south and along the border with Bosnia-Herzegovina might still be less than elsewhere and probably needs improvement.

Croatia is going through a time of upheaval. It is only recently that international treaties have been ratified (Table 4.1). Lynx is now (since 1998) fully protected by law. A management plan has been finished since fall 2002, the approval from the Ministry of Environment is soon to be expected (D. HUBER, pers. comm.).To counteract the still ongoing illegal killings, it is suggested to allow for an official quota hunting on a low level again (comment Table 8). It is however questionable whether this would help as illegal killings already occurred before 1998 (see Table 4.3). Additionally, quotas would need to be carefully set regarding the fact, that there is a certain discrepancy between different population estimations, and that the current number could be as low as 40 individuals (Table 3.1). According to FRKOVIC (2001) a number of less than 50 individuals is indicated by the low availability of prey; the alternative estimation he mentions is 70-90 animals. The prey base seems to be the most important limiting factor for the lynx in Croatia (Table 8). The scientific basis for this assumption as well as for lynx-prey relationship in general (e.g. for population estimations as practised) is however missing. Data in FRKOVIC (2001) on known

lynx mortality rather highlight shooting (legal and illegal) as most important mortality factor (157 of 211 lynx from 1974-2000). Traffic accidents, a major threat listed in Table 6 were responsible for only 17 known deaths in the same time period (FRKOVIC 2001).

Having in mind the negative trend seen during the past few years (Tab. 3.1), Croatia should undertake everything necessary to stabilize and strengthen the central part of the Dinaric population. As seen above, measures regarding prey base on one hand and against human induced direct mortality on the other hand need to have highest priority. Further, a common strategy for the whole population has to be developed in co-ordination with Slovenia and Bosnia-Herzegovina (see population report).

References:

COP. J. & FRKOVIC, A. 1998: The re-introduction of the lynx in Slovenia and its present status in Slovenia and Croatia. *Hystrix* 10 (1): 65-76.

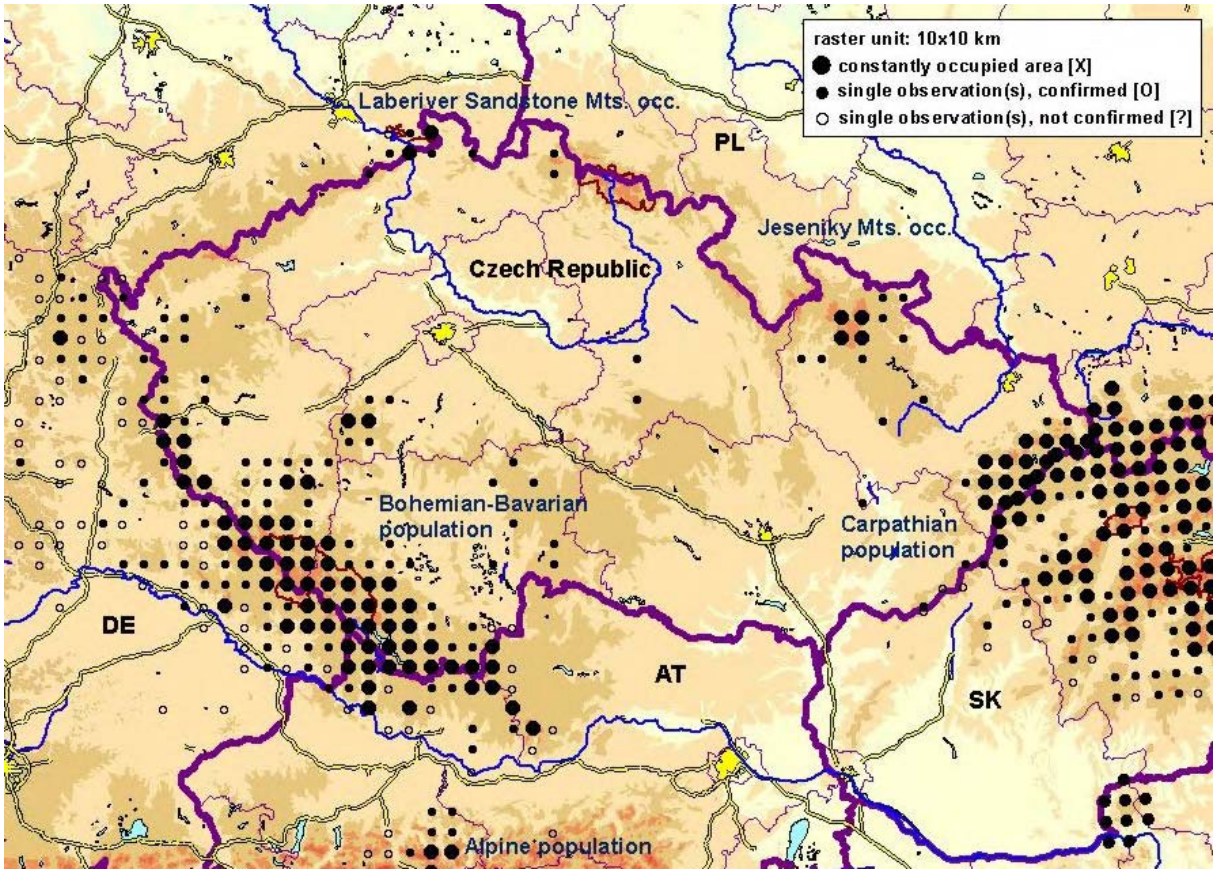
FRKOVIC, A. 2001: Ris (*Lynx lynx* L.) u Hrvatskoj - naseljavanje, odlov i brojnost (1974-2000). Sumarski list 11-12: 625-634.

Czech Republic (CZ)

Ludek BUFKA & Jaroslav CERVENY

Area: 78'866 km²
Forests & Woodland: 34.1 % (2000)
Human population: 10'264'212 (2001)
Population density: 130.2 / km²

1. Lynx distribution in the Czech Republic in 2001:



Geographic range of the population(s)

Bohemian-Bavarian population: Sumava Mts., on both sides of the Czech-Bavarian-Austrian border, NW-part of the Cesky les Mts. = Oberpfälzerwald, the Sumava foothills, S-Novohradske Mts. In the north more isolated, small, but constant occurrence in the Brdy highlands in connection with the core population. After a peak of the population in 1996/97, a decrease, remarkable since 1999 has been noticed with a reduction of the area of occurrence, especially in the southern part of the population.

Carpathian population: Beskydy Mts., N-Moravia, seldom occurrence more to the south (Bile Karpaty Mts.) along the Slovakian border. In the Beskydy Mts. relatively stable situation.

Laberiver Sandstone Mts. occurrence (LSo): N of the Czech Republic, sandstone area at the border Czech-Saxonian; very small population, decreasing.

Jeseniky Mts. occurrence (JMo): Jeseniky Mts. and foothills, N-Moravia; more isolated population, potential connection to the east (Besyky Mts.). Irregular occurrence more south - the Oderske vrchy Highlands. Small population with no big changes since 1995.

Methods: sightings & signs, snow tracking, inquiry, radio telemetry

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Boh.-Bav.	70	4'500	4'700	0	9'200	5.7 / 11.7	1.56
Carpathian	40	1'300	600	0	1'900	1.7 / 2.4	3.08
LSo	10	200	300	0	500	0.3 / 0.6	5
JMo	10	400	900	0	1'300	0.5 / 1.6	2.5
Total	*130*	*6'400*	*6'500*	*0*	*12'900*	*8.1 / 16.4*	*2.03*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Boh.-Bav.	1996		**80**	[a]	**decreasing** [b]
	2001		**60**		
Carpathian	2001		**40**		**stable**
LSo	2001		**10**	Probably less than 10 individuals.	**decreasing**
JMo	2001		**10**	No change, but very low numbers.	**stable**
Ø Total 1996-2001			**130**		

[a] In general: Only estimations, but much more objective than official hunting statistics that overestimate traditionally the lynx numbers.
[b] main reason probably poaching by hunters

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
BB/Ca/LSo/JMo	-	snow tracking, radio-tracking (Bohemian-Bavarian population), questionnaires
Institution	-	Administrations of the individual protected areas, Czech Academy of Science, Agency of Nature Protection of the Czech Republic

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
signed	ratified 1998	1993 declaration of succession

4.2. Legal status

Lynx is completely protected by law.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
BB/Ca [a]	1996	-	0	1	6	0	0	1	0	0	8	*10* [b]
	1997	-	0	0	5	0	0	0	0	0	5	*6.25* [b]
	1998	-	0	0	10	0	0	1	0	0	11	*13.75* [b]
	1999	-	0	1	5	0	0	0	0	0	6	*10* [c]
	2000	-	0	0	7	0	0	0	0	0	7	*11.7* [c]
	2001	-	0	0	6 [d] +2 [e]	0	0	0	0	0	8	*10* [c,d] */ 5* [e]
Total 1996-2001		*-*	*0*	*2*	*39* [d] *+2* [e]	*0*	*0*	*2*	*0*	*0*	*43* [d] *+2* [e]	*-*
Yearly Ø		*-*	*0*	*0.33*	*6.5* [d] */ 0.3* [e]	*0*	*0*	*0.33*	*0*	*0*	*7.2* [d] *+0.3* [e]	*10.3* [d] */ 0.8* [e]
Known mortality / 100 km² [X+O]		*-*	*0*	*0*	*0.07* [d] */ 0.02* [e]	*0*	*0*	*0*	*0*	*0*	*0.08* [d] */ 0.02* [e]	*-*

[a] all data from the Bohemian-Bavarian population, except 2 illegally killed animals from the Carpathian population in 2001
[b] if a population size of 80 animals is taken
[c] if a population size of 60 animals is taken
[d] Bohemian-Bavarian population
[e] Carpathian population

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
BB/Ca/LSo/JMo	Ministry of Environment, Ministry of Agriculture	Bodies of nature conservancy within regional authorities; authorities of the national park/protected landscape areas.	none

5. Depredation:

5.1. Depredation losses & compensation paid

Sheep, goat, cattle → statistics do not exist.

5.2. Regional & seasonal differences

Region: Potentially more conflicts with sheep in the Beskydy Mts. (Carpathians, traditional sheep breeding).
Season: Vegetation period.

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
BB/Ca/LSo/JMo		State (Ministry of Environment). District authorities are responsible for the procedure.	The kill is necessarily examined by a veterinarian and representative of the body of state nature protection.

5.4. Prevention

Population	Prevention methods	Legal measures	Illegal actions
BB/Ca/LSo/JMo	Electric fences, exceptionally sheep guarding dogs	-	-

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
BB/Ca/LSo/JMo	-	Shooting	Infrastructure development: Human settlement Infrastructure development: Tourism / recreation Infrastructure development: Road building Shooting Vehicle and train collision Limited dispersal Inbreeding Recreation / tourism

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Population numbers and range			especially Boh.-Bav. pop.
Biology and Ecology			X
Habitat status			X
Monitoring / Trends			X
Genetic status			X
Corridors			X

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Bohemian-Bavarian	vulnerable	• Public education, especially hunters • Continuation of research (telemetry, food analyses, genetics)
Carpathian	vulnerable	• Public education, especially hunters and sheep farmers • Monitoring of numbers
Laberiver Sandstone Mts. occ.	endangered	• Public education, especially hunters • Monitoring • Genetics
Jeseniky Mts. occ.	endangered	• Public education, especially hunters • Monitoring

9. Projects:

→ No current projects.

10. Contact:

Population	Name	Address
BB/Ca/LSo/ JMo	Ludek BUFKA	Sumava National Park Administration, Susicka 399, 341 92 Kasperske Hory e-mail: ludek.bufka@npsumava.cz
	Jaroslav CERVENY	Institute of Vertebrate Biology, Academy of Science of the Czech Republic, Kvetna 8, Brno e-mail: jardaryscerveny@centrum.cz

Country assessment:

The Beskydy Mts. form the western edge of the Carpathian lynx population and the only part of the Czech Republic, within the historically permanently occupied range. However, the number of lynx in the Czech Carpathian Mountains (only 3.3% of the entire Carpathians; WEBSTER, HOLT & AVIS 2001, Carpathian Ecoregion Initiative website) always depended on the situation of the population in neighbouring Slovakia (CERVENY, KOUBEK & ANDÉRA 1996, KUNC 1996). When the Carpathian population expanded to the west in the 1950s (HELL 1961), the Laberiver Sandstone Mts. were re-occupied (CERVENY, KOUBEK & ANDÉRA 1996, BENDA 1996). (Earlier observations of lynx kills in this region were probably misinterpretations of carcasses handled by foxes; e.g. in RIEBE 1994 or BENDA 1996). Animals moving west also settled in the Jeseniky Mts. and have probably even been early founders of the Bohemian-Bavarian population (CERVENY, KOUBEK & ANDÉRA 1996, CERVENY & BUFKA 1996; for information on the releases in the Bavarian Forest in 1970 see country report Germany). After a decrease during the 1970s (in the entire Czech Republic), the population in the Bohemian-Bavarian Forest was supported through a re-introduction. A total of 18 lynx (11 males and 7 females) from the Slovak Carpathians were released from 1982-89 (CERVENY & BUFKA 1996, CERVENY, KOUBEK & ANDÉRA 1996, BUFKA & CERVENY 1996).

At the end of 1995, 100-150 independent territorial individuals covering some 17'810 km² were estimated for the Czech Republic. The Bohemian(-Bavarian) population had with 70-100 animals the biggest share, the Carpathian population was estimated to be 10-15 individuals (CERVENY, KOUBEK & ANDÉRA 1996, KUNC 1996). The Jeseniky Mts. and Laberiver Sandstone Mts. occurrences, which sizes are difficult to estimate, consisted of around five and six individuals, respectively, at that time (KOUBEK & BABIČKA 1996, BENDA 1996). The peak of lynx presence in the country was reached 1997/98, with 100-150 lynx occupying an area of 22'800 km² (8'900 km² permanently, 13'900 km² occasionally; CERVENY, KOUBEK & BUFKA 1998, CERVENY, KOUBEK & BUFKA 2002). Since then, the distribution area has almost been halved (Table 2). However, the total number for 2001 is still estimated to be around 120 animals, which is a rather high estimate regarding to the trends described (Table 3.1). The populations/occurrences may be overestimated. With the exception of the Bohemian-Bavarian population, the densities calculated would otherwise be too high for a decreasing population (Table 2).

In the Czech Republic the main threat to lynx and most serious cause for the recent decrease is illegal killing (Table 8, CERVENY, KOUBEK & BUFKA 2002). Although there is only data for the Bohemian-Bavarian population (6.5 known cases per year from 1996-2001, Table 4.3), all populations and occurrences are assumed to suffer from it (CERVENY, KOUBEK & ANDÉRA 1996, KUNC 1996, BENDA 1996, KOUBEK & BABIČKA 1996, OKARMA *et al.* 2000, CERVENY, KOUBEK & BUFKA 2002). In the Bohemian-Bavarian population, which is the best studied in the Czech Republic, four out of nine radio-tagged lynx have probably been illegally shot (CERVENY, KOUBEK & BUFKA 2002). An inquiry made by the same authors revealed that 36.9% of 204 hunters asked were aware of concrete cases of illegal killings and 10.3% even admitted to killing lynx illegally. For a study the scientists were provided with more than 50 lynx skulls between 1989 and 2001 (CERVENY, KOUBEK & BUFKA 2002). (The statutory period of limitation for killing lynx is only 2 years, M. WÖLFL, pers. comm.). According to the hunters taking part in the inquiry, their reasons for killing a lynx were (i) damage / loss to game animals, (ii) trophy, hunting experience, and (iii) non-availability of shooting permits (CERVENY, KOUBEK & BUFKA 2002). The authors conclude the strict protection (Table 4.2) – according to CERVENY *et al.* (2001) lynx is a specially protected species and classed as endangered – to be totally inefficient. Therefore, KOUBEK, CERVENY & ANDÉRA (1998) drafted a management plan suggesting a zoning of the country surface into protected, legally harvested and not regulated areas (areas outside the potential distribution range). This management plan is not yet implemented (Table 4.4). Measures to reduce illegal killings would however be urgent.

Wildlife biologists from Germany, the Czech Republic and Austria proposed to connect all populations / occurrences in the Czech Republic and adjacent countries in a circle-like manner (WÖLFL *et al.* 2001). As a fact, a rim of secondary mountain ranges, which, in a metapopulation context, would allow incorporating the Bohemian-Bavarian population and the smaller occurrences into the Carpathian population, circles the central plateau of the Czech Republic. At present however, both the Jeseniky Mts. and Laberiver Sandstone Mts. occurrence seem to be rather isolated (see map; CERVENY, KOUBEK & ANDÉRA 1996, BENDA 1996). According to SCHADT *et al.* (2002b) there are suitable connections between the Bohemian-Bavarian population and the Laberiver Sandstone Mts. occurrence. Whether corridors also exist between the other lynx populations and occurrences has so far not been studied. To aggravate the situation, the contacts consider infrastructure developments in the near future (besides illegal killing) to be the major threat to the lynx in the Czech Republic (Table 6). In this context, the conservation measure "corridors" can not be considered implemented yet (Table 7).

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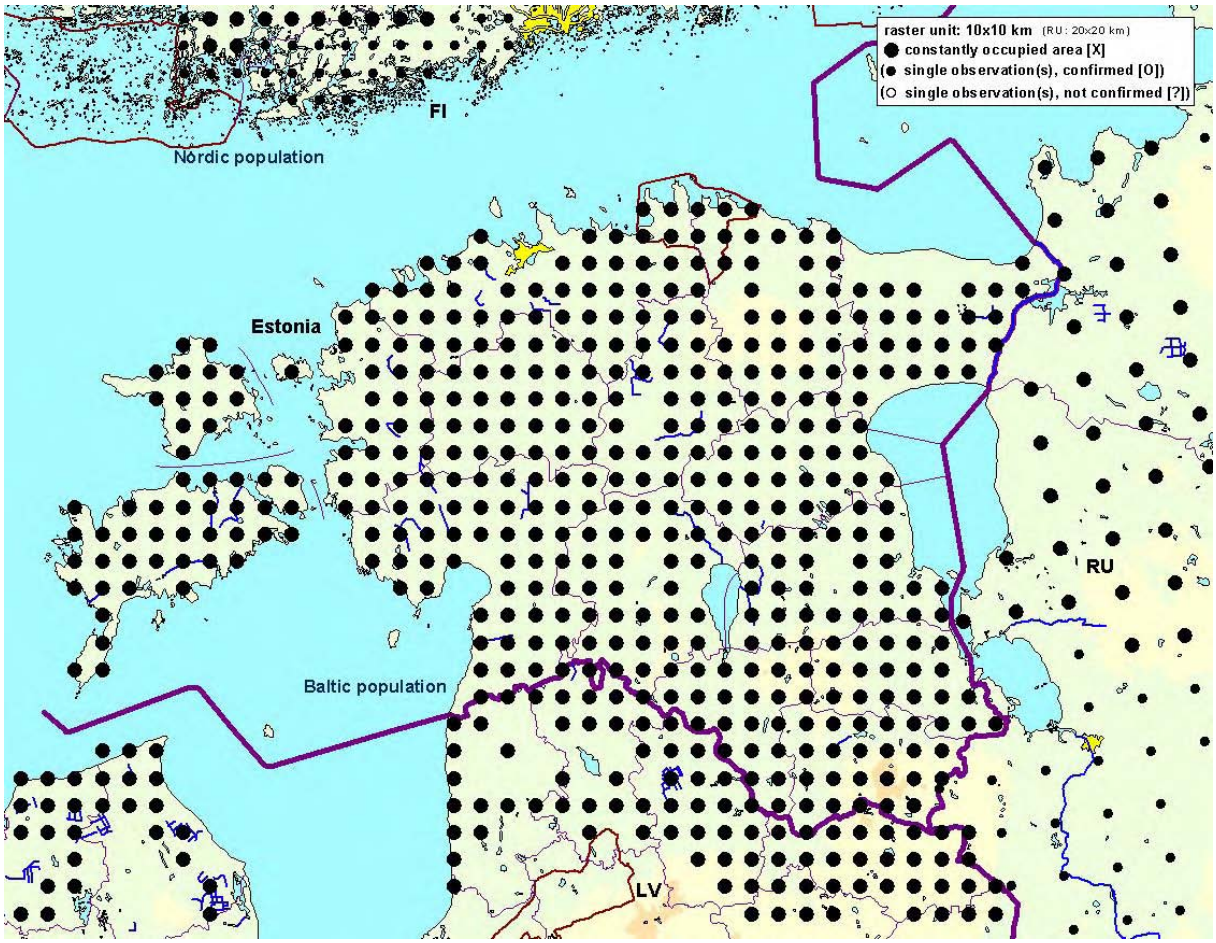
Estonia (EE)

Harri VALDMANN

Area: 45'226 km²
Forests & Woodland: 48.7 % (2000)
Human population: 1'423'316 (2001)
Population density: 31.5 / km²

1. Lynx distribution in Estonia in 2001:



Geographic range of the population(s)

Baltic population: The whole country except cities, but including the larger islands, is occupied by lynx. There is no information yet to separate permanently and occasionally occupied areas (probably in 2004). No isolated subpopulations within the country.

Methods: lynx tracks met by hunting units

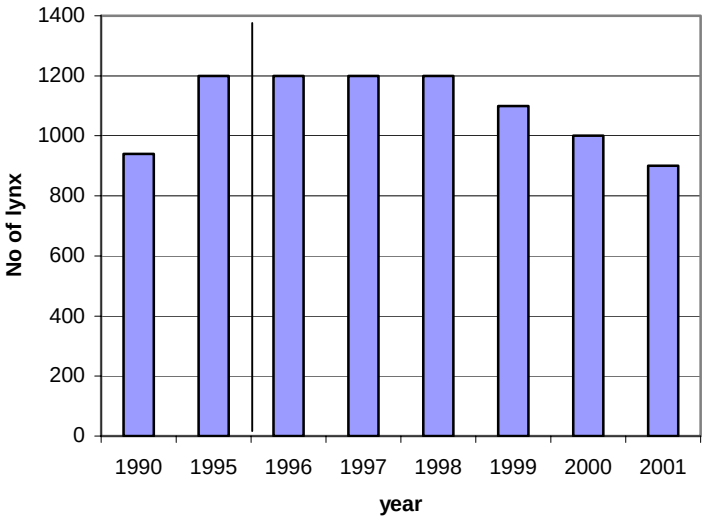
2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Baltic	1'100	42'700	0	0	42'700	94.4	2.58
Total	*1'100*	*42'700*	*0*	*0*	*42'700*	*94.4*	*2.58*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Baltic	1996	**1200**		Overestimated, probably 20 %, but hard to prove.	**decreasing** (intentional)
	1997	**1200**			
	1998	**1200**			
	1999	**1100**			
	2000	**1000**			
	2001	**900**			
Ø 1996-2001		**1100**			



Number of estimated lynx in Estonia 1996-2001 (Baltic population). The estimations for 1990 and 1995, taken from the former inquiry, are also included.

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Baltic	Hunters' estimates	Monitoring based on snow tracking. [a]
Institution	Estonian Ministry of Environment	Estonian Ministry of Environment

[a] n.d.a.: There is no agreement how this different data should be managed.

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
-	ratified 1992	ratified 1992

4.2. Legal status

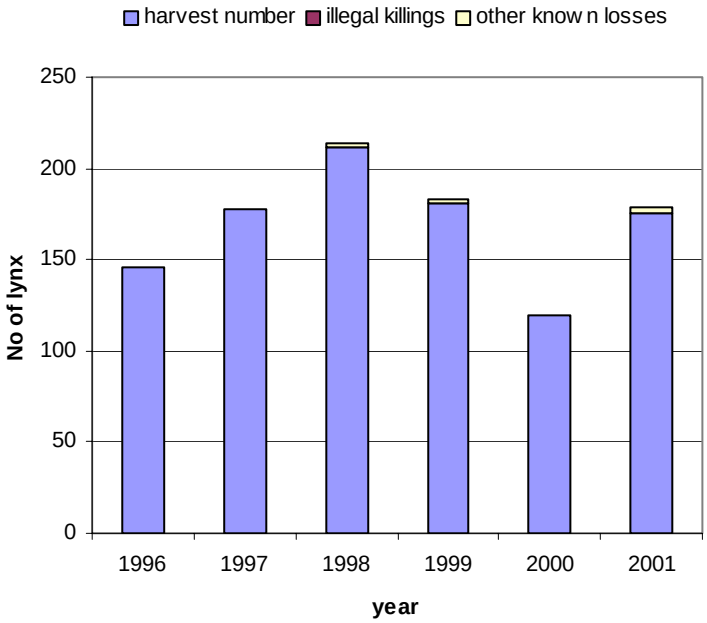
Controlled hunting and trapping of lynx.

Hunting season:	01.11. - 28.02.
Yearly quota:	Usually 100-150 animals per season; family groups are protected.
Institution responsible:	Working group in the Ministry of Environment.
Method quota setting:	As there is no reproduction data yet, it is mostly from previous years experience and monitoring data (basically all data available, sick animals etc.).
Comments:	Harvest numbers depend largely on snow conditions. Trapping is not separated from hunting in databases, but it's only occasional.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Quota	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Baltic	1996	yes	146	0	0	0	0	0	0	0	0	*146*	*12.2*
	1997	yes	178	0	0	0	0	0	0	0	0	*178*	*14.8*
	1998	yes	212	0	0	0	0	2	0	0	0	*214*	*17.8*
	1999	yes	181	0	0	0	0	2	0	0	0	*183*	*16.6*
	2000	yes	120	0	0	0	0	0	0	0	0	*120*	*12*
	2001	yes	175	1	0	0	0	3	0	0	0	*179*	*19.9*
Total 1996-2001		-	*1012*	*1*	*0*	*0*	*0*	*7* [a]	*0*	*0*	*0*	1020	-
Yearly Ø		-	*168.7*	*0.17*	*0*	*0*	*0*	*1.17*	*0*	*0*	*0*	*170*	*15.5*
Known mortality / 100 km² [X+O]		-	*0.4*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0.4*	-

[a] rabies



Number of known losses to the Baltic population in Estonia from 1996-2001.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Baltic	According to the management plan, a workgroup of large carnivores is established within the Estonian Ministry of Environment.	Hunters' associations, local branches of the Ministry of Environment.	LÕHMUS, A. 2001: Large Carnivore Control and Management Plan for Estonia, 2002-2011. [a]

[a] http://www.large-carnivores-lcie.org/blcipublic2.htm

5. Depredation:

→ No depredation losses due to lynx in Estonia from 1996-2001. No compensation systems and prevention methods are applied.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Baltic	-	-	Prey / food base

Comment: No serious threats could be foreseen except decline of its local main prey roe deer {but at the moment (2003) official numbers of roe deer have started to increase (from 30'000 to 35'000)}.

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans			X
Legislation on an international level			X
Legislation on a national level			X
Legislation on a regional level			X
Formal education			X
Capacity-building / Training			X
Population numbers and range			X
Biology and Ecology			X
Habitat status			X
Uses and harvest levels			X
Monitoring / Trends			X
Genetic status			X
Human attitude / Human dimensions	X	X	
Management of protected areas			X
Expansion of protected areas	X		
Sustainable use / Harvest management			X
Disease, pathogen, parasite management			X
Limiting population growth	X		
Genome resource bank			X

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Baltic	data deficient	• Improve monitoring system (incorporating telemetry (lacking) data)

9. Projects:

Population	Title	Duration	Contact
Baltic / (Nordic)	Large carnivores in northern landscapes: an interdisciplinary approach to their regional conservation (in collaboration with the other Baltic States, Poland and Norway).	2003-2005	Harri Valdmann: harriva@ut.ee

10. Contact:

Population	Name	Address
Baltic	Harri VALDMANN	Department of Integrative Zoology, Institute of Zoology and Hydrobology, Vanemuise 46, 51014 Tartu, Estonia e-mail: harriva@ut.ee

Country assessment:

For the Baltic population, Estonia is vital. Lynx is distributed over more or less the entire country in a comparatively high number (see map and Table 2). The densities are highest in the forests of the north and centre (LÕHMUS 2001). This corresponds well with the distribution in neighbouring Russia where the density towards the south decreases as well. In Latvia, lynx presence is most coherent along the border with Estonia and becomes scattered further south (see Latvian report). The Estonian database does not allow to separate permanently and occasionally occupied regions (see point 1). The available information is mainly derived from hunting, also the official population estimates (Table 3.2). Since 1954, an inventory has existed, though without following a coherent methodology (MÄNNIL 2002). The official population numbers are considered to be overestimated (Table 3.1, LÕHMUS 2001). When taking into account an inaccuracy of 20% (Table 3.1), the current population size would reduce to 720 animals. An additional estimate made after a census in 1999 was 450 animals, however it was supposed to be underestimated (Valdmann in LÕHMUS 2001). The disagreement on the methods to be used for the population estimates is also indicated in Table 3.2. The Estonian lynx management plan (LÕHMUS 2001, ELF 2001) makes allowances for the fact that there is quite an uncertainty regarding the census and indicates as present population size a range of 600-900 individuals. According to the management plan, the long-term aim is to maintain a population of at least 500 lynx. However, to increase the reliability and accuracy of the estimations, the monitoring needs improvement. H. VALDMANN considers this to be the most urgent measure for the lynx population in Estonia (Table 8).

More accurate numbers would allow for a better hunting management. The possibility to continue hunting (of all large carnivores) is amongst the main objectives of the management plan (LÕHMUS 2001). The lynx number is said to have to be regulated because it is regarded as threat to the public health (rabies[1]), to reduce its impact on game ungulate populations, and to preserve its shyness towards humans (ESTONIAN MINISTRY OF THE ENVIRONMENT 2000, LÕHMUS 2001). Following a peak of the lynx population in Estonia in the mid 1990s (Fig. 3.1), the number was intentionally reduced through intensive hunting (Table 3.1, MÄNNIL 2003, VALDMANN 2003). From 1996-2001, a total of 1012 lynx (which is an annual average of 169 animals) were harvested (Table 4.3), making up to 20% of the entire population considering the official figures. Taking into account that the population was likely overestimated, the loss was even higher. LÕHMUS (2001) recommends reducing hunting in the coming years to a magnitude of 10% of the official estimate. According to H. VALDMANN (pers. comm.), the harvest number for 2002 was 81 animals, less than half of the number in the year before (Table 4.3). As Estonia wants to continue regulating the lynx numbers through hunting (see above), but will recently join the European Union, the country applied for exclusion of all large carnivores from the Annexes II & IV of the Habitat Directive and inclusion to Annex V. This application has however only been met in the case of wolf (Table 4.1, ESTONIAN MINISTRY OF THE ENVIRONMENT 2000, LÕHMUS 2001). As lynx does hardly cause any damage to livestock (point 5), derogations to the Habitat Directive are difficult to fulfil. Estonia has, so far, maintained a healthy lynx population in spite of or maybe because of regulated hunting. The population clearly supports a certain harvest, and such a harvest increases the acceptance of a large carnivore species. The examples of Poland or Slovakia demonstrate that a ban on hunting may not lead to an increase of the species' abundance. A ban of hunting may also in Estonia have a counterproductive impact. What however should be considered is a diversification of the hunting management. Estonia may contribute to strengthen the population towards the south (Latvia, Lithuania and Belarus) through a reduced hunting along its southern border.

Although the knowledge on the lynx in Estonia clearly needs improvement (first research projects started a few years ago, VALDMANN 2001, 2002, 2003) we consider the status to be rather "least concern" than "data deficient" (Table 8). Even when assuming a lower population size than the official data, the population seems to be safe. Major threats are not obvious at present (Table 6), potentially maybe over-hunting could be one (LÕHMUS 2001). Due to its importance for the Baltic population west of Russia, international co-operation has to be continued (e.g. Baltic Large Carnivore Initiative) or enhanced (towards Russia). In regard to the genetic similarity of the Baltic and the Finnish lynx (see population assessments and chapter 2.2. "Phylogenetic history and subspecies"), we recommend to develop a common conservation strategy with neighbouring Russia and Finland regarding the conservation of the species in the vicinity of the Gulf of Finland.

[1] Lynx can get rabies (as indicated in Table 4.3), but lynx is not a vector species for rabies. A control of the lynx population has no effect on the rabies epidemic.

References:

BALTIC LARGE CARNIVORE INITIATIVE: http://www.large-carnivores-lcie.org/blci2.htm

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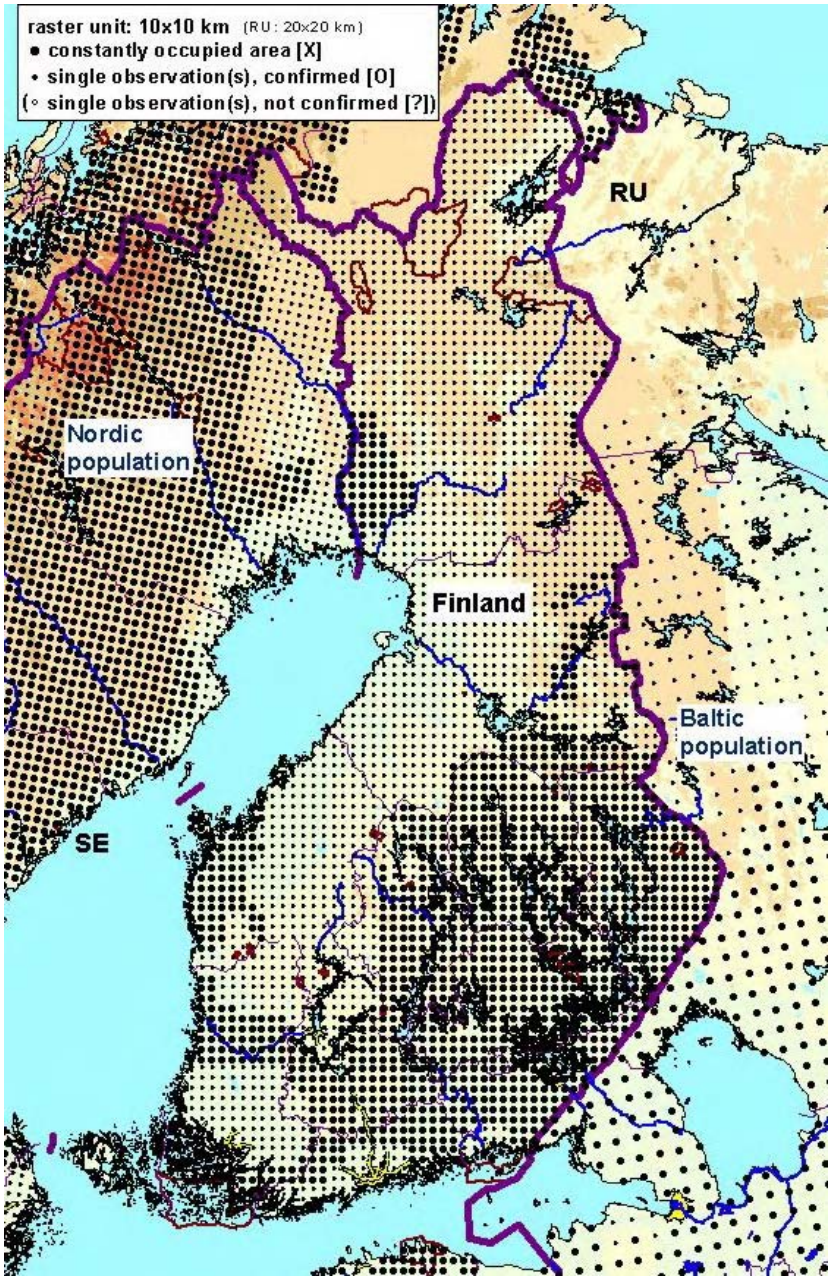
→ Proceedings of the BLCI Symposium 2001, abstracts of the 5th Baltic Theriological Congress 2002, as well as the Estonian lynx Management plan, and the ELF report can be downloaded at: http://www.large-carnivores-lcie.org/blcipublic2.htm

Finland (FI)

Ilpo KOJOLA

Area: 337’030 km²
Forests & Woodland: 72 % (2000)
Human population: 5’175’783 (2001)
Population density: 15.4 / km²

1. Lynx distribution in Finland in 2001:



Geographic range of the population(s)

Nordic population:
Whole country, permanently present particularly in the south-east.

Methods: sightings & signs, snow tracking, inquiry

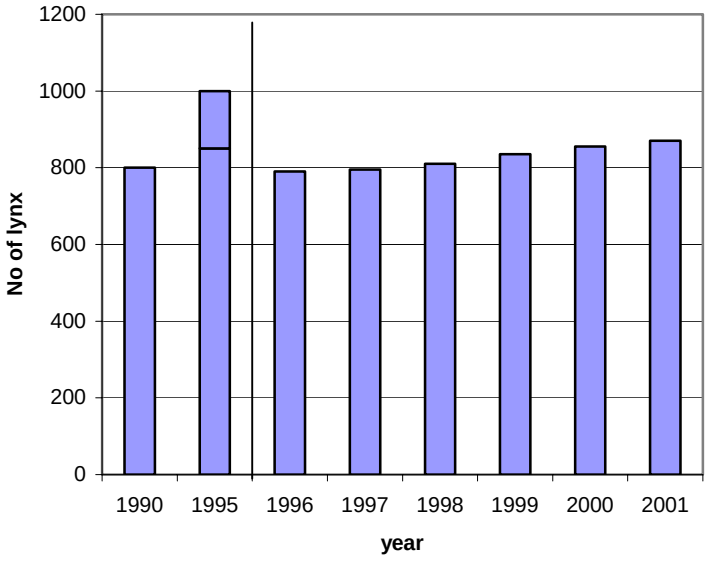
2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Nordic	826	123'900	196'900	0	320'800	36.8 / 95.2	0.67
Total	*826*	*123'900*	*196'900*	*0*	*320'800*	*36.8 / 95.2*	*0.67*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Nordic	1996	**790**		Minimum estimate, not reflecting the total population size!	**increasing & expanding**
	1997	**795**			
	1998	**810**			
	1999	**835**			
	2000	**855**			
	2001	**870**			
Ø 1996-2001		**826**			



Number of lynx in Finland from 1996-2001 (official estimations). Numbers for 1990 and 1995 from the former inquiry (1995: 850-1000 animals[a]).

[[a] There was an expert estimation of 790 animals, as well, as mentioned in the Action Plan (BREITENMOSER *et al.* 2000).]

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Nordic	Minimum estimates: number of family groups; observations recorded by 1600 large carnivore contact persons. Estimates are based on comparing geographic distances, dates of observations, and number of young between neighbouring family groups by means of GIS-modelled home ranges. The number of family groups multiplied by 6 gives the minimum estimate. Population trends are also monitored from winter track index revealed by a triangle transect scheme.	-
Institution	Finnish Game and Fisheries Research Institute	-

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
ratified 1995, with reservation	ratified 1985	ratified 1976

4.2. Legal status

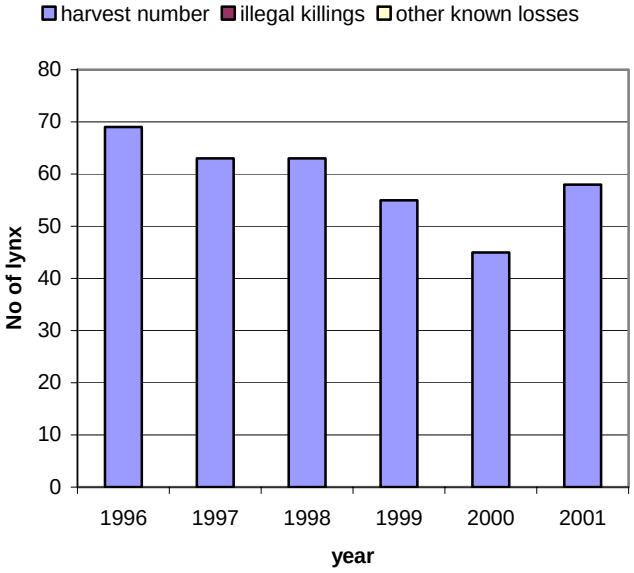
Lynx is completely protected by law. [a]

[a] Complete protection can however be derogated in accordance with article 16 of the EU Habitat Directive.

Hunting season:	-
Yearly quota:	yes, see below
Institution responsible:	Ministry of Agriculture and Forestry
Method quota setting:	The Finnish Game and Fisheries Research Institute estimates yearly population size and sustainable level. Based on this information and taking into account the policy objectives specified, the Ministry of Agriculture and Forestry (after consultation with the Ministry of Environment) defines in a yearly ordinance the maximum number of licences for each hunting district. Within these limits and other specific restrictions given in the yearly ordinance, the Game Management Districts can then issue licences, after a specific and detailed application, in situations which fulfil the derogation criteria of article 16 of the Habitat Directive.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Quota	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Nordic	1996	yes	69	0	0	0	0	0	0	0	0	*69*	*8.7*
	1997	yes	63	0	0	0	0	0	0	0	0	*63*	*7.9*
	1998	yes	63	0	0	0	0	0	0	0	0	*63*	*7.8*
	1999	yes	55	0	0	0	0	0	0	0	0	*55*	*6.6*
	2000	yes	45	0	0	0	0	0	0	0	0	*45*	*5.3*
	2001	yes	58	0	0	0	0	0	0	0	0	*58*	*6.7*
Total 1996-2001		-	*353*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*353*	-
Yearly Ø		-	*58.8*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*58.8*	*7.1*
Known mortality / 100 km² [X+O]		-	*0.02*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0.02*	-



Number of known losses to the lynx population in Finland from 1996-2001.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	**Regional level**	
Nordic	Ministry of Agriculture and Forestry	Ministry of Agriculture and Forestry	Ministry of Agriculture and Forestry 6a/1996: "Management of bear, wolf, wolverine and lynx in Finland": 43 pp. + appendices. Report of the Working Group for Large Terrestrial Carnivores. Source: Council of Environment and Natural Resources. [a]

[a] The management plan has so far supported and strengthened the positive development of the lynx population in Finland. It is planned to revise the current national management policy taking into account the Pan-European Action Plan 2000 as guideline.

5. Depredation:

5.1. Depredation losses & compensation paid

Population	Year	Sheep	Goat	Reindeer	Other species	Total	Compensation (in Euro)	Compensation other predators
Nordic	1996	0	0	92	0	92	n.d.a.	n.d.a.
	1997	0	0	131	0	131	n.d.a.	n.d.a.
	1998	0	0	97	0	97	n.d.a.	n.d.a.
	1999	0	0	86	0	86	n.d.a.	n.d.a.
	2000	0	0	136	0	136	n.d.a.	n.d.a.
	2001	0	0	127	0	127	n.d.a.	n.d.a.
Total 1996-2001		*0*	*0*	*669*	*0*	*669*	*n.d.a.*	*n.d.a.*

5.2. Regional & seasonal differences

None; depredation occurs throughout the year.

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
Nordic	Government's decree on compensation of large carnivore damage (15 March 2000): Compensation is paid by the state for verified damage if the value of damage is over 250 Euro. It has to be applied for by a written procedure.	The state in the frame of its budget.	All cases are documented and verified by the police or municipal officials.

5.4. Prevention

Population	Prevention methods	Legal measures	Illegal actions
Nordic	E.g. electric fences, guarding.	Derogations in accordance with article 16 of the EU Habitat Directive.	None.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Nordic	-	-	Prey / food base Pathogens / parasites

Comment: There are no real threats, which could negatively affect the increasing and expanding Finnish lynx population, except hard winter conditions and diseases due to the population density.

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans			X
Legislation on an international level			X
Legislation on a national level			X
Public involvement	X		
Formal education			X
Awareness			X
Capacity-building / Training			X
Taxonomy			X
Population numbers and range			X
Biology and Ecology			X
Uses and harvest levels			X
Monitoring / Trends			X
Genetic status			X
Human attitude / Human dimensions	X		
Sustainable use / Harvest management			X
Disease, pathogen, parasite management			X

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Nordic	least concern	• Public attitudes in relation to the Habitat Directive

9. Projects:

→ No current projects.

10. Contact:

Population	Name	Address
Nordic	Ilpo KOJOLA	Finnish Game and Fisheries Research Institute, Tutkijantie 2 A, 90570 Oulu e-mail: ilpo.kojola@rktl.fi

Country assessment:

In 1950, no lynx were left in Finland. Due to an intense immigration from Russia, most pronounced in the 1960s, the south-east of the country was recolonised (PULLIAINEN 1992). This region has since then always been – and still is – the core area of the Finnish population with the highest lynx densities (PULLIAINEN 1992, PULLIAINEN, LINDGREN & TUNKKARI 1995; see distribution map). The long-term increasing trend is still continuing (BREITENMOSER & BREITENMOSER-WÜRSTEN 1990, KARIVALO 1995, BREITENMOSER *et al.* 2002). In the late 1980s, some 500 animals were supposed to roam the country. They expanded to the south-west and the north (BREITENMOSER & BREITENMOSER-WÜRSTEN 1990, PULLIAINEN, LINDGREN & TUNKKARI 1995), so that more or less the whole country was gradually occupied. From 1996-2001, the estimated number of lynx increased from 790 to 870 (Table 3.1). Lynx has never been abundant in the northern regions (see map; also PULLIAINEN 1992). As reindeer husbandry is common in northern Finland, lynx densities might always be kept low to avoid conflicts. The MINISTRY OF AGRICULTURE AND FORESTRY (2002) states: "Large Predators are relatively rare in Finland. The economic damage they cause and the threat they pose to humans is considered to be significant". In 2000, the total compensation paid for killed sheep by large carnivores was 84'100 Euro, for reindeer 1'000'000-1'700'000 Euro (MINISTRY OF AGRICULTURE AND FORESTRY 2002). Although depredation by lynx is by far not as extensive as in Sweden and Norway (see respective reports), 353 lynx have been hunted from 1996-2001 (Table 4.3). Since 1980 the harvest number has steadily increased: three-fold from 1980-1990 (totally 497 lynx killed; PULLIAINEN, LINDGREN & TUNKKARI 1995), and from 1990-95, a total of 330 lynx were killed (information from the former inquiry, BREITENMOSER *et al.* 2000). The 353 lynx hunted from 1996-2001 indicate that the harvest continued at about the same level in spite of the fact that the lynx was given legal protection after the ratification of the EU Habitat Directive. The continued expansion and increase of the population indicates however that the present harvest in Finland is sustainable.

As in previous reports, we attributed the lynx in Finland to the Nordic population. Recent genetic investigations however indicate that they have actually more similarities with the Baltic population (HELLBORG *et al.* 2002, BREITENMOSER-WÜRSTEN & OBEXER-RUFF 2003). This is not surprising when taking into consideration the current distribution map and the ways the country was recolonised (see above). The taxonomic status of the subspecies *Lynx lynx lynx* needs to be reconsidered, also regarding the obvious ecological differences between lynx from Norway and Sweden and lynx from north-eastern Europe. Different to the lynx in Scandinavia, where the animals feed mainly on roe deer, in Finland and neighbouring Russia, where this prey species is practically not available, hares are the most important prey. In the south-west of Finland, lynx' diet is completed by introduced white tailed deer, which have become as important as hares (PULLIAINEN, LINDGREN & TUNKKARI 1995).

Due to the results from the genetic analysis, HELLBORG *et al*. (2002) recommended to manage the Finnish lynx separately from the Nordic population. Hence, international co-operation should be established with Russia and the Baltic states, but needs to be continued with Sweden and Norway, as the distribution ranges in the north still merge.

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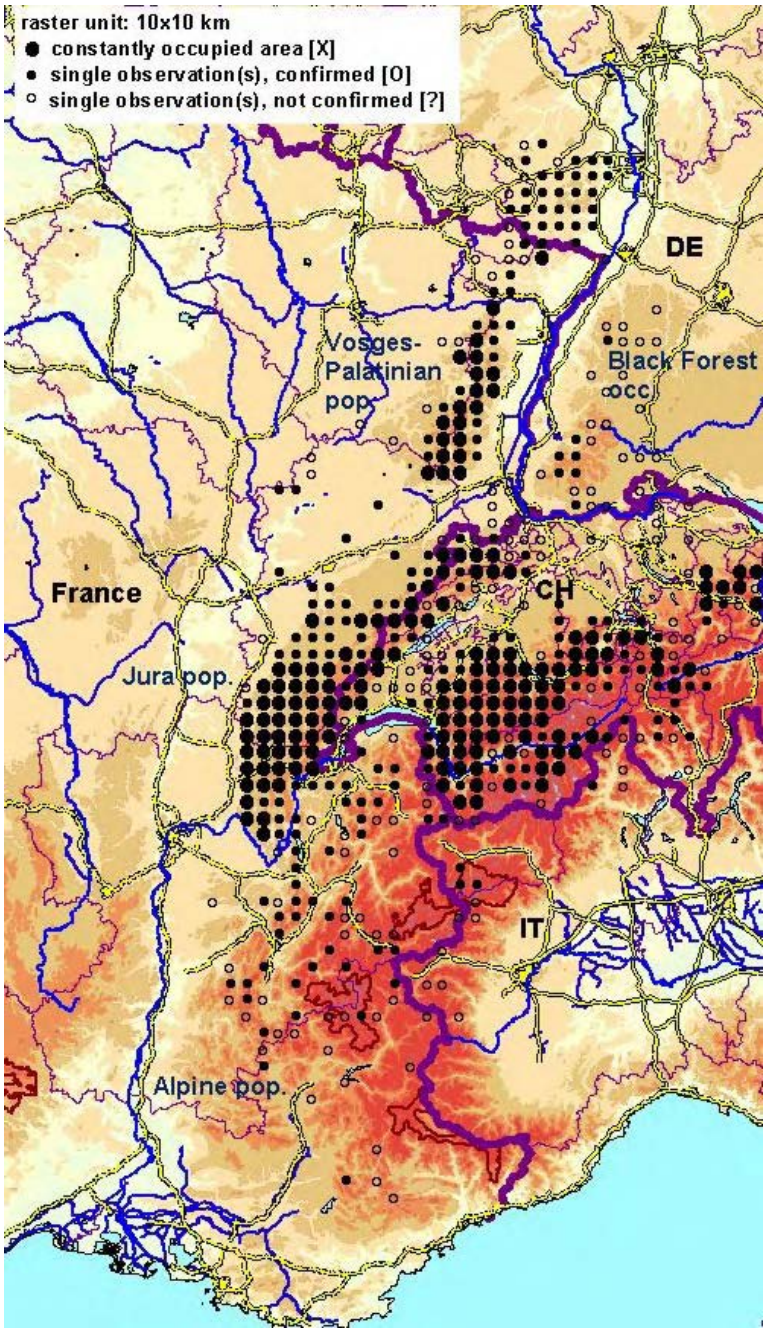
France (FR)

Jean-Michel VANDEL, Eric MARBOUTIN, Philippe STAHL & Pierre MIGOT

Area: 547'030 km²
Forests & Woodland: 27.9 % (2000)
Human population: 59'551'227 (2001)
Population density: 108.9 / km²

1. Lynx distribution in France in 2001:



Geographic range of the population(s)

Jura population:
Jura Mts., central-eastern France north of the Rhone.

Vosges-Palatinian population:
Vosges Mts., north-eastern France: The area of lynx presence increased in the range of the South and Central Vosges Mts., whereas in the North Vosges Mts. the number of collected data decreased in spite of the presence of new correspondents in this region.

Alpine population:
Since 1995, the collected data have indicated the expansion of the species to the south as far as to the department of Hautes-Alpes, however, no establishment of a population yet.

The available data do not allow enumerating the lynx populations in France. Therefore, the given information only concern the evolution of the areas of lynx presence. It is very difficult to make an exact diagnosis for the French Alps: The area of lynx presence is probably underestimated.

Methods: sightings & signs, snow tracking, unspecific survey, radio telemetry (9 lynx were followed by means of radio-tracking between 1995-1999 in the Jura Mts.). Specifically, lynx presence was studied with data from the "réseau lynx" [network of trained local correspondents who collect, verify and transmit data to departmental coordinators, Eds.].

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Jura	47	5'300	3'000	800	8'300	1 / 1.5	0.89
Vosges	16	2'000	1'500	1'300	3'500	0.4 / 0.6	0.8
Alpine	a few individuals	0	4'500	3'800	4'500	0 / 0.8	-
Total	*63*	*7'300*	*9'000*	*5'900*	*16'300*	*1.3 / 3*	-

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Jura	1998		**40**	The available data do not allow to propose an even approximate yearly estimation. The numbers here have to be considered as minimum numbers while the available data do not allow to estimate maximum numbers. [b, c]	**expanding**
	2001		**54**		
Vosges-Palatinian	1998		**14**		**expanding** (apart from the North Vosges) [a]
	2001		**18**		
Alpine	1996-2001	**a few single individuals**			**expanding**
Ø Total 1996-2001			**63**		

[a] The area of lynx presence increased in the range of the South and Central Vosges Mts. whereas in the North Vosges Mts. the number of collected data decreased in spite of the presence of new correspondents in this region.
[b] If taking into consideration the temporary and/or recent area of presence the upper limits are as follows: Jura = 94, Vosges = 37, and Alps = 56 individuals (E. MARBOUTIN, pers. comm.).
[c] unit = number of adults in wintertime

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Ju/Vos/Alp	-	The available data allow giving a minimum number by extrapolating the lynx density identified in the Swiss Jura Mts. (1 lynx /100 km^2) to the area of regular presence identified during the surveys in 1998 and 2001.
Institution	-	Office national de la chasse et de la faune sauvage

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
ratified 1992	ratified 1990	ratified 1978

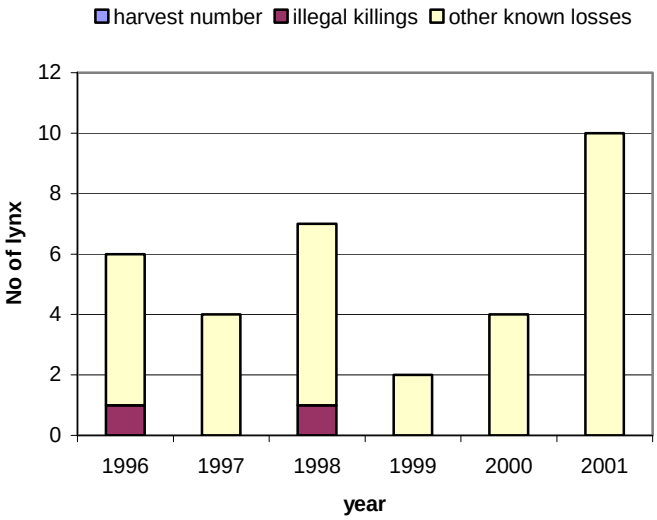
4.2. Legal status

Lynx has been fully protected by law since 1976. Removal of problem animals.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Jura	1996	-	1	0	1	0	0	1	1	1	*5*	*12.5* [a]
	1997	-	3	0	0	0	0	0	0	0	*3*	*7.5* [a]
	1998	-	3	0	1	1	1	0	1	0	*7*	*17.5* [a]
	1999	-	1	0	0	0	0	0	0	0	*1*	*2.5* [a]
	2000	-	3	0	0	0	0	1	0	0	*4*	*7.4* [b]
	2001	-	4	2	0	1	0	0	2	0	*9*	*16.7* [b]
Total 1996-2001		-	*15*	*2*	*2*	*2*	*1*	*2*	*4*	*1*	*29*	-
Yearly Ø		-	*2.5*	*0.33*	*0.33*	*0.33*	*0.17*	*0.33*	*0.67*	*0.17*	*4.83*	*10.3*
Known mortality / 100 km² [X+O]		-	*0.03*	*0.004*	*0.004*	*0.004*	*0.002*	*0.004*	*0.01*	*0.002*	*0.06*	-
Vosges-Palatinian	1996	-	0	0	0	0	0	0	1	0	*1*	*7.1* [a]
	1997	-	1	0	0	0	0	0	0	0	*1*	*7.1* [a]
	1998	-	0	0	0	0	0	0	0	0	*0*	*0*
	1999	-	0	0	0	0	0	0	0	0	*0*	*0*
	2000	-	0	0	0	0	0	0	0	0	*0*	*0*
	2001	-	0	0	0	0	0	0	0	0	*0*	*0*
Total 1996-2001		-	*1*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*2*	-
Yearly Ø		-	*0.17*	*0*	*0*	*0*	*0*	*0*	*0.17*	*0*	*0.33*	*2.1*
Known mortality / 100 km² [X+O]		-	*0.005*	*0*	*0*	*0*	*0*	*0*	*0.005*	*0*	*0.01*	-
Alpine	1996	-	0	0	0	0	0	0	0	0	*0*	*n.a.*
	1997	-	0	0	0	0	0	0	0	0	*0*	*n.a.*
	1998	-	0	0	0	0	0	0	0	0	*0*	*n.a.*
	1999	-	0	0	0	0	0	1	0	0	*1*	*n.a.*
	2000	-	0	0	0	0	0	0	0	0	*0*	*n.a.*
	2001	-	1	0	0	0	0	0	0	0	*1*	*n.a.*
Total 1996-2001		-	*1*	*0*	*0*	*0*	*0*	*1*	*0*	*0*	*2*	-
Yearly Ø		-	*0.17*	*0*	*0*	*0*	*0*	*0.17*	*0*	*0*	*0.33*	*n.a.*
Known mortality / 100 km² [X+O]		-	*0.004*	*0*	*0*	*0*	*0*	*0.004*	*0*	*0*	*0.007*	-

[a] when the estimation of 1998 is taken (Jura: 40 animals, Vosges: 14)
[b] when the estimation of 2001 is taken (Jura: 54 animals)



Number of known losses to the lynx populations in France from 1996-2001. Mainly affected was the Jura population (29 of totally 33 lynx). In the category "other known losses" N=17 lynx died due to traffic accidents.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Ju/Vos/Alp	Ministère de l'Environment, Office national de la chasse et de la faune sauvage	Services départementaux de l'Etat (State department services)	Anonyme 2000: Protocole d'élimination de lynx pour limiter des dégats répétés sur le cheptel domestique. Ministère de l'Environment, 2pp.

5. Depredation:

5.1. Depredation losses & compensation paid

Population	Year	Sheep	Goat	Rein-deer	Other species	Total	Compensation (in Euro)	Compensation other predators
Ju (/Vos/Alp)	1996	96	9	-	0	105	0 €	n.d.a.
	1997	147	1	-	0	148	0 €	n.d.a.
	1998	170	3	-	0	173	58'231 €	n.d.a.
	1999	214	0	-	0	214	55'640 €	n.d.a.
	2000	197	5	-	0	202	53'515 €	n.d.a.
	2001	156	1	-	0	157	31'020 €	n.d.a.
Total 1996-2001		*980*	*19*	-	*0*	*999*	*198'406 €*	*n.d.a.*

5.2. Regional & seasonal differences

Region: 95% of the cases in the period from 1996-2001 were located in the Jura Mts. (n=732), 3% in the Vosges Mts. (n=24) and 2% in the Alps (n=15). In the south of the department of Jura and in the west of the department of Ain, 9 particular sectors of small areas concentrated every year since 1989 the majority of the damages.
Season: Basically April to November. The monthly distribution of damage varied in subsequent years.

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
Ju/Vos/Alp	Financial compensation of damage assessed by the correspondents of the "réseau lynx": Judgement according to technical elements observed by the correspondent during visit at place. In case of a disagreement between livestock breeder and correspondent, a departmental commission takes the decision for or against compensation payment.	Ministère de l'Environment	Technical elements that allow a judgement are very exactly recorded. A technical opinion is then given: attack confirmed to lynx (100% compensation) or probable/doubtful (75% compensation) or not confirmed/examination not possible.

5.4. Prevention

Population	Prevention methods	Legal measures	Illegal actions
Ju/Vos/Alp	Financial compensation, abandonment of parks at risk during the night, placement of guarding dogs. The latter two measures are however difficult to establish in the context of the sheep breeding in the Jura Mts. The establishment of a guarding dog falls under the financial responsibility of the breeder.	Several permissions for the removal of lynx have been given by the Ministry of Environment to prevent further attacks in places of exploitation concerned by repeated attacks (2 adult lynx).	A minimum of two adult lynx were illegally killed in the sectors where there have been repeated attacks. It is difficult to say whether these two animals have been victims of livestock breeders or hunters.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Jura	-	-	-
Comment: In the Jura Mts. the area of lynx presence increased from 1998-2001 in spite of several cases of illegal and legal eliminations of lynx. The lynx population in this region has therefore endured these losses and those that have not been noticed.			
Vosges-Palatinian	Shooting	Shooting	Shooting
Comment: In the Vosges Mts. poaching could present a far more important threat than in the Jura Mts. In this region the lynx population is numerically lower than in the Jura, the hunting pressure is more important, and the mode of hunting (stalking or raised hide) more adapted to observe and shot lynx than in the Jura (collective hunting with hounds).			
Alpine	-	-	-
Comment: The available data do not allow knowing the possible threats that could affect the lynx population in the Alps.			

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans		X	
Legislation on an international level			X
Legislation on a national level			X
Legislation on a regional level			X
Population numbers and range			X
Biology and Ecology			X
Monitoring / Trends			X
Human attitude / Human dimensions			X
Re-introductions			Vosges Mts.

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Jura	least concern	• Test new prevention measures to protect livestock herds
Vosges-Palatinian	vulnerable	• Determine the points of opposition of the hunters (sociological study) • Re-introduction of lynx to the North Vosges or the Palatinian
Alpine	data deficient	• Improve the knowledge of the population status, the potential habitat and the possibilities of connections between favourable massifs

Comment: A restoration plan for the lynx populations in France is currently going to be developed.

9. Projects:

→ No current projects.

10. Contact:

Population	Name	Address
Ju/Vos/Alpine	Jean-Michel VANDEL	Office national de la chasse et de la faune sauvage, CNERA PAD, Montfort, F-01 330 Birieux e-mail: jean-michel.vandel@oncfs.gouv.fr
Collaborators:	Eric MARBOUTIN	Office national de la chasse et de la faune sauvage, CNERA PAD, Montfort, F-01 330 Birieux e-mail: eric.marboutin@oncfs.gouv.fr
	Philippe STAHL	Office national de la chasse et de la faune sauvage, CNERA PAD, Montfort, F-01 330 Birieux
	Pierre MIGOT	Office national de la chasse et de la faune sauvage, CNERA PAD, Montfort, F-01 330 Birieux

Country assessment:

In France, lynx is currently present in three different mountain regions: the Jura, the Vosges, and the Alps. Whereas the occurrences in the Jura and Alps stem from immigrating animals from the re-introductions in Switzerland in the 1970s, 21 lynx were re-introduced in the Vosges Mts. between 1983 and 1993 (STAHL, VANDEL & MIGOT 2000, 2002). From the Pyrenean lynx population – still considered questionable in all earlier pan-European reports – all signs of presence have been missing since ages, and the population is now considered to be extinct (STAHL & VANDEL 1999). Indeed, STAHL & VANDEL (1998b) concluded in their review that the lynx in the Pyrenees has disappeared already in the 1940s. Extinction seems as well to have been the fate of the Metz occurrence (BREITENMOSER *et al.* 2000) in the Western Lorraine, where indications are now absent (contacts, pers. comm.)

Since 1974 lynx has spread into the French Jura Mts. (STAHL & VANDEL 1998a). A big part of the forested parts have already been settled, a progression is nevertheless still possible (STAHL, VANDEL & MIGOT 2002). The French part of the Jura Mts. presents two third of the entire population and its status is, according to the contacts' judgement, considered to be at least concern (Table 8). Considering the three populations within France, the Jura population is indeed the largest one. In the pan-European context, the Jura population is nevertheless still to be considered "endangered", even when an upper limit of 94 animals (Table 3.1) is taken as a basis.

The lynx occurrence in the French Alps depends on individuals immigrating from the Jura Mts. and/or from the Swiss Alps; the real colonisation pattern is not yet known. Although the area occupied steadily increased over the past few years, the distribution is still very scattered over space. Only from the northern part (north of Grenoble), lynx signs have been regularly collected for the last 15 years (VANDEL, STAHL, MIGOT & MARBOUTIN 2003). This area is however fragmented by high altitude ridges and urbanised valleys, the habitat further south is actually considered much more favourable for lynx (very large continuous forests, no important natural barriers; STAHL & VANDEL 1998a, 2001). There has been a southward expansion in time, but no continuous area seems to be settled so far (STAHL & VANDEL 1998a). The occurrences in the Alps cannot be considered a reproductive population yet (STAHL & VANDEL 1999, STAHL, VANDEL & MIGOT 2002). However, as the contacts point out (point 1), the lynx range in the Alps might be underestimated (see also VANDEL, STAHL, MIGOT & MARBOUTIN 2003). According to the Pan-Alpine Conservation Strategy for the Lynx (MOLINARI-JOBIN *et al.* 2003), the presence of a large population in the French Alps is still improbable even if the range is underestimated. A viable population will probably only become established if lynx colonise the large forested regions in the southern Alps. The habitat suitability for lynx including the potential connectivity (immigration) should therefore be analysed (see also Table 8).

The Vosges population consists at present in a larger patch in the south and a very small one in the north, the last actually better connected to the Palatinian Forest occurrence than to the southern Vosges Mts. (see map). There has been evidence of more than 30 reproductions in the southern Vosges between 1992 and 1998, but the signs of lynx presence in the north are very irregular. The status of the population remains fragile, particularly as human induced mortality seems to be important in the whole region (STAHL, VANDEL & MIGOT 2002). The two distribution patches have to be re-connected, especially as the expansion potential to the east (Rhine valley) and probably also to the west (fragmented forest massifs) is limited (STAHL, VANDEL & MIGOT 2002). A possible goal would be to connect the Vosges-Palatinian population with the Jura population (which in turn is probably connected to the

Alps). As long as the connections to the north and south are not secured and the Vosges mountains remain isolated, we consider the Vosges-Palatinian population to be critically endangered.

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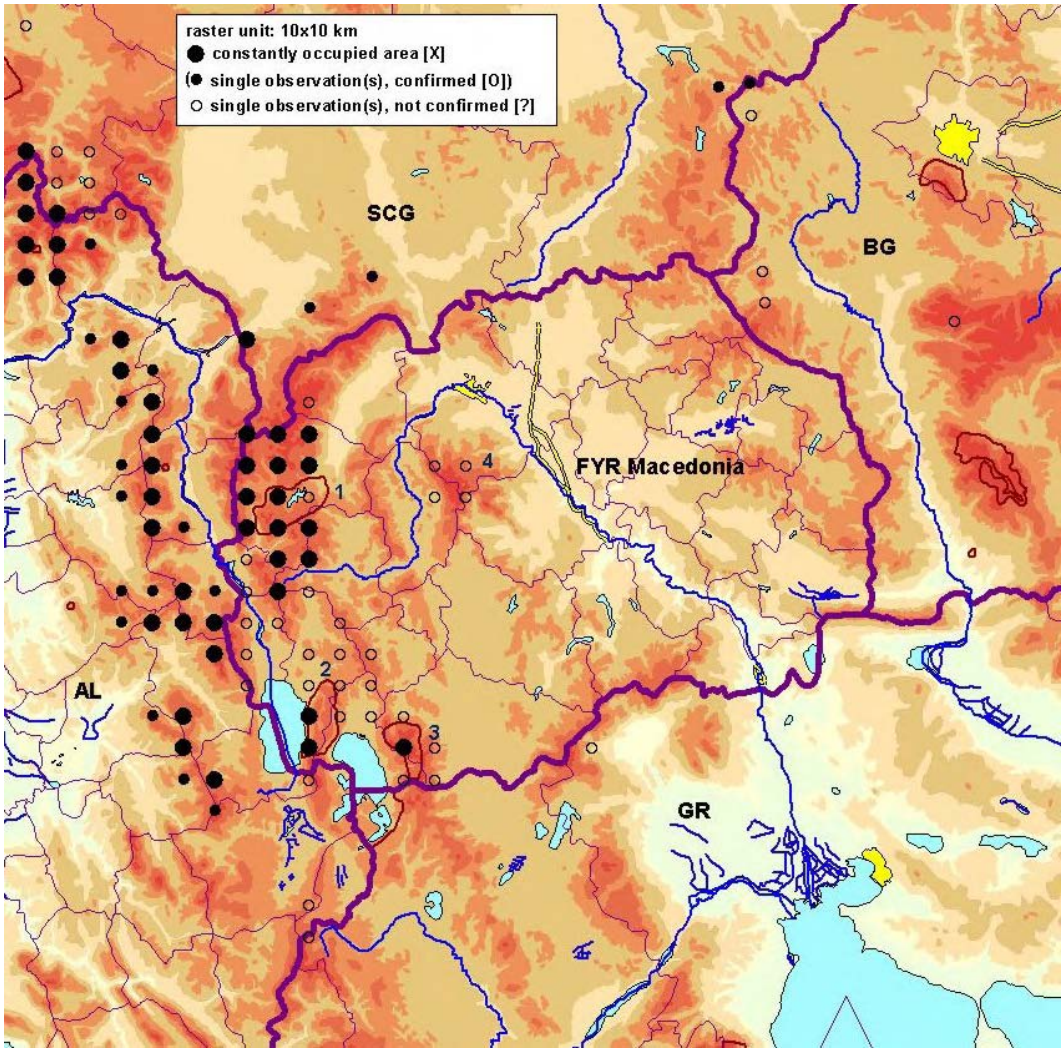
FYR Macedonia (MK)

Miso HRISTOVSKI & Dragan ANGELOVSKI

Area: 25'333 km²
Forests & Woodland: 35.6 % (2000)
Human population: 2'046'209 (2001)
Population density: 80.8 / km²

1. Lynx distribution in FYR Macedonia in 2001:



Geographic range of the population(s)

Balkan population: 1. Mavrovo NP (~30 individuals), 2. Galicica NP (1-3 individuals), 3. Pelister NP (1-3 individuals), (4. Jakupica Mts.).

Methods: sightings & signs, unspecific survey

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Balkan	~35	1'700	0	2'600	1'700	6.7	2.06
Total	*~35*	*1'700*	*0*	*2'600*	*1'700*	*6.7*	*2.06*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Balkan	1999	**35**			**decreasing**
	2000	**35**			
Ø 1996-2001		**35**			

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Balkan	Survey and continuous field monitoring.	-
Institution	National park management and independent NGO inquiry	-

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
signed	ratified 1998	ratified 2000

4.2. Legal status

Lynx has been fully protected by law since 1973.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Balkan	1996	-	0	0	0	0	0	0	0	0	*0*	*0*
	1997	-	0	0	0	0	0	1	0	0	*1*	*2.86*
	1998	-	0	0	0	0	0	0	0	0	*0*	*0*
	1999	-	0	0	0	0	0	0	0	0	*0*	*0*
	2000	-	0	0	0	0	0	0	0	1 [a]	*1*	*2.86*
	2001	-	0	0	0	0	0	0	0	0	*0*	*0*
Total 1996-2001		*-*	*0*	*0*	*0*	*0*	*0*	*1*	*0*	*1*	*2*	*-*
Yearly Ø		*-*	*0*	*0*	*0*	*0*	*0*	*0.17*	*0*	*0.17*	*0.33*	*0.94*
Known mortality / 100 km² [X+O]		*-*	*0*	*0*	*0*	*0*	*0*	*0.01*	*0*	*0.01*	*0.02*	*-*

[a] deaths from waste consumption

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	**Regional level**	
Balkan	Ministry of Agriculture and Forestry	National Parks, Hunting Associations	none

5. Depredation:

5.1. Depredation losses & compensation paid

→ No depredation losses due to lynx in FYR Macedonia from 1996-2001.

5.2. Regional & seasonal differences

-

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
Balkan	Cash payment; amount depending on the value of the animal.	Ministry of Agriculture	Examination by national park authorities or forestry police.

5.4. Prevention

→ There are no prevention methods applied in the country.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Balkan	Extraction of wood Infrastructure development: Tourism / recreation Inbreeding Restricted range Recreation / tourism War / civil unrest Other: Feeding at urban waste collection centres	Extraction of wood Infrastructure development: Tourism / recreation Prey / food base Inbreeding Restricted range Recreation / tourism War / civil unrest Other: Feeding at urban waste collection centres	Extraction of wood Infrastructure development: Tourism / recreation Competitors Prey / food base Inbreeding Restricted range Recreation / tourism Other: Feeding at urban waste collection centres

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans	X		
Legislation on an international level	X		
Legislation on a national level			X
Legislation on a regional level			X
Public involvement	X		
Formal education	X		
Awareness	X		
Capacity-building / Training	X		
Taxonomy	X		
Population numbers and range	X		
Biology and Ecology	X		
Habitat status	X		
Threats	X		
Conservation measures		X	
Monitoring / Trends	X		
Genetic status	X		
Human attitude / Human dimensions	X		
Maintenance / Conservation	X		
Restoration	X		
Corridors	X		
Identification of new protected areas	X		
Establishment of protected areas			X
Management of protected areas			X
Expansion of protected areas	X		
Community-based initiatives	X		
Re-introductions	X		
Recovery management	X		

Conservation measure (cont.)	Lacking / proposed	Drafted / ratified	Implemented / applied
Disease, pathogen, parasite management	X		
Limiting population growth	X		
Captive breeding / Artificial propagation	X		
Genome resource bank	X		

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Balkan	vulnerable	• Raising of public awareness in lynx habitats • Enforcement of the hunting law • Habitat conservation • Public education

9. Projects:

→ No current projects.

10. Contact:

Population	Name	Address
Balkan	Miso HRISTOVSKI	St. Kozle 88/2/3, MK-1000 Skopje e-mail: hristovskim@hotmail.com
Collaborator:	Dragan ANGELOVSKI	Bul. Jane Sandanski 76/1, MK-1000 Skopje e-mail: angelovski@mt.net.mk

Country assessment:

As no distribution map was available, information from HRISTOVSKI (2001) and MELOVSKI & HRISTOFSKI (2002) were used. The maps in these two reports though greatly differ. Therefore, we only considered an area constantly occupied by lynx if so indicated in both references. The symbol for single, not confirmed observations [?] was set where only the ARCTUROS (2002) report indicated lynx presence. It seems that lynx in FYR Macedonia is currently restricted to three isolated national parks only. The two parks in the south however host a very small part of the population, whereas around 95% of the animals are located in and around Mavrovo NP (HRISTOVSKI 2001). Only ten years ago, lynx is supposed to have covered the whole western range of FYR Macedonia, thus there has been a strong decline since (HRISTOVSKI 2001). Especially (but not only) outside the national parks, illegal woodcutting and illegal killing of animals (large carnivore and their prey species) is widespread (HRISTOVSKI 2001, MELOVSKI & HRISTOFSKI 2002). Although the contacts did not put it into the list of major threats (Table 6), law enforcement is considered an urgent conservation measure (Table 8). As a matter of fact, there have not been any known losses of lynx due to illegal acts (Table 4.3). Nevertheless, MELOVSKI & HRISTOFSKI (2002) mention that at least 20 lynx have been illegally killed between 1990 and 1999. According to this, and to statements in the above-mentioned reports, we indeed believe illegal killing to be an important threat to the lynx in FYR Macedonia.

There is obviously not much known about other threats, too; some of those mentioned seem to be rather anecdotic (e.g. death due to waste consumption).

Information on population numbers published in the ARCTUROS (2002) report also greatly differs from the data offered by our contact (Arcturos: 50-60 individuals with positive trends against 30-35 animals with decreasing tendency, this survey). The main current nucleus is in the Mavrovo NP which is 740 km². Even taking the pessimistic estimation, the resulting population density would be surprisingly high: 30 animals are considered to live in this range, hence around 4 lynx per 100 km² (2 lynx per 100 km² for the whole population across the entire range). Considering that ecological impoverishment is a problem (see 6. Major threats), it is hard to believe that there is such good lynx abundance, let alone even better. Between 1993 and 2000, park wardens from Mavrovo NP reported 8 lynx sightings (3 dead animals, 3 observations, twice lynx tracks; HRISTOVSKI 2001), rather few considering the observation density in a national park. GRUBAĈ (2002) estimated the Macedonian population also to consist of 35-40 animals, however including the Jakupica Mts. in the north-central part of the country (indicated by [?] in the distribution map).

Compared to the former inquiry (when no population estimation was possible at all; BREITENMOSER *et al.* 2000) there is now more information available on the situation of lynx in FYR Macedonia. But still, there are many uncertainties, as seen above. The monitoring needs to go on and to be improved. The population is clearly very fragile, but nevertheless of crucial importance for the entire Balkan population (see population report and reports for the neighbouring countries). Especially the information base outside national parks needs to be improved and measures taken to merge the isolated distribution patches. A connection with the occurrences in Albania, and therefore international co-operation, must receive high priority. Within FYR Macedonia, law enforcement to protect both the predator and its prey species should be pushed and further habitat degradation strictly limited. Even if the political and economic situation seems not be favourable for nature conservation, we think that the charismatic lynx could act as a flagship species not only for habitat and species recovery programmes, but to build coalitions to conserve the natural heritage of this region.

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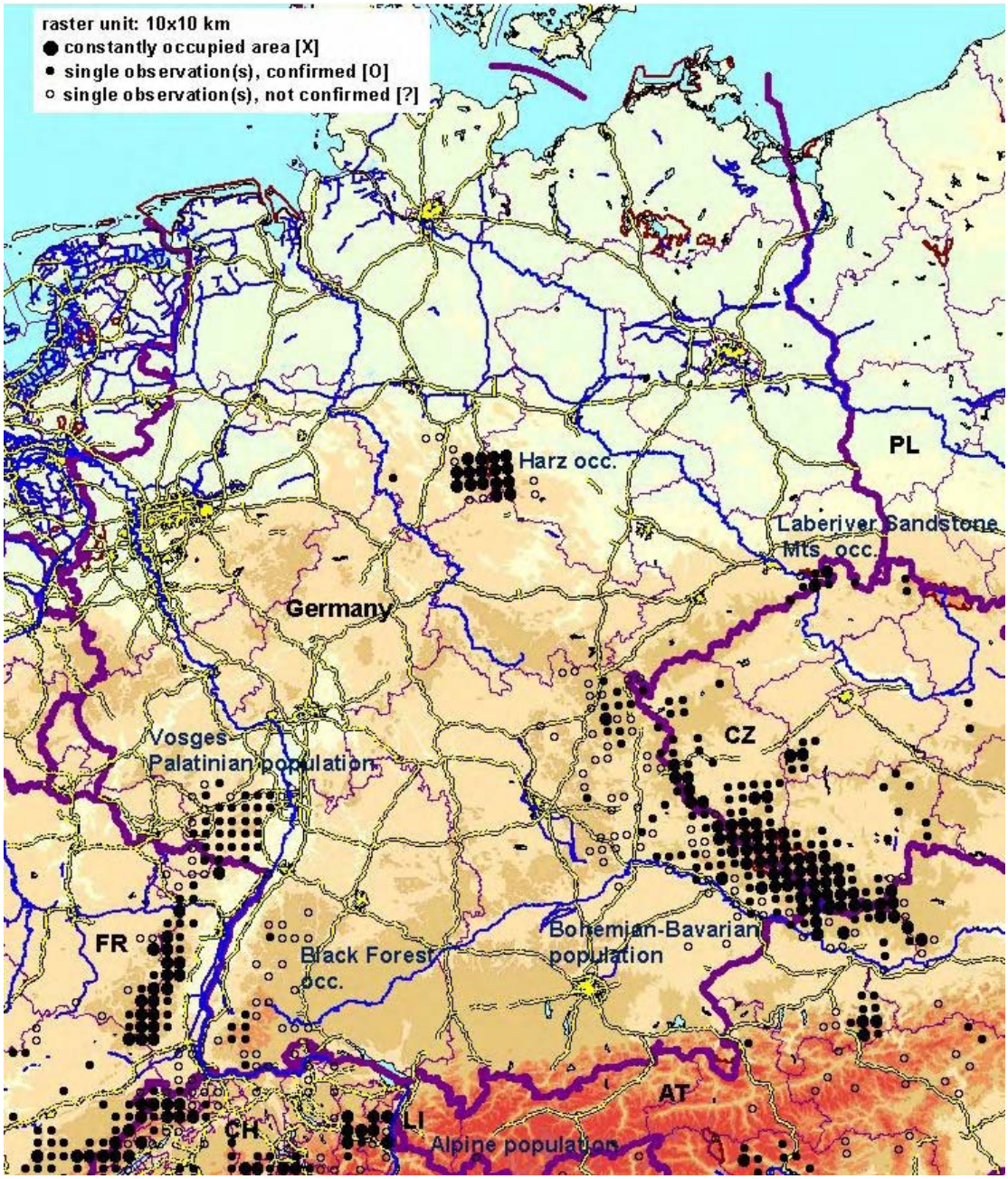
Germany (DE)

Manfred WÖLFL, Ditmar HUCKSCHLAG & Ulf HOHMANN,
Nationalparkverwaltung Harz (Ole ANDERS & Meike HULLEN),
Thomas A.M. KAPHEGYI & Ursula KAPHEGYI, Holm RIEBE

Area: 357'021 km²
Forests & Woodland: 30.7 % (2000)
Human population: 83'029'536 (2001)
Population density: 232.6 / km²

1. Lynx distribution in Germany in 2001:



Geographic range of the population(s)

Bohemian-Bavarian population: Bayerischer and Oberpfaelzer Forest, Fichtelgebirge, Frankenwald. Core population along the border, single occurrences far west and north.
Methods: sightings & signs, snow tracking, unspecific survey, radio telemetry

Vosges-Palatinian population: Palatinian Forest and surroundings.
Methods: sightings & signs

Harz occurrence: In 2000 the first three captive bred animals have been released. Another 9 were set free in 2001. All animals were released at the same place in the Harz Nationalpark. The observation density and/or quality in some UTM-grids has changed between 2000 and 2002.
Methods: sightings & signs, snow tracking, inquiry, photo traps

Black Forest occurrence: Black Forest (south-west Germany). Rare sightings and signs in particular, therefore, the Black Forest occurrence is supposed to consist of a few individuals only; origin still unknown.
Methods: sightings & signs, snow tracking, inquiry

Laberiver Sandstone Mts. occurrence (LSo): Saxon and Bohemian Switzerland, Osterzgebirge, Westlausitz
Methods: sightings & signs, inquiry

Alpine population: No confirmed evidence of lynx presence.

2. Lynx population(s):

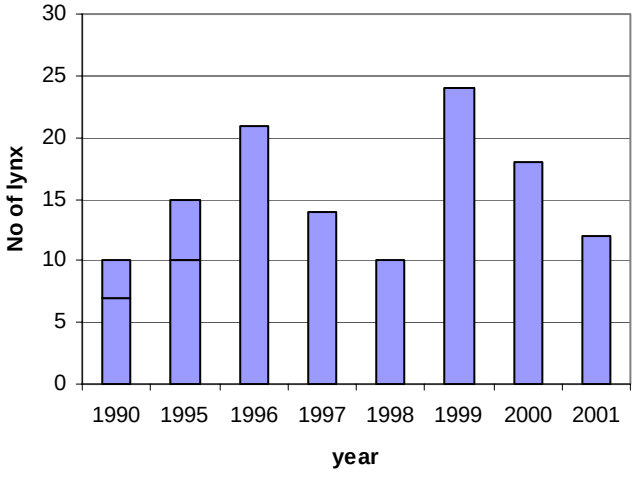
Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Boh.-Bav.	16.5	1’700	4’000	5’500	5’700	0.5 / 1.6	0.97
Vosges-Palatinian	4	0	2’900	600	2’900	0.8	-
Harz occ.	7	1’600	100	800	1’700	0.5	0.44
Black Forest occ.	a few indiv.	0	700	2’100	700	0.2	-
LSo	1-3	0	600	100	600	0.17	-
Total	*~30*	*3’300*	*8’300*	*9’100*	*11’600*	*0.9 / 3.3*	-

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Bohemian-Bavarian	1996	**21**		Resident animals only. (Only few of the data were verified, especially the data gathered by questionnaires generally could not be verified.)	**decreasing** (stable until 1998, steady decline afterwards)
	1997	**14**			
	1998	**10**			
	1999	**24**			
	2000	**18**			
	2001	**12**			
Ø 1996-2001		**16.5**			
Vosges-Palatinian	1997	**8** [a]		The methodology allows only a very rough estimate.	**decreasing** [b]
	1999	**3-4**			
	2000	**3-4**			
	2001	**3-4**			
Ø 1996-2001		**4**			
Harz occ.	2000	**3**		Re-introductions since 2000.	**increasing** [c]
	2001	**12**			
Black Forest occ.	1996-2001	**a few individuals**			**unknown**
Laberiver Sandstone Mts. occ.	1996-2001	**1-3**			**decreasing**
Alpine	1996-2001	-	**-**	No confirmed evidence.	**unknown**
Ø Total DE 1996-2001		**~30**			

[a] "ÖKO-LOG" Freilandforschung estimated 8 lynxes in 1997/1998. There are no data available from march 1998 to spring 1999, when the state forest administration established a lynx monitoring system.
[b] Supporting measures (re-introductions) are discussed at present.
[c] Release of additional captive bred lynx in spring/summer 2003 are planned.



Estimated number of lynx for the Bohemian-Bavarian population in Germany from 1996-2001. The numbers for 1990 and 1995 (always lower and upper value) are from the former inquiry.

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Bohemian-Bavarian	Data have been collected using snow tracking and questionnaires; incidental findings were gathered as well.	-
Institution	Naturpark Bayrischer Wald e.V.	-
Vosges-Palatinian	Rough estimation from dates and spatial distribution of the collected sightings and signs.	-
Institution	"ÖKO-LOG Freilandforschung" until 2002; "Forschungsanstalt für Waldökologie und Forstwirtschaft Rheinland-Pfalz" since 2003	-
Harz occ.	Number of released lynx.	-
Institution	Harz Nationalpark	-
Black Forest occ.	Rare sightings and signs in particular.	-
Institution	Forstzoologisches Institut, University of Freiburg	-
Laberiver Sandstone Mts. occ.	The population was estimated by a small number of observations.	-
Institution	Nationalpark- and Forstamt Sächsische Schweiz	-

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
ratified 1992	ratified 1984	ratified 1976

4.2. Legal status

Lynx is completely protected by law.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Bohemian-Bavarian	1996	-	1	0	0	0	0	0	0	0	1	*1.4*
	1997	-	0	0	0	0	0	0	0	0	0	*0*
	1998	-	0	0	0	1	0	0	0	0	1	*1.5*
	1999	-	0	0	0	0	0	0	0	0	0	*0*
	2000	-	0	0	0	0	0	0	0	0	0	*0*
	2001	-	0	0	1	1	0	0	0	0	2	*6.9*
Total 1996-2001		-	*1*	*0*	*1*	*2*	*0*	*0*	*0*	*0*	*4*	-
Yearly Ø		-	*0.17*	*0*	*0.17*	*0.33*	*0*	*0*	*0*	*0*	*0.67*	*1.2*
Known mortality / 100 km² [X+O]		-	*0*	*0*	*0*	*0.01*	*0*	*0*	*0*	*0*	*0.01*	-

→ No known losses for the Vosges-Palatinian population, and for the Harz, Black Forest and Laberiver Sandstone Mts. occurrences in Germany.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
BB/VosPf/Harz/ BlackF/LSo	(none)	states (Bundesländer)	(2000: Pan-European action plan adopted but no effect on national/regional level)

5. Depredation:

5.1. Depredation losses & compensation paid

Population	Year	Sheep	Goat	Reindeer	Other species	Total	Compensation (in Euro)	Compensation other predators
Bohemian-Bavarian	1996	0	0	-	0	0	0	-
	1997	0	0	-	0	0	0	-
	1998	3	0	-	5	8	1'035 €	-
	1999	1	0	-	3	4	383 €	-
	2000	1	0	-	0	1	128 €	-
	2001	4	0	-	7	11	1'233 €	-
Total 1996-2001		*9*	*0*	-	*15* [a]	*24*	*2'779 €*	-
Harz occ.	2000	0	0	-	0	0	0 €	-
	2001	4	0	-	0	4	200 €	-
Total 2000-2001		*4*	*0*	-	*0*	*4*	*200 €*	-

[a] deer in enclosures

→ No depredation losses for the Vosges-Palatinian population, and for the Black Forest and Laberiver Sandstone Mts. occurrence.

5.2. Regional & seasonal differences

Bohemian-Bavarian population: Deer enclosures in late fall/winter.

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
Bohemian-Bavarian	Privately sponsored by three NGOs (sheep, goat and deer in enclosures).	Bavaria: funding by a hunting association and two conservationist groups (Bund Naturschutz, Landesbund für Vogelschutz)	Trained people examine kill at kill site; autopsy has to be made by a veterinarian.
Vosges-Palatinian	Compensation fund: payment if lynx was the cause.	Ministry for Environment and Forestry Rheinland-Pfalz	A lynx expert verifies the cause of predation by examining the kill.
Harz occ.	Financial compensation. Each case has to be verified.	100% compensation paid by the Ministry for Agriculture, Nutrition and Forestry in Lower Saxony	Kills must be examined by members of the administration of the Harz Nationalpark.
Black F. occ.	(no compensation system)		
LSo	(no compensation system)		

5.4. Prevention

Population	Prevention methods	Legal measures	Illegal actions
BB/VosPf/Harz/ BlackF/LSo	none	none	none

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Bohemian-Bavarian	Shooting	Infrastructure development: Road building Shooting Prey / food base (?)	Infrastructure development: Road building Shooting Prey / food base (?)
Vosges-Palatinian	-	-	Infrastructure development: Road building Shooting Trapping / snaring Poisoning Vehicle and train collision
Comment: These statements refer only to the Palatinian Forest occurrence, not to the whole Vosges-Palatinian population. "Intrinsic factors": The monitoring method is not suitable to answer these questions, and there are no other ongoing research projects.			
Harz occ.	-	-	-

Comment: Question cannot be answered as lynx has been released only 3 years ago, and additional introductions are planned.

Black Forest occ.	Infrastructure development: Road building Low densities	Infrastructure development: Road building Low densities	Infrastructure development: Road building Low densities
Laberiver Sandstone Mts. occ.	-	-	-

7. Conservation measures:

Bohemian-Bavarian population:

Conservation measure	**Lacking / proposed**	**Drafted / ratified**	**Implemented / applied**
Management plans	X		
Legislation on an international level			X
Legislation on a national level			X
Formal education			X
Awareness			X
Capacity-building / Training			X
Population numbers and range			X
Biology and Ecology			X
Habitat status			X
Threats			X
Conservation measures			X
Monitoring / Trends			X
Human attitude / Human dimensions			X

Vosges-Palatinian population:

Conservation measure	**Lacking / proposed**	**Drafted / ratified**	**Implemented / applied**
Management plans	in progress		
Legislation on an international level			X
Legislation on a national level			X
Legislation on a regional level			X
Public involvement			X
Formal education			X
Awareness			X
Capacity-building / Training			X
Monitoring / Trends			X
Corridors	under discussion		
Establishment of protected areas			X
Management of protected areas	in progress		
Re-introductions	under discussion		

Harz occurrence:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Formal education			X
Awareness			X
Capacity-building / Training			X
Population numbers and range			X
Re-introductions			X

Black Forest occurrence:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans	X		
Legislation on an international level			X
Legislation on a national level			X
Legislation on a regional level			X

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Bohemian-Bavarian	vulnerable	• Prevent illegal killing
Vosges-Palatinian	endangered	• Corridors • Re-introductions
Harz occ.	vulnerable	• Re-introduction of additional lynx • Monitoring • Educational measures
Black Forest occ.	endangered [a]	• Research (origin and behaviour of occurring individuals) • Adapting measures with a future management strategy on national level
Laberiver Sandstone Mts. occ.	extinct / data deficient	• (*no information available*)

[a] endangered as an occurrence, but data deficient in the bigger sense as the origin of the animals is still unknown

9. Projects:

Population	Title	Duration	Contact
Bohemian-Bavarian	Luchsprojekt Naturpark Bayerischer Wald	1996-2006	Manfred Wölfl: woelfl@i3c.com
Vosges-Palatinian	Palatinian Forest Lynx Monitoring	long-term	Ditmar Huckschlag, Forschungsanstalt für Waldökologie und Forstwirtschaft Rheinland-Pfalz: ditmar.huckschlag@wald-rlp.de
Black	Black Forest Lynx Monitoring	1996-	T. Kaphegyi, Forstzoologisches Institut der

Forest occ.	Universität Freiburg: thomas.kaphegyi@fzi.uni-freiburg.de

10. Contact:

Population	Name	Address
Bohemian-Bavarian & Alpine	Manfred WÖLFL	Trailling 1 a, D-94372 Lam e-mail: woelfl@i3c.com
Vosges-Palatinian	Ditmar HUCKSCHLAG	Schloss, D-67705 Trippstadt e-mail: ditmar.huckschlag@wald-rlp.de
Collaborator:	Ulf HOHMANN	Schloss, D-67705 Trippstadt e-mail: ulf.hohmann@wald-rlp.de
Harz occ.	Nationalparkverwaltung Harz, (Ole ANDERS) & Meike HULLEN	Oderhaus 1, D-37444 St. Andreasberg Meike.Hullen@npharz.niedersachsen.de
Black Forest occ.	Thomas A.M. KAPHEGYI	Forstzoologisches Institut der Universität Freiburg, Fohrenbühl 27, D-79252 Stegen-Wittental e-mail: thomas.kaphegyi@fzi.uni-freiburg.de
Collaborator:	Ursula KAPHEGYI	Forstzoologisches Institut der Universität Freiburg, Fohrenbühl 27, D-79252 Stegen-Wittental e-mail: thomas.kaphegyi@fzi.uni-freiburg.de
Laberiver Sandstone Mts. occ.	Holm RIEBE	Nationalpark- und Forstamt Sächsische Schweiz, An der Elbe 4, D-01814 Bad Schandau e-mail: Holm.Riebe@nlpfoa.smul.sachsen.de

Country assessment:

Germany hosts several small lynx occurrences or parts of populations that are mainly situated along the border regions with France and the Czech Republic, respectively (see map). Hereof, the permanently occupied area is with a total of 3'300 km² very low (Table 2). The much bigger proportion is of sporadically occupied areas and those with questionable observations, indicating that all occurrences within the country consist of a few, isolated animals only (except for the Bavarian Forest where a continuous population with Bohemia exists). Except for the Bohemian-Bavarian population and the newly founded Harz occurrence, there are almost no "hard fact" data (dead lynx or photos) available (point 1, Table 3.2, website of the "Initiative pro Luchs", KAPHEGYI & KAPHEGYI 2004). In the Bohemian-Bavarian population, additional data is often not verified, as stated by WÖLFL *et al.* (2001). The establishment of a general database to compile information on lynx in Bavaria is in preparation (WÖLFL 2004).

There is no country-wide monitoring system. The competence for the lynx in Germany (i.e. the implementation of both the conservation and the hunting law) lies in the hand of the single states (Bundesländer); each state has its own additional laws and decrees. On the national level, the lynx is on one hand considered a game animal in the hunting law but with a closed season, on the other hand there are international treaties including conservation measures for lynx (e.g. CITES, EU Habitat Directive) that are in force in Germany as well. This legal complexity together with the significant responsibility of the states might be the main cause for the non-existing course for a national management of the lynx. Often, there is even no co-ordination amongst neighbouring states within the country (e.g. Harz: KRAH 2003). On the other hand however, there is cross-border cooperation on the non-governmental level with France (Vosges-Palatinian population: "Initiative Pro Luchs") and the Czech Republic and Austria, respectively (Bohemian-Bavarian: "LYNX – Bohemian Research Group"). Nevertheless, the German

authorities have to play a more active role in lynx management so as to promote a general concept for the future of the species in the country as well as for common methods and a centralized data collection. The single states should be obliged to co-ordinate their activities.

The origin of all occurrences – except of the Harz, where 12 captive bred animals have been released in 2000/2001 (and some more animals in summer 2003, http://www.harz24.de/harznews/20031119132601.shtml) – is not exactly known. In the Laberiver Sandstone Mts. area, a natural recolonisation seems to be possible (RIEBE 1994), but is not proved. The Bohemian-Bavarian population was probably first founded on the Bohemian side by immigrating animals from the Carpathians. Then, it was raised by illegal re-introductions in the Bavarian Forest in 1970-72, and official releases in Sumava from 1982-89 (with 5-9 and 18 individuals respectively, BUFKA & CERVENY 1996, CERVENY & BUFKA 1996). For the Palatinian and the Black Forest, clandestine releases and/or escaped animals, or immigrating lynx from other populations/regions (e.g. Vosges Mts.) have been suggestions for the origin of the occurrences (website "Initiative Pro Luchs"; KAPHEGYI & KAPHEGYI 2004). In the German Alps, there has not yet been confirmed evidence on lynx presence so far (WÖLFL & KACZENSKY 2001).

From 1996-2001, all lynx populations and occurrences in Germany excluding the newly founded Harz occurrence showed rather a decreasing tendency (or at least fluctuating as in the Bavarian Forest, Table 3.1). Declining population estimations could however also be a consequence of changes in the monitoring system (e.g. Palatinian Forest). Realistic estimations are difficult on the basis of mainly unconfirmed data (especially sightings). As there is almost no data on lynx mortality, no threat factors were evaluated (Table 4.3 & Table 6). The reason for the smallness of most of the occurrences as well as for their isolation lies in the limitation of available habitat. A major part of 81% of the country area is actually considered not suitable for lynx, and the distribution of suitable areas is furthermore patchy and many of them fragmented (SCHADT *et al.* 2002a). According to habitat models by SCHADT *et al*. (2002a), only the north-eastern forest, the Palatine Forest with the Vosges Mountains, and the German-Czech area (Erz Mts. and Bohemian-Bavarian region) are large enough to host up to 100 animals. The extremely high road density in Germany (see map) is not only a threat for the lynx within the suitable patches, but is also a problem hard to overcome in regard to the creation of a network of potential lynx areas (SCHADT *et al.* 2002a, 2002b). Consequently, re-introductions into small and in the long run isolated patches (as it happened in the Harz national park) are problematic. However, Germany has a few areas where – in connection with adjacent areas in neighbouring countries –viable populations could exists in the long-term (Alps, Bavarian Forest, Palatinian Forest, maybe Black Forest). Conservation and management measures should concentrate on these areas. Currently, all occurrences in Germany have to be considered endangered or critically endangered.

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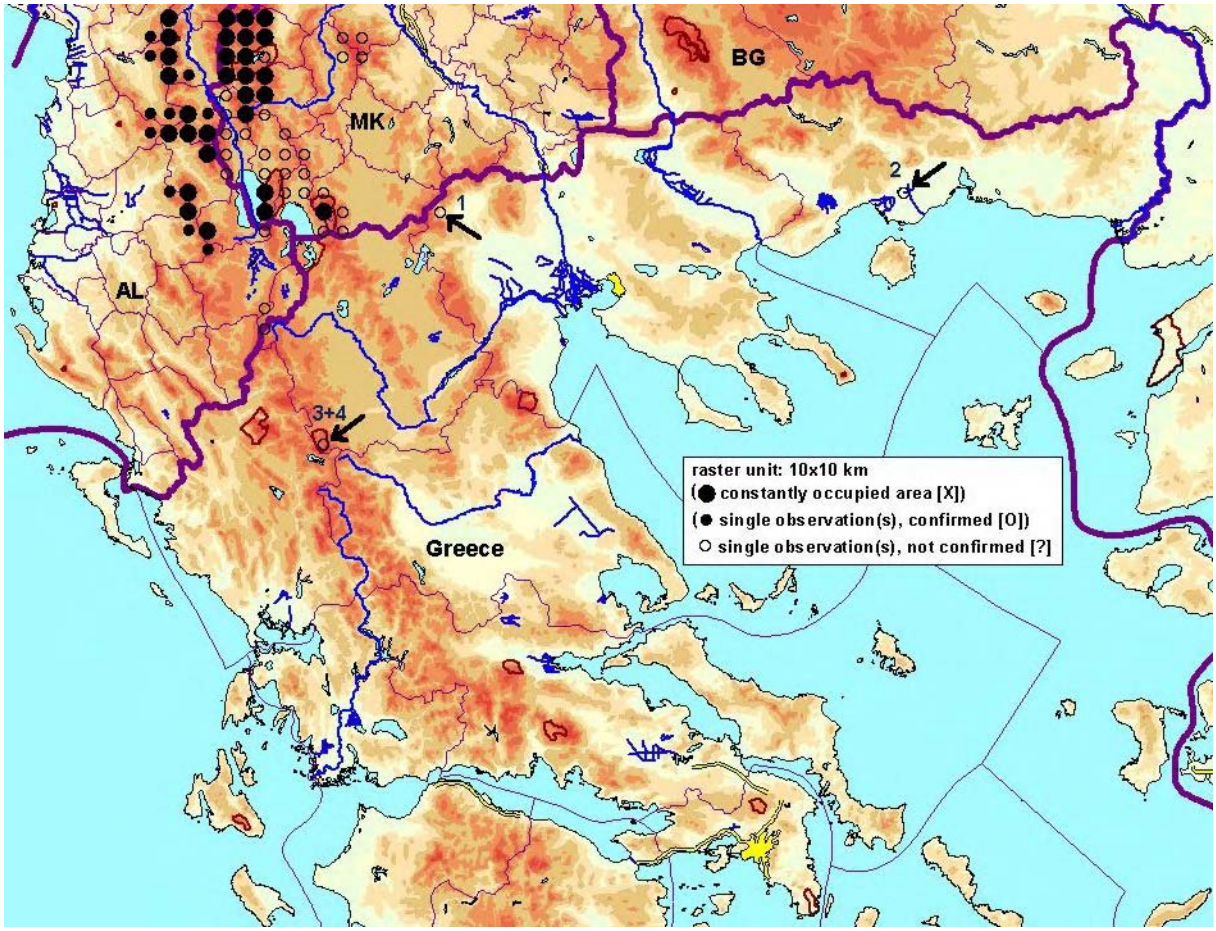
Greece (GR)

Maria PANAYOTOPOULOU & Constantinos GODES

Area: 131'940 km²
Forests & Woodland: 27.9 % (2000)
Human population: 10'623'835 (2001)
Population density: 80.5 / km²

1. Lynx distribution in Greece in 2001:



Geographic range of the population(s)

Balkan population: 1. Voras Mt. & Tzena and Pinovo Mt. (border with FYROM), 2. Nestos Delta, 3. Vassilitsa (N. Pindos), 4. Valia Kalda National Park (N. Pindos). These are only indications of lynx presence (unverified), there is no information at all on populations and/or subpopulations. Since there has been no monitoring and no project on the lynx in Greece at all, possible changes could not be detected systematically. However, a new grid cell has been added compared to earlier surveys on Nestos Delta (2) where unverified information have been reported since 1998.

Methods: sightings & signs, inquiry

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Balkan	isolated individuals?	0	0	300	0	0	-
Total	*isolated individuals?*	*0*	*0*	*300*	*0*	*0*	*-*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Balkan	1996-2001	It is not possible to describe a tendency since there has been no evidence of a population. A significant change was the increased frequency of reported sightings in the Nestos Delta.			**unknown**
Ø 1996-2001		**-**			

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Balkan	(No official method has been used)	-
Institution	No institution officially responsible	-

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
-	ratified 1983	ratified 1992

4.2. Legal status

Lynx has been fully protected by law since 1937.

4.3. Harvest numbers and other known losses to the population(s)

→ No known losses.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Balkan	Ministry of Agriculture	none	none

5. Depredation:

→ There have been no documented lynx damages in the past three decades. Compensation would be paid by ELGA (State organization for damage compensation). As preventive method, aiming primarily at wolves, livestock guarding dogs are used.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Balkan	Agriculture Extraction of wood Shooting Trapping / snaring Poisoning Prey / food base Poor recruitment / reproduction / regeneration Low densities Restricted range Other: abandonment of traditional pastoral systems Other: expansion of forest coverage	Infrastructure development: Road building	-

Comment: Threats mentioned in the column "before 1996" refer to threats encountered 25-30 years ago or even earlier when there was evidence of the last remnants of a lynx population in Greece.

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Legislation on an international level			X
Legislation on a national level			X
Monitoring / Trends		X	
Establishment of protected areas			X

Comment: All the above-mentioned measures, with exception of monitoring, are not addressed specifically to the lynx, but in general to the wild fauna of Greece. The NGO Arcturos will soon undertake the first monitoring project for the lynx in Greece, focusing on areas where the most recent observations have been reported.

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Balkan	data deficient	• Research to verify lynx presence in Greece[a]

[a] Comment: Fieldwork in target areas (N. Pindos, Mt. Voras, Nestos Delta) will include: Survey with recorded calls, placement of remote control cameras in selected points, distribution of questionnaires and detailed examination of livestock killed. There should be a monitoring programme in forested areas bordering mainly on FYROM and secondarily Albania, where observations should be regularly collected and evaluated. Also, collaboration with local game wardens and stock raisers is needed in order to examine kills of roe deer and livestock, respectively. Collaboration with ELGA (State organization for damage compensation) would allow for the recognition of livestock damages possibly caused by lynx. Co-ordinated work and collaboration with FYROM, Albania and possibly Bulgaria, concerning dissemination of questionnaires and livestock damage inspection.

9. Projects:

Population	Title	Duration	Contact
Balkan	Arcturos will soon start the implementation of a small lynx project in Mt. Voras (NW Greece). It will involve mainly dissemination of questionnaires and interviews with local inhabitants, in order to collect information (and evidence) on the existence of the species there.		Constantinos Godes: cgodes@arcturos.gr

10. Contact:

Population	Name	Address
Balkan	Maria PANAYOTOPOULOU	Frangini, 9, GR-54624 Thessaloniki e-mail: buru@otenet.gr
Collaborator:	Constantinos GODES	7 Aristotelous Sq., GR-54624 Thessaloniki e-mail: cgodes@arcturos.gr

Country assessment:

There is no lynx population in Greece, and even the presence of single individuals remains cryptic. Since the 1950/60s lynx observations in Greece have been more or less anecdotic (PANAYOTOPOULOU 2001, 2002). From 1996-2001, three isolated spots with lynx sightings were identified (see map); their verification is however not possible as long as there are no “hard facts”. A monitoring does not exist yet, but should be implemented as soon as possible. As no data on former lynx presence are available (PANAYOTOPOULOU 2001), it is very difficult to judge the unverified indications from the last few years as well as the overall status of the lynx in Greece (PANAYOTOPOULOU 2001, 2002). Consequently, it remains open where these animals would have come from. According to PANAYOTOPOULOU (2001) their origin could be due to (i) occasional transborder excursions from FYR Macedonia and/or Albania, (ii) remnants of an autochthonous population, (iii) attempts for the reestablishment of a new population nucleus by individuals originating from the neighbouring countries, (iv) clandestine releases. If the observations in the Pindos Mts (3 and 4 in map 1) could be explained through lynx venturing south from Albania, the observations in the Voras Mts (1) and especially in the Nestos Delta (2) are far away from occurrences in Albania and FYR Macedonia. Even if lynx presence in the current spots was verified, it would remain difficult to connect them to the rest of the Balkan population. Another problem is the status of the habitat and prey base. Habitat degradation has partly been extensive and although the forest coverage is currently increasing, the prey base remains poor in most areas of potential lynx habitat (PANAYOTOPOULOU 2001, 2002).

To carry out research in areas of lynx sightings as proposed by the contacts (see Table 8) is to be recommended. A continuous monitoring should be set up in the areas where a spread from the remaining nuclei in Albania and FYR Macedonia is possible; special attention should be paid to border areas. Therefore, co-operation with the neighbouring countries should be intensified. Even though no lynx may exist in Greece at the moment, the provinces of western Macedonia and Epirus in northern Greece will be of crucial importance for the future restoration of the Balkan population. The mountains of north-western Greece are strategically the best areas for an expansion or a re-introduction of lynx to boost the Balkan population.

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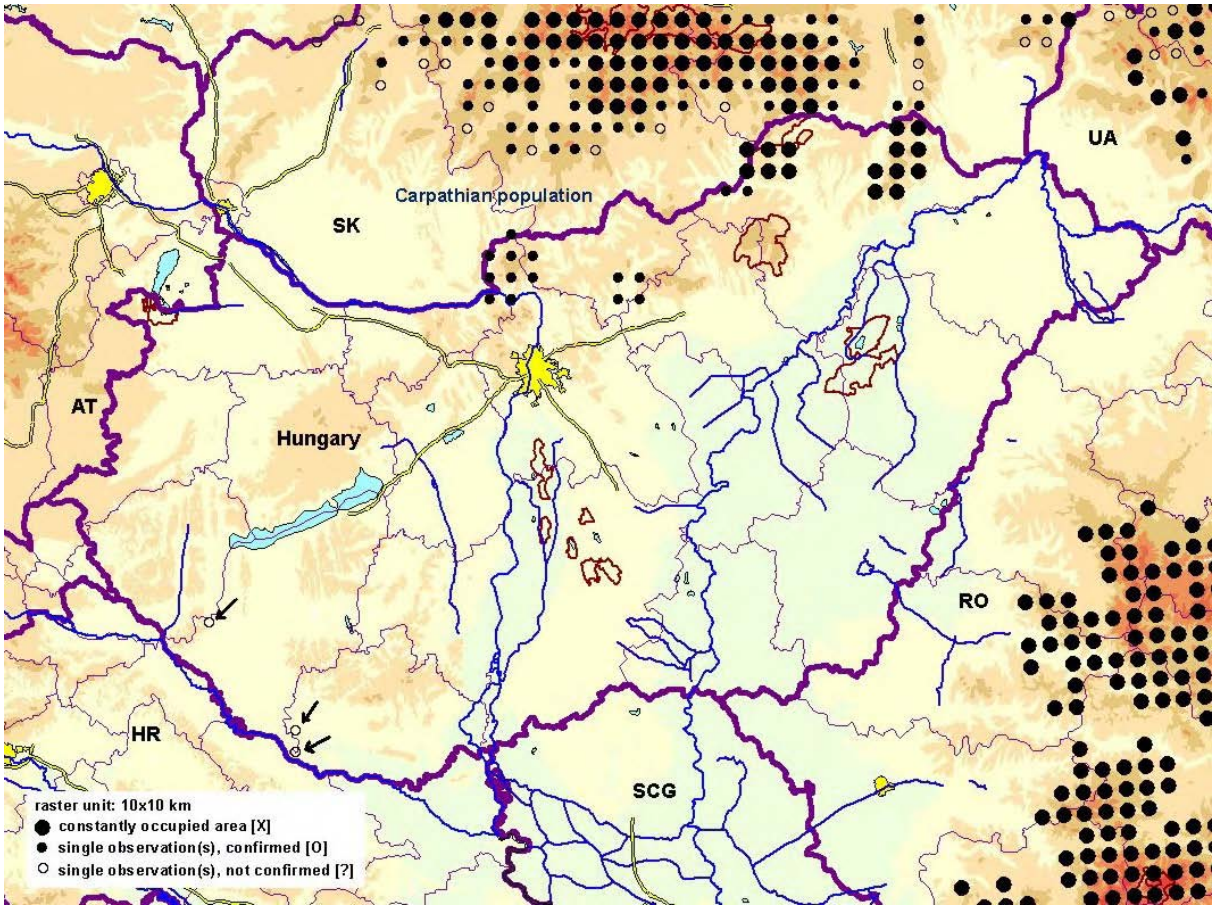
Hungary (HU)

Laszlo SZEMETHY & Marta MARKUS

Area: 93'030 km²
Forests & Woodland: 19.9 % (2000)
Human population: 10'106'017 (2001)
Population density: 108.6 / km²

1. Lynx distribution in Hungary in 2001:



Geographic range of the population(s)

Carpathian population: Several patches with sporadic lynx presence in the Nógrád Megye and in the Borsod-Abaúj-Zemplén Megye, northern Hungary. Unconfirmed observations in the south-west (**↙**). Observations for 1997/98 and 2000/01 (inquiries). No data on immigration or reduction as there are only a few lynx specimen.

Methods: For the last years only inquiry data (hunters/foresters) available.

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Carpathian	single individuals	1'500	1'700	0	3'200	1.6 / 3.4	-
unknown origin [a]	-	0	0	300	0	-	-
Total	*single individuals*	*1'500*	*1'700*	*300*	*3'200*	*1.6 / 3.4*	-

[a] single, unconfirmed observations in south-west Hungary

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Carpathian	1996	**1-5**		-	**unknown**
	1997	**1-5**			
	1998	**1-5**			
	1999	**1-5**			
Ø 1996-2001		**1-5**			

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Carpathian	Questionnaire to game managers	
Institution	Saint Stephen University	

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
signed	ratified 1989	ratified 1985

4.2. Legal status

Lynx has been fully protected by law since 1988.

4.3. Harvest numbers and other known losses to the population(s)

→ *No data available*

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Carpathian	National Authority for Nature Conservation as part of the Ministry for Environment	National Park Directorates	(Hungarian Ministry for Environment. Acceptance is only in process!)

5. Depredation:

→ No depredation losses due to lynx in Hungary from 1996-2001. There are no compensation systems, and, as there is no need, no prevention methods applied in the country.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Carpathian	(unknown)	(unknown)	(unknown)

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Legislation on a national level			X
Population numbers and range [a]			X

[a] local field monitoring

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Carpathian	extinct	• Sanctions against poachers • Conservation of lynx area

Comment: Only sporadic occurrences; no trends at all. There is no information on how to protect it.

9. Projects:

Population	Title	Duration	Contact
Carpathian	Funding the base of conserving large carnivores in Hungary: LIFE Nature project (LIFE00/NAT/H/7162) [a]		Laszlo Szemethy: szlaci@ns.vvt.gau.hu

[a] www.vvt.gau.hu/english.html >LIFE Nature

10. Contact:

Population	Name	Address
Carpathian	Laszlo SZEMETHY	Saint Stephen University, Dep. of Wildlife Biology and Game Management, Pater K. str. 1, 2100 Gödöllö e-mail: szlaci@ns.vvt.gau.hu
Collaborator:	Marta MARKUS	Saint Stephen University, Dep. of Wildlife Biology and Game Management, Pater K. str. 1, 2100 Gödöllö e-mail: mmarti@ns.vvt.gau.hu

Country assessment:

Some first observations of lynx – after its extinction in Hungary at the beginning of the 20th century – were made at the end of the 1970s (BREITENMOSER & BREITENMOSER-WÜRSTEN 1990). Numbers of records have then started to increase in the 1980s (BALTAY *et al.* 2000): a spontaneous re-settlement from the neighbouring Carpathians to north-east Hungary had begun (BREITENMOSER & BREITENMOSER-WÜRSTEN 1990, SZEMETHY *et al.* 2003). Nevertheless, the estimate at the end of the 1980s was less than 10 individuals (BREITENMOSER & BREITENMOSER-WÜRSTEN 1990). Although young lynx were observed, the occurrences remained rather sporadic with a distribution pattern varying from year to year (BALTAY *et al.* 2000, SZEMETHY 2002). Currently, there are four small and scattered distribution nuclei in north / north-east Hungary. The two eastern most have been constantly occupied by lynx during the past few years (see map).

All together, there is little information on the status of the lynx in Hungary (Table 3.1, Table 4.3). Therefore, threats (Table 6), and consequently also conservation measures (Table 7, comment Table 8) are not known, either. BALTAY *et al.* (2000), OKARMA *et al.* (2000), SZEMETHY (2002), and SZEMETHY *et al*. (2003) also mentioned this lack of information, but nevertheless listed threats: habitat fragmentation (intensive forestry and road constructions, human disturbance through increasing tourism/recreation; BALTAY *et al.* 2000, OKARMA *et al.* 2000), illegal killings (BALTAY *et al.* 2000, OKARMA *et al.* 2000), and intensive game management (OKARMA *et al.* 2000). BALTAY *et al.* (2000) further consider extensive livestock breeding to be a main threat. There is no data to support neither the one nor the other (Table 4.3, Table 5). The most urgent conservation action in Hungary would actually be to gather more information on the lynx. In 2001 a field monitoring system was established (LIFE Nature Project, SZEMETHY 2002, SZEMETHY *et al*. 2003). Three levels of data collection were defined: (i) regular examination by qualified people (field survey to look for tracks and signs on previously assigned transects six times a year), (ii) other observations in the area of qualified or professional people, and (iii) information from other sources, which are not or cannot be verified (SZEMETHY *et al.* 2003). The results so far confirmed the above described situation, i.e. that the occurrences are sporadic and sometimes unverifiable (see south-western Hungary, map), and that a more detailed survey is needed using additional methods (SZEMETHY *et al.* 2003).

Hungary with a share of 3.8% of the Carpathians only (CARPATHIAN ECOREGION INITIATIVE) will never have a viable population. It is expected that it could host 15-20 lynx (SZEMETHY 2002). The current number estimated (Table 3.1) is far away from that. Migration across the Slovakian border have a special importance and international collaboration should therefore be enhanced (OKARMA *et al.* 2000). BALTAY *et al.* (2000) believe that no migration of significant level is to be expected, but provide no arguments for this opinion. A habitat suitability study would be needed. The potential living space, the prey base in Hungary, and the corridors to the Slovakian population need to be assessed in order to develop a sensible conservation strategy. Furthermore, a close co-operation regarding the lynx conservation with neighbouring Slovakia has to be established. The future of the lynx in Hungary entirely depends on the management of the species in southern Slovakia, which at the moment is uncertain. A strategic

co-operation could motivate and support the sensible conservation and management of the species on both sides of the border.

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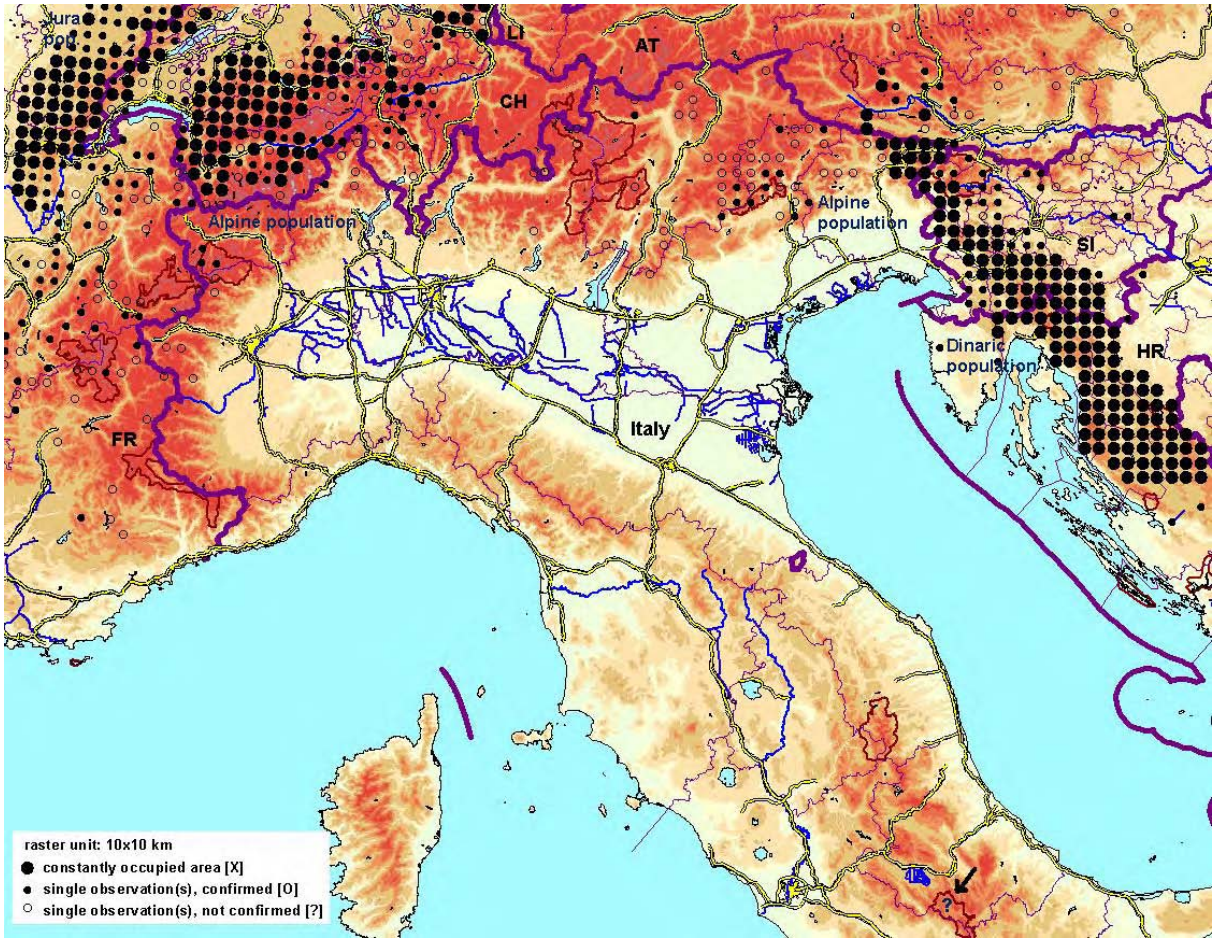
Italy (IT)

Paolo MOLINARI & Marco CATELLO

Area: 301'230 km²
Forests & Woodland: 34 % (2000)
Human population: 57'679'825 (2001)
Population density: 191.5 / km²

1. Lynx distribution in Italy in 2001:



Geographic range of the population(s)

Alpine population: Western sub-population: Aosta, Piemonte (Verbania). In the western Italian Alps there have been no changes. Eastern sub-population: Friuli VG, Veneto (Bellunese).
Abruzze Mts. occurrence (↙)**:** Status unknown, probably extinct.

Methods: sightings & signs, snow tracking, inquiry: according to SCALP standards (direct observations are not considered).

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Alpine East	7	1'200	1'200	4'100	2'400	0.4 / 0.8	0.58
Alpine West	3	0	600	1'000	600	0 / 0.2	-
Total	*10*	*1'200*	*1'800*	*5'100*	*3'000*	*0.4 / 1*	-

3. Population size:

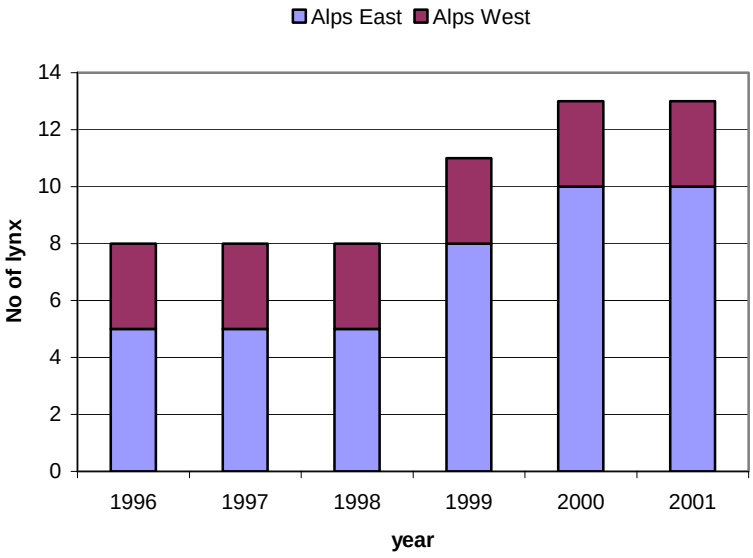
3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Alpine East	1996		**5**	Conservative estimations.	**increasing & expanding**
	1997		**5**		
	1998		**5**		
	1999		**8**		
	2000		**10**		
	2001		**10**		
Alpine West	1996		**3**	Conservative estimations.	**stable**
	1997		**3**		
	1998		**3**		
	1999		**3**		
	2000		**3**		
	2001		**3**		
Trentino occurrence	2001		1	(Illegal releases)	decreasing / unknown
Abruzze Mts. occurrence	2001		?	(Illegal releases)	unknown
Ø Total 1996-2001			**10**		

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Alpine	-	Based on number and distribution of signs of presence of Q1 and Q2 data (SCALP).[a]
Institution	-	Progetto Lince Italia

[a] [SCALP ("Status and Conservation of the Alpine Lynx Population") expert group defined 3 levels of data reliability, refer to MOLINARI-JOBIN *et al.* 2003, Eds.]



Number of lynx in Italy from 1996-2001. Estimations are from the “Progetto Lince Italia”.

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
ratified 1992	ratified 1982	ratified 1979

4.2. Legal status

Lynx has been fully protected by law since 1992.

4.3. Harvest numbers and other known losses to the population(s)

→ There are no known losses to the Alpine lynx population in Italy from 1996-2001.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Alpine	I.N.F.S. Istituto Nazionale Fauna Selvatica	officially none	none

5. Depredation:

→ No depredation losses due to lynx in Italy from 1996-2001. The compensation system is different for each "Provincia" and "Regione". There are no prevention methods applied in the country against lynx attacks.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Alpine	Infrastructure development: Human settlement Infrastructure development: Road building Shooting Pathogens / parasites (?) Limited dispersal Poor recruitment / reproduction / regeneration (?) High juvenile mortality (?) Inbreeding (?) Low densities Skewed sex ratios (?) Slow growth rates Population fluctuations (?) Restricted range Transport (?)	Infrastructure development: Human settlement Infrastructure development: Road building Shooting Pathogens / parasites (?) Limited dispersal Poor recruitment / reproduction / regeneration (?) High juvenile mortality (?) Inbreeding (?) Low densities Skewed sex ratios (?) Slow growth rates Population fluctuations (?) Restricted range Transport (?)	Agriculture (?) Extraction of wood (?) Infrastructure development: Human settlement Infrastructure development: Road building Legal hunting & trapping (?) Shooting (?) Vehicle and train collision (?) Pathogens / parasites (?) Limited dispersal (?) Poor recruitment / reproduction / regeneration (?) High juvenile mortality (?) Inbreeding (?) Low densities (?) Skewed sex ratios (?) Slow growth rates (?) Population fluctuations (?) Restricted range Transport (?)

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans	X		
Legislation on an international level			X
Legislation on a national level			X
Legislation on a regional level			X
Public involvement	X		
Awareness			X
Capacity-building / Training			X
Taxonomy	X		
Population numbers and range		X	
Biology and Ecology		X	
Habitat status	X		
Threats		X	
Uses and harvest levels	X		
Conservation measures		X	
Monitoring / Trends			X
Genetic status		X	
Human attitude / Human dimensions	X		
Maintenance / Conservation	X		
Restoration	X		

Conservation measure (cont.)	Lacking / proposed	Drafted / ratified	Implemented / applied
Corridors		X	
Identification of new protected areas	X		
Establishment of protected areas	X		
Management of protected areas	X		
Expansion of protected areas	X		
Community-based initiatives	X		
Re-introductions		X	
Sustainable use / Harvest management	X		
Recovery management		X	
Disease, pathogen, parasite management		X	
Limiting population growth		X	
Captive breeding / Artificial propagation	X		
Genome resource bank	X		

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Alpine East	vulnerable	• Improve dispersal • Public education and involvement • Research
Alpine West	data deficient	• Improve dispersal • Public education and involvement • Research
Trentino occ.	data deficient	• Connect to eastern sub-population • Prevention of illegal actions (releases)
Abruzze Mts. occ.	data deficient	• Prevention of more illegal actions (releases)

9. Projects:

→ No current projects.

10. Contact:

Population	Name	Address
Alpine	Paolo MOLINARI	Progetto Lince Italia, Via Roma 35, I-33018 Tarvisio (UD) e-mail: p.molinari@progetto-lince-italia.it, JobinMolinari@aol.com
Collaborator:	Marco CATELLO	Progetto Lince Italia, Via Barozzi 48, I-32100 Belluno (BL) e-mail: marcocatello@hotmail.com

Country assessment:

As a consequence of the re-introductions in the mid 1970s in Austria, Slovenia and Switzerland, the lynx returned to Italy at the beginning of the 1980s. A few individuals immigrated and established two occurrences in south-east and north-west Italy, respectively, an ongoing, but very slow process, so that lynx actually still occurs only in the border areas (MOLINARI *et al.* 2001). Besides Austria, Italy makes up the biggest part of the Alpine arc (28 %, ALPINE CONVENTION) and has therefore a good potential to host much more lynx than currently present. Consequently, Italy is very important regarding the desired connection between the western nuclei of the Alpine population in Switzerland with the eastern one in Slovenia, as stated in the Pan-Alpine Conservation Strategy for the Lynx (MOLINARI-JOBIN *et al*. 2003). The situation in western Italy however looks not optimistic, as the signs of presence collected from 2000-2003 showed a decreasing trend. On the other hand, a positive trend was reported for the eastern part, in spite of the negative tendency in the adjacent Slovenian Alps (see country report). There has been a first record of reproduction in the Tarvisiano recently (MOLINARI *et al*. 2003). As in both areas, a few animals are present at best, the observed trends could just reflect fluctuations due to single individuals (MOLINARI *et al.* 2001, 2003). Systematic monitoring needs to be continued, but is not secured as it presently relies on volunteer work only. A more active role of the authorities to support and improve the monitoring and to establish a management plan is recommended. If the current lynx occurrences do not have enough potential to expand on their own, re-introductions should be considered in order to foster the spread of lynx between the two existing subpopulations in the Alps. This would however need careful planning, as clandestine actions – as they probably occurred in the Trentino and Abruzzo region (Table 3.1, Table 8) – provoke public mistrust and are counterproductive. The status of the above-mentioned occurrences in the Trentino and Abruzze Mts. remains unclear, they most likely went extinct (Trentino: MOLINARI *et al.* 2001, 2003).

Main threats to the Italian lynx are thought to be infrastructure development, illegal killings and intrinsic factors (Table 6). Illegal killings are supposed to be quite common, but data are basically lacking (RAGNI *et al.* 1998, MOLINARI *et al.* 2001). Research would help to support or reject, respectively, the different subjective assumptions regarding the threats.

References:

ALPINE CONVENTION: http://www.conventionalpine.org/page4b_de.htm#A2

MOLINARI, P., ROTELLI, L. & CATELLO, M. 2001: Present status and distribution of the Eurasian lynx (*Lynx lynx*) in the Italian Alps. *Hystrix* 12 (2): 3-9.

MOLINARI, P., DE MARTIN, P., RODOLFI, M., COLLOREDO, R., VUERICH, C., CATELLO, M., RAMIRES, L., BIONDA, R. & ROTELLI, L. 2003: Status of the lynx in the Italian Alps: update 2000-2003. Proceedings of the 2nd Conference on the Status and Conservation of the Alpine Lynx Population (SCALP), 7-9 May 2003, Amden, Switzerland: 11-12.

MOLINARI-JOBIN, A., MOLINARI, P., BREITENMOSER-WÜRSTEN, CH., WÖLFL, M., STANISA, C., FASEL, M., STAHL, P., VANDEL, J.-M., ROTELLI, L., KACZENSKY, P., HUBER, T., ADAMIC, M., KOREN, I. & BREITENMOSER, U. 2003: The Pan-Alpine Conservation Strategy for the lynx. Nature and environment, No. 130, Council of Europe Publishing, Strasbourg: 1-20.

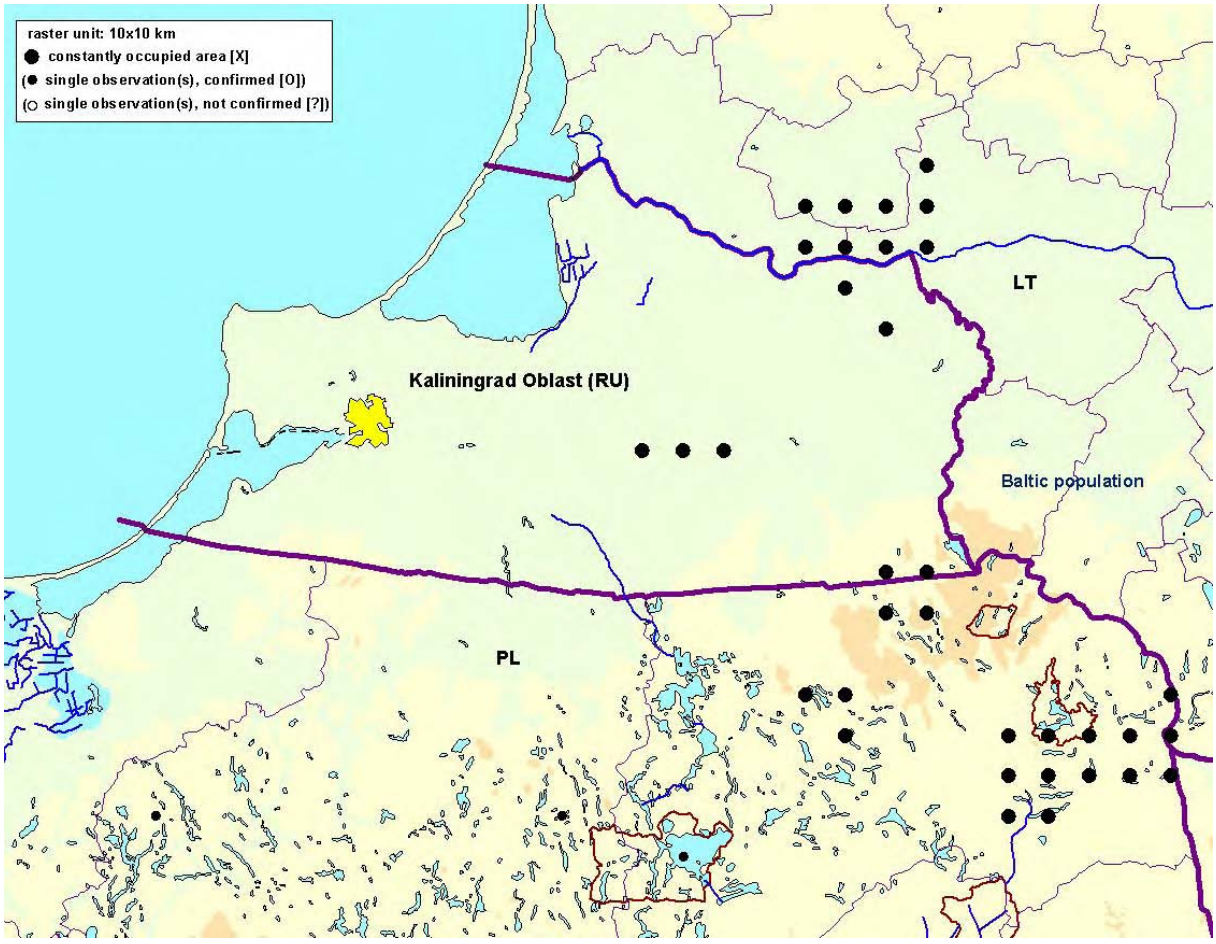
RAGNI, B., POSSENTI, M., MAYR, S., CARRER, M., ZANGRANDO, E., CATELLO, M., DORIGATTI, E., DI LORENZO, M., MOSCA, A., FATTOR, M. & LOMBARDI, G. 1998: The lynx in the Italian Alps. *Hystrix* 10 (1): 31-38.

Kaliningrad Oblast (RU)

Gennady GRISHANOV

Area: 15'100 km²
Forests & Woodland: ~18 % (?)
Human population: 920'900 (2003)
Population density: 61 / km²

1. Lynx distribution in Kaliningrad in 2001:



Geographic range of the population(s)

Baltic population: North-eastern, south-eastern and central parts of the Kaliningrad region.

Methods: (No information available.)

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Baltic	8-10	700	0	0	700	4.6	1.14-1.43
Total	*8-10*	*700*	*0*	*0*	*700*	*4.6*	*1.14-1.43*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Baltic	2001-2002		**8-10**		**stable** [a]
Ø 1996-2001			**8-10**		

[a] in the last 10-15 years

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Baltic	-	Questionnaires and interrogatory of hunters and hunting chiefs, winter counts of scents.
Institution	-	(No information available.)

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
-	-	continuation 1992

4.2. Legal status

Lynx is fully protected by law.

4.3. Harvest numbers and other known losses to the population(s)

→ Lynx are not hunted, but may be killed accidentally. There are 1-3 individuals killed every year.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Baltic	Region State Hunt Inspection	none	none

5. Depredation:

(No information available.)

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Baltic	Shooting	Shooting	Shooting

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
→ *Comment: Special conservation is absent for lynx.*			

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Baltic	(n.a.)	• (No information available.)

9. Projects:

→ No current projects.

10. Contact:

Population	Name	Address
Baltic	Gennady GRISHANOV	University str.2, Kaliningrad 236040, Russia e-mail: grishanov@email.albertina.ru

Country assessment:

Russia is not considered in this report. Russian colleagues have recently published an extensive review of the situation of the lynx in Russia and its neighbouring countries (MATYUSHKIN & VAISFELD 2003). We here consider however the Kaliningrad Oblast, the Russian exclave between Latvia and Poland. Not much information on the lynx in Kaliningrad is available, and MATYUSHKIN & VAISFELD (2003) did not treat this region. Thanks to the Lithuanian contact, L. Balciauskas, Gennady Grishanov took part in this inquiry, providing the information on lynx available. Currently, three distribution patches are known, two of them parts of cross-border, but all the same very small ranges (see map). In this whole area, the Baltic population is very fragmented, and the distances between patches are rather large. The number of lynx in Kaliningrad is estimated 8-10 animals only, though stable for already some time (Table 3.1). A yearly loss of 1-3 individuals is assumed, most probably due to illegal killing (Table 4.3) (lynx is legally protected, Table 4.2). The most urgent actions needed are (i) to get more data and information on the status and the real and potential distribution of the lynx, (ii) law enforcement, (iii) co-operation with Latvia and Poland in regard to the cross-border distribution ranges.

References:

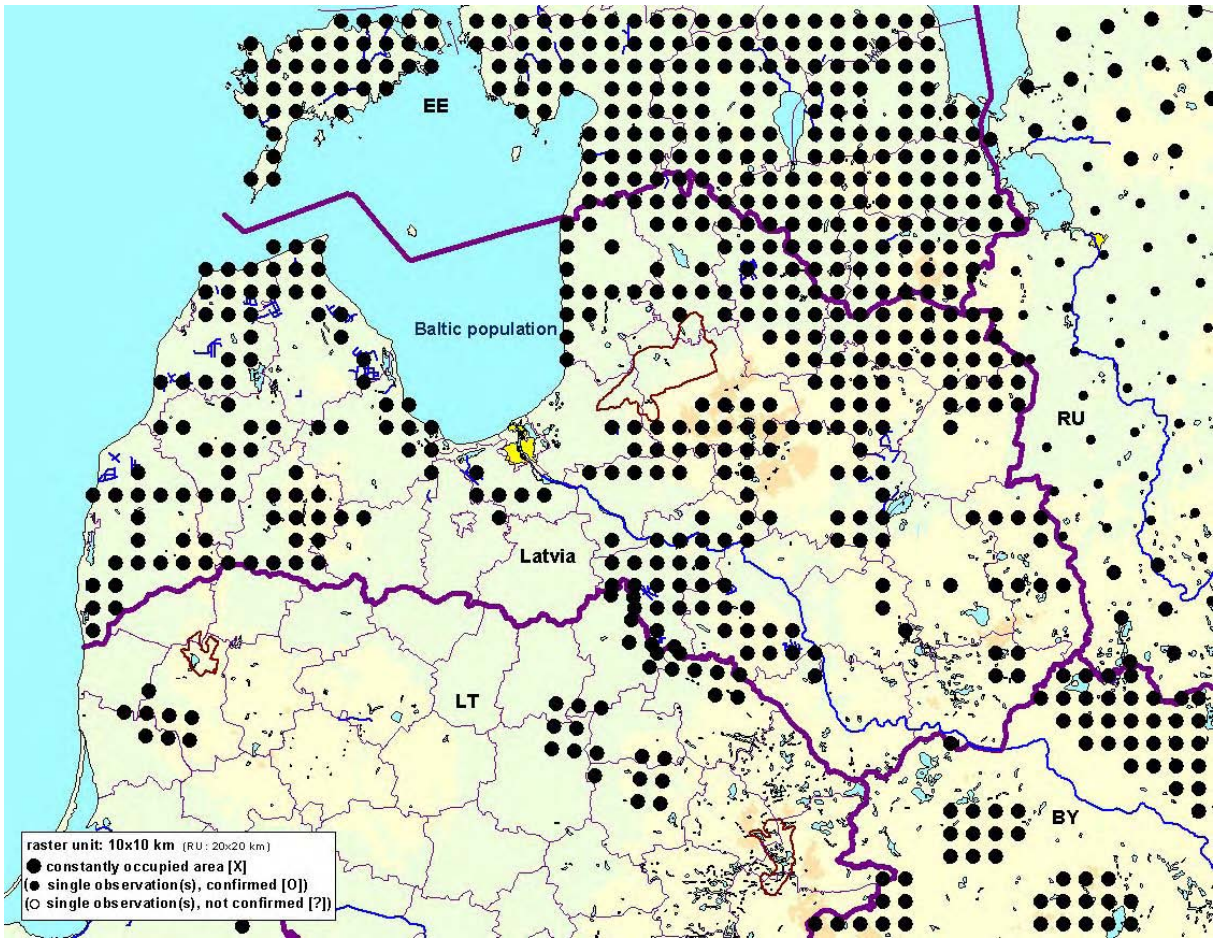
MATYUSHKIN, Y. N. & VAISFELD, M. A. 2003: The lynx – regional features of ecology, use and protection. Game animals of Russia and adjacent countries and their environment. Moscow Nauka: 523 pp.

Latvia (LV)

Zanete ANDERSONE & Janis OZOLINS

Area: 64'589 km²
Forests & Woodland: 45 % (2003)
Human population: 2'385'231 (2001)
Population density: 36.9 / km²

1. Lynx distribution in Latvia in 2001:



Geographic range of the population(s)

Baltic population: It is practically impossible to draw a precise distribution map based on the data available (data of census and data on hunting bag, State Forest Service). Therefore, it is only approximate.

Methods: sightings & signs, snow tracking, inquiry, lynx mortality

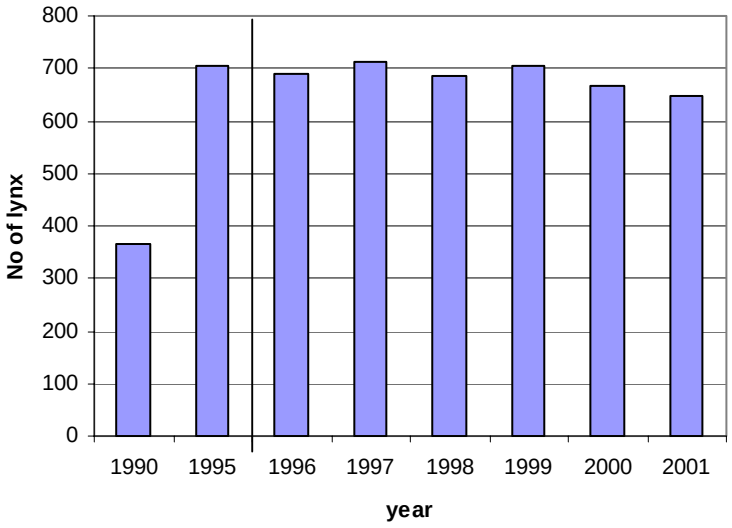
2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Baltic	685	29'000	0	0	29'000	44.9	2.36
Total	*685*	*29'000*	*0*	*0*	*29'000*	*44.9*	*2.36*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Baltic	1996	**691**		The real number is somewhat lower as double counting cannot be excluded (individual forestry units are smaller than the home range of predators) but no solid data are available to support this opinion.	**stable**
	1997	**712**			
	1998	**686**			
	1999	**703**			
	2000	**667**			
	2001	**648**			
Ø 1996-2001		**685**			



Estimated official number of lynx in Latvia from 1996-2001 (Baltic population). Included are also the numbers for 1990 and 1995, taken from the former inquiry.

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Baltic	Snow-tracking by forest guards and their observations during hunting - a sort of educated guess.	-
Institution	State Forest Service	-

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
(2004) - Lynx harvest will be subject to derogations from the Habitat Directive, i.e. it will be harvested in accordance with a strict quota mentioned in the national species conservation plan.	ratified 1997	ratified 1997

4.2. Legal status

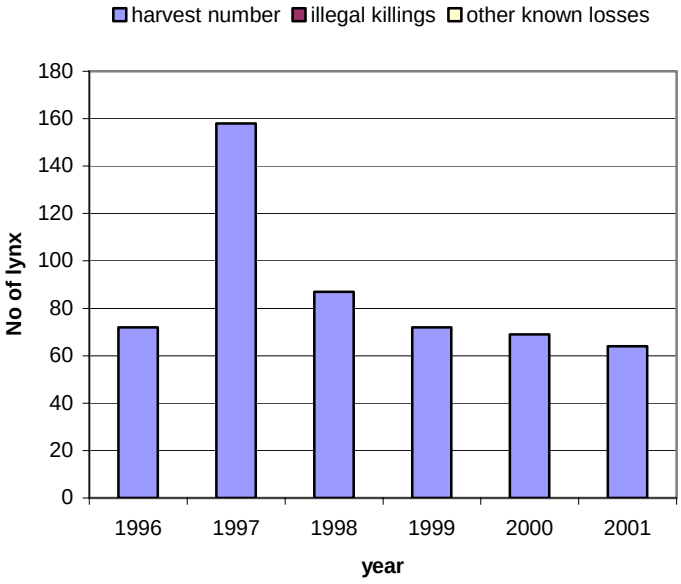
Controlled hunting of lynx.

Hunting season:	01.10. - 15.03. New hunting regulations have been accepted in 2003. Hunting season is reduced to 01.12. to 31.03.
Yearly quota:	No quotas until 2003. – According to the new regulations, hunting quota will be as stated in the national species conservation plan (50 individuals in the season 2003/04).
Institution responsible:	State Forest Service
Method quota setting:	No quota during report period. Under the new regulation, maximum quotas will be defined according to local characteristics and reproduction capacity of the population, and should be below 10 % of the population estimate.
Comments:	Protected areas can apply special rules for lynx management, e.g. according to the regulations of the Kemeri NP [about 40 km west of Riga, not shown on the map] lynx hunting is not allowed within its territory. But this does not influence the whole population much.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Quota	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	Total	% of population
Baltic	1996	no	72				0					72	*10.4*
	1997	no	158				0					158	*22.2*
	1998	no	87	no information available			0	no information available				87	*12.7*
	1999	no	72				0					72	*10.2*
	2000	no	69				0					69	*10.3*
	2001	no	64				0					64	*9.9*
Total 1996-2001		-	*522*	*n.a.*	*n.a.*	*n.a.*	*0*	*n.a.* [a]	*n.a.*	*n.a.*	*n.a.*	*522*	-
Yearly Ø		-	*87*	*n.a.*	*n.a.*	*n.a.*	*0*	*n.a.*	*n.a.*	*n.a.*	*n.a.*	*87*	*12.7*
Known mortality / 100 km² [X+O]		-	*0.3*	*n.a.*	*n.a.*	*n.a.*	*0*	*n.a.*	*n.a.*	*n.a.*	*n.a.*	*0.3*	-

[a] Trichinellosis (common) and rabies (rare)



Number of known losses to the lynx in Latvia (Baltic population) from 1996-2001 (only harvest numbers as there is no information on other losses).

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Baltic	State Forest Service	Head forestry districts (35 in the country) which are divided into 251 forestry districts.	OZOLINS, J. 2002: Action Plan for the conservation of Eurasian lynx (*Lynx lynx*) in Latvia. Forest Research Institute "Silava", Salaspils: 1-34. [a]

[a] http://www.varam.gov.lv/vad/English/Plans/Species_plans.html

5. Depredation:

Some cases of depredation on roe deer in fenced deer farms. In Latvia, no compensation systems and prevention methods are applied. In the last few years at least one lynx has been killed annually within game farms (lynx can accidentally be caught in traps for other predators).

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Baltic	Agriculture Infrastructure development: Human settlement Infrastructure development: Road building Shooting Other: Habitat fragmentation, isolation of some parts of the population	-	Agriculture (?) Extraction of wood Infrastructure development: Road building Vehicle and train collision (?) Transport (?) Other: Habitat fragmentation, isolation of some parts of the population

Comment: The main threat is not the harvest itself but its combination with habitat fragmentation due to active forestry in combination with big agricultural areas, e.g. the central part of Latvia (south of Riga) is an agricultural area and there is only a very narrow corridor of forests connecting the western part of the country with the east. Therefore, any hunting in that area is critical for dispersing lynx. National legislation must be arranged to allow regional hunting bans e.g. in the corridor areas between the west and east of the country. Regulated hunting as such is not a threat. If, in the future, Latvia joins the EU and starts developing infrastructure (e.g. roads), there might be additional barriers within the population.

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans			X
Legislation on an international level			X
Legislation on a national level			X
Legislation on a regional level	X		
Population numbers and range		X	
Biology and Ecology		X	
Uses and harvest levels			X
Conservation measures		X	
Monitoring / Trends			X
Human attitude / Human dimensions			X
Sustainable use / Harvest management			X
Disease, pathogen, parasite management			X
Limiting population growth			X

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Baltic	least concern	• Yearly hunting quotas (no more than 10%) and hunting ban in the most sensitive areas • Ensuring connectivity between lynx sub-populations in the east and west of the country

9. Projects:

Population	Title	Duration	Contact
Baltic	Investigation of interrelations between natural consumers and impact of game management in forest ecosystems (lynx is only one of the subjects in the project).	2001-2003	Janis Ozolins, Forest Research Institute "Silava": janiso@vmd.gov.lv
Baltic	Programme on monitoring harvested lynx (age/sex structure, fertility, parasites) {more or less on voluntary basis}.		Janis Ozolins, State Forest Service: janiso@vmd.gov.lv
Baltic / (Nordic)	Large carnivores in northern landscapes: an interdisciplinary approach to their regional conservation (in collaboration with the other Baltic States, Poland and Norway).	2003-2005	Zanete Andersone, Forest Research Institute "Silava": zanete.a@ml.lv or vilkumeitene@hotmail.com

10. Contact:

Population	Name	Address
Baltic	Zanete ANDERSONE	Large carnivore project, State Forest Research Institute “Silava”, Rigas Str. 111, Salaspils, LV-2169 e-mail: zanete.a@ml.lv or vilkumeitene@hotmail.com
Collaborator:	Janis OZOLINS	State Forest Service, 13. Janvara Str. 15, Riga, LV-1932 and State Forest Research Institute “Silava”, Rigas Str. 111, Salaspils, LV-2169 e-mail: janiso@vmd.gov.lv

Country assessment:

Latvia is very important for the Baltic lynx population as it links Estonia and Russia, where lynx is numerous and extensively distributed with Belarus and Lithuania where the status is less positive (see map, population assessment, and respective country reports). Latvia is a transition range between these two patterns: Lynx is most common in the northern districts, especially near the Estonian and Russian border, while comparatively rare along the border with Lithuania and Belarus (see map, and OZOLINS 2002). Except for the north, the distribution is very fragmented, and in the central-south and south-east, observations have been missing. The western and eastern population parts have been relatively isolated from each other already since the 19th century, and are considered to be subpopulations by the contacts (Table 8, ELF 2001, OZOLINS 2002). At the beginning of the 1940s lynx in the west was even part-time extinct. The recolonisation started at the northern edge of western Latvia (OZOLINS 2002, ANDERSONE *et al.* 2003). A document by the Estonian Fund for Nature (2001) claims that

the isolation of these subpopulations was caused mainly by a too high hunting pressure, and that, by limiting the harvest in the central area south of Riga, a good exchange between the two areas would be ensured. However, as the comment to Table 6 stresses out, the habitat suitability in the region concerned might be a problem as well. The factors behind the fragmented distribution have to be further investigated to identify appropriate measures.

During the past few years, international treaties were ratified and national legislation in Latvia have strongly improved (Table 4.1). Lynx has traditionally been a game species in Latvia, and it was only in 1985, when a closed season from 15 March until 1 October was introduced (ANDERSONE *et al.* 2003). Latvia does not want to put lynx under a complete protection because it is assumed that this would impair the conservation status of the species (due to so-called "biological reasons", and the public attitude, ELF 2001).The lynx management plan (OZOLINS 2002), adopted by the Ministry of Environmental Protection and Regional Development in December 2002, provides for annual hunting quotas that should however be below 10% of the population estimate (Table 4.2). This implies a further reduction of the harvest compared to 1996-2001: A total of 522 lynx was legally killed during this period, making a yearly average of 87 animals or 12.7% of the estimated population (Table 4.3). The real harvest might even have been a bit higher as the official population estimations are considered to be slightly overestimated (Table 3.1, ANDERSONE *et al.* 2003). A lower number of around 500 lynx is mentioned in the ELF report (2001). Nevertheless, the population status at present is considered as being much better than ever in the last 150 years, and one of the objectives of the management plan is to maintain it at such level (OZOLINS 2002).

To support this, the monitoring has to be improved to get additional data beyond the currently gathered information through hunting (Table 3.2. and 4.3). Such a monitoring system may not allow to detect negative changes early enough, and any additional data allowing a critical assessment of the information now available would approve the reliability of the system. It is only since 1999 that research projects on the lynx in Latvia have been started (ANDERSONE 2001). Scientific collaboration with Estonia and Lithuania has recently been established (BALTIC LARGE CARNIVORE INITIATIVE). In regard to the status of the lynx in Lithuania and Belarus, where the species shows a rather decreasing tendency in spite of being completely protected by law, the management in Latvia should be adopted according to a common strategy. The assessment "least concern" (Table 8) may be acceptable regarding the number of lynx and the fact that the population has considerably recovered from a historic low. Nevertheless, the fragmentation of the population bears a potential threat to be observed.

References:

ANDERSONE, Z. 2001: Ongoing projects and research priorities on large carnivores in Latvia. Proceedings of the BLCI Symposium "Human dimensions of large carnivores in Baltic countries", 27-29 April 2001, Siauliai, Lithuania: 45-48.

ANDERSONE, Z., OZOLINS, J., PUPILA, A. & BAGRADE, G. 2003: Latvia. In: The Lynx – Regional Features of Ecology, Use and Protection, Ed. by YE.N. Matyushkin & M.A. Vaisfeld, Moscow Nauka 2003: 92-105.

BALTIC LARGE CARNIVORE INITIATIVE: http://www.large-carnivores-lcie.org/blci2.htm

ESTONIAN FUND FOR NATURE (ELF) 2001: Report of the Status of Large Carnivore Conservation in the Baltic States and Action Plan for the Baltic Large Carnivore Initiative 2001-2005. Council of Europe Publishing, Strasbourg: 1-25 plus Annexes.

OZOLINS, J. 2002: Management plan for the Eurasian lynx (*Lynx lynx*) in Latvia. Latvian State Forestry Research Institute "Silava", State Forest Service of the Ministry of Agriculture, Salaspils: 1-37.

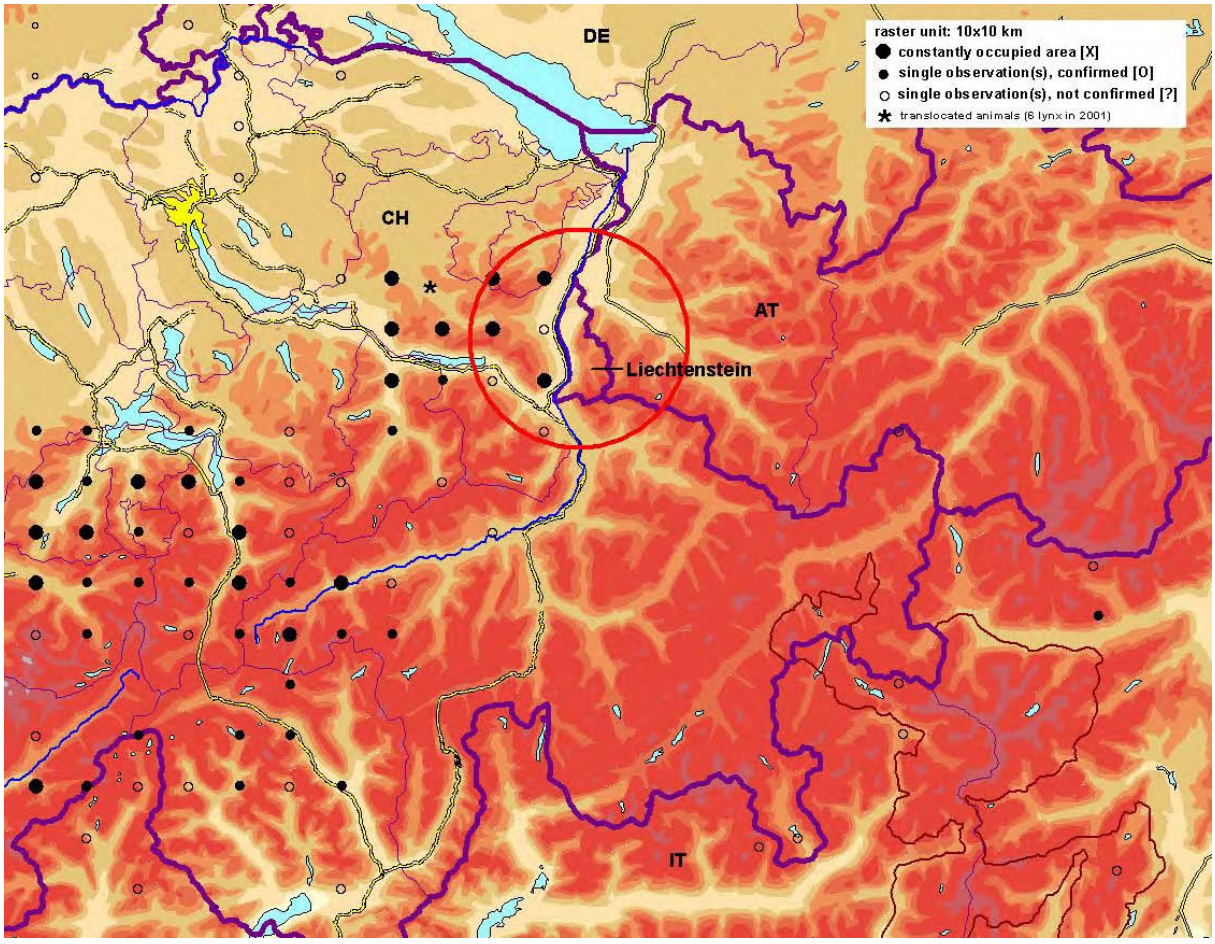
→ Proceedings of the BLCI Symposium 2001 in Lithuania, as well as the Latvian lynx Management plan, and the ELF report can be downloaded at: http://www.large-carnivores-lcie.org/blcipublic2.htm

Liechtenstein (LI)

Michael FASEL

Area: 160 km²
Forests & Woodland: 46.7 % (2000)
Human population: 32'528 (2001)
Population density: 203.3 / km²

1. Lynx distribution in Liechtenstein in 2001:



Geographic range of the population(s)

Alpine population: No signs of lynx presence during the report period. [a]

Methods: -

[a] In early January 2004, a lynx was observed for the first time in Liechtenstein (M. FASEL, pers. comm.; see assessment), probably an individual immigrating from Switzerland and later killed in a car accident.

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Alpine	-	0	0	0	0	0	-

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Alpine	1996-2001	**0**	**0**	So far no signs of lynx presence. [a]	**-**

[a] In 2002 some roe deer and chamois kills have been checked but it turned out they had been killed by dogs or foxes.

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Alpine	-	-
Institution	(Amt für Wald, Natur und Landschaft)	-

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
-	ratified 1980	ratified 1979

4.2. Legal status

Lynx has been fully protected by law since 1937.

4.3. Harvest numbers and other known losses to the population(s)

(→ No lynx presence.)

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Alpine	Amt für Wald, Natur und Landschaft	none	none

10. Contact:

Population	Name	Address
Alpine	Michael FASEL	Amt für Wald, Natur und Landschaft, Dr. Grass Strasse 10, FL-9490 Vaduz e-mail: michael.fasel@awnl.llv.li

Country assessment:

Since the extinction of the lynx in Liechtenstein, neither direct observations, nor livestock killed, tracks or other signs of presence have been recorded (FASEL 2001). However, the country should be prepared that this could happen in the near future: In 2001, lynx were translocated to and released in eastern Switzerland at the border to Liechtenstein. They are now only separated through the Rhine valley. The most important measures are the information and education of the public and interest groups as pointed out by the "Pan-Alpine Conservation Strategy for the Lynx" where Liechtenstein takes part (MOLINARI-JOBIN *et al.* 2003). Close co-operation with the neighbouring countries is important, as the limited expansion of Liechtenstein will not allow for a self-sustaining population.

Update 2004: The sighting of a lynx in Liechtenstein on January 3, 2004 was reported by the country contact (M. FASEL, pers. comm.). As a matter of fact, one of the females released during the translocation project in north-eastern Switzerland had her home range established just across the Rhin valley from Liechtenstein (RYSER *et al.* 2004). She had been missing in her home range when the observation in Liechtenstein was made. In March 2004, this lynx was killed in a car accident in the Rhine valley exactly between the spot of the observation in Liechtenstein and her former home range in Switzerland.

References:

FASEL, M. 2001: The lynx in Liechtenstein. *Hystrix* 12 (2): 29.

MOLINARI-JOBIN, A., MOLINARI, P., BREITENMOSER-WÜRSTEN, CH., WÖLFL, M., STANISA, C., FASEL, M., STAHL, P., VANDEL, J.-M., ROTELLI, L., KACZENSKY, P., HUBER, T., ADAMIC, M., KOREN, I. & BREITENMOSER, U. 2003: The Pan-Alpine Conservation Strategy for the lynx. Nature and environment No. 130, Council of Europe Publishing, Strasbourg: 1-20.

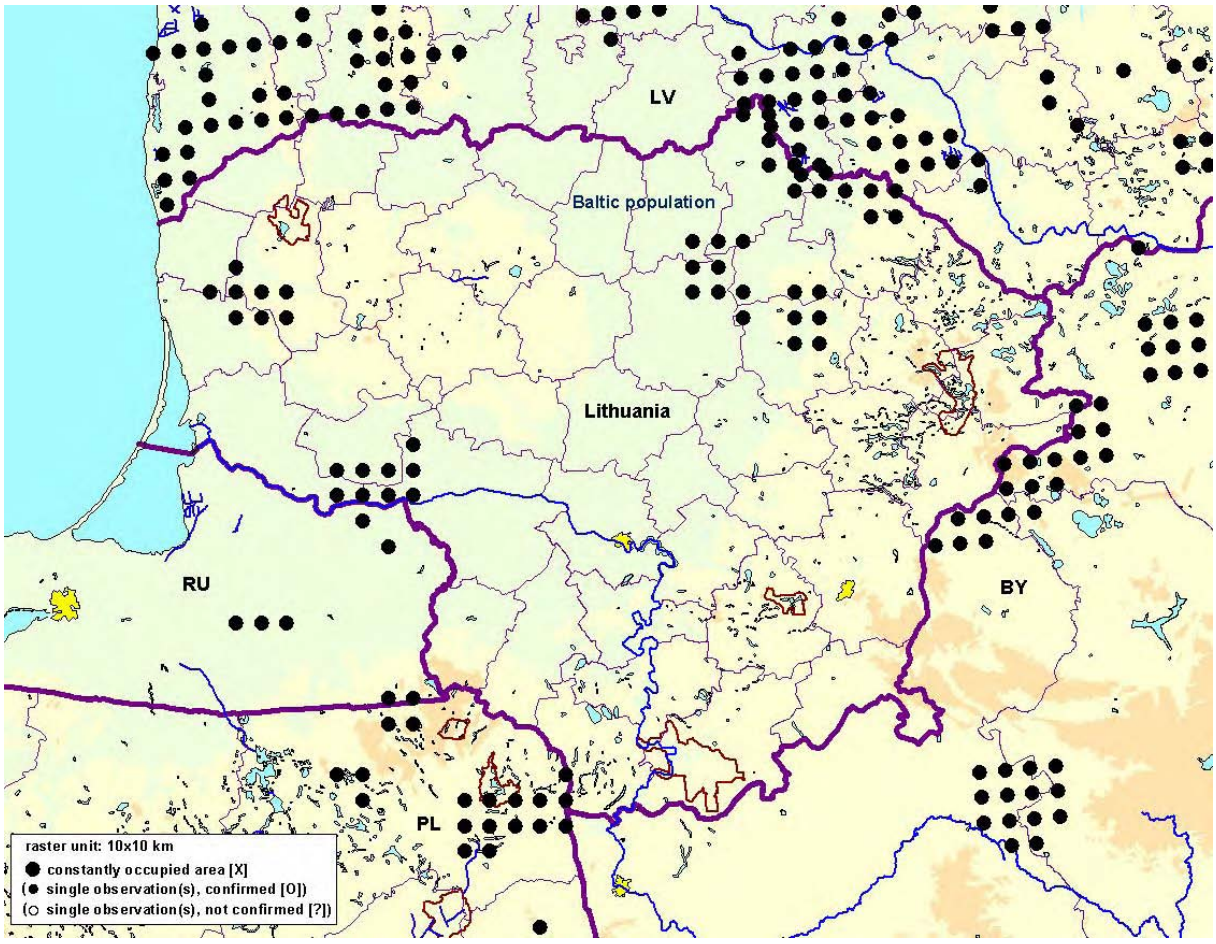
RYSER, A., VON WATTENWYL, K., RYSER-DEGIORGIS, M.-P., WILLISCH, CH., ZIMMERMANN, F. & BREITENMOSER, U. 2004: Luchsumsiedlung Nordostschweiz 2001-2003. Schlussbericht Modul Luchs des Projektes LUNO. KORA Bericht No. 22: 1-60.

Lithuania (LT)

Linas BALCIAUSKAS

Area: 65'200 km²
Forests & Woodland: 31 % (2001)
Human population: 3'610'535 (2001)
Population density: 55.4 / km²

1. Lynx distribution in Lithuania in 2001:



Geographic range of the population(s)

Baltic population: Mainly NE of the country. Areas for lynx distribution shown in the map include ca. 90% of the population in the country. These are going to be Natura 2000 sites. Rest of the former locations are either absent or not confirmed. Current distribution is more restricted than it was. Southern Lithuania lost permanent population of lynx. Some other parts still have wandering single animals, but no confirmed observations.

Methods: sightings & signs, unspecific survey, inquiry, Natura 2000 survey

2. Lynx population(s):

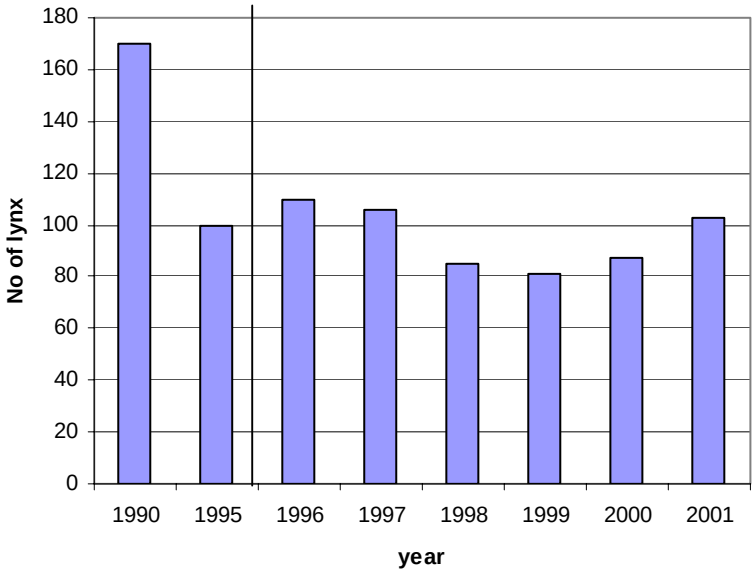
Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Baltic	95	4'500	0	0	4'500	6.9	2.1
Total	*95*	*4'500*	*0*	*0*	*4'500*	*6.9*	*2.1*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Baltic	1996	**110**		Lynx is the only species, for which official survey is more or less exact.	**decreasing** [a]
	1997	**106**			
	1998	**85**			
	1999	**81**			
	2000	**87**			
	2001	**103**			
Ø 1996-2001		**95**			

[a] Collapse of lynx in the country; species included into the national Red Data Book).



Official numbers of lynx in Lithuania (Baltic population) from 1996-2001. Included are also the estimations for 1990 and 1995, which are taken from the former inquiry.

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Baltic	Hunters' data, snow counts, special counts - e.g. under Natura 2000.	
Institution	Ministry of Environment	

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
Signed. (Not ratified, but Lithuania included requirements of the Habitat Directive into its law system. According to Brussels, there are ca. 70-80 % of requirements implemented into the Law of Protected Territories and the "Law on Protected Fauna, Flora And Fungi Species and Communities of Lithuanian Republic".)	ratified 1996	ratified 2001

4.2. Legal status

Lynx has been fully protected by law since 1979.

4.3. Harvest numbers and other known losses to the population(s)

→ Currently, there are no information on losses available.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Baltic	Ministry of Environmental Protection	Regional departments of the Ministry of Environmental Protection, also hunters' society and clubs involved.	none [a]

[a] (Natura 2000 project identified potential sites for lynx protection (in 2001). Implementation not yet started.)

5. Depredation:

→ So far, depredation losses due to lynx have in Lithuania not been known. Therefore, no compensation systems and prevention methods are applied.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Baltic	Extraction of wood (?) Prey / food base (?) Low densities Recreation / tourism (?)	Extraction of wood (?) Prey / food base (?) Poor recruitment / reproduction / regeneration (?) Low densities Recreation / tourism (?)	Extraction of wood (?) Infrastructure development: Tourism / recreation (?) Poor recruitment / reproduction / regeneration (?) Low densities Recreation / tourism (?)

Comment: Population collapse due to the intensive forestry and disturbance, but it is thought that main cause could also be more intrinsic, such as marginal range or something else. Hare numbers may also have some influence.

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans	X		
Legislation on an international level		X	
Legislation on a national level		X	
Public involvement	X		
Formal education	X		
Awareness	X		
Capacity-building / Training	X		
Taxonomy	X		
Population numbers and range	X		
Biology and Ecology	X		
Habitat status	X		
Threats	X		
Conservation measures	X		
Monitoring / Trends			X
Genetic status	X		
Human attitude / Human dimensions		X	
Maintenance / Conservation		X	
Restoration	X		
Corridors	X		
Identification of new protected areas		X	

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Baltic	endangered	• Management plan • Natura 2000 implementation (to protect sites with population remains)

9. Projects:

Population	Title	Duration	Contact
Baltic / (Nordic)	Large carnivores in northern landscapes: an interdisciplinary approach to their regional conservation (in collaboration with the other Baltic States, Poland and Norway).	2003-2005	Linas Balciauskas: linasbal@ekoi.lt

10. Contact:

Population	Name	Address
Baltic	Linas BALCIAUSKAS	Institute of Ecology, Akademijos 2, LT-2600 Vilnius e-mail: linasbal@ekoi.lt

Country assessment:

In the first half of the 20th century lynx in the range of today's Lithuania had been on the edge of extinction. The remaining population was situated along the border with Belarus (BLUZMA & BALEISIS 2001, BLUZMA 2003). From the 1950s on, numbers started to increase and lynx settled again in western areas. The peak was reached in the mid 1980s when 200 animals have been estimated (BALCIAUSKAS 1996, BLUZMA 2003). Since then, a decrease in number and range has been noticed, still ongoing at present (BLUZMA & BALEISIS 2001, BALCIAUSKAS 2003, Table 3.1, point 1). The lynx was included in the national Red Data Book in 2000 (BLUZMA 2001, BLUZMA & BALEISIS 2001), but had already been completely protected by law since 1979 (see 4.2). The negative trend in the population size was not very obvious during the past few years; it may be fluctuating (see numbers and graph in 3.1). In former years, official survey data were considered being not very reliable (BALCIAUSKAS 1996), and for 1995-2000 two ministries publishing very different official numbers (BALCIAUSKAS & VOLODKA 2001). Additional estimates found in the literature are: 98 animals for 1995, whereof 76 residents (BLUZMA 1999), 60-80 individuals in 2001 (BUDRYS 2001), around 100 individuals during the last 10 years without a serious downward trend in 2001 (ELF 2001). The monitoring system has been improved, but a in-depth field study to verify the census data is lacking.

The current distribution area of the lynx in Lithuania is split in five patches, which do not match with the distribution indicated by the contacts of the neighbouring countries along the national borders (see map). The north-eastern patches are considered to be the most important Lithuanian ranges, with higher lynx densities than in the west (point 1, BLUZMA 1999), and these are connected to the species' range in Latvia. In the south, where some patches still existed in 1995 (BLUZMA 1999, BREITENMOSER *et al*. 2000), lynx is now absent (see map). According to BLUZMA (1999, 2003), the present habitat conditions are characterized by a significant fragmentation of the woodland, and intensive economic activities in the forests. The decrease could have been caused by such changes and disturbances (Table 6, BLUZMA 1999). There is however no data on lynx demography or mortality, and therefore, threats are not really understood (Tables 4.3 and 6).

As Lithuania is about to join the European Union, it harmonises its laws with EU standards, and international treaties have recently been signed and ratified (Table 4.1, BLUZMA 2001). The reason why the EU Habitat Directive has not being ratified so far is the intention to continue hunting of wolves (100 animals per year), which would not further be allowed according to the convention (BUDRYS 2001).

Unlike the other Baltic states, Estonia and Latvia (see country reports), Lithuania has not yet developed national action plans for the large carnivores, but their preparation is likely to be undertaken in the near future (ELF 2001). As the conservation status of the lynx in Lithuania is actually quite different than in the two other countries, and has to be considered as endangered, a national strategy for the conservation and management of the species is highly recommended. The improvement of the knowledge on the lynx in the country range is a priority. Cross-border cooperation with Latvia and Estonia has been initiated in 2000 with the foundation of the Baltic Large Carnivore Initiative. Together with Poland (and Norway) an international project is currently going on (Table 9). Collaboration with Kaliningrad and Belarus, which are sharing a long borderline (inclusive lynx presence) with Lithuania, needs to be established as well. The strongly fragmented distribution (see map) clearly indicates the need of action: Lithuania does not only need to maintain its own lynx occurrences, but it is very important to

connect the now isolated patches in NE Poland, Kaliningrad and Belarus with the more continuous range in the north-east. To do this, the recovery of the lynx population in the south-eastern part of Lithuania is needed, with several protected areas in this region as potential stepping stones.

References:

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BALCIAUSKAS, L. & VOLODKA, H. 2001: Some aspects of human dimensions of large carnivores in north-west Lithuania. Proceedings of the BLCI Symposium "Human dimensions of large carnivores in Baltic countries", 27-29 April 2001, Siauliai, Lithuania: 92-102.

BALCIAUSKAS, L. 2003: Public acceptance of large carnivores in Lithuania. Abstract, Carpathian Workshop on Large Carnivore Conservation, Brasov (Romania) 12-14 June 2003.

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BLUZMA, P. 1999: Estimation of the state of lynx and wolf populations in Lithuania. *Acta Zoologica Lituanica* 9 (1): 35-41.

BLUZMA, P. & BALEISIS, R. 2001: Monitoring of large carnivores in Lithuania: Experience and first results. Proceedings of the BLCI Symposium "Human dimensions of large carnivores in Baltic countries", 27-29 April 2001, Siauliai, Lithuania: 55-63.

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BREITENMOSER, U., BREITENMOSER-WÜRSTEN, CH., OKARMA, H., KAPHEGYI, T., KAPHEGYI-WALLMANN, U., & MÜLLER, U. M. 2000: Action Plan for the Conservation of the Eurasian Lynx (*Lynx lynx*) in Europe. Nature and environment No. 112, Council of Europe Publishing, Strasbourg: 1-70.

BUDRYS, R.R. 2001: Status of lynx and wolf in Lithuania. Proceedings of the BLCI Symposium "Human dimensions of large carnivores in Baltic countries", 27-29 April 2001, Siauliai, Lithuania: 53-54.

ESTONIAN FUND FOR NATURE (ELF) 2001: Report of the Status of Large Carnivore Conservation in the Baltic States and Action Plan for the Baltic Large Carnivore Initiative 2001-2005. Council of Europe Publishing, Strasbourg: 1-25 plus Annexes.

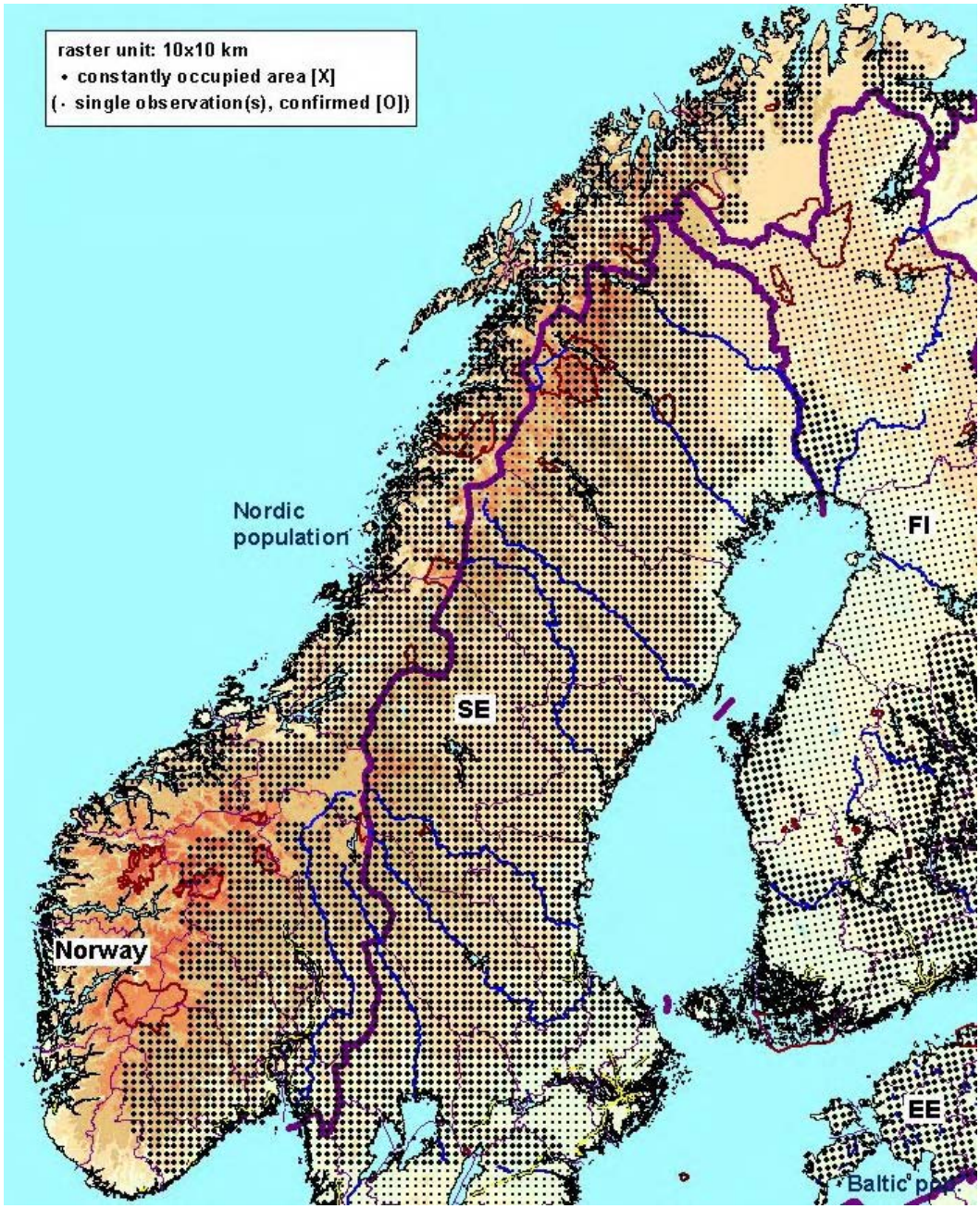
→ Proceedings of the BLCI Symposium 2001 in Lithuania, as well as the ELF report can be downloaded at: http://www.large-carnivores-lcie.org/blcipublic2.htm

Norway (NO)

John LINNELL & Henrik BRØSETH

Area: 324'220 km²
Forests & Woodland: 28.9 % (2000)
Human population: 4'503'440 (2001)
Population density: 13.9 / km²

1. Lynx distribution in Norway in 2001:



Geographic range of the population(s)

Nordic population: Continuous with Sweden. The national population has declined by 27% in the period 1996-2002, but the overall distribution remained relatively unchanged, with the exception of the extreme south-west of Norway, where reproductive units are now absent.

Methods: sightings & signs, snow tracking, radio telemetry, lynx mortality, depredation on sheep with identified predator (all point data are buffered with 15 km to approximate a small home range radius).

2. Lynx population(s):

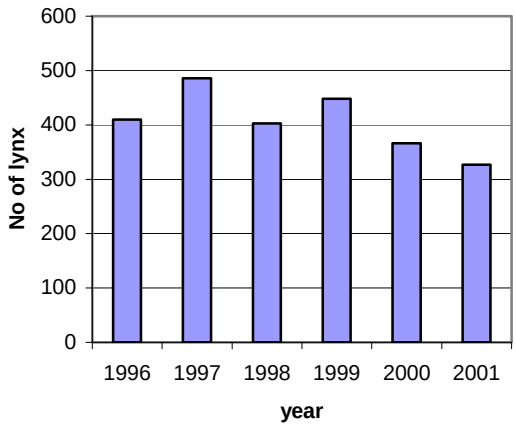
Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Nordic	406	215'600	0	0	215'600	66.5	0.19
Total	*406*	*215'600*	*0*	*0*	*215'600*	*66.5*	*0.19*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Nordic	1996	**410**		Conservative estimate of total population size as some family groups are not reported. Reports of tracks are field controlled by experienced wardens. Given the size of the distribution area these are as seen as accurate numbers.	**stable** (in the north and south-east) **/ decreasing** (in the central and south-west) [a]
	1997	**486**			
	1998	**403**			
	1999	**448**			
	2000	**366**			
	2001	**327**			
Ø 1996-2001		**406**			

[a] The Norwegian segment of the Nordic population has declined by 25-30% since the first nationwide census in 1996, probably the consequence of too high hunting quotas. The decline has been strongest in the south-west and the central areas. {Update 2004: the population estimates for 2002 and 2003 are 332 and 267 lynx, respectively.}



Official estimations for the Nordic lynx population in Norway from 1996-2001.

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Nordic	The minimum number of family groups is determined each winter based on the application of a distance rule (based on telemetry data on movement rates and home range size) to observation of reproduction (tracks of family groups and shot kittens). Using data on population structure obtained from telemetry studies this minimum number of family groups is extrapolated to an estimate of total population size. [a]	-
Institution	Norwegian Institute for Nature Research	-

[a] [refer to ANDRÉN *et al.* 2002, Eds.]

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
-	ratified 1986	ratified 1976

4.2. Legal status

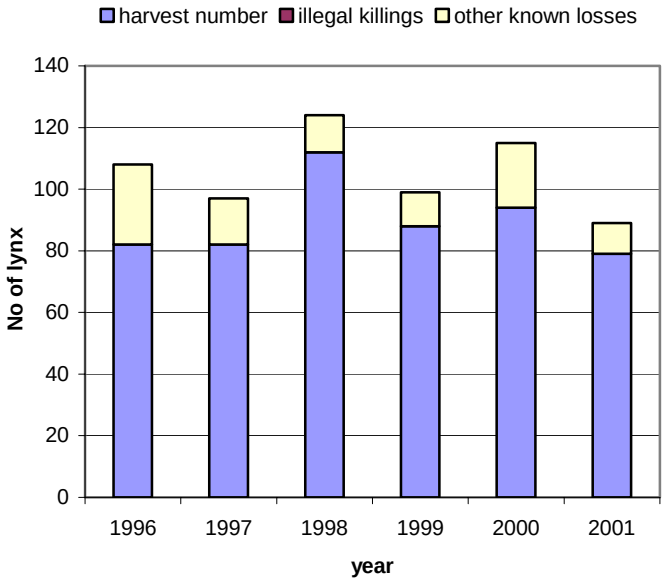
Controlled hunting of lynx and removal of problem animals.

Hunting season:	01.02. - 30.04.
Yearly quota:	Regional quotas. In the west and south-west (4 counties) and north (1 county and parts of another) there is no quota limit on the numbers of lynx that can be killed per hunting season. The remaining 13 counties allow for an annual quota, usually with a female sub-quota.
Institution responsible:	The office of environmental affairs of each county sets the annual hunting quota, and the allocation of this quota within the county. In two counties, a local stakeholder committee is authorised to set the quotas as part of a trial to decentralise management.
Method quota setting:	Quotas base on the previous year's population estimate plus data on depredation losses of sheep and semi-domestic reindeer.
Comments:	See http://www.naturforvaltning.no/archive/images/01/01/kvote073.jpg for areas of different quota regulations for lynx hunting.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Quota	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Nordic	1996	yes	82	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	26	*108*	*26.3*
	1997	yes	82	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	15	*97*	*20*
	1998	yes	112	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	12	*124*	*30.8*
	1999	yes	88	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	11	*99*	*22.1*
	2000	yes	94	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	21	*115*	*31.4*
	2001	yes	79	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	10	*89*	*27.2*
Total 1996-2001		-	*537* [a]	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*95* [b]	*632*	-
Yearly Ø		-	*89.5*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*15.8*	*105.3*	*25.9*
Known mortality / 100 km² [X+O]		-	*0.04*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*0.01*	*0.05*	-

[a] some few individuals shot as problem animals are included in the harvest number - not possible to separate
[b] other: TOTAL number (mainly traffic, but also problem animals, research and disease: sarcoptic mange in a few animals)
{Update 2004: in 2002 harvest number = 88, lynx killed by other causes = 11; in 2003 harvest number = 62 animals.}



Number of known losses to the Nordic population in Norway from 1996-2001.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	**Regional level**	
Nordic	National Directorate for Nature Management (has in all cases the ultimate responsibility).	Office for environmental affairs in each county (sets the quotas). In two counties a local stakeholder committee is authorised to set the quotas (see 4.2).	No formal conservation AP or management plan explicitly aimed at lynx. Large carnivore management guidelines by a government White Paper from 1997. New edition due in 2003. [a]

[a] This paper defines the overall national goals and management strategy also for lynx. Within this framework the Directorate for Nature Management draws up overall management protocols about hunting season, types of weapons & traps allowed, and regional differences in the management system.

5. Depredation:

5.1. Depredation losses & compensation paid

Population	Year	Sheep	Goat	Rein-deer	Other species	Total	Compensation (in Euro)	Compensation other predators
Nordic	1996	9'862	0	yes	0	n.d.a.	4'086'391 €	
	1997	9'075	0	yes	0	n.d.a.	4'332'756 €	
	1998	9'204	0	yes	0	n.d.a.	5'444'639 €	
	1999	9'300	0	yes	0	n.d.a.	5'881'162 €	
	2000	8'337	0	yes	0	n.d.a.	5'843'047 €	
	2001	7'330	0	yes	0	n.d.a.	5'253'971 €	
Total 1996-2001		*53'108* [a]	*0*	*n.d.a.* [b]	*0*	*n.d.a.*	*30'841'966 €* [c]	

[a] These figures are the number of sheep compensated.
[b] Lynx depredation on reindeer is extensive; but compensation is paid for all losses to predators, and reindeer killed by individual carnivore species cannot be separated.
[c] all large predators (lynx, bear, wolf, wolverine and golden eagle plus unspecified)
{Update 2004: 6198 sheep were killed in 2002; in 2003 6853 sheep.}

5.2. Regional & seasonal differences

Region: Throughout the country; reindeer depredation only in the northern parts. The depredation rates are positively correlated with sheep densities.
Season: Mainly June to September, when sheep are grazing unattended in the forest and alpine tundra habitats.

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
Nordic	Farmers must report killed sheep to have them examined by trained wardens. Once depredation has been documented, compensation is also paid for missing sheep up to a level of losses to be expected for the respective area when large carnivores would be absent.	Paid by the state, with each county's office of environmental affairs responsible for processing the claims.	Trained personnel examine reported kills to identify which carnivore species (wolf, bear, lynx, wolverine or golden eagle) is responsible. Responsibility for depredation verification presently lies with the State Nature Inspectorate.

5.4. Prevention

Population	Prevention methods	Legal measures	Illegal actions
Nordic	Most sheep are unprotected. Few measures to protect sheep are taken especially for lynx, although in areas with bears and wolves there are some attempts to change husbandry (electric fencing, livestock guarding dogs), which also helps reducing lynx depredation.	Quota harvest partly intends to limit lynx population growth, and so to prevent further increases of depredation. Special permits are also issued during summer to remove "problem individuals", although these lynx are rarely killed.	Poaching of lynx is a common cause of mortality – although it is not possible to say if this is motivated especially because of their depredation on sheep.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Nordic	Legal hunting & trapping other: Poaching	Legal hunting & trapping other: Poaching	Legal hunting & trapping other: Poaching

Comment: Harvest will only be a threat if the quotas are set too high. It should be possible to achieve a relatively sustainable harvest in the future, if the management system is adapted to the most recent research results about population growth rates, and updated population estimates are constantly used. Agriculture is an indirect threat as the present form of sheep farming exposes sheep to depredation, and so decreases public acceptance of lynx.

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans			X
Legislation on an international level			X
Legislation on a national level			X
Legislation on a regional level			X
Public involvement			X
Population numbers and range			X
Biology and Ecology			X
Habitat status			X
Threats			X
Uses and harvest levels			X
Conservation measures			X
Monitoring / Trends			X
Genetic status			X
Human attitude / Human dimensions			X
Sustainable use / Harvest management			X
Limiting population growth			X

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Nordic	requires monitoring	• Adjust hunting quotas to a sustainable level • Begin to make changes to sheep husbandry practices to reduce depredation rates

9. Projects:

Population	Title	Duration	Contact
Nordic	(Project goals include population dynamics, social organisation, depredation on livestock and predation on roe deer.)	1995-2004	Reidar Andersen: reidar.andersen@nt.ntnu.no
(Nordic) / Baltic	Large carnivores in northern landscapes: an interdisciplinary approach to their regional conservation (in co-operation with the Baltic States and Poland).	2003-2005	John Linnell & Tore Bjerke, Norwegian Institute for Nature Research: john.linnell@nina.no

10. Contact:

Population	Name	Address
Nordic	John LINNELL	Norwegian Institute for Nature Research, N-7005 Trondheim e-mail: john.linnell@nina.no
Collaborator:	Henrik BRØSETH	Norwegian Institute for Nature Research, N-7005 Trondheim e-mail: henrik.broseth@nina.no

Country assessment:

In the middle of the 20th century, lynx in Norway were reduced to a few very small areas in the centre and south-east of the country. The removal of state bounties in 1980 (LINNELL *et al*. 1996), immigration from Sweden and an improved prey base supported the recovery in the entire country except the extreme west. The system of quota hunting was introduced in Norway in 1994 (LINNELL, ANDERSEN & KVAM 1999). The national objective is to maintain an overall viable population (c. 500 lynx, LINNELL *et al*. 2001), but to be keep lynx away from certain areas where the potential conflicts in regard to livestock depredation (sheep in the south-west, reindeer in some northern islands and areas of Finnmark county) have been judged as being too high (LINNELL *et al*. 1998, LINNELL, ANDERSEN & KVAM 1999). These regions have no harvest limits (quotas) (Table 4.2). The yearly loss of lynx from 1996-2001 has been very high: on average 26 % of the estimated population, of which by far the highest part due to harvest (Table 4.3). Most probably due to this (too) high harvest levels, the population size dropped from around 500 animals in 1997 – the agreed goal for the population in Norway – to 300-350 in 2001 (Table 3.1; to around 267 in 2003, J. LINNELL, pers.comm.). The overall trend has been decreasing, although the numbers have been stable in certain areas (Table 3.1, also BRØSETH, ODDEN & LINNELL 2003). It is assumed that immigration from Sweden may be responsible for maintaining stable levels in border areas (ANDERSEN *et al*. 2003). All together, harvest in Norway has been much higher (in percentage) compared to Sweden or Finland and, as mentioned by the contacts, has not been sustainable recently (Tables 6 and 8). Additionally, poaching is regarded as common cause of mortality and even listed as major threat (Table 6). However, although it is assumed to occur at high levels, there are few hard facts available (Table 4.3; LINNELL & ANDRÉN 1999, ANDERSEN *et al*. 2003). Given the high anthropogenic losses and the estimated very low abundance (0.19 lynx/100 km²; Table 2), the Norwegian population must be considered a sink, which may not be self-sustaining, but relying on immigration from the neighbouring Swedish source. Recent studies (LANDE *et al.* 2003) indicate that over 90% of the Norwegian land area is suitable lynx habitat. Therefore, human tolerance rather than habitat availability is clearly the limiting factor.

Depredation on sheep and semi-domestic reindeer is, as mentioned above, the major source of conflict and the main reason for the severe management. Between 2-2.5 million sheep and lambs are grazed annually in Norway. As only a tiny part of the country consists of cultivated area, the animals are freely roaming in the forests and mountain habitats during summer, with hardly any supervision (ODDEN *et al*. 2002, LINNELL & BRØSETH 2003). From 1996-2001, an average 8851 sheep per year have been compensated as killed by lynx (Table 5.1). However, between 1996 and 1999, for example, only 5-10 % of the sheep compensated for were actually confirmed as having been killed by carnivores (LINNELL & BRØSETH 2003). The numbers indicated in Table 5.1 are the result of an estimated loss to large carnivores based upon a calibration by means of telemetry studies in areas with and without depredation.

Norway and Sweden have established a tight co-operation regarding large carnivore research and monitoring in the early 1990s (SWENSON 1998). A wealth of information on lynx biology and human dimension aspects (livestock depredation, hunting) have come out since (e.g. ANDRÉN *et al*. 1997, LINNELL & ANDRÉN 1999, PEDERSEN *et al*. 1999, LINNELL *et al*. 2001, ANDRÉN *et al*. 2002). The monitoring is co-ordinated and is based on two methods: counts of family groups and snow-tracking censuses (ANDRÉN *et al*. 2002). This is a good example of how countries sharing the same population can co-operate, in spite of the fact that the public's attitude and the management approach differ considerably between the two countries. A potential threat to the Norwegian lynx population is, however, that it seems to depend strongly on the conservation of the species in neighbouring Sweden (see also population assessment).

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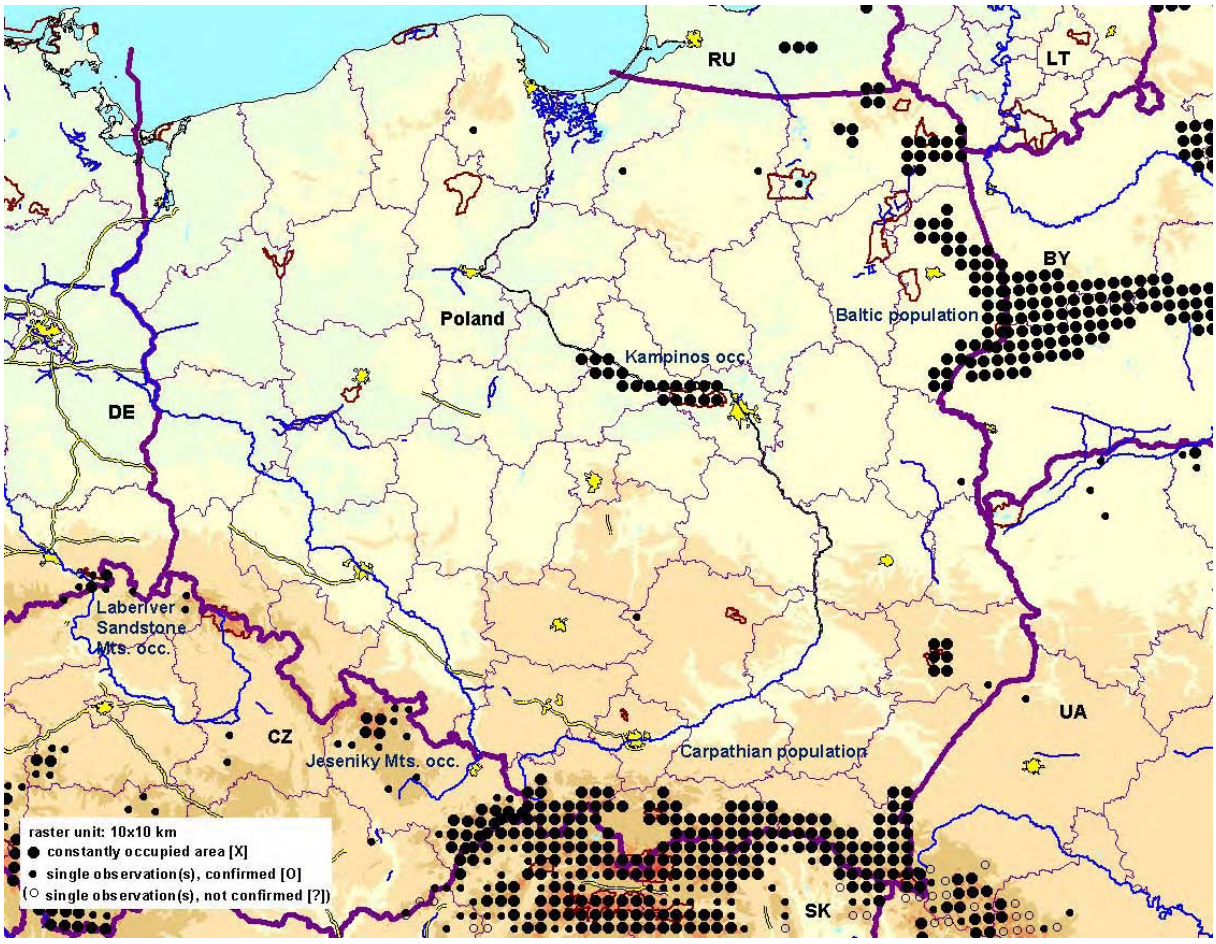
Poland (PL)

Henryk OKARMA & Agnieszka OLSZANSKA

Area: 312'685 km²
Forests & Woodland: 29.7 % (2000)
Population: 38'633'912 (2001)
Population density: 123.6 / km²

1. Lynx distribution in Poland in 2001:



Geographic range of the population(s)

Carpathian population: South-eastern Poland.

Baltic population: North-eastern Poland.

Kampinos NP occurrence: Central Poland. Lynx in the Kampinos National Park introduced in 1993.

Since 1995, distribution of lynx in Poland has more or less been the same. There was a considerable reduction of range from the early 1980s - mid 1990s. Since 1995, quite a change in numbers of lynx within the range, for the range itself no reduction or expansion.

Methods: sightings & signs, snow tracking, radio telemetry. Information is based on a survey done in winter 2000/2001 all over the country by forest service people and coordinated by the Mammal Research Institute in Białowieza.

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Carpathian	97	9'500	100	0	9'600	3	1.02
Baltic	60	5'700	500	0	6'200	1.8 / 2	1.05
Kampinos NP	22	1'900	100	0	2'000	0.6	1.16
Total	*179*	*17'100*	*700*	*0*	*17'800*	*5.5 / 5.7*	*1.05*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Carpathian	2001		**97**	This last estimate is realistic, however probably slightly underestimated because not all lynx are possible to be detected during 1-2 days of snow tracking.	**decreasing**
Baltic	2001		**60**		**decreasing**
Kampinos NP	2000		**22**		**increasing & expanding**
Ø Total 1996-2001			**179**		

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Ca/Balt/Ko	(No official estimation since 1995 when the lynx was declared a strictly protected species.)	Minimum number estimated in winter 2000/01 during a country survey done by forestry personnel (hunters, foresters etc.). All signs of lynx presence recorded: direct observations, tracks, ungulates killed by lynx.
Institution	-	Mammal Research Institute in Białowieza

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
-	ratified 1995	ratified 1989

4.2. Legal status

Lynx has been fully protected by law since 1995.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Carpathian [a]	1996	-	No reliable data on losses of lynx for the years 1996-2000.									*n.d.a.*
	1997	-										*n.d.a.*
	1998	-										*n.d.a.*
	1999	-										*n.d.a.*
	2000	-										*n.d.a.*
	2001	-	1	0	7	0	1	2	0	0	11	*10.67*
Total 1996-2001		-	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	-
Yearly Ø		-	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*?*
Known mortality / 100 km² [X+O]		-	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	-

[a] no information available for the Baltic population and the Kampinos NP occurrence

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Ca/Balt/Ko	Ministry of Environment	none	none

5. Depredation:

→ No depredation losses in Poland from 1996-2001. Therefore, in the case of lynx, there are no compensation systems and prevention methods applied in the country.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Carpathian / Baltic / Kampinos NP occurrence	Agriculture Extraction of wood	Infrastructure development: Human settlement Infrastructure development: Road building Trapping / snaring Limited dispersal High juvenile mortality Restricted range	Infrastructure development: Human settlement Infrastructure development: Road building Trapping / snaring Vehicle and train collision Limited dispersal High juvenile mortality Restricted range

Comment: An important threat is the fragmentation of forest habitats resulting in a lack of migration possibilities, when forest corridors between major forest complexes inhabited by lynx are interrupted. Often the habitat is fine, however lynx are not able to recolonise a given area because there is a lack of dispersal routes (mainly forest belts connecting larger complexes of forests).

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans	X		
Legislation on an international level	X		
Legislation on a national level			X
Public involvement	X		
Formal education	X		
Awareness	X		
Capacity-building / Training	X		
Taxonomy			X
Population numbers and range			X
Biology and Ecology	X		X
Habitat status	X		
Threats	X		
Conservation measures	X		
Monitoring / Trends	X		
Genetic status	X	X	
Human attitude / Human dimensions		X	
Maintenance / Conservation	X		X
Restoration	X		
Corridors	X		
Identification of new protected areas		X	
Establishment of protected areas			X
Management of protected areas			X
Expansion of protected areas	X		
Community-based initiatives	X		
Re-introductions	X		
Recovery management	X		
Disease, pathogen, parasite management	X		
Limiting population growth	X		
Captive breeding / Artificial propagation	X		
Genome resource bank	X		

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Carpathian	endangered	• Stop poaching • Ensure that highway construction will not fragment the lynx range

Population (cont.)	Judgement	Most urgent actions needed
Baltic	endangered	• Reestablishment of ecological corridors between larger forest complexes • Ensure that highway construction will not fragment lynx range even more • Stop poaching
Kampinos NP occurrence	least concern	• Control of genetic origin of these lynx • Stop further reinforcement of the population with new lynx taken from zoos

9. Projects:

Population	Title	Duration	Contact
Carpathian	Ecology of the natural lynx population in the Polish Carpathian Mountains	2000-2003	Dr Henryk Okarma; Institute of Nature Conservation, Krakow: okarma@iop.krakow.pl
Baltic [a]	(Exact title unknown.) It is placed in the Białowieza Primeval Forest, north-eastern Poland		Dr Krzysztof Schmidt, Mammal Research Institute, Białowieza: schmidt@bison.zbs.bialowieza.pl

[a] (A series of scientific publications resulted from the research performed in the Białowieza Primeval Forest, which have considerably contributed to the general knowledge of the species, e.g. JEDRZEJEWSKI *et al*. 1993 and 1996, OKARMA *et al*. 1995, SCHMIDT *et al*. 1997, and others.)

10. Contact:

Population	Name	Address
Carpathian / Baltic / Kampinos NP occ.	Henryk OKARMA	Institute of Nature Conservation, Polish Academy of Sciences, Mickiewicza 33, PL-31-120 Krakow e-mail: okarma@iop.krakow.pl
Collaborator:	Agnieszka OLSZANSKA	Institute of Nature Conservation, Polish Academy of Sciences, Mickiewicza 33, PL-31-120 Krakow e-mail: olszanska@iop.krakow.pl

Country assessment:

Two lynx populations inhabit Poland: the Baltic population (by local experts also named lowland population) in the north-east, and the Carpathian (or mountain) population in the south (see map). The two populations belong to different subspecies: the Baltic to *L. l. lynx*, the Carpathian to *L .l. carpathicus* (see chapter 2.2. Phylogenetic history and subspecies). Both populations are situated along border regions (Belarus and Slovakia, respectively) and their distribution is more or less coherent with the one in the neighbouring countries (see map). For the Baltic population this is however only true in the area of the Białowieza Primeval Forest, where a continuous cross-border exchange of individuals is observed (OKARMA 1993), otherwise the distribution is quite scattered. A few isolated observations in the north of Poland, far west of the population, are reported, but there is no evidence these animals came form the Baltic population. The Polish Carpathian population is larger in number and distribution than the Baltic (Table 2 and Table 3.1). There is a small isolated patch with permanent lynx presence further north-east from the core area (in the Rozdocze national park, see map), which is in connection with the Carpathian population as well (H. OKARMA, pers. comm.), and therefore not treated as additional occurrence in

this survey. Apart from this patch and the single observations in the north, the distribution of lynx in Poland did not undergo major changes since the 1990s (OKARMA 1992). The map for the beginning of the 1960s as presented by HABER & MATUSZEWSKI (1968) actually indicated already a similar distribution. An exception is the Kampinos national park in central Poland (see map), where lynx was re-introduced in 1994 (BÖER *et al.* 1994, 1995, 2000). This experiment with zoo-born lynx caused national and international critics, reflected by the judgement and most urgent actions proposed by the contacts (Table 8). For further background information on the Kampinos NP occurrence refer to the assessment in "Additional occurrences".

The development of the number of lynx in Poland (official numbers) has been as follows: 330 in 1963 (HABER & MATUSZEWSKI 1968), 435 in 1988 (BREITENMOSER & BREITENMOSER-WÜRSTEN 1990), 500-600 in 1992 (OKARMA 1992), less than 300 in 2000 (ANONYMOUS 2000), and 179 in 2001 (this report). Unfortunately, a differentiation between the populations was usually not made. Official population estimates were however considered to be too high (BREITENMOSER & BREITENMOSER-WÜRSTEN 1990, OKARMA 1992, OKARMA *et al.* 2000). A marked decreasing trend during the past few years (except for the Kampinos NP occurrence, Table 3.1) is widely supposed (ANONYMOUS 2000, OKARMA *et al.* 2000, LANGOWSKI 2003, OKARMA 2003). Currently, a total of about 180 lynx is estimated for Poland (Table 3.1). However, the information for this survey base on one winter of data collection only. No reliable data were available for the years 1996-2000 (point 1, Tables 3.1 and 3.2, Table 4.3). After the legal protection of the lynx in Poland in 1995, state authorities ceased their monitoring efforts (Table 3.2). As indicated in Table 7, monitoring is now lacking, and therefore, threats and conservation measures are not really known. A sound monitoring of the species would however be important to assess the effect of the legal protection. All data indicate that in spite of the protection, the population was further declining. Harvest through legal hunting used to be 21-59 lynx per year from 1971-1988; OKARMA 1992, or a total of 408 animals from 1976-1989; BREITENMOSER & BREITENMOSER-WÜRSTEN 1990).

Assumed threats are the decrease of prey populations, both to over-hunting and poaching (with snares; OKARMA *et al.* 2000, OKARMA 2003), loss of habitat and industrial barriers, as well as illegal killings (LANGOWSKI 2003, also Table 6). In Poland, a lynx trophy is very valuable (OKARMA 1992, SALVATORI *et al.* 2002), and consequently, poaching is assumed to be considerable. There are two observations supporting this assumption: 3 out of 9 radio collared lynx in the Białowieza Forest were illegally killed (OKARMA 1993), and 7 out of 11 known losses for the Carpathian population in 2001 were due to illegal killing (Table 4.3). Another problem mentioned by OKARMA (1993 and 2003) is the lack of cooperation between neighbouring countries (Poland, Belarus, Lithuania and Russia for the Baltic; Poland, the Ukraine and Slovakia for the Carpathian population, respectively) in regard to the conservation and management of large carnivores. However, the Ministry of Environment not only stated to plan the preparation of a national strategy in the near future, but also to coordinate its activities with the neighbouring countries (ANONYMOUS 2000, LANGOWSKI 2003). From its (scientific) tradition, Poland should play a leading role regarding large carnivore and especially lynx conservation. This needs, however, a clear commitment from the governmental authorities in charge. It is clearly not sufficient to legally protect a species to grant its survival. Poland might be one of the examples were the ban of hunting had rather a counterproductive effect, but the information is presently too scarce to assess this possibility.

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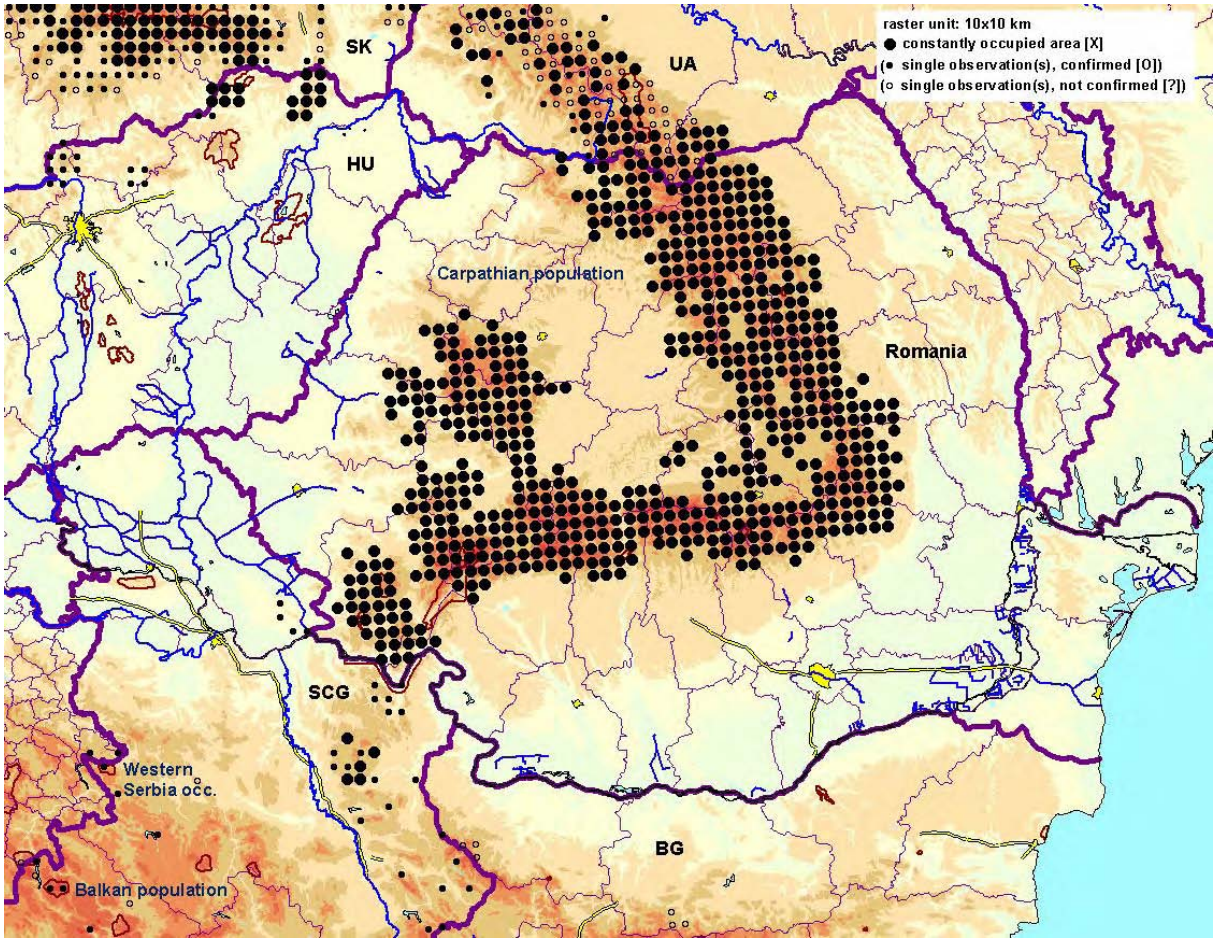
SCHMIDT, K., JEDRZEJEWSKI, W., & OKARMA, H. 1997: Spatial organization and social relations in the Eurasian lynx population in Bialowieza Primaval Forest, Poland. *Acta theriol.* 42: 289-312.

Romania (RO)

Ovidiu IONESCU

Area: 237'500 km²
Forests & Woodland: 28 % (2000)
Human population: 22'364'022 (2001)
Population density: 94.2 / km²

1. Lynx distribution in Romania in 2001:



Geographic range of the population(s)

Carpathian population: All mountainous regions, uneven distribution within mountain forests; the abundance is higher in inaccessible and rocky areas.

Methods: sightings & signs, snow tracking, unspecific survey, inquiry

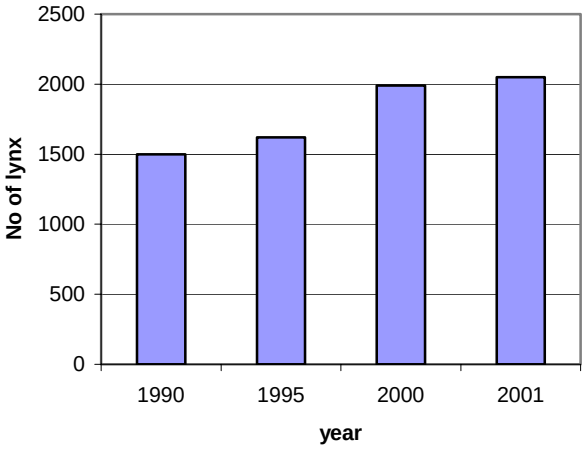
2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] / [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Carpathian	2020	59'600	0	0	59'600	25.1	3.39
Total	*2020*	*59'600*	*0*	*0*	*59'600*	*25.1*	*3.39*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Carpathian	2000	**1990**		Up to 25% of accounting errors.	**stable**
	2001	**2050**			
Ø 1996-2001		**2020**			



Estimated number of lynx in Romania (Carpathian population). Indicated are the estimations from the former (1990 & 1995), and the current inquiry (2000 & 2001).

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Carpathian	Administrators of game species management and hunting units: tracks and observations, studying animal carcasses eaten by lynx, correlating the number of lynx shot during a year with the most probable population etc. Basic data submitted are processed by the central public authority in the field of game species management.	-
Institution	Scientific authority in the field of wild fauna management (Romanian Academy, through its National Commission of Natural Monuments) and the national public authorities in the field of environmental protection.	-

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
signed	ratified 1993	ratified 1994

4.2. Legal status

Controlled hunting of lynx and removal of problem animals.

Hunting season:	01.09. – 31.03.
Yearly quota:	A quota of 250 lynx is theoretically possible to be hunted. Some poaching surely occurs, but it cannot be said how much.
Institution responsible:	Romanian Ministry of Agriculture, Food and Forests
Method quota setting:	One lynx allowed for any game species management and hunting area in which conflicts between lynx and other game species (deer), or between lynx and livestock breeding activities are likely.
Comments:	The data are reliable as the specimen shot are reported and registered officially.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Quota	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Carpathian	1996	250	0									*?*	*?*
	1997	250	0									*?*	*?*
	1998	250	0				No data available					*?*	*?*
	1999	250	30									*?*	*1.5* [a]
	2000	250	13									*?*	*0.7* [a]
	2001	250	0									*?*	*0*
Total 1996-2001		-	*43*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	-
Yearly Ø		-	*7.2*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*0.36* [a]
Known mortality / 100 km² [X+O]		-	*0.01*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	*?*	-

[a] when a population size of 1990 animals is taken for calculation

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Carpathian	Forest Department in the Ministry of Agriculture, Food Industry and Forests	Hunting Associations and Wildlife Service of the Forestry Direction	Minister order No. 378/2003, Romanian Ministry of Agriculture, Food and Forests with the help of other relevant institutions like Forests Management and Research Institute, Forest Engineering Faculty etc.

5. Depredation:

5.1. Depredation losses & compensation paid

→ No realistic reports available. In the area of radio-collared lynx, up to 10 cases reported per year. Very often, prey discovered is assigned to wolves.

5.2. Regional & seasonal differences

→ No significant differences between regions and seasons.

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
Carpathian	Hunting fund administrators and livestock owners have to take specific measures to protect livestock. If still cases of depredation occur, hunting fund administrators have to pay compensation.	Game species management and hunting fund administrators	Studying the carcasses.

5.4. Prevention

Population	Prevention methods	Legal measures	Illegal actions
Carpathian	Keeping livestock away from lynx' most probable habitat, and using dogs.	None.	Poaching.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Carpathian	Agriculture Extraction of wood Infrastructure development: Industry Infrastructure development: Human settlement Infrastructure development: Tourism / recreation Infrastructure development: Road building Legal hunting & trapping Shooting Trapping / snaring Poisoning Competitors Prey / food base Skewed sex ratios (?) Recreation / tourism Transport	Agriculture Extraction of wood Infrastructure development: Tourism / recreation Shooting Poisoning (?) Competitors Prey / food base Pathogens / parasites (?) Skewed sex ratios (?) Population fluctuations (?) Recreation / tourism	Agriculture Extraction of wood Infrastructure development: Industry (?) Infrastructure development: Human settlement (?) Infrastructure development: Tourism / recreation Infrastructure development: Road building (?) Shooting Competitors Prey / food base Pathogens / parasites (?) Inbreeding (?) Low densities (?) Skewed sex ratios (?) Population fluctuations (?) Recreation / tourism

Comment: The most important threat is represented by habitat degradation.

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans			X
Legislation on an international level			X
Legislation on a national level			X
Public involvement	X		
Formal education	X		
Awareness	X		
Capacity-building / Training			X
Taxonomy			X
Population numbers and range			X
Biology and Ecology			X
Habitat status			X
Threats			X
Uses and harvest levels			X
Monitoring / Trends		X	
Genetic status			X
Human attitude / Human dimensions			X
Maintenance / Conservation			X
Corridors	X		
Identification of new protected areas		X	
Establishment of protected areas	X		
Management of protected areas	X		
Community-based initiatives	X		
Sustainable use / Harvest management			X

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Carpathian	least concern	• Habitat conservation • Green corridors • Education and research • Population monitoring and better methods for population density estimation • Action plans for large carnivores are welcome

9. Projects:

Population	Title	Duration	Contact
Carpathian	Carpathian Large Carnivore Project (http://www.clcp.ro/index.htm)	1993-2003	Barbara Promberger-Fürpass & Christoph Promberger: info@clcp.ro

10. Contact:

Population	Name	Address
Carpathian	Ovidiu IONESCU	Neptun Str. No. 1, Ap. 25, RO-Brasov e-mail: ovidiu@icaswildlife.ro

Country assessment:

Of the seven countries sharing the Carpathians, Romania hosts by far the largest part: 55.2%, and is supposed to have the highest concentration of large carnivores in Europe (CARPATHIAN ECOREGION INITIATIVE). As a matter of facts, Romania reported the highest population number of any country in Europe except Russia (2050 lynx in 2001, Table 3.1), followed by Sweden with 1400-1800 animals (see respective country report). Compared to the Swedish lynx distribution area, the Romanian is less than one fifth (312'500 km² and 59'600 km², respectively of permanent occupied area), thus indicating major differences in lynx densities (Tables 2). In the areas of continuous presence, lynx density varies, according a map received by the contact, between less than one to more than four animals per 100 km² of forest. The average density is calculated to be 3.4 lynx per 100 km². All experts considered the official population numbers to be overestimated (Table 3.1, CARPATHIAN LARGE CARNIVORE PROJECT 1998, 2001, OKARMA *et al.* 2000, ROMANIAN MINISTRY OF WATERS, FORESTS AND ENVIRONMENT 2000). BREITENMOSER & BREITENMOSER-WÜRSTEN (1990) doubted that the carrying capacity for lynx would be so high in habitats where wolf and bear occur in high numbers, too. O. IONESCU assumed an inaccuracy of 25% (Table 3.1), OKARMA *et al.* (2000) of 30 %, resulting in a population size of 1435-1537. However, no objective data on home range size and overlap from a study using radio-telemetry is available to confirm the density, and until such data are produced, the question on the lynx abundance remains unsolved. There is unfortunately not much known about lynx ecology from the country (OKARMA *et al.* 2000, ROMANIAN MINISTRY OF WATERS, FORESTS AND ENVIRONMENT 2000, CARPATHIAN LARGE CARNIVORE PROJECT 1998, 2001). The reason for this was the species' limited economic value as a hunting trophy and the fact that lynx does hardly cause any damage to livestock (see 5.1, ROMANIAN MINISTRY OF WATERS, FORESTS AND ENVIRONMENT 2000, CARPATHIAN LARGE CARNIVORE PROJECT 1998, 2001).

The areas where lynx is permanently present (see map) have not changed for more than 10 years (O. IONESCU, pers. comm.; see also map in BREITENMOSER & BREITENMOSER-WÜRSTEN 1990), and even maps from much earlier years look almost the same (VASILIU & DECEI 1964), or with slight differences in the south and west (KRATOCHVIL 1968). According to O. IONESCU (pers. comm.) data on single observations or not confirmed presence are not collected. Such information would considerably increase the distribution area. Lynx is said to be hunted occasionally even near the Black Sea. Information on occasional lynx presence may not be of high importance for the management of Romania itself, but it would be valuable information regarding the potential of lynx recovery for the neighbouring countries. Romania is in any case very important not only for the Carpathian population, but also for the lynx in Europe as a whole, and the country therefore has a special responsibility for its conservation.

The Ministry of Forests has produced yearly estimates already since 1953 (BREITENMOSER & BREITENMOSER-WÜRSTEN 1990). After a near-extermination in 1930 (about 100 individuals were left according to KRATOCHVIL 1968), the official numbers were as follows: 500 (1950), 1000 (1960), 800 (1970), 1500 (1987), 1500 (1990), 1620 (1995), and 2050 (2001; KRATOCHVIL 1968, BREITENMOSER & BREITENMOSER-WÜRSTEN 1990; this report). In the 1960s and 1970s, lynx in Romania was affected by poison baits used during the anti-wolf campaign (ROMANIAN MINISTRY OF WATERS, FORESTS AND ENVIRONMENT 2000, CARPATHIAN LARGE CARNIVORE PROJECT 1998, 2001). Current threats are not really known although many potential ones are listed (of which habitat degradation is considered to be the major one, Table 6). Besides changes to habitat, OKARMA *et al.* (2000) assumed poaching of lynx and roe deer to be the most probable potential threats. Currently the population trend is however rather positive (Table and Figure 3.1, OKARMA *et al.* 2000), and lynx seem even to expand to Serbia and Montenegro (see map and respective country report).

In Romania, lynx can be hunted during a limited season and with a quota (Table 4.2). Considering the population number (Table 3.1) and a maximum quota of 250 (Table 4.2) the very low number of actually harvested lynx is astonishing: only 30 animals in 1999 and 13 in 2000 are registered (Table 4.3). From 1955-1970, when the population number was much lower than today, the annual harvest has been between 28 and 84 animals (BREITENMOSER & BREITENMOSER-WÜRSTEN 1990). According to OKARMA *et al.* (2000) 10-20 lynx were legally killed every year from 1995-1999, and according to the CARPATHIAN LARGE CARNIVORE PROJECT (2001) the annual harvest number was around 30 animals. SALVATORI *et al.* (2002) indicated a harvest number of 72 lynx for the year 1999. These differences suggest that there is no control over hunting records (see also CARPATHIAN LARGE CARNIVORE PROJECT 1998). In any case, the number of lynx shot was lower than the quota would have allowed for. The lynx population in Romania obviously is strong and healthy. The point to worry about is the inconsistency of the data, which is also found in the discrepancy between conservation measures indicated as implemented (e.g.

population number and range, biology and ecology, Table 7) and those mentioned as most urgently needed (Table 8). A clear need regarding conservation and management of the lynx in Romania is to improve the basic knowledge on the species to produce consistent and transparent data.

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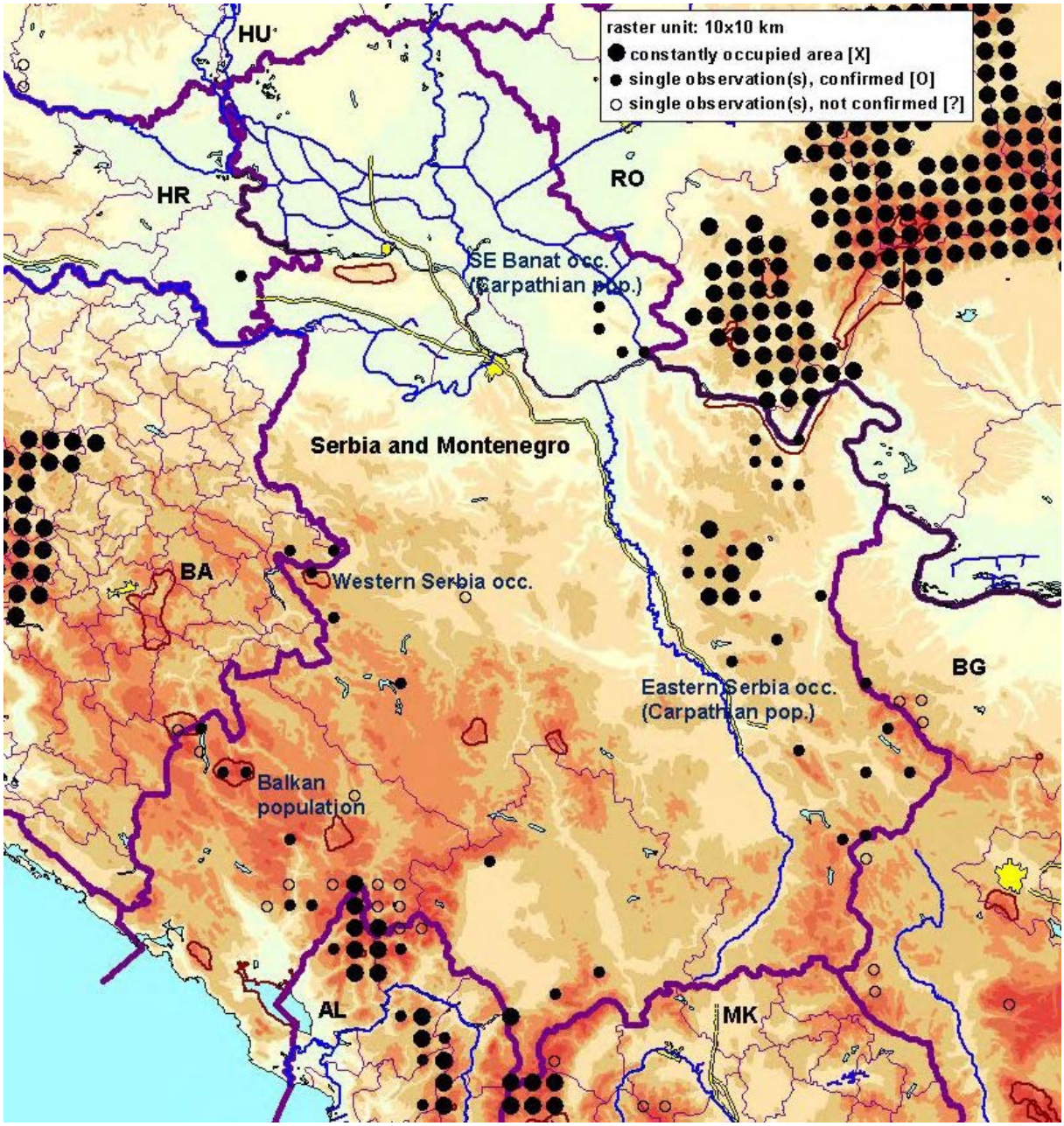
Serbia and Montenegro (SCG)

Milan PAUNOVIC & Miroljub MILENKOVIC

Area: 102'350 km²
Forests & Woodland: 28.3 % (2000)
Human population: 10'667'290 (2001)
Population density: 104.3 / km²

1. Lynx distribution in Serbia and Montenegro in 2001:



Geographic range of the population(s)

Carpathian population:
Eastern Serbia occurrence: Localized between the Danube river in the north, the Morava river valley in the west, the border with Bulgaria in the east and from the Stara Planina Mts. to the right banks of the Nisava and Jerma rivers in the south. Separated from the Carpathian population by the Danube river.

Southeastern Banat occurrence: Southeastern part of Deliblatska Pescara sands, Vrsacke Planine mountains. This is a "micropopulation" recently formed due to the expansion of lynx originating from the Southern Carpathian Mountains. The "population" is increasing but due to the limited space no further expansion is expected.

Balkan population: Southern, south-western and western part of Kosovo and Metohija provinces; western, south-western, central and northern Montenegro.

Western Serbia occurrence: Western Serbia incl. Tara mountain, Mokra Gora mountain, Zlatar mountain, Uvac gorge. [a]

[a] Origin not clear. Hypothetical, specimens could be descendants of lynx re-introduced in 1973 at Kocevje, Slovenia (from the Carpathian source population). [Keeping in mind that the monitoring in southern Bosnia-Herzegovina is fragmentary at best, it might well be that the re-introduced population has expanded further to the SE than expected. An alternative, but less likely explanation is that the Western Serbia occurrence is a remnant nuclei of the Balkan population. Expansion from the Carpathian population is the third, but least likely possibility. Only a genetic assessment would allow clarifying the origin of these lynx, Eds.].

Methods: sightings & signs, unspecific survey, lynx mortality (shooting, car accidents, trapping by snap traps)

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Carpathian [a]	40	500	2'000	0	2'500	0.5 / 2.4	8
[b]	5	0	400	0	400	0.4	-
Balkan	30	100	900	1'300	1'000	0.1 / 1	-
Western Serbia occ.	5	0	500	100	500	0.5	-
Total	*~ 80*	*600*	*3'800*	*1'400*	*4'400*	*0.6 / 4.3*	-

[a] Eastern Serbia occurrence
[b] Southeastern Banat occurrence

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Carpathian	2000		**40** [a]	Only data authenticated from different sources or results of personal research and assessments are taken into consideration. As data are not numerous and not a result of permanent monitoring, it was not dared to make annual size estimations.	**increasing, expanding** [a]
	2000		**5** [b]		**stable** [b]
Balkan	2000		**30**		**decreasing**
Western Serbia occ.	2000		**5**		**increasing & expanding**
Ø Total 1996-2001			**80**		

[a] Eastern Serbia occurrence. (In February/March 2003 a lot of new data on lynx presence in Eastern Serbia were discovered. Therefore, the population assessment of 40 specimens could be too modest).
[b] Southeastern Banat occurrence

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Ca/Balk/WSo	There is no official estimation.	Collection of trustworthy data from different sources and by different ways.
Institution	Bureau for Nature Protection of both, Serbia and Montenegro, as well as Hunting Unions of Serbia and Montenegro	Institute for Biological Research "Sinisa Stankovic" and Natural History Museum, both from Belgrade

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
-	-	ratified 2001

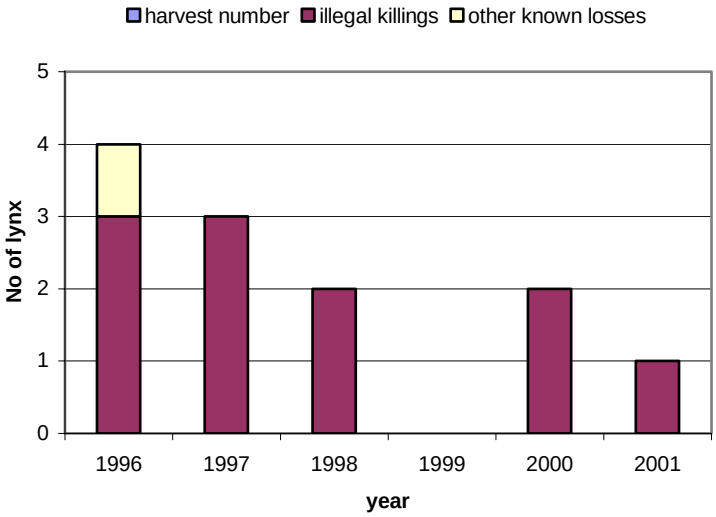
4.2. Legal status

Lynx is completely protected by law.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Carpathian / Balkan / Western Serbia occ. [a]	1996	-	1	0	3	0	0	0	0	0	*4*	*n.d.a.*
	1997	-	0	0	3	0	0	0	0	0	*3*	*n.d.a.*
	1998	-	0	0	2	0	0	0	0	0	*2*	*n.d.a.*
	1999	-	0	0	0	0	0	0	0	0	*0*	*n.d.a.*
	2000	-	0	0	2	0	0	0	0	0	*2*	*n.d.a.*
	2001	-	0	0	1	0	0	0	0	0	*1*	*n.d.a.*
Total 1996-2001		-	*1*	*0*	*11*	*0*	*0*	*0*	*0*	*0*	*12*	-
Yearly Ø		-	*0.17*	*0*	*1.83*	*0*	*0*	*0*	*0*	*0*	*2*	*n.d.a.*
Known mortality / 100 km² [X+O]		-	*0.00*	*0*	*0.04*	*0*	*0*	*0*	*0*	*0*	*0.05*	-

[a] no numbers per population available



Number of known losses to the lynx in Serbia and Montenegro from 1996-2001.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	**Regional level**	
Ca/Balk/WSo	Bureau for Nature Protection of both, Serbia and Montenegro (under the respective responsible Ministries). Lynx management is under the responsibility of the republic ministries, both bureaus give their opinion and suggestions to them to create appropriate politics.	Hunting Unions of Serbia and Montenegro (and the Federal Hunting Union). They are responsible to conduct the Hunting Law both in Serbia and Montenegro through their net of individual Hunting Societies.	none

5. Depredation:

→ There is not enough data as such events are very rare. Attacks on livestock are almost not known. No compensation systems and prevention methods are applied in the country. (Poaching is a regular incident, and is not connected to the very rare attacks on livestock).

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Carpathian: *Eastern Serbia occurrence*	Infrastructure development: Road building Shooting Trapping / snaring Vehicle and train collision Competitors War / civil unrest Transport	Infrastructure development: Road building Shooting Trapping / snaring Vehicle and train collision Competitors Transport	Infrastructure development: Road building Shooting Trapping / snaring Vehicle and train collision Competitors Transport
Carpathian: *Southeastern Banat occurrence*	Shooting Wildfire Competitors Low densities War / civil unrest	Shooting Trapping / snaring Competitors Low densities	Shooting Trapping / snaring Competitors Low densities
Balkan	Extraction of wood Shooting Trapping / snaring Competitors Limited dispersal Inbreeding Low densities Population fluctuations Restricted range War / civil unrest	Extraction of wood Shooting Trapping / snaring Competitors Limited dispersal Inbreeding Low densities Population fluctuations Restricted range War / civil unrest	Extraction of wood Shooting Trapping / snaring Competitors Limited dispersal Inbreeding Low densities Population fluctuations Restricted range War / civil unrest
Western Serbia occ.	Shooting Trapping / snaring Competitors War / civil unrest	Shooting Trapping / snaring Competitors	Shooting Trapping / snaring Competitors

Comment: Data are very scarce; for none of the populations specific research has been conducted. The recorded number of losses could be much bigger. Also, access to the Balkan population in Kosovo and Metohija provinces has always been difficult and recently not possible at all. As a consequence of the absence of a nature protection and conservation law, [or its implementation, respectively, Eds.], there are good indications that - in the past and especially in recent times - in Kosovo and Metohija provinces, poaching by local and international groups has been very frequent.

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans	X		
Legislation on a national level			X
Legislation on a regional level			X
Public involvement	X		
Formal education	X		

Conservation measure (cont.)	Lacking / proposed	Drafted / ratified	Implemented / applied
Awareness		X	
Capacity-building / Training	X		
Taxonomy		X	
Population numbers and range			X
Biology and Ecology		X	
Habitat status	X		
Threats	X		
Uses and harvest levels		Eastern Serbia	
Conservation measures			X
Monitoring / Trends	X		
Genetic status	X		
Human attitude / Human dimensions		X	
Maintenance / Conservation	X		
Restoration		Southern Banat	
Corridors	X		
Identification of new protected areas	X		
Establishment of protected areas	X		
Management of protected areas	X		
Expansion of protected areas	X		
Community-based initiatives	X		
Re-introductions	X		
Sustainable use / Harvest management	X		
Recovery management			Eastern Serbia
Disease, pathogen, parasite management	X		
Limiting population growth	Balkan		
Captive breeding / Artificial propagation	X		
Genome resource bank	X		

Comment: Despite an interesting situation – presence of different lynx nuclei and challenging questions regarding the taxonomy and ecology –, the level of research was recently very low. The economical and political crisis, and the war in and around the country caused chronic lack of funding for scientific work. All recorded data are gathered out of any special lynx project and they are the product of the persistence and enthusiasm of a very few people. A minimum of data collection was maintained throughout this time by some enthusiastic people.

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Carpathian: *Eastern Serbia occ.*	vulnerable	• Research • Sanctions against poachers • Compensation system
Carpathian: *Southeastern Banat occ.*	data deficient	• Research • Sanctions against poachers • Compensation system
Balkan	endangered	• Sanctions against poachers • Research • Compensation system

Population (cont.)	Judgement	Most urgent actions needed
Western Serbia occ.	data deficient	• Research • Sanctions against poachers • Compensation system

9. Projects:

→ No current projects.

10. Contact:

Population	Name	Address
Carpathian / Balkan / Western Serbia occ.	Milan PAUNOVIC	Natural History Museum, Njegoseva 51, P.O. Box 401, 11000 Belgrade e-mail: paunmchi@eunet.yu
Collaborator:	Miroljub MILENKOVIC	Institute for Biological Research, 29. novembra 142, 11000 Belgrade e-mail: mikim@ibiss.bg.ac.yu

Country assessment:

In the 1950s lynx in the area of current Serbia and Montenegro has only been present in the southern and south-western parts (Balkan). It was only in the 1980s when first indications of lynx presence have been noticed in eastern Serbia. The animals very likely originated from the Carpathian Mts. in neighbouring Romania (PAUNOVIĆ, MILENKOVIĆ & IVANOVIĆ-VLAHOVIĆ 2001). The same is most probably true for the Eastern Banat occurrence, where first evidence has been found in 1991 (GRUBAČ 2000). The observations in western Serbia are very recent and were first reported by GRUBAČ (2000). They are assumed to be the result of immigrating animals from Bosnia-Herzegovina (GRUBAČ 2000, PAUNOVIĆ, MILENKOVIĆ & IVANOVIĆ-VLAHOVIĆ 2001). However, there is no (genetic) evidence yet. Especially for south-eastern and western Serbia, as well as for western Montenegro, it would be very important to get more information about the recolonisation processes and the origin of the individuals as these areas belong to the potential range of the critically endangered Balkan population. For the conservation of this population, the spreading of Carpathian lynx (animals from Bosnia-Herzegovina also have Carpathian origin) to western and south-eastern Serbia may provide a boost, but could also cause taxonomic problems (GRUBAČ 2002, see also the Balkan population assessment).

The four occurrences in Serbia and Montenegro are not only separated from each other, but also within the occurrences, the observations are often widely scattered. This is the consequence of several source populations and probably of the lack of adequate monitoring. The border regions in the east, south and west are important areas for the current or potential distribution of lynx, whereas in central and northern Serbia, consisting mainly of lowlands or valleys, the habitat is not very favourable (PAUNOVIĆ, MILENKOVIĆ & IVANOVIĆ-VLAHOVIĆ 2001, PAUNOVIĆ 2002). Although the evidence in the south of the country is somewhat uncertain, lynx indications in neighbouring Bulgaria and Albania match well with the observations in Serbia and Montenegro. Cooperation with these countries (co-ordination of the monitoring) as well as with FYR Macedonia and Bosnia-Herzegovina are recommended to get more reliable information about lynx in the border areas. Afterwards, a common management should be developed for these transboundary occurrences or populations, respectively.

But also within Serbia and Montenegro the monitoring should be improved to enhance the data base. Current information indicate very small distribution areas. However, this conflicts with the estimations on the number of lynx, which would result in surprisingly high densities (Table 2). M. PAUNOVIĆ (pers. comm.) believes that the area of probable distribution is at least twice as large as indicated in the map, and possibly even larger. Alternatively, the population sizes given in Table 3.1 might be overestimated: According to GRUBAČ (2000) the Carpathian part consists of 30 animals. His estimation for the Balkan population was 22-27 for 1990-1999 and presently 12-18

individuals only. He assumes that there was a decrease due to the military intervention in this region in 1999-2000 and that this trend goes on because of the uncontrolled carrying and use of guns (illegal killing of lynx) (GRUBAČ 2000). Considering the limited distribution area, the scarce data and the assessment of the Balkan population in neighbouring Albania and FYR Macedonia, it is more likely that the number of lynx in southern Serbia and Montenegro was overestimated in the 1990s.

Illegal killings are considered to be the major threat for the lynx in Serbia and Montenegro. Between 1996 and 2001 an average of two cases were reported yearly (Table 4.3), but there might have been at least five (PAUNOVIĆ 2002). Other threats mentioned (Table 6) may rather base on a personal judgement than on hard evidence. Hence, research is considered an urgent conservation action (Table 8). Furthermore, the need for a compensation system is listed, although depredation seems to be very rare (point 5). For lynx, other measures might be more important, but a compensation system would probably reduce the conflict potential between local inhabitants and large carnivores in general.

Political and economic instability have a negative influence on the implementation of management and conservation measures (PAUNOVIĆ 2002). Nevertheless, Serbia and Montenegro must overcome these problems also for the sake of nature conservation. The potential for the lynx is currently good, and the country could in the future play an important role for the conservation of the species in the whole region.

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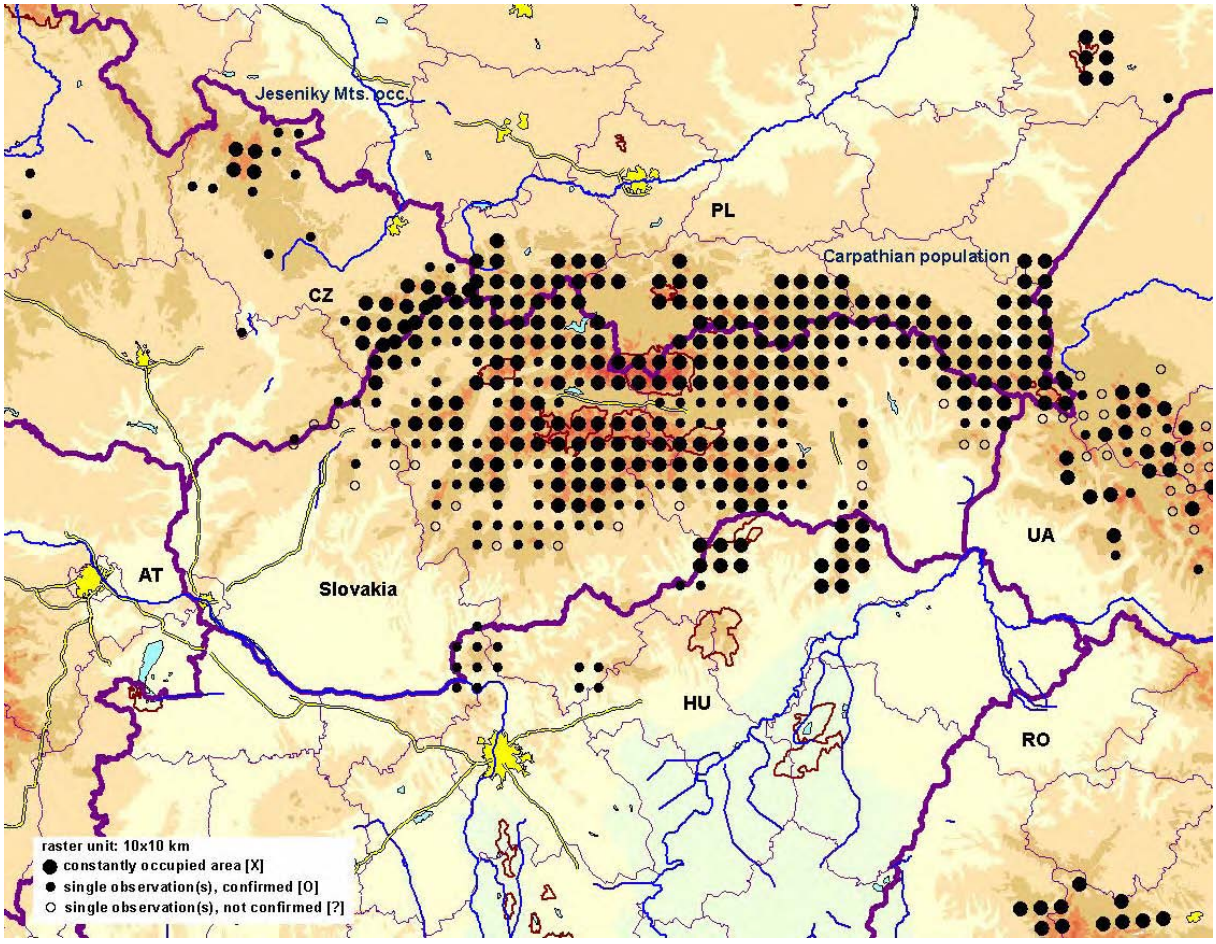
Slovakia (SK)

Eva GREGOROVÁ, Peter PILINSKY, Pavel HELL & Ivan VALACH

Area: 48'845 km²
Forests & Woodland: 45.3 % (2000)
Human population: 5'414'937 (2001)
Population density: 110.9 / km²

1. Lynx distribution in Slovakia in 2001:



Geographic range of the population(s)

Carpathian population: Slovak part of the Carpathians. Data for the distribution map base on the years 1999, 2000 and 2001. Reduction compared to 1995, but distribution was then overestimated.

Methods: sightings & signs, snow tracking, unspecific survey, inquiry, lynx mortality

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Carpathian	400	14'500	6'900	1'700	21'400	29.7 / 43.8	2.76
Total	*400*	*14'500*	*6'900*	*1'700*	*21'400*	*29.7 / 43.8*	*2.76*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Carpathian	1999	**400**			**decreasing**
	2000	**400**			
Ø 1996-2001		**400**			

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Carpathian	Estimate of the population size (resident lynx + yearlings) = the sum of the estimate of the frequency habitat complex. [a]	-
Institution	State Protection of Nature (State Nature Conservancy).	-

[a] (Extensive collection of sightings and signs and of lynx mortality is offset against the habitat. From 1999-2001, the annual recruitment covered losses of lynx (hunting and other mortality; approx. 60 specimen per year.)

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
ratified 2002	ratified 1996	ratified 1993

4.2. Legal status

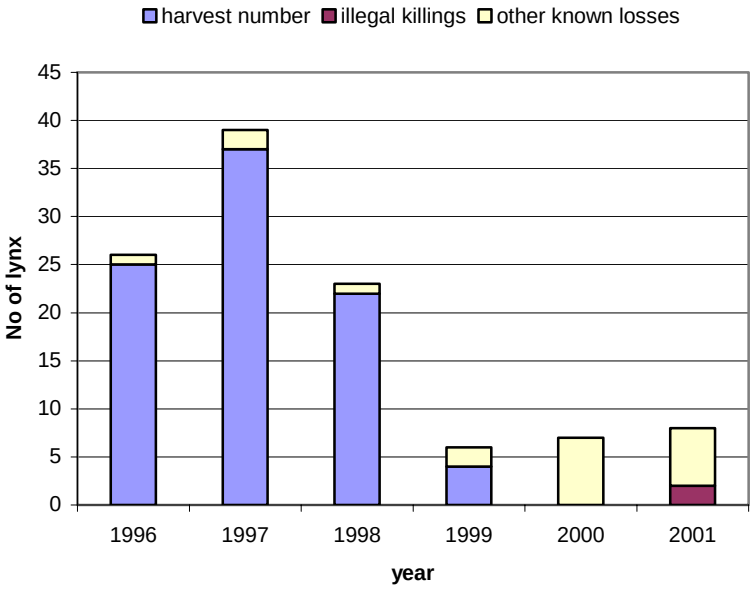
Lynx has been fully protected by law since 2001. Removal of problem animals.

Hunting season: -
Yearly quota: -
Institution responsible: -
Method quota setting: -
Comments: Harvest numbers from statistics of the Forest Research Institute Zvolen, numbers to other known losses from statistics of the project lynx Slovakia – official.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Quota	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Carpathian	1996	-	25	0	0	0	0	0	0	1	0	*26*	*6.5* [a]
	1997	-	37	0	0	0	0	0	0	2	0	*39*	*9.75* [a]
	1998	-	22	0	0	0	0	0	0	1	0	*23*	*5.75* [a]
	1999	-	4	0	0	0	0	0	0	2	0	*6*	*1.5*
	2000	-	0	1	3	0	0	0	0	3	0	*7*	*1.75*
	2001	-	0	2	1	2	0	0	1	2	0	*8*	*2* [a]
Total 1996-2001		-	*88*	*3*	*4*	*2*	*0*	*0*	*1*	*11*	*0*	*109*	-
Yearly Ø		-	*14.7*	*0.5*	*0.7*	*0.3*	*0*	*0*	*0.2*	*1.8*	*0*	*18.2*	*4.55*
Known mortality / 100 km² [X+O]		-	*0.07*	*0*	*0*	*0*	*0*	*0*	*0*	*0.01*	*0*	*0.09*	-

[a] when a population size of 400 individuals is taken as well



Number of known losses to the Carpathian lynx population in Slovakia from 1996-2001.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Carpathian	Ministry of Environment and Ministry of Agriculture; all depends on mutual agreement. (Contrary to the past, and in accordance with the new legislation of both Ministries, the lynx is year-round protected.)	None.	(Management plan is under preparation and will be agreed in 2003.) [a]

[a] Preliminary date of the implementation is 2005, depending on the evaluation of the influence of the full protection.

5. Depredation:

5.1. Depredation losses & compensation paid

→ Losses to poultry and fallow deer in enclosures . (No information on numbers available.)

5.2. Regional & seasonal differences

In winter.

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
Carpathian	Restrictive system with particular conditions to be met to touch compensations. Valid since January 2003.	Ministry of Environment SR	Zoologist (ranger) from a local State Nature Conservancy inspects the damage.

5.4. Prevention

Population	Prevention methods	Legal measures	Illegal actions
Carpathian	Sheep yards, electric fences, guarding dogs, bells.	None.	Orphan lynx in poultry yard was killed.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Carpathian	Agriculture Extraction of wood Infrastructure development: Industry Infrastructure development: Human settlement Infrastructure development: Road building Shooting Trapping / snaring Poisoning Population fluctuations	Extraction of wood Infrastructure development: Human settlement Infrastructure development: Tourism / recreation Infrastructure development: Road building Legal hunting & trapping Shooting Trapping / snaring Poisoning (?) Vehicle and train collision Limited dispersal Restricted range Recreation / tourism	Agriculture Extraction of wood Infrastructure development: Industry Infrastructure development: Human settlement Infrastructure development: Tourism / recreation Infrastructure development: Road building! Shooting Trapping / snaring Poisoning (?) Vehicle and train collision Prey / food base Limited dispersal High juvenile mortality (?) Low densities (?) Population fluctuations (?) Restricted range Recreation / tourism

Comment: Limiting factors are: habitat loss/degradation, shooting, trapping/snaring, and prey/food base.

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans		X	
Legislation on an international level			X
Legislation on a national level			X
Legislation on a regional level			X
Public involvement	X		
Formal education		X	
Awareness	X		
Capacity-building / Training	X		
Taxonomy			X
Population numbers and range		X	
Biology and Ecology			X
Habitat status			X
Threats			X
Uses and harvest levels		X	
Conservation measures		X	
Monitoring / Trends			X
Genetic status			X
Human attitude / Human dimensions			X
Maintenance / Conservation			X
Restoration			X
Corridors		X	
Identification of new protected areas			X
Establishment of protected areas			X

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Carpathian	vulnerable	• Monitoring

9. Projects:

→ No current projects.

10. Contact:

Population	Name	Address
Carpathian	Eva GREGOROVÁ	Zoologicka zahrada Bojnice, Zamok a okolie 6, 972 01 Bojnice e-mail: zoobojnice@stonline.sk, e.gregorova@stonline.sk
Collaborators:	Peter PILINSKY	Ministry of Environment SR, Dep. of Nature and Landscape Protection, Nam. Ludovita Stura 1, 812 35 Bratislava e-mail: pilinsky.peter@lifeenv.gov.sk
	Pavel HELL	Forest Research Institute, T.G. Masaryka 22, 960 92 Zvolen
	Ivan VALACH	Administration of PLA Biosphere Reserve Polana, J.M. Hurbana 20, 960 01 Zvolen e-mail: valach@sazp.sk

Country assessment:

17.2% of the Carpathian region is located within Slovakia. After Romania, this is the second largest share of all Carpathian countries (CARPATHIAN ECOREGION INITIATIVE), both in extent of the population and in numbers of lynx (see Table 2.1 and Table 2.3 of the population report). This illustrates the importance of Slovakia for the entire population. Except of the southern parts, the current lynx distribution covers the entire Slovak Carpathians. It is more or less coherent with the distribution range in Poland and the Czech Republic (except for the area north-west of the Great Tatra NP, where lynx is on the Slovak, but not on the Polish side), but more scattered to the Hungarian and Ukrainian border (see map). The Slovak distribution area is split by the Waag valley with its motorway between the national parks in the High and the Low Tatra Mountains. Habitat suitability and connectivity should be analysed in order to identify the possibilities to create corridors between the two mountain ranges.

The autochthonous population had reached a historic minimum in Slovakia at the beginning of the 1930s, however it recovered and expanded, particularly at the end of the 1950s. In 1964, 500-600 animals were estimated to live on 13'700 km² (slightly less than the current permanently occupied area); in 1972 the estimate was 482 animals (HELL & SLAMEŠKA 1996). The positive development of the population and its proximity allowed taking lynx for re-introduction programmes in west and central Europe during the 1970s and 1980s (SI, IT, FR, CH, AT, CZ; HELL & SLAMEŠKA 1996, OKARMA *et al.* 2000).

The current population size is estimated to be 400 animals with a decreasing tendency over the past few years (Table 3.1). However, official numbers by the Slovak Ministry of Agriculture have since 1996 been higher than 800 individuals (OKARMA *et al.* 2000), for the year 2000, a total of 1037 lynx are indicated (SALVATORI *et al.* 2002)! Local experts have always challenged these numbers, as they are based on statistics from the single hunting grounds, which are smaller than a lynx home range, and multiple counts are hence to be expected (HELL & SLAMEŠKA 1996, OKARMA *et al.* 2000). An overestimation of approximately 50% was assumed (HELL & SLAMEŠKA 1996, OKARMA *et al.* 2000), with a consequential population size of 400-500 individuals, corresponding to the number indicated in Table 3.1. SALVATORI *et al.* (2002) even consider an estimate of 200 lynx to be more realistic. The fact that the population density calculated (2.8 lynx/100 km²; Table 2) is relatively high after a supposed decline for many years indicates that indeed the expert estimation of 400 animals is still rather optimistic, and that the official estimations of more than 1000 lynx was grossly exaggerated. A serious baseline survey, leading to a more reasonable monitoring is recommended to get reliable population estimates and to adjust the conservation measures and the management.

Over several decades the legal status of the lynx in Slovakia has been changing between no protection, seasonal protection and total protection (for further information refer to HELL 1992, HELL & SLAMEŠKA 1996). From 1955-1994, a total of 2993 lynx were hunted, making a yearly average of almost 75 animals (HELL & SLAMEŠKA 1996). HELL & SLAMEŠKA (1996) considered hunting to be too intensive and insufficiently managed. At the end of the 1990s, the Ministry of Environment prepared a new legislation, which was negotiated with the Ministry of Agriculture and the Slovak Hunting Union representatives (SLOVAKIAN MINISTRY OF ENVIRONMENT 2000). For several years, the legal status of the lynx in Slovakia was not clear, as according to the Ministry of Environment, the lynx was protected year-round, but according to a decree of 1975 of the Ministry of Agriculture there was an open season from 16 September to 28 February (OKARMA *et al.* 2000). OKARMA *et al.* (2000) concluded that, as a consequence of the confusion regarding the species' legal status, the official harvest data from 1996-1998 (Table 4.3) are lower than the actual number of lynx killed, because not all lynx hunted were actually reported. By 2001, the lynx in Slovakia was finally granted complete protection (Table 4.2), and the competence is now divided between the two ministries involved (Table 4.4, SLOVAKIAN MINISTRY OF ENVIRONMENT 2000). Not only the legislation has recently changed, but a management plan has been prepared (Table 4.4), and a compensation system was established (Table 5.3). These changes were adaptations in regard to the EU Habitat Directive, which Slovakia has ratified in 2002 (Table 4.1).

As the lynx in Slovakia was not well studied nor surveyed recently (OKARMA *et al.* 2000), real threats are not exactly known. As a result of the publications in the 1960s (population increase) and the fact that the Slovakian population was the source for most re-introductions in western and central Europe, it was generally believed that Slovakia hosts a strong and healthy lynx population. There was however little data to support this confidence. Experts nowadays assume that especially illegal killing and habitat loss/degradation currently threat the population (Table 6). Some orphans found in recent years (Table 4.3) may indeed be an anecdotic hint for illegal killings. The effect of habitat loss/degradation is likely to be an ongoing fragmentation of the once firm population. It is expected that road constructions will have an increasing negative impact on the Slovakian lynx population in the near future (Table 6), especially when the EU accession provides more funds for new infrastructure.

Slovakia is the centre of the lynx population in the north-western Carpathians. The status of the lynx in all neighbouring countries, the Czech Republic, Poland, the Ukraine, and Hungary, depend on the fate of the lynx in Slovakia. As a consequence, Slovakia has a particular responsibility for the conservation of its lynx population, but also regarding the co-operation among the countries sharing the northern bow of the mountain range. There is, so far, no evidence that the legal protection has supported the Slovakian lynx population. What is needed is above all a sincere survey, but also detailed studies on the ecology of the lynx in Slovakia. Then, based on better figures and understanding, the conservation and management of the lynx in Slovakia has to be re-considered in a joint effort of all interest groups.

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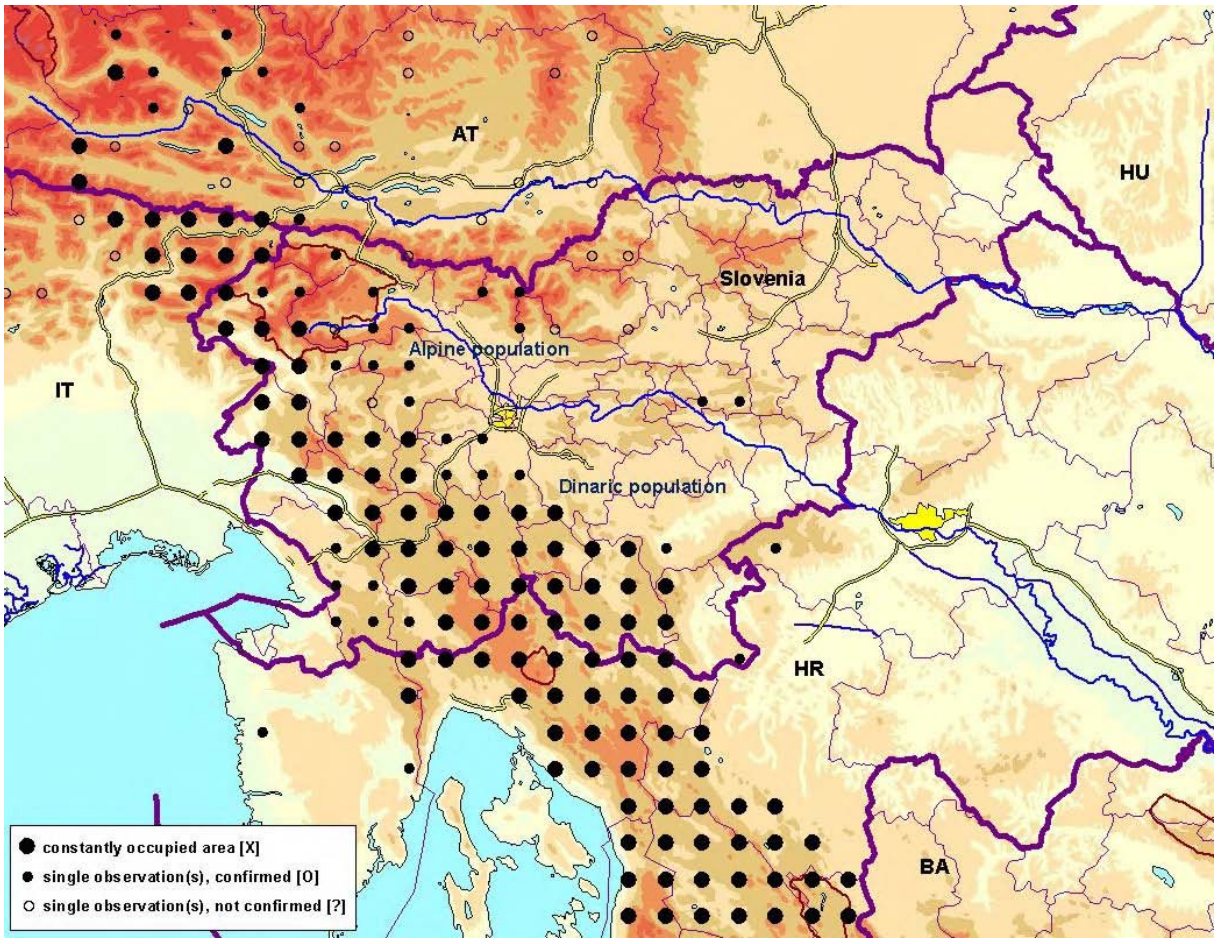
Slovenia (SI)

Cvetko STANISA

Area: 20'253 km²
Forests & Woodland: 55 % (2000)
Human population: 1'930'132 (2001)
Population density: 95.3 / km²

1. Lynx distribution in Slovenia in 2001:



Geographic range of the population(s)

Dinaric & Alpine population [a]**:** Kocevska, Notranjska (SE, S, SW Slovenia). There are no big changes. Lynx is more present close to the Ljubljana highway than before (slight shift of the main population to the west) but it is still the same extent; the area of lynx occurrence has not increased during the past five years.

Methods: sightings & signs, snow tracking, inquiry, radio telemetry

[a] divided by the Jesenice-Ljubljana-Triest highway

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Dinaric	40	2'800	1'100	0	3'900	13.8 / 19.3	1.43
Alpine	10	1'900	1'500	600	3'400	9.4 / 16.8	0.53
Total	*50*	*4'700*	*2'600*	*600*	*7'300*	*23.2 / 36.1*	*1.06*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Dinaric	1996	**40**		Population number 1996 was probably closer to 30 than 40 but then increased slightly to about 50 individuals in 1998. Since then the number is surely closer to 30 again than to 50.	**stable / decreasing** [a]
	1997	**40**			
	1998	**40**			
	1999	**40**			
	2000	**40**			
	2001	**40**			
Ø 1996-2001		**40**			
Alpine	1996-2001	**10**		It is not a reproductive population on its own yet.	**decreasing**
Total Ø 1996-2001		**50**			

[a] The fact that the hunting quota has not been met since 1992 even though the quotas were set considerably lower than previously and hunting efforts were constant may indicate that the number of lynx has decreased.

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Dinaric / Alpine	Data from the monitoring of large carnivores in (1) GL Medved Kocevje and GL Jelen Sneznik, as well as (2) north-west Slovenia, (3) data of lynx killed or found dead, and (4) data on the payment for damages by lynx.	-
Institution	(1) and (2): Slovenian Forest Service, (3) and (4): Ministry of Agriculture, Forestry and Food	-

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
-	ratified 1999	ratified 2000

4.2. Legal status

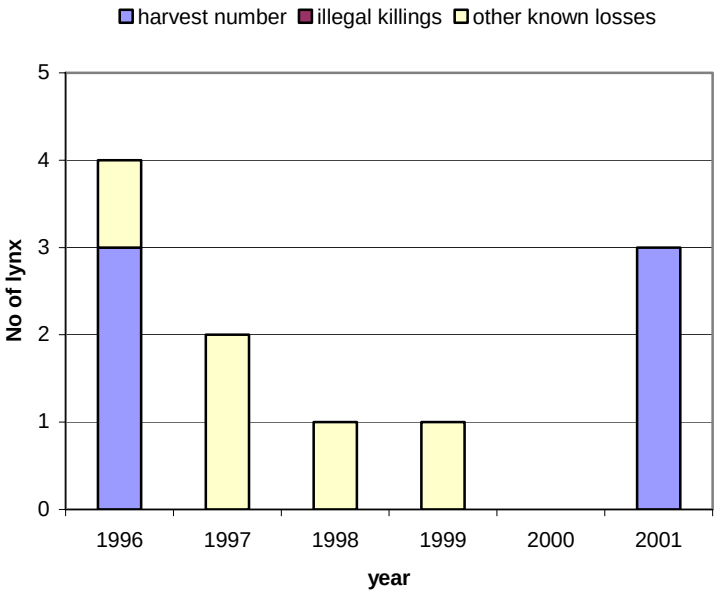
Controlled hunting of lynx.

Hunting season:	01.11. - 28.02. (varies from year to year)
Yearly quota:	0-5 lynx (varies from year to year)
Institution responsible:	Ministry of Agriculture, Forestry and Food
Method quota setting:	Number depends on whether the quotas have been realized the previous years, the damages by lynx, and the population trend.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Quota	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Dinaric / Alpine	1996	5	3	1	0	0	0	0	0	0	0	*4*	*8* [b]
	1997	0	0	1	1	0	0	0	0	0	0	*2*	*4* [b]
	1998	5	0	1	0	0	0	0	0	0	0	*1*	*2* [b]
	1999	0	0	0	0	0	0	0	0	0	1 [a]	*1*	*2* [b]
	2000	0	0	0	0	0	0	0	0	0	0	*0*	*0*
	2001	5	3	0	0	0	0	0	0	0	0	*3*	*6* [b]
Total 1996-2001		-	*6*	*3*	*1*	*0*	*0*	*0*	*0*	*0*	*1*	*11*	-
Yearly Ø		-	*1*	*0.5*	*0.17*	*0*	*0*	*0*	*0*	*0*	*0.17*	*1.83*	*3.66* [b]
Known mortality / 100 km² [X+O]		-	*0.03*	*0.01*	*0.00*	*0*	*0*	*0*	*0*	*0*	*0.00*	*0.03*	-

[a] hunger – young animal
[b] Dinaric and Alpine populations together



Number of known losses to the Dinaric/Alpine lynx population in Slovenia from 1996-2001.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Dinaric / Alpine	Ministry of Agriculture, Forestry and Food	none	none [a]

[a] Slovenia has contributed to and officially ratified the Pan-Alpine Conservation Strategy for lynx PACS (MOLINARI-JOBIN *et al.* 2003), Eds.]

5. Depredation:

5.1. Depredation losses & compensation paid

Population	Year	Sheep	Goat	Rein-deer	Other species	Total	Compensation (in Euro)	Compensation other predators
Dinaric / Alpine	1996	3	0	-	0	3	400 €	42'250 €
	1997	8	2	-	3	13	1'450 €	50'000 €
	1998	63	1	-	2	66	35'800 €	181'350 €
	1999	25	5	-	4	34	8'000 €	137'650 €
	2000	49	0	-	0	49	9'500 €	123'050 €
	2001	121	6	-	1	128	29'100 €	128'450 €
Total 1996-2001		*269*	*14*	*-*	*10*	*293*	*84'250 €*	*662'750 €*

5.2. Regional & seasonal differences

Region: South-west Slovenia close to the highway Ljubljana-Triest, and Bovec in north-west Slovenia close to the Italian border (Alpine population).
Season: 50-60 % of all cases from July-September.

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
Dinaric / Alpine	Payment and subventions for the protection of livestock.	Ministry of Agriculture, Forestry and Food	Slovenian Forest Service as part of the Ministry of Agriculture, Forestry and Food has 14 regional departments. Each has a head of wildlife dep. who, together with a representative of the local hunting organisation, has to go out and check the case (protocol).

5.4. Prevention

Population	Prevention methods	Legal measures	Illegal actions
Dinaric / Alpine	none	Elimination of problem animals / Regulation of the population number through yearly setting of the harvest quota.	none

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Dinaric / Alpine	Inbreeding (?)[c]	Competitors [b] Prey / food base [b] Pathogens / parasites (?)[c] Limited dispersal (?)[b] Poor recruitment / reproduction / regeneration (?)[c] Inbreeding (?)[c]	Shooting (?)[a] Competitors (?)[b] Prey / food base (?)[b] Pathogens / parasites (?)[c] Limited dispersal (?)[b] Poor recruitment / reproduction / regeneration (?)[c] Inbreeding (?)[c]

[a] no data available but probably responsible for decreasing population trend
[b] depends strongly on the management of the big carnivores: at the moment strong attitude against
[c] no data available but possible reason for decreasing population trend

Comment: Concerning habitat and nature lynx in Slovenia still has a good basis for existence. Limiting factors are rather the isolation, genetic state, competition and others, but there are no scientific data available. Another problem is the missing management plan that would mitigate human-carnivore-prey relations.

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans	X		
Legislation on an international level			X
Legislation on a national level			X
Public involvement	X		
Formal education			X
Awareness			X
Capacity-building / Training	X		
Taxonomy			X
Population numbers and range			X
Biology and Ecology			X
Habitat status			X
Threats	X		
Uses and harvest levels	X		
Conservation measures			X
Monitoring / Trends			X
Genetic status	X		
Human attitude / Human dimensions	X		
Maintenance / Conservation			X
Corridors			X
Management of protected areas	X		
Community-based initiatives	X		
Sustainable use / Harvest management			X
Disease, pathogen, parasite management	X		
Limiting population growth	X		
Captive breeding / Artificial propagation	X		
Genome resource bank	X		

Comment: Re-introductions as last chance but only after a genetic study of the present population.

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Dinaric / Alpine	endangered	• National strategy and a management plan • Genetic refreshment of the population through "recommended actions PACS" [a]

[a] The Pan-Alpine Conservation Strategy for the lynx (MOLINARI-JOBIN *et al.* 2003)

9. Projects:

→ No current projects.

10. Contact:

Population	Name	Address
Dinaric / Alpine	Cvetko STANISA	Zavod za gozdove Slovenije, OE Kocevje, Rozna ul. 39, 1330 Kocevje e-mail: cvetko.stanisa@ribnica.si

Country assessment:

In 1973, six lynx from the Slovakian Carpathian Mountains were translocated to Kocevje in southern Slovenia where they soon reproduced and expanded to Croatia. To the north-west, the expansion was not as fast as to the south. In 1984 the Julian Alps were reached and first animals crossed over to Italy. The intense harvest (which started only 5 years after the re-introduction, COP 1997) hindered further expansion of the population, especially the re-colonisation of the Alps (COP & FRKOVIC 1998). Even an additional lynx occurrence in north-eastern Slovenia – most probably immigrating animals from Austria (COP 1997) – was not supportive enough. Newest estimations indicate that there are only 6-8 lynx left in the Alpine part (C. STANISA, pers. comm.). The situation in the Alps still depends strongly on immigration from the Dinaric mountains. The distinction made here is based on geographic features (Dinaric mountains / Alps, divided by the Jesenice-Ljubljana-Triest highway). This motorway seems to act as barrier. This is not obvious in a 10x10 km raster, but is actually more pronounced when just looking at point data (e.g. in MOLINARI *et al*. 2003 or STANISA *et al*. 2001). The Alpine occurrence might indeed not be as well connected to southern Slovenia as previously assumed (STANISA & KOREN 2003).

It is the aim of the Pan-Alpine Conservation Strategy to join the lynx occurrence in the Slovenian/eastern Italian Alps with the population in the north-western Alps (MOLINARI-JOBIN *et al.* 2003). To support this, the Slovenian population should be helped to expand. Since 1993/94 the hunting season has been shortened and the quotas reduced. Also, hunting was restricted to the core area in the Dinarics to protect dispersing animals (COP 1997, COP & FRKOVIC 1998). The current tendencies (Table 3.1) in the Slovenian Alps as well as in the Dinaric area indicate that these measures were not enough. Therefore, Slovenia should build up an effective, long-term management strategy for the survival of the lynx in its territory. As JONOZOVIC *et al*. (2003) stated: “While Slovenia is about to join the European Union, this strategy should be according to the European and Slovenian legislation and in cooperation with neighbouring countries”.

Up to 1995, there was no important problem with livestock depredation (COP & FRKOVIC 1998). Since 1998, losses have markedly increased (see Table 5.1). Sheep farming is more common in the Alps, where depredation therefore occurred in the first place. The increasing number of cases of depredation in combination with a decreasing number of lynx raises questions. The only logical explanation would be a decreasing availability of wild prey. So far, no information indicating such a trend was provided. It can be suspected that some damages have been attributed to lynx although there were other reasons responsible for the death of the animals. The establishment of appropriate prevention methods is highly recommended.

The data on known losses alone with a calculated yearly loss of around 3.7% (Table 4.3) do not explain the current negative population trend. According to the same table, there is no knowledge of any illegal lynx killings between 1996 and 2001. Although the re-introduction of the lynx in 1973 was the action of a hunting organisation with the aim that lynx will become a hunted species again, the general hunter community did not support it (COP 1997). Although there is no information available, we fear that illegal hunting is high and probably even responsible for the current negative tendency in number and expansion.

There was an increasing controversy on large carnivores in Slovenia in the past years, and rumours on poaching lynx even in protected areas in the Alps, which cannot be verified, but must be taken into consideration when discussing the lynx (and generally large carnivore) management in Slovenia. Slovenia, which forms the bridge between the Dinaric and Alpine ranges for many species, is important for the conservation of large mammals also in the neighbouring countries. The Slovenian authorities and wildlife management institutions must consider this and work towards a conservation and management strategy with foresight and in co-operation with neighbouring countries.

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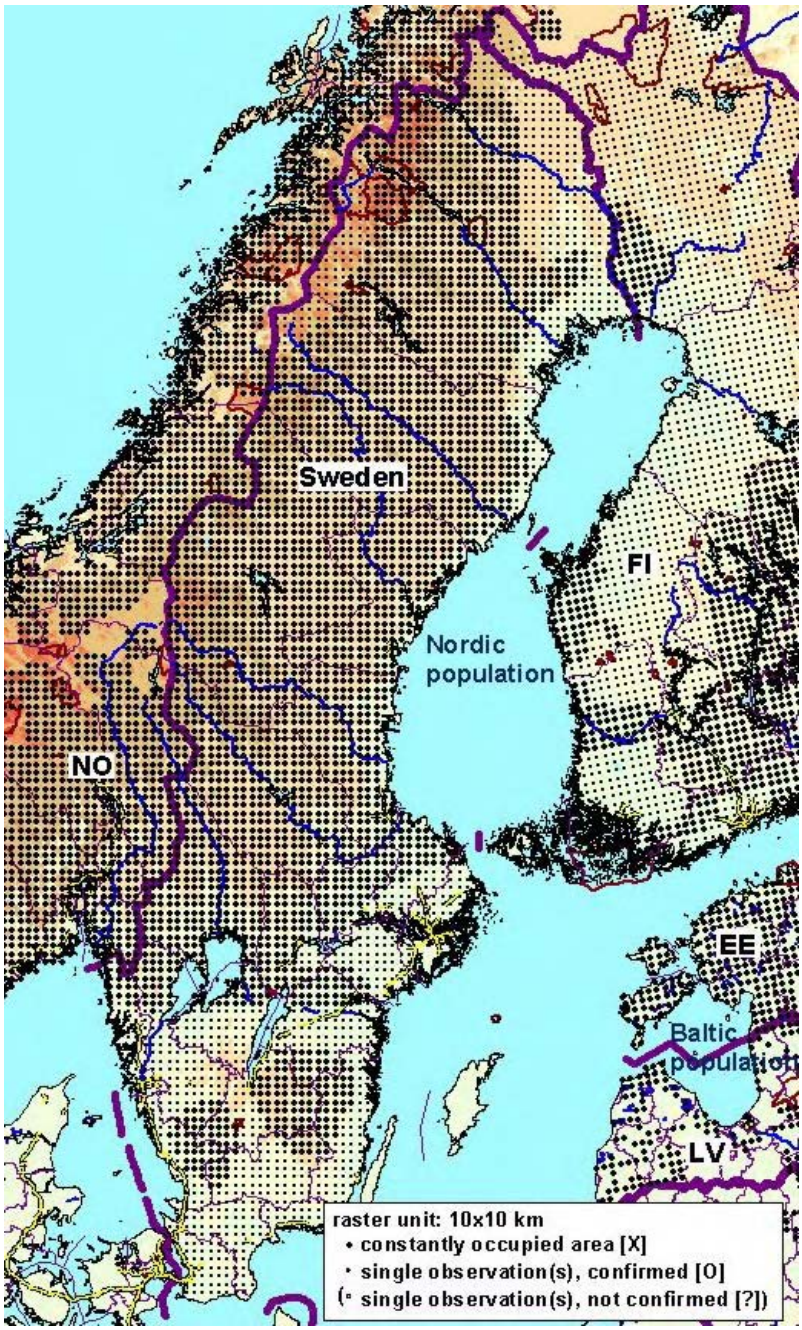
Sweden (SE)

Olof LIBERG & Henrik ANDRÉN

Area: 449'964 km²
Forests & Woodland: 65.9 % (2000)
Human population: 8'875'053 (2001)
Population density: 19.7 / km²

1. Lynx distribution in Sweden in 2001:



Geographic range of the population(s)

Nordic population:
Continuous with Norway. There has been an ongoing expansion southwards on a broad front since 1995.

Methods: sightings & signs, snow tracking, radio telemetry, regular large-scale censuses. Recording tracks in the snow along predetermined census lines and backtracking each trail allows locating family groups and estimating number and distribution of lynx.

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Nordic	1500	312'500	116'900	0	429'400	69.5 / 95.4	0.48
Total	*1500*	*312'500*	*116'900*	*0*	*429'400*	*69.5 / 95.4*	*0.48*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Nordic	1998	**1300-1500**		Correct within limits of 20%.	**stable / expanding** [a]
	2000	**1400-1800**			
Ø 1996-2001		**1500**			

[a] The population is slowly declining in the reindeer area (northern 40% of Sweden) while it is increasing and expanding in southern Sweden. On a national scale the population number seems at present to be rather stable, while its range is expanding.

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Nordic	Recording tracks in fresh snow along predetermined census lines, and backtracking each crossing track to connect crossings that belong to the same animal.	-
Institution	The County Boards and Swedish Association for Hunting and Wildlife Management with control by the Swedish University of Agricultural Sciences (Grimsö).	-

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
signed	ratified 1983	ratified 1974

4.2. Legal status

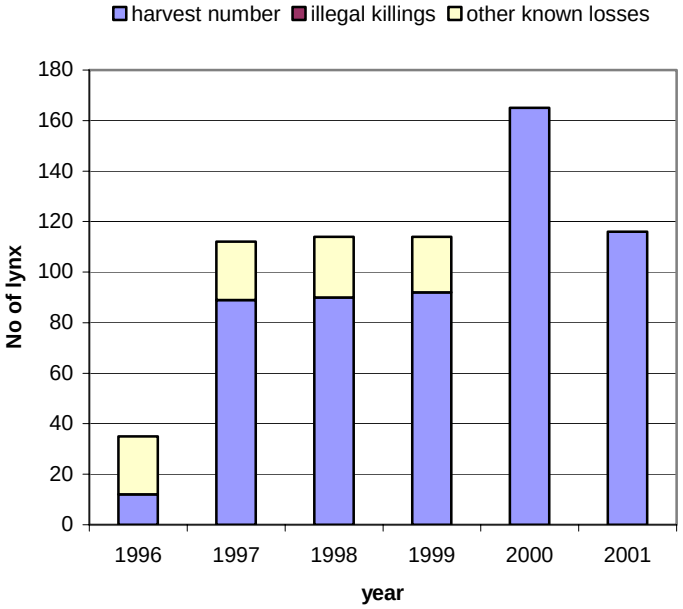
Controlled hunting of lynx and removal of problem animals.

Hunting season:	10.01. - 31.03.
Yearly quota:	A new quota is decided each year based on census results.
Institution responsible:	Swedish Environmental Protection Agency (SEPA).
Method quota setting:	Based on census results. Goal: to lower the number in the reindeer area, and let the lynx increase in the south.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Quota	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Nordic	1996	35	12	19	0	0	0	4	0	0	0	*35*	*2.5* [a]
	1997	147	89	14	0	0	0	9	0	0	0	*112*	*8* [a]
	1998	168	90	16	0	0	0	8	0	0	0	*114*	*8.1* [a]
	1999	168	92	20	0	0	0	2	0	0	0	*114*	*8.1* [a]
	2000	168	165	n.a.	0	0	0	n.a.	0	0	0	*165*	*10.3* [b]
	2001	127	116	n.a.	0	0	0	n.a.	0	0	0	*116*	*7.3* [b]
Total 1996-2001		-	*564*	*69*	*0*	*0*	*0*	*23*	*0*	*0*	*0*	656	-
Yearly Ø		-	*94*	*11.5*	*0*	*0*	*0*	*3.8*	*0*	*0*	*0*	*109.3*	*7.3*
Known mortality / 100 km² [X+O]		-	*0.02*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0.025*	-

[a] when a population size of 1400 lynx is taken
[b] when a population size of 1600 lynx is taken



Number of known losses to the Nordic lynx population in Sweden from 1996-2001.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Nordic	Swedish Environmental Protection Agency (SEPA)	County authorities	Atgärdsprogram för bevarande av lodjur (Action Plan for the conservation of lynx), Action Plan No. 22, Swedish Environmental Protection Agency (SEPA) 2000. [a]

[a] Effect so far: through differential hunting quotas reducing lynx numbers in the reindeer management area and favouring expansion in the south.

5. Depredation:

5.1. Depredation losses & compensation paid

Population	Year	Sheep	Goat	Rein-deer	Other species	Total	Compensation (in Euro)	Compensation other predators
Nordic	1996	n.d.a.	n.d.a.	20'000-40'000 per year	0	n.d.a.	2'800'000 €	n.d.a.
	1997	153	n.d.a.		0	n.d.a.	n.d.a. €	n.d.a.
	1998	157	n.d.a.		0	n.d.a.	1'900'000 €	n.d.a.
	1999	51	0		0	n.d.a.	9'000 €	n.d.a.
	2000	98	0		4	n.d.a.	1'713'000 €	n.d.a.
	2001	130	1		2	n.d.a.	n.d.a. €	n.d.a.
Total 1996-2001		*(589)*	*(1)*	*n.d.a.*	*6* [a]	*n.d.a.*	*(6'422'000 €)*	*n.d.a.*

[a] 4 cattle, 2 turkey

5.2. Regional & seasonal differences

Region: In the reindeer area.
Season: Reindeer year round, sheep in summer and autumn.

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
Nordic	Reindeer area: The Sami villages are paid a standard sum per recorded lynx reproduction in their area. Southern Sweden (livestock, pets): Each killed animal is compensated for according to its judged live value.	The State, through SEPA (Swedish Environmental Protection Agency).	In the reindeer area the compensation paid is based on census of lynx, in the rest of the country each reported case is inspected by trained inspectors employed by regional authorities.

5.4. Prevention

Population	Prevention methods	Legal measures	Illegal actions
Nordic	Electric fencing of sheep pastures in areas with resident lynx.	Fencing, licensed hunting.	Not known.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Nordic	Legal hunting & trapping Shooting Trapping / snaring Poisoning	Shooting Trapping / snaring	Shooting Trapping / snaring Poisoning (?)

Comment: Scarce prey/food base: in the 19th century; pathogens/parasite: maybe for a short period in the 1980s (fox mange).

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans			X
Legislation on an international level			X
Legislation on a national level			X
Legislation on a regional level			X
Public involvement			X
Formal education			X
Awareness			X
Capacity-building / Training			X
Population numbers and range			X
Biology and Ecology			X
Habitat status			X
Threats			X
Uses and harvest levels			X
Conservation measures			X
Monitoring / Trends			X
Genetic status			X
Human attitude / Human dimensions			X
Maintenance / Conservation			X
Sustainable use / Harvest management			X
Disease, pathogen, parasite management			X
Limiting population growth			in reindeer area

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Nordic	vulnerable	• Annual monitoring • Careful harvesting • Generous compensation for damage

9. Projects:

Population	Title	Duration	Contact
Nordic	Lynx in the reindeer management area	1994-	Henrik Andrén, Grimsö Wildlife Research Station, 730 91 Riddarhyttan: henrik.andren@nvb.slu.se
Nordic	Lynx - roe deer interactions	1996-	Henrik Andrén & Olof Liberg, Grimsö Wildlife Research Station, 730 91 Riddarhyttan: henrik.andren@nvb.slu.se, olof.liberg@nvb.slu.se

10. Contact:

Population	Name	Address
Nordic	Olof LIBERG	Grimsö Wildlife Research Station, Swedish University of Agricultural Sciences, 730 91 Riddarhyttan e-mail: olof.liberg@nvb.slu.se
	Henrik ANDRÉN	Grimsö Wildlife Research Station, Swedish University of Agricultural Sciences, 730 91 Riddarhyttan e-mail: henrik.andren@nvb.slu.se

Country assessment:

In the middle of the 19th century, lynx in Sweden experienced a marked decrease, leading to a complete extinction in southern and central parts of the country. There might have been only 100 animals left, maybe even less (HELLBORG *et al.* 2002). A phase of total protection from 1927-1942 induced a recovery of the population, especially in the north. In the 1950/60s, reindeer became an important prey species. In the 1980s the population was thought to have decreased again, but with the implementation of hunting restrictions this trend was reversed (BJÄRVALL 1992, BJÄRVALL & LINDSTRÖM 1994). In 1995, the Swedish population was around 1000 animals again, however with the south only very occasionally occupied (LIBERG & GLÖERSEN 1995, BREITENMOSER *et al.* 2000). During the past few years, the population has further increased to 1400-1800 lynx where it seems to stabilize (Table 3.1).

The current trend is an expansion in the south, but an intentional reduction of lynx in the north, where losses on semi-domestic reindeer have recently been tremendous (Table 5.1). Exact numbers on reindeer depredation are however not available, as with the new compensation system applied in northern areas, payments are dependent on the number of lynx present in a community rather than the number of reindeer killed (Table 5.3). Nevertheless, reindeer are indeed a very important food source for lynx in northern Sweden, especially in winter (PEDERSEN *et al.* 1999), as roe deer are rare or absent in these areas (LINNELL *et al*. 2001). In contrast to neighbouring Norway, where depredation on sheep is outstanding (see Table 5.1 of the Norway report), this is a minor problem in Sweden, because of the different husbandry systems: while in Norway, sheep are normally grazing free in forests

during the summer, they are mainly kept on fields or inside fenced pastures in Sweden. No prevention methods are applicable for reindeer, which are roaming far and year-round vulnerable to predators (LINNELL *et al.* 2001).

From 1996-2001, harvest of the lynx has usually been less than 10 % of the population (Table 4.3), and as more importance was given to northern parts, lynx started to expand in the south. This is in accordance with the objectives of the national lynx action plan implemented in 2000 (Table 4.2 and 4.4). The second most important known mortality factor was traffic accidents. It is not known on which category of roads these accidents occur, but as a dense network of timber roads covers most of Swedish forests (LIBERG & GLÖERSEN 1995), lynx are prone to be victims of crashes. The number of animals killed in collisions runs up to one fifth of the harvest (Table 4.3). Neither harvest nor traffic losses are however considered a threat (Table 6), in contrast to illegal persecution (shooting and trapping). Data to confirm a negative impact of illegal killing on the population do not exist; for 1996-2001 no case was reported (Table 4.3). Nevertheless, illegal hunting is also mentioned to be important by ANDERSEN *et al.* (2003).

Co-operation with Norway has for long been practised (e.g. ANDRÉN *et al*. 1997, SWENSON 1998, LINNELL & ANDRÉN 1999, LINNELL *et al*. 2001, ANDRÉN *et al*. 2002, ANDERSEN *et al*. 2003), as the two countries share the population, and animals migrate across the border. The same kind of co-operation should be established with Finland in the north, where the two populations meet.

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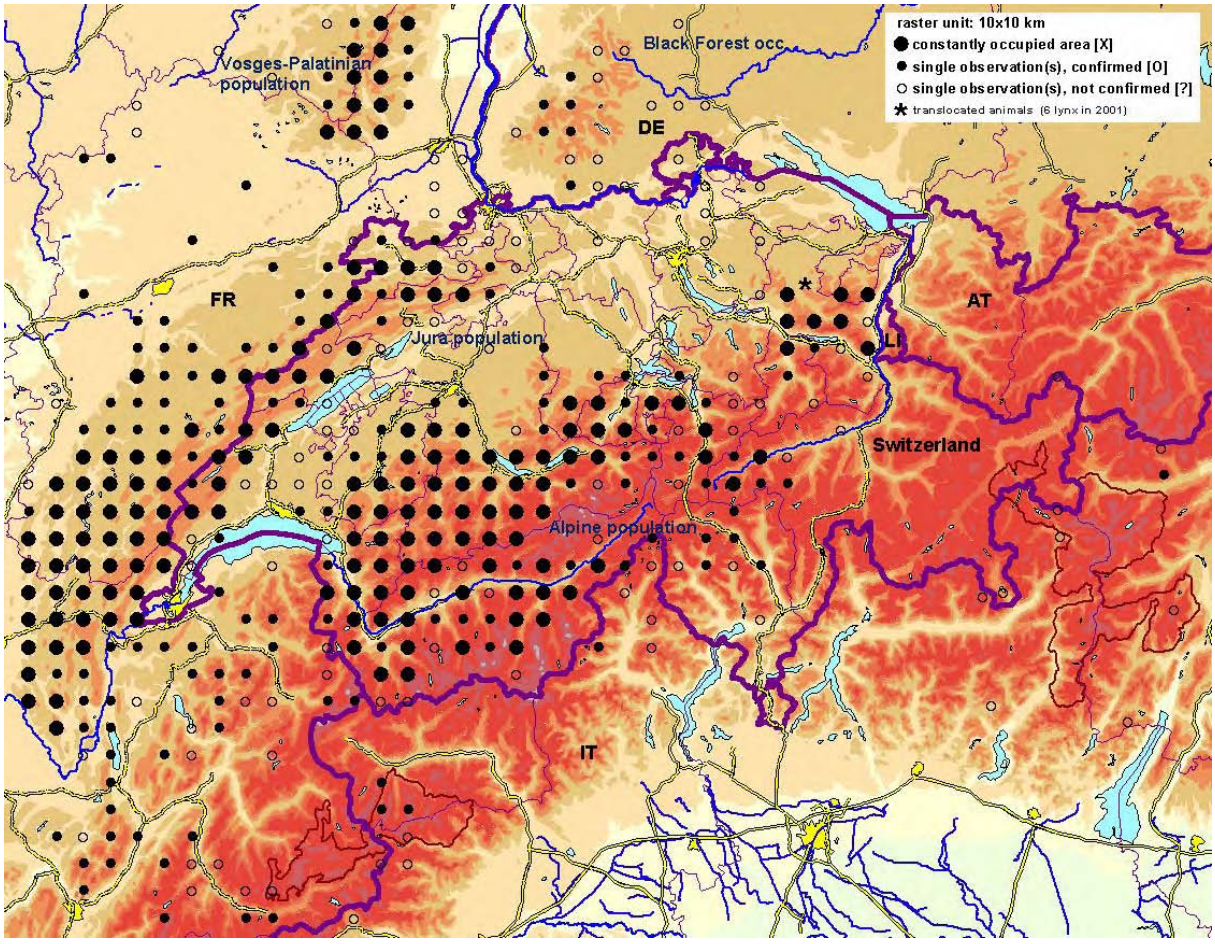
Switzerland (CH)

Urs BREITENMOSER & Christine BREITENMOSER-WÜRSTEN

Area: 41'290 km²
Forests & Woodland: 30.3 % (2000)
Human population: 7'283'274 (2001)
Population density: 176.4 / km²

1. Lynx distribution in Switzerland in 2001:



Geographic range of the population(s)

Alpine population: North-western Swiss Alps (cantons of Vaud, Fribourg and Berne, i.e. the area between the lake of Geneva and the lakes of Thun and Brienz), north and central Valais as well as the western central Alps. A few indications in the eastern central Swiss Alps and in the cantons of Grison and Ticino. Between March 5 and April 20, 2001 3 female and 3 male lynx have been translocated from the north-western to the north-eastern Alps. [a]

Jura population: Jura Mts., western Switzerland between Geneva and Basel.

Methods: sightings & signs, lynx mortality, photo trapping, livestock depredation

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Alpine	70	7'900	4'300	4'300	12'200	19.1 / 29.5	0.89
Jura	20-25	1'900	1'300	1'600	3'200	4.6 / 7.8	1.05-1.32
Total	*90-95*	*9'800*	*5'600*	*5'900*	*15'400*	*23.7 / 37.3*	*0.92-0.97*

3. Population size:

3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Alpine	1999	**70**			**stable** [a] **/ expanding** [b]
Jura	2000	**20-25**			**increasing & expanding**
Ø Total 1996-2001		**90-95**			

[a] Increasing until 1997/1998, then decreasing in 1999/2000. Since 2001 the population seems to stabilize.
[b] released animals in Eastern Switzerland

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Alpine / Jura	Based on different data sources: yearly inquiry of gamekeepers, sightings & signs, known losses of lynx, livestock number compensated as lynx kills, intensive and extensive sessions of photo trapping, and radio-telemetry.	-
Institution	KORA (Coordinated research projects for the conservation and management of carnivores in Switzerland)	-

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
-	ratified 1981	ratified 1974

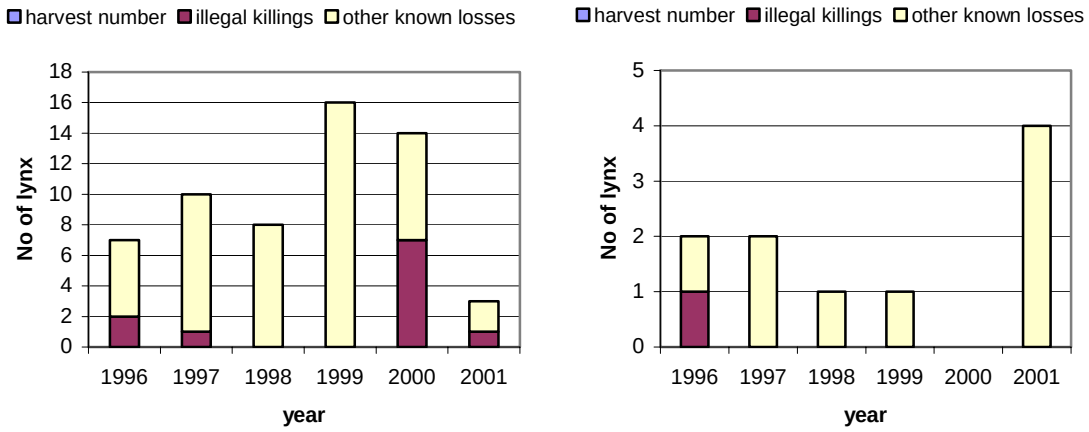
4.2. Legal status

Lynx has been fully protected by law since 1962. Removal of problem animals.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Alpine	1996	-	0	4	2	0	0	1	0	0	*7*	*10* [a]
	1997	-	1	2	1	1	0	5	0	0	*10*	*14.3*
	1998	-	2	2	0	1	2	0	0	1 [d]	*8*	*11.4*
	1999	-	0	5	0	1	6	3	1	0	*16*	*22.9*
	2000	-	3	1	7	0	1	0	2	0	*14*	*20*
	2001	-	0	0	1	1	0	1	0	0	*3*	*4.3*
Total 1996-2001		-	*6*	*14*	*11*	*4*	*9* [c]	*10*	*3*	*1*	*58*	-
Yearly Ø		-	*1*	*2.3*	*1.8*	*0.7*	*1.5*	*1.7*	*0.5*	*0.17*	*9.7*	*13.9*
Known mortality / 100 km² [X+O]		-	*0.01*	*0.02*	*0.01*	*0.01*	*0.01*	*0.01*	*0*	*0*	*0.08*	-
Jura	1996	-	1	0	1	0	0	0	0	0	*2*	*10* [b]
	1997	-	1	0	0	0	1	0	0	0	*2*	*10*
	1998	-	0	0	0	0	0	1	0	0	*1*	*5*
	1999	-	0	0	0	0	0	0	1	0	*1*	*5*
	2000	-	0	0	0	0	0	0	0	0	*0*	*0*
	2001	-	1	0	0	0	0	1	2	0	*4*	*20*
Total 1996-2001		-	*3*	*0*	*1*	*0*	*1*	*2*	*3*	*0*	*10*	-
Yearly Ø		-	*0.5*	*0*	*0.17*	*0*	*0.17*	*0.3*	*0.5*	*0*	*1.7*	*8.5*
Known mortality / 100 km² [X+O]		-	*0.02*	*0*	*0.01*	*0*	*0.01*	*0.01*	*0.01*	*0*	*0.05*	-

[a] all numbers calculated with a population size of 70 individuals
[b] all numbers calculated with a population size of 20 individuals
[c] fox mange (Sarcoptes scabiei), cat mange (Notoedres cati)
[d] fight with other lynx



Number of known losses to the Alpine (left) and the Jura population (right) in Switzerland from 1996-2001.

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	Regional level	
Alpine / Jura	SAEFL (BUWAL): Swiss Agency for the Environment, Forests and Landscape	Cantons: 8 regional management compartments have been established. In each of the compartments the cantons are represented by their hunting administration.	SAEFL 2000 (Bundesamt für Umwelt, Wald und Landschaft, 28. August 2000: Konzept Luchs Schweiz) [a]

[a] www.umwelt-schweiz.ch/imperia/md/content/forstdirektion/wildjagd/wj20_factsfigures/wj20_006_wildinfos/wj20_006_luchskonzept_d.pdf (also available in French and Italian)

Effects so far: The cantons have more competences for the lynx management (e.g. if it comes to the removal of problem animals); translocation of lynx to East Switzerland (from high lynx density areas to areas with no lynx or low densities); criteria for the intervention into the lynx populations are currently discussed.

5. Depredation:

5.1. Depredation losses & compensation paid

Population	Year	Sheep	Goat	Rein-deer	Other species	Total	Compensation (in Euro)	Compensation other predators
Alpine / Jura	1996	60	10	-	2	72	18'704 €	0 €
	1997	86	14	-	7	107	27'644 €	0 €
	1998	88	12	-	10	110	30'767 €	21'364 €
	1999	190	17	-	3	210	48'558 €	70'734 €
	2000	199	17	-	18	234	48'712 €	77'298 €
	2001	152	6	-	4	162	45'319 €	12'167 €
Total 1996-2001		*775*	*76*	-	*44* [a]	*895*	*219'704 €*	*181'563 €* [b]

[a] fallow deer & poultry
[b] wolf

5.2. Regional & seasonal differences

Region: The main area of livestock depredation lies in the north-western Alps (especially in the western part, i.e. west of the valley of Frutigen). No depredation in the Jura Mts. from 1996-1998, but in 2000 and 2001 almost one third of all cases occurred in a restricted area (Clos du Doubs) in the northern part of the Jura Mts. (canton of Jura).
Season: Jura Mts.: whole year, Alps: summer (June-October).

5.3. Compensation systems

Population	Description	Who is paying?	Procedures to verify lynx kills
Alpine / Jura	The animal(s) killed are examined and compensated to 100% (50% in doubtful cases) if they have been killed by lynx.	80% of the amount by the confederation (SAEFL), 20% by the canton concerned.	An official person (game warden, designated wildlife biologist or veterinarian) has to examine the carcass.

5.4. Prevention

Population	Prevention methods	Legal measures	Illegal actions
Alpine / Jura	Electric fences, donkeys, shepherds, guarding dogs, flashing lights.	Removal of problem animals (lynx killing more than 15 sheep within a circle of 5 km radius within a year; the lynx is shot by a game warden).	Illegal shooting, poisoning.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Alpine	Infrastructure development: Road building Shooting Poisoning Vehicle and train collision Avalanches / landslides Limited dispersal	Infrastructure development: Road building Shooting Poisoning Vehicle and train collision Avalanches / landslides Pathogens / parasites Limited dispersal	Infrastructure development: Road building Shooting Poisoning Vehicle and train collision Avalanches / landslides Pathogens / parasites Limited dispersal Inbreeding Population fluctuations Restricted range
Jura	Infrastructure development: Road building Shooting Poisoning Vehicle and train collision Limited dispersal	Infrastructure development: Road building Shooting Poisoning Vehicle and train collision Pathogens / parasites Limited dispersal	Infrastructure development: Road building Shooting Poisoning Vehicle and train collision Pathogens / parasites Limited dispersal Inbreeding Population fluctuations Restricted range

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans			X
Legislation on an international level			X
Legislation on a national level			X
Legislation on a regional level			X
Public involvement			X
Formal education			X
Awareness			X
Capacity-building / Training			X
Taxonomy			X
Population numbers and range			X
Biology and Ecology			X
Habitat status			X
Threats			X
Conservation measures			X
Monitoring / Trends			X

Conservation measure (cont.)	Lacking / proposed	Drafted / ratified	Implemented / applied
Genetic status			X
Human attitude / Human dimensions			X
Maintenance / Conservation	X		
Corridors	X		
Identification of new protected areas		X	
Establishment of protected areas		X	
Management of protected areas			X
Expansion of protected areas		X	
Community-based initiatives	X		
Re-introductions		X	X
Sustainable use / Harvest management		X	
Recovery management			X
Disease, pathogen, parasite management			X
Captive breeding / Artificial propagation			X
Genome resource bank			X

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Alpine	vulnerable	• Continue close monitoring of demographic and genetic parameters • Increase acceptance of local people • Improve law implementation
Jura	vulnerable	• Continue close monitoring of demographic and genetic parameters • Increase acceptance of local people • Improve law implementation

9. Projects:

Population	Title	Duration	Contact
Alpine / Jura	"Monitoring Luchs Schweiz": Monitoring of the lynx populations in Switzerland by use of different methods.		Fridolin Zimmermann, Anja Molinari-Jobin (KORA) & Simon Capt (CSCF): f.zimmermann@kora.ch, JobinMolinari@aol.com, simon.capt@cscf.unine.ch
Alpine	SCALP "Status and Conservation of the Alpine Lynx Population": Monitoring of the lynx population across the entire Alpine arc, development of an action plan for its conservation and management.		Anja Molinari-Jobin (KORA): JobinMolinari@aol.com
Alpine (Eastern CH)	LUNO: Lynx translocations to north-eastern Switzerland. Radio-telemetry monitoring of the released animals.	2001-	Andreas Ryser, Kuno von Wattenwyl (KORA): andreas.ryser@freesurf.ch, kvw@gmx.ch

Population	Title	Duration	Contact
Alpine / Jura	"Genetikprojekt Luchs": Study of the genetic population structure of the re-introduced lynx populations in Switzerland.		Christine Breitenmoser-Würsten (KORA): ch.breitenmoser@kora.ch
Alpine / Jura	OMO-LC "Online Monitoring System for Large Carnivores": Development of an internet platform for the reporting of large carnivore observations. As first step, different cartographic information will be available online.		Uli Müller, Stephanienstrasse 4, 79100 Freiburg, Germany: uli@geops.de

10. Contact:

Population	Name	Address
Alpine / Jura	Urs BREITENMOSER & Christine BREITENMOSER-WÜRSTEN	KORA, Thunstrasse 31, CH-3074 Muri b. Bern e-mails: urs.breitenmoser@ivv.unibe.ch ch.breitenmoser@kora.ch

Country assessment:

Switzerland is important for the conservation of the lynx in the Alps and in the Jura, as it hosts the core of the Alpine and one third of the Jura population. The potential capacity of the Swiss Alps is not yet exhausted; there is still unoccupied suitable habitat in the eastern and southern Alps. A colonisation of these regions would support the linking of the isolated lynx occurrences in the western Alps with the population in Slovenia and, ultimately to establish a long-term viable population across the Alps (see Pan-Alpine Conservation Strategy for the Lynx; MOLINARI-JOBIN *et al.* 2003). However, the further natural spread of the population from the north-western Alps is limited due to habitat fragmentation. Switzerland has a very high human population density and – with 2.69 km/km² – one of the most densely road network in Europe (BUWAL 2001b). This is even true for the mountain regions. As a consequence, it is not only difficult for lynx to spread across valleys and settle new areas, but traffic accidents are an important mortality factor. The problem of traffic infrastructure as a direct and indirect threat to wildlife has recently been reviewed. 50 bottlenecks with barriers were identified and should be retrofit with adequate fauna passages within the next 10-20 years (BUWAL 2001a). However, it is unclear whether lynx actually accept such corridors (ZIMMERMANN, BREITENMOSER-WÜRSTEN & BREITENMOSER subm.).

There is probably almost no exchange between the two populations in the Alps and Jura Mts. which are separated through the Swiss Plateau (only one lynx from the Jura Mts. has so far been genetically attributed to the Alpine population). Both populations origin from the Slovak Carpathian population, but have experienced an important genetic drift and are today clearly distinct. Compared to the origin population, both populations show a strong reduction in their genetic variability (BREITENMOSER-WÜRSTEN & OBEXER-RUFF 2003). This process needs to be further monitored in order to detect possible future threats to the genetic viability of the populations (Table 8).

The main threat to the lynx in Switzerland is, 30 years after the re-introductions, still the controversy about the return of this large carnivore. When in 1999/2000 a population peak was observed in the north-western Alps, the re-emerging controversy lead to demonstrative illegal acts against lynx (Table 4.3). In August 2000, the Swiss Lynx Concept, a management plan, was implemented and offered new solutions. It defines general management and conservation goals, the share of competences between the confederation and the cantons, and criteria for interventions if lynx are considered to be “too abundant”. To mitigate the problem and support the spread of the population, 6 lynx from the north-western Alps and 3 from the Jura Mts. were translocated to the north-eastern Swiss Alps in 2001 and 2003, respectively (RYSER *et al*. 2004). Since their release, the animals are monitored by means of radio telemetry.

Both populations are currently considered to be stable. There was a decreasing number of records from the south of the Jura Mts., but more indications from the north-east. Scientific research in the Jura Mts. has finished in 1998, and the monitoring (established in Switzerland since 1992) now relies more on reports from the public, game wardens and institutions concerned.

Known lynx mortalities in both populations are high (up to 20%, Table 4.3). Illegal killings are assumed to be the main cause of mortality (BREITENMOSER, BREITENMOSER-WÜRSTEN & CAPT 1998, MOLINARI-JOBIN *et al.* 2001), but the majority of known cases were traffic accidents. The illegal killing of lynx goes often undetected, and law enforcement is difficult and sometimes not pursued strenuously. Estimations from radio-tagged individuals revealed that most likely, only one out of four illegal killings are detected (BREITENMOSER, BREITENMOSER-WÜRSTEN & CAPT 1998). Repressive measures seem not to be applicable in the context of the Swiss federative system, so the new management plan aims to mitigate the conflict through involvement of the cantons and the local interest groups. The success of this strategy is not yet proven.

The continuation of the monitoring of the lynx in Switzerland is very important to be able to counteract possible threats for the long-term survival of the populations.

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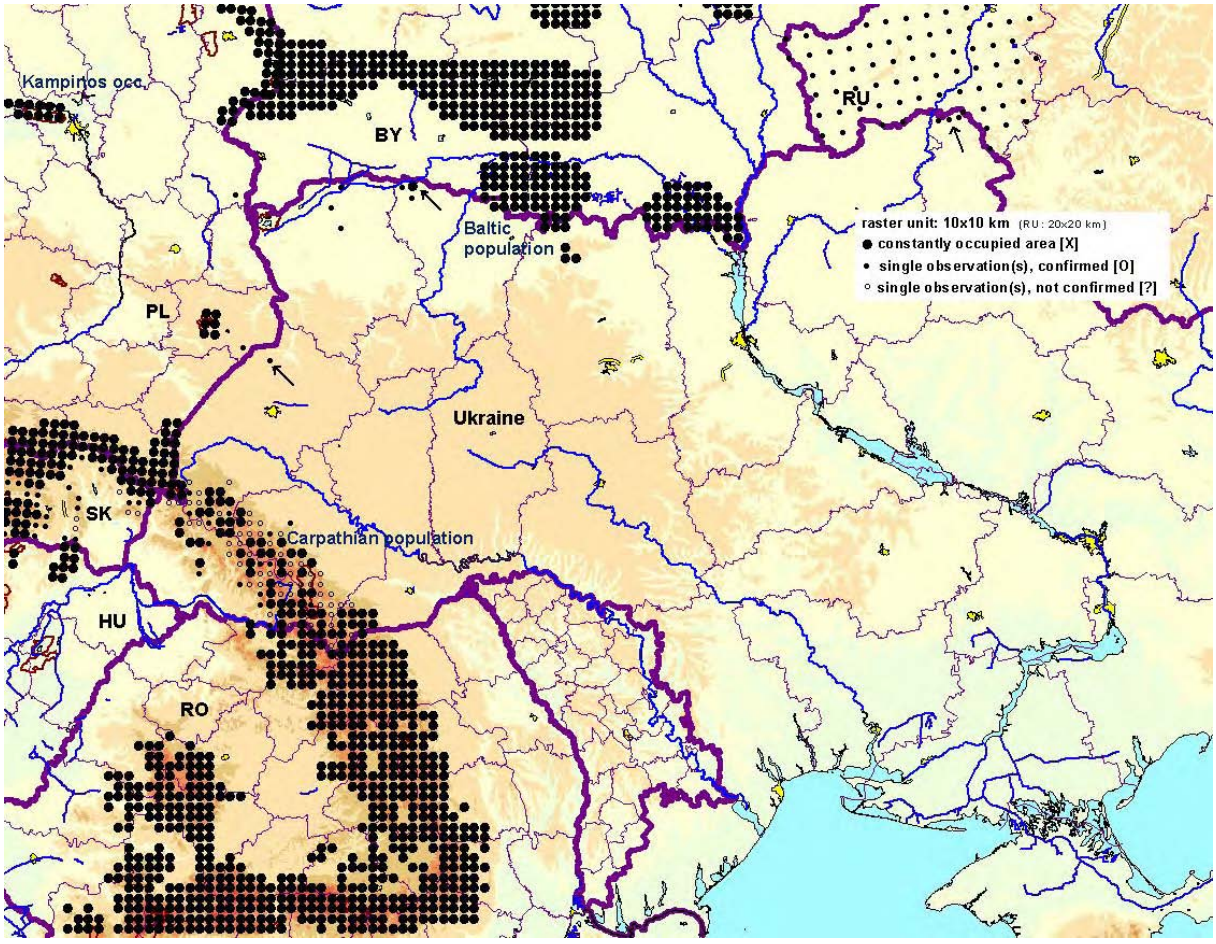
ZIMMERMANN, F., BREITENMOSER-WÜRSTEN, CH. & BREITENMOSER, U. (subm.): Importance of dispersal for the expansion of an Eurasian lynx (*Lynx lynx*) population in a fragmented landscape.

Ukraine (UA)

Andriy-Taras BASHTA, Sergiy ZHYLA, Igor DYKY & Yuriy TKACHUK

Area: 603'700 km²
Forests & Woodland: 16.5 % (2000)
Human population: 48'760'474 (2001)
Population density: 80.8 / km²

1. Lynx distribution in the Ukraine in 2001:



Geographic range of the population(s)

Carpathian population: Eastern Carpathians.

Baltic population: Polissia. (Data from 1985-2002 as the most recent data would be very incomplete.)

Methods: sightings & signs, snow tracking, unspecific survey, inquiry

2. Lynx population(s):

Population	Pop. size (Ø 1996-2001)	Lynx distribution area [km²]				[X] & [X+O] / country area [%]	Pop. density [lynx/100 km²]
		[X]	[O]	[?]	[X+O]		
Carpathian	263	5'800	1'600	5'500	7'400	1 / 1.2	4.53
Baltic	18	1'300	1'000	0	2'300	0.2 / 0.4	1.38
Total	*281*	*7'100*	*2'600*	*5'500*	*9'700*	*1.2 / 1.6*	*3.96*

3. Population size:

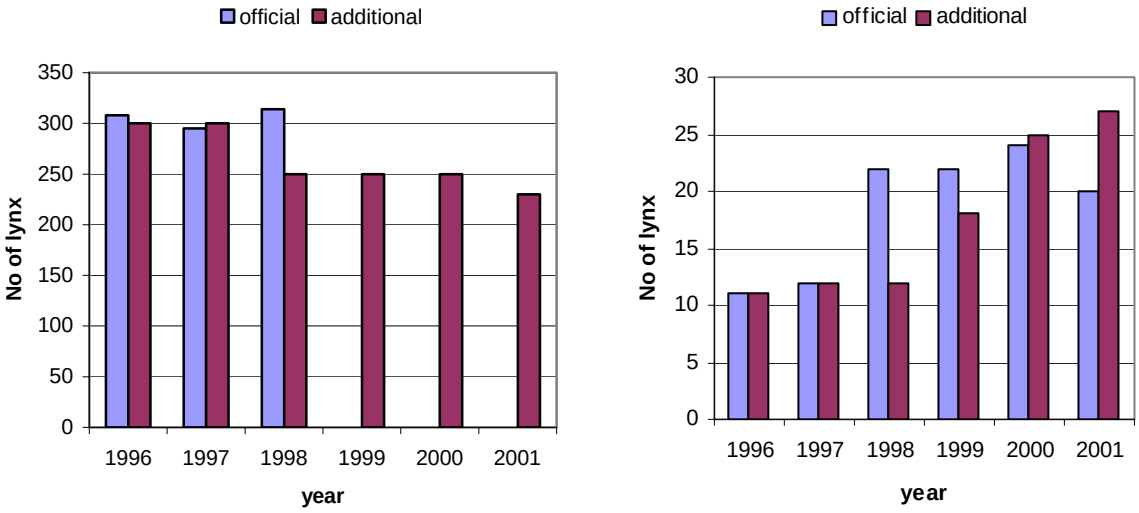
3.1. Estimations

Population	Year	Official estimation	Additional estimation	Accuracy	Tendency
Carpathian	1996	**308**	**300**	Middle. [a]	**decreasing**
	1997	**295**	**300**		
	1998	**314**	**250**		
	1999		**250**		
	2000		**250**		
	2001		**230**		
Ø 1996-2001		**(305.7)**	**263.3**		
Baltic	1996	**11**	**11**	Relatively good.	**increasing**
	1997	**12**	**12**		
	1998	**22**	**12**		
	1999	**22**	**18**		
	2000	**24**	**25**		
	2001	**20**	**27**		
Ø 1996-2001		**18.5**	**17.5**		
Total Ø 1996-2001		***(324.2)***	***280.8***		

[a] Data are not precisely enough. There was no possibility to carry out a detailed investigation in all parts of this area.

3.2. Methods and institutions responsible for the estimations

Population	Official estimation	Additional estimation
Carpathian / Baltic	Official inquiry.	Sightings, signs, snow trapping, inquiry.
Institution	Central Statistics board of Ukraine	Institute of Ecology of the Carpathians, Polissky NP, HELP-group



Official and additional estimates of lynx numbers in the Carpathian (left), and the Baltic (right) population in the Ukraine from 1996-2001.

4. Legal situation, harvest and losses of lynx:

4.1. International treaties

EU Habitat Directive	Bern Convention	CITES
ratified 1999 [?: the Ukraine is not EU member, Eds.]	ratified 1999	ratified 1999

4.2. Legal status

Lynx has been fully protected by law since 1980.

4.3. Harvest numbers and other known losses to the population(s)

Population	Year	Harvest number	Traffic	Other accidents	Illegal killings	Removal problem animals	Diseases	Unknown cause	Orphans	Other	*Total*	*% of population*
Carpathian [a]	1996	-	0	0	4	0	0	0	0	0	*4*	*1.3*
	1997	-	0	0	1	0	0	0	0	0	*1*	*0.3*
	1998	-	0	0	1	0	0	0	0	0	*1*	*0.4*
	1999	-	0	0	2	0	0	0	0	0	*2*	*0.8*
	2000	-	0	0	n.a.	0	0	0	0	0	*n.a.*	*n.d.a.*
	2001	-	0	0	n.a.	0	0	0	0	0	*n.a.*	*n.d.a.*
Total 1996-2001		-	*0*	*0*	*n.a.* [b]	*0*	*0*	*0*	*0*	*0*	*n.a.*	-
Yearly Ø		-	*0*	*0*	*2* [c]	*0*	*0*	*0*	*0*	*0*	*n.a.*	*n.d.a.*
Known mortality / 100 km² [X+O]		-	*0*	*0*	*n.a.*	*0*	*0*	*0*	*0*	*0*	*n.a.*	-

[a] all known facts are from the Carpathian population
[b] Illegal killing is the most important factor for the population decrease, but it is currently not possible to evaluate this impact.
[c] if only the known numbers from 1996-1999 are considered

4.4. Lynx management

Population	Authority in charge		Management / Conservation Plan
	National level	**Regional level**	
Carpathian / Baltic	Ministry of Ecology and Natural Resources	National Parks, Nature reserves etc.	(The conservation action plan is prepared by a group of scientists (A.-T. Bashta, S. Zhyla, I. Dyky, Ju. Tkachuk) but is not adopted yet.) [a]

[a] BASHTA *et al.* 2002: Current state evaluation of lynx population in Ukraine and programme of its conservation. Preparation for the Ministry of Ecology and Nature Resources. Institute of Ecology of the Carpathians: 1-30.

5. Depredation:

5.1. Depredation losses & compensation paid

→ Only one such incident is known for the last 10 years: 1 calf in the year 2000 in the area of the Baltic population.

5.2. Regional & seasonal differences

-

5.3. Compensation systems

→ There are no compensation systems applied in the country.

5.4. Prevention

Population	Prevention methods	Legal measures	Illegal actions
Carpathian / Baltic	Flocks and herds are guarded mainly by herdsmen, shepherds and dogs.	None.	Poaching.

6. Major threats to the lynx population(s) in the country:

Population	Past (<1996)	Present (1996-2001)	Future (>2001)
Carpathian	Extraction of wood Infrastructure development: Tourism / recreation Infrastructure development: Road building Shooting Trapping / snaring Poisoning Avalanches / landslides Competitors Prey / food base High juvenile mortality Recreation / tourism	Extraction of wood Infrastructure development: Tourism / recreation Infrastructure development: Road building Shooting Trapping / snaring Avalanches / landslides Competitors Prey / food base High juvenile mortality Recreation / tourism	Extraction of wood Infrastructure development: Tourism / recreation Infrastructure development: Road building Avalanches / landslides Competitors Prey / food base High juvenile mortality Recreation / tourism
Baltic	Agriculture Extraction of wood Infrastructure development: Tourism / recreation Infrastructure development: Road building Shooting Trapping / snaring Poisoning Wildfire Competitors Prey / food base Limited dispersal High juvenile mortality Low densities Restricted range Recreation / tourism	Extraction of wood Infrastructure development: Tourism / recreation Infrastructure development: Road building Shooting Trapping / snaring Wildfire Competitors Prey / food base Limited dispersal High juvenile mortality Low densities Restricted range Recreation / tourism	Extraction of wood Infrastructure development: Tourism / recreation Infrastructure development: Road building Wildfire Competitors Prey / food base Limited dispersal High juvenile mortality Low densities Restricted range Recreation / tourism

7. Conservation measures:

Conservation measure	Lacking / proposed	Drafted / ratified	Implemented / applied
Management plans		X	
Legislation on an international level			X
Legislation on a national level			X
Legislation on a regional level			X
Public involvement		X	
Formal education	X		
Awareness	X		
Capacity-building / Training	X		
Taxonomy		X	

Conservation measure (cont.)	Lacking / proposed	Drafted / ratified	Implemented / applied
Population numbers and range			X
Biology and Ecology		X	
Habitat status			X
Threats		X	
Uses and harvest levels		X	
Conservation measures			X
Monitoring / Trends		Carpathian	Baltic
Human attitude / Human dimensions			X
Maintenance / Conservation			X
Restoration		X	
Corridors		X	
Identification of new protected areas		X	
Establishment of protected areas		X	
Management of protected areas		X	
Expansion of protected areas			X
Community-based initiatives	X		
Re-introductions	X		
Sustainable use / Harvest management		X	
Recovery management		X	
Disease, pathogen, parasite management	X		
Limiting population growth	X		
Captive breeding / Artificial propagation	X		
Genome resource bank	X		

8. Judgement of the status of the population(s) within the country & most urgent actions needed:

Population	Judgement	Most urgent actions needed
Carpathian	endangered	• Control poaching
Baltic	endangered	• Ecological corridors • Enriching of prey

9. Projects:

Population	Title	Duration	Contact
Carpathian / Baltic	Evaluation of the population state of rare predatory species in Ukraine.	2002	Dr. Andriy-Taras Bashta, Institute of Ecology of the Carpathians: atbashta@polynet.lviv.ua

10. Contact:

Population	Name	Address
Carpathian / Baltic	Andriy-Taras BASHTA	Institute of Ecology of the Carpathians, Koselnytska St. 4, Lviv 79026 e-mail: atbashta@polynet.lviv.ua
Collaborators:	Sergiy ZHYLA	Selezivka-Vallage, Ovrutsky-rajon, Zhytomyr-oblast 11122
	Igor DYKY	Lviv National University, Zoology Dept., Hrushevsky st. 4, Lviv 79012
	Yuriy TKACHUK	Vydynivskoho St. 41/2, Storozhynets, Chernivtsi-region 59000

Country assessment:

The Ukraine has part of two populations, the Baltic population in the north of the country, and the Carpathian population in the central-west. As a matter of facts, in Polissia (Baltic) there are most probably only a few single individuals that are migrating from neighbouring Belarus or having their home ranges on both sides of the border, as data from more than a decade were used to demonstrate the distribution in this area (see point 1, UKRAINIAN MINISTRY OF THE ENVIRONMENT AND NATURAL RESOURCES 2000). In the Carpathians, the Ukraine builds the bridge between Slovakia and Romania, the two main nuclei of the Carpathian population (see map). The Ukraine is therefore very important for the cohesion of the entire population. However, the Ukrainian distribution is currently quite scattered, with only unconfirmed signs of lynx presence over a big part of the area (see map). This is inconsistent with OKARMA *et al.* (2000), who stated that there is a continuous distribution over the entire Ukrainian Carpathians. Either the decrease noticed during the past few years (Table 3.1) indeed caused a quick fragmentation of the distribution range, or the database is simply too deficient. Table 3.1, but also the information provided by OKARMA *et al.* (2000) and SALVATORI *et al.* (2002) indicate that the information is indeed feeble. The high density of 4.5 lynx/100 km² calculated in Table 2 moreover suggest that the estimated size and distribution of the population do not match. According to A.-T. BASHTA (pers. comm.) the distribution map indeed draws a too pessimistic picture of the real situation. The obvious inconsistency of the information presented could only be resolved by means of a more detailed survey.

The population estimate for the Carpathian population varies according to different sources between 230 (2001, this report), 300 (1999, SALVATORI *et al.* 2002) and 400-500 (UKRAINIAN MINISTRY OF THE ENVIRONMENT AND NATURAL RESOURCES 2000). In recent years the official estimates have been incomplete (see Table 3.1), since some regions have not produced reports (OKARMA *et al.* 2000). According to OKARMA *et al.* (2000) the data from the questionnaires completed by forest guards are not sufficient to produce population estimates, and a more intensive monitoring is only carried out in the national parks and the Carpathian Biosphere Reserve. OKARMA *et al.* (2000) therefore considered a number of 314 animals in 1998 to be underestimated. However, the additional estimation for 1998 in this survey was 250 lynx (Table 3.1), so even below the official number. From this it follows that further investigations are needed to get more accurate numbers.

At the end of the 1970s, the number of lynx in the Ukraine was about 90-100 with a decreasing tendency, and there was no legal protection (TURANIN & KOLUSEV 1968). This changed in 1980 when the species received full protection (Table 4.2). Lynx is included in the category “vulnerable” in the country Red Data Book (SHEVCHENKO1994, UKRAINIAN MINISTRY OF THE ENVIRONMENT AND NATURAL RESOURCES 2000). Habitat degradation due to wood cutting and poaching are considered to be the main threats (OKARMA *et al.* 2000, UKRAINIAN MINISTRY OF THE ENVIRONMENT AND NATURAL RESOURCES 2000), some more factors are assumed (see Table 6). However, there is not much evidence to evaluate the threats. Illegal killing really occurs – at least in the Carpathian population –, the number of known cases is however small (Table 4.3).

All together, the baseline information on the lynx in the Ukraine should be improved. There are some articles in Ukrainian from local experts (TKACHUK 1998a, TKACHUK 1998b, ZHYLA 1999), but there was, so far, no international co-operation. Efforts to strengthen and to formalise the co-operation regarding large carnivore research, conservation and management are currently made (see Recommendation No. 100 (2003) of the Standing Committee of the Bern Convention, adopted on 4 December 2003, on the conservation of large carnivores in the Carpathians). It is of high importance that the Ukraine evolves into a full partner in all those programmes concerning the conservation of the whole of the Carpathians.

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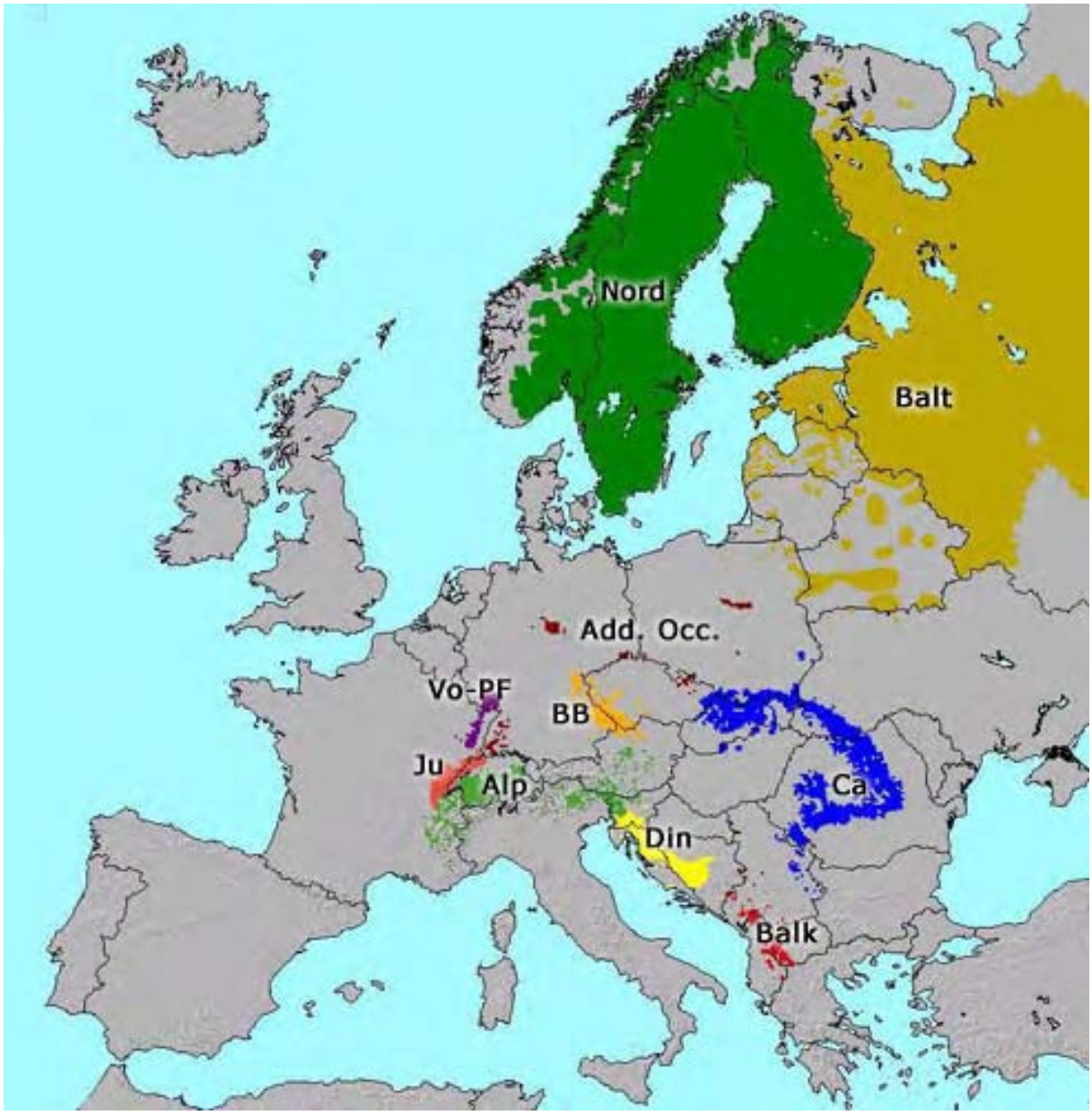
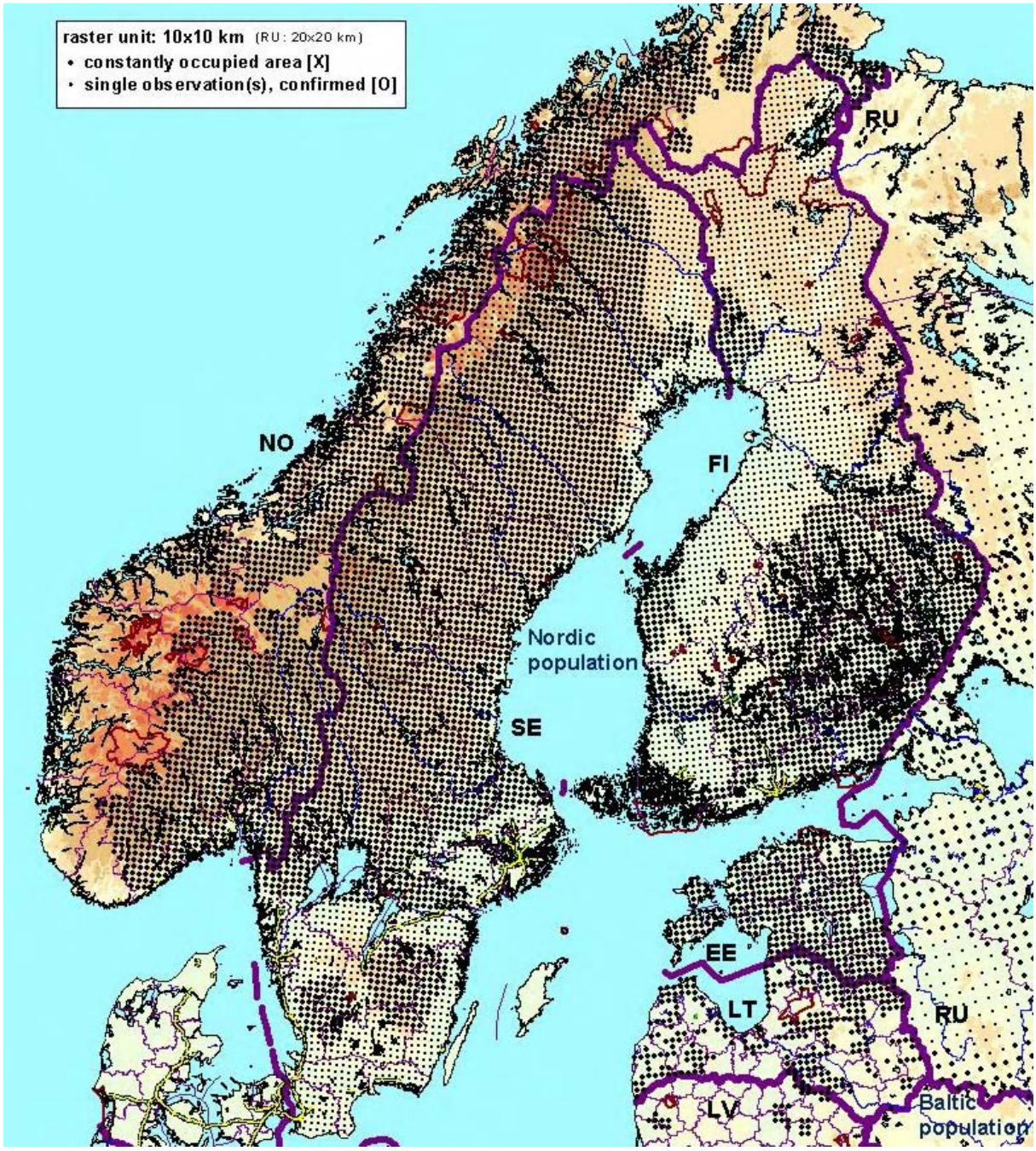
5. Populations



Nordic population

1. Description:

1.1. Distribution of the Nordic population in 2001



1.2. Countries (regions) and spatial trend

Countries sharing the population: *Sweden* (almost whole country, continuous with Norway), *Norway* (from central-south to north-east Norway, absent in the south-west), *Finland* (whole country, permanently present particularly in the south-east).

Spatial trend (change in distribution area since 1995): *Sweden*: ongoing expansion in the south on broad front since 1995; *Norway*: overall distribution relatively unchanged in spite of population decline, with exception of the extreme south-west Norway, where reproductive units are now absent; *Finland*: main and expanding population area in the south-east, sporadic presence throughout the country.

2. Status and trend:

2.1. Extension

Country	Lynx distribution area [km²]				Population share (% area [X] / [X+O])
	[X]	[O]	[?]	[X+O]	
Sweden	312'500	116'900	0	429'400	47.9 / 44.5
Norway	215'600	0	0	215'600	33.1 / 22.3
Finland	123'900	196'900	0	320'800	19.0 / 33.2
Total population	*652'000*	*313'800*	*0*	*965'800*	*100 / 100*

2.2. Fragmentation

Total area ([X+O] – isolated [O]):	965'800 km²
Number of patches:	2
Mean patch size and range:	482'900 km²; 5'900-959'900 km²
Mean nearest distance between patches:	10 km

2.3. Size of the population

Country	Estimation 1995*	Estimation 2001**	Density (lynx per 100 km² area [X])	Trend 1990-1995*	Trend 1996-2001
Sweden	1000	1400-1800	0.48	increasing & expanding	stable / expanding [a]
Norway	600	327	0.19	increasing & expanding	stable / decreasing [b]
Finland	850-1000	870	0.67	increasing & expanding	increasing & expanding
Total population	*~ 2500*	*~ 2800*	*0.45*	*increasing & expanding*	*stable & partly expanding*

***** Eurasian Lynx Action Plan 2000, Table 2 (BREITENMOSER *et al.* 2000)
** or most recent estimation available, refer to the respective country report
[a] The population is slowly declining in the reindeer area (northern 40% of Sweden) while it is increasing and expanding in southern Sweden. On a national scale the population size seems at present to be rather stable, while its range is expanding.
[b] stable in the north and south-east, decreasing in the centre and south-west

2.4. Management

Country	Legal status	National institution in charge	Conservation / Management plan status 1995*	Conservation / Management plan status 2001
Sweden	controlled hunting	Swedish Environmental Protection Agency (SEPA)	planned	implemented
Norway	controlled hunting	National Directorate for Nature Management	yes	(government white paper)
Finland	fully protected [a]	Ministry of Agriculture and Forestry	yes	implemented
Population	*controlled hunting*		*none*	*none*

* Eurasian Lynx Action Plan 2000, Table 3
[a] Complete protection can be derogated in accordance with article 16 of the EU Habitat Directive [resulting in a kind of quota hunting].

2.5. Harvest and known losses (yearly average 1996-2001)

Country	Harvest number	Removal of problem animals	Illegal killings	Other mortality	Total Ø 1996-2001	Total Ø 1990-1995*
Sweden	94	0	0	15.3	109.3	102
Norway	89.5	(other mort.)	n.a.	15.8	105.3	37
Finland	58.8	0	0	0	58.8	50-70
Total population	*242.3*	*n.a.*	*0*	*~ 32*	*~ 274*	*~ 200*

* Eurasian Lynx Action Plan 2000, Table 3

2.6. Depredation, compensation and prevention

Depredation: In the Nordic population, livestock depredation is intense: Up to 10'000 sheep and several thousands of reindeer have yearly been killed by lynx from 1996-2001. Whereas in Norway, sheep depredation is the most extensive, reindeer is the species mainly affected in Sweden. In Finland the extent of livestock depredation is much smaller than in the two other Nordic countries.

Compensation: In all three countries the state pays for domestic animals killed. In the Swedish reindeer area, Sami communities do not get paid for the losses, but receive a fixed sum per recorded lynx reproduction in their area. In Norway and Sweden, the compensation payments make often up millions of Euro per year (see country reports).

Prevention: Fencing and guarding of livestock is applied to prevent depredation. The hunting of lynx is seen as a measure to reduce conflicts with local people due to livestock/reindeer depredation.

3. Threats

Country (population share in % area [X]) ►	Sweden (47.9 %)	Norway (33.1 %)	Finland (19 %)	Nordic population 1996-2001
Threat ▼				
Agriculture				
Extraction of wood				
Infrastructure development: Industry				
Infrastructure development: Human settlement				
Infrastructure development: Tourism / recreation				
Infrastructure development: Road building				
Legal hunting & trapping		X		X
Shooting (illegal)	X			XX
Trapping / snaring (illegal)	X	} Poaching		XX
Poisoning				
Vehicle and train collision				
Storms / flooding				
Wildfire				
Avalanches / landslides				
Competitors				
Prey / food base				
Pathogens / parasites				
Limited dispersal				
Poor recruitment / reproduction / regeneration				
High juvenile mortality				
Inbreeding				
Low densities				
Skewed sex ratios				
Slow growth rates				
Population fluctuations				
Restricted range				
Recreation / tourism				
Research				
War / civil unrest				
Transport				
Other				

Threats 1995 (Eurasian Lynx Action Plan 2000, Table 6):
Depredation and potentially hunting.

4. Population assessment

In the 19th and 20th centuries, the Nordic population underwent a marked decrease, lasting until the 1950s: In Norway, there were only a few very small relict occurrences left in the centre and south-east of the country (LINNELL, ANDERSEN & KVAM 1999). Lynx was extinct in southern and central parts of Sweden, but in the north, the recovery started from 1920 on (BJÄRVALL & LINDSTRÖM 1984). In Finland, there were no animals left by 1950, before recolonisation from Russia started (PULLIAINEN 1992). Since then, the population has been increasing and expanding in all three countries, especially during the past two decades (PULLIAINEN, LINDGREN & TUNKKARI 1995, LINNELL & ANDRÉN 1999, see also Table 2.3). In Sweden and Norway, the removal of state bounties and a better regulation of harvest are supposed to be the main reason for this trend (LINNELL *et al*. 2001). Yet, the recovery and expansion of the roe deer population in Scandinavia may have been as important. Today, the lynx is distributed across the three Nordic countries with exception of the south-west of Norway and a still very low abundance in southern Sweden. The distribution map furthermore reveals a certain inconsistency between the three countries and with Russia in the far north, where the lynx abundance however is naturally very low and may fluctuate.

In the past few years however, the population increase came to a halt (Table 2.3), what was partly intended: In certain areas where conflicts with livestock breeders are judged to be too high, lynx are controlled. In Norway this is true for the west and south-west (sheep husbandry) and the north (semi-domestic reindeer) (LINNELL *et al*. 2001). These areas match quite well with the regions where roe deer are not available (ANDERSEN, DUNCAN & LINNELL 1998). Here, hunting of lynx is not limited, whereas in the rest of the country, hunting is restricted by quotas (Table 4.2 country report). In Norway and Sweden, roe deer are the main prey in southern areas, whereas in the north, semi-domestic reindeer are abundant (ANDERSEN, DUNCAN & LINNELL 1998, LINNELL *et al*. 2001), and considered a very important food source for lynx (PEDERSEN *et al*. 1999). Current Swedish policy therefore foresees a reduction of lynx in the reindeer area (Table 4.2 country report). In Finland, lynx has so far not been abundant in the north (see map). There is, however, an area at the north shore of the Bottnic Gulf where lynx is permanently present (see map), and this is the area of the only roe-deer occurrence of the country. In the southern half, lynx feed mainly on hares and, in the south-west, on introduced white-tailed deer (PULLIAINEN 1992, PULLIAINEN, LINDGREN & TUNKKARI 1995, ANDERSEN, DUNCAN & LINNELL 1998).

The dimensions of depredation exceed everything known from other populations (point 2.6, Table 5.1 of the country reports). The killing of semi-domestic reindeer is an equally important problem in Norway and Sweden – and somewhat less in Finland – and is difficult to solve because the reindeer herds are free and wide ranging year-round . Depredation on sheep, in contrast, is particularly a problem in Norway (LINNELL, ANDERSEN & KVAM 1999, LINNELL *et al.* 2001). In Sweden, sheep are mainly grazed on fenced pastures. But in Norway, they each summer graze unattended in forests and mountain habitats (LINNELL *et al.* 2001, country reports Table 5.4). The number of sheep compensated as lynx kill in Norway was about 8'800 per year during the inquiry period. The contacts in Norway therefore suggest changing sheep husbandry as an important measure for lynx conservation (Table 8 country report, LINNELL *et al.* 2001). In Finland, only reindeer were known to be affected from 1996-2001. All together, depredation is much less pronounced than in Norway and Sweden, but still judged as problematic (MINISTRY OF AGRICULTURE AND FORESTRY 2002). In all three countries, depredation on semi-domestic reindeer is a delicate problem, because it affects the traditional lifestyle of the Sami people and is consequently a socio-cultural conflict going beyond the economic losses caused by the predators.

As a result of the successful recovery of the Nordic population and the (increasing) conflicts, lynx harvest has markedly increased during the past years (this report, compared to BREITENMOSER *et al*. 2000 and PULLIAINEN, LINDGREN & TUNKKARI 1995; see also country reports). In Norway, lynx mortality increased three fold compared to 1990-95 (Table 2.5), mainly as a result of higher hunting quotas. Consequently, the Norwegian population dropped by almost 50% from1995 to 2001 (Table 2.3). The toll in Norway is actually 30% of the census figure (Tables 2.3 and 2.5). Even if the population estimation may be rather conservative, the fact that little is known about other mortalities than hunting indicates that this population today is a sink, profiting from the much stronger Swedish population as a source. In Sweden, hunting quotas have been raised considerably from 1996 to 1997 (from 35 to 147, see Table 4.3 in the country report), but the population was still further increasing and expanding during the report period. Finland has, compared to the last report period (BREITENMOSER *et al*. 2000), maintained the level of harvest, which is considered sustainable. To meet the EU Habitat Directive – ratified in 1995 with reservation –, the intervention is however no longer called "hunting". Legal hunting can mitigate conflicts, and – if done in a responsible way – must not harm the population (LCIE 2003). The Nordic countries claim to do this, and, all together, the Nordic population, numbering around 2800 animals, is considered to be stable and least concerned. Nevertheless it is important to set the annual quotas on the basis of good census data (LINNELL *et al*. 1998, ANDRÉN *et al*. 2002) and according to the principle of sustained yield. Otherwise, legal harvest could become a potential threat to the population. The intervention in Norway may already have reached this level. As major threat, the contacts suppose illegal killings (Table 3). Several other authors (e.g. ANDERSEN *et al*. 2003) mention poaching to be a problem, too. However, there are no data to support this guess (Table 2.5). The Nordic countries maintain a well-established monitoring system based on scientific experiences. However, a shortcoming of the system is the lack of data on non-hunting mortality. More differentiated information on mortality in general would allow a faster and more accurate assessment of population trends.

The Nordic countries more or less apply the same census methods: systematic large-scale tracking along transect lines, mainly to reveal the number of lynx families (LINNELL *et al*. 1998, SWENSON 1998). These data are then extrapolated using knowledge from telemetry studies or general information on the average number of lynx per family group and the abundance of solitary lynx. Since 1995, Norway and Sweden maintained co-ordinated research ("Scandinavian Lynx Project"), where studies in one area in the north and south each were carried out (ANDRÉN *et al*. 1997, SWENSON 1998, LINNELL *et al*. 2001, ANDRÉN *et al*. 2002, ANDERSEN *et al*. 2003). Finland has so far not been involved in these projects. One result out of the studies was the finding of very large home ranges of lynx in Scandinavia compared to those in continental Europe (600-1'400 km² for males, 300-800 km² for females; LINNELL *et al*. 2001). This is consistent with the relatively low density of less than 0.5 lynx/100 km² estimated for the overall population (Table 2.3). Considering the huge continuous distribution range (965'800 km²) and the fact that the Nordic countries have the lowest human population and road densities in Europe, the small lynx abundance is likely a consequence of the relatively low productivity of boreal habitats and therefore a reduced prey density compared to more southern habitats. The Carpathian population for example, which consists of a similar number of animals as the Nordic, has an average density of 3 lynx/100 km² (which may however be an overestimation; see respective report). The large home ranges and low abundance observed in Scandinavia have a direct bearing on the monitoring and management of the population (LINNELL *et al.* 2001).

The main distribution area in Finland is part of the large Karelian population which in turn is connected to the Baltic population and the lynx areas in northern Russia and western Siberia. Together, they build the biggest continuous range of the nominate subspecies *Lynx lynx lynx*. The connection is less pronounced between Sweden and Finland. The reunion of the Finish and Scandinavian distribution areas is recent, and there is still a huge area in western and northern Finland, where lynx are not abundant (see map, point 1.1). The recolonisation of Finland occurred from the east (though there may – following the spread of the roe deer – now be immigration from Sweden). Recent genetic investigations actually indicate that the lynx from Finland are closer related to the Baltic population than to the Nordic (HELLBORG *et al*. 2002, BREITENMOSER-WÜRSTEN & OBEXER-RUFF 2003). According to HELLBORG *et al*. (2002), the Scandinavian population should be treated as a management unit separate from Finland and the Baltic population. The split of the Fennoscandian population was considered to be a historic artefact. However, the taxonomic unity of *L. l. lynx* is under debate (see chapter 2.2.). Since the last inquiry, all three countries attributed to the Nordic population in this report, have developed and applied their own management plans (Table 2.4). A further result from HELLBORG *et al*. (2002) was the finding that the gene flow is more pronounced between south Norway and south Sweden, and north Norway and north Sweden, respectively, than in a north-south direction within the single countries. This may support the guess that the toll in Norway is only sustainable as long as the Swedish parts of the population act as a source and calls for a close management co-operation between these two countries. Finland, on the other side, should search co-operation with Russia and the Baltic countries. All three Nordic countries however need a common strategy in the north, where the distribution ranges continue to merge and where the countries also share the problem of predation on reindeer.

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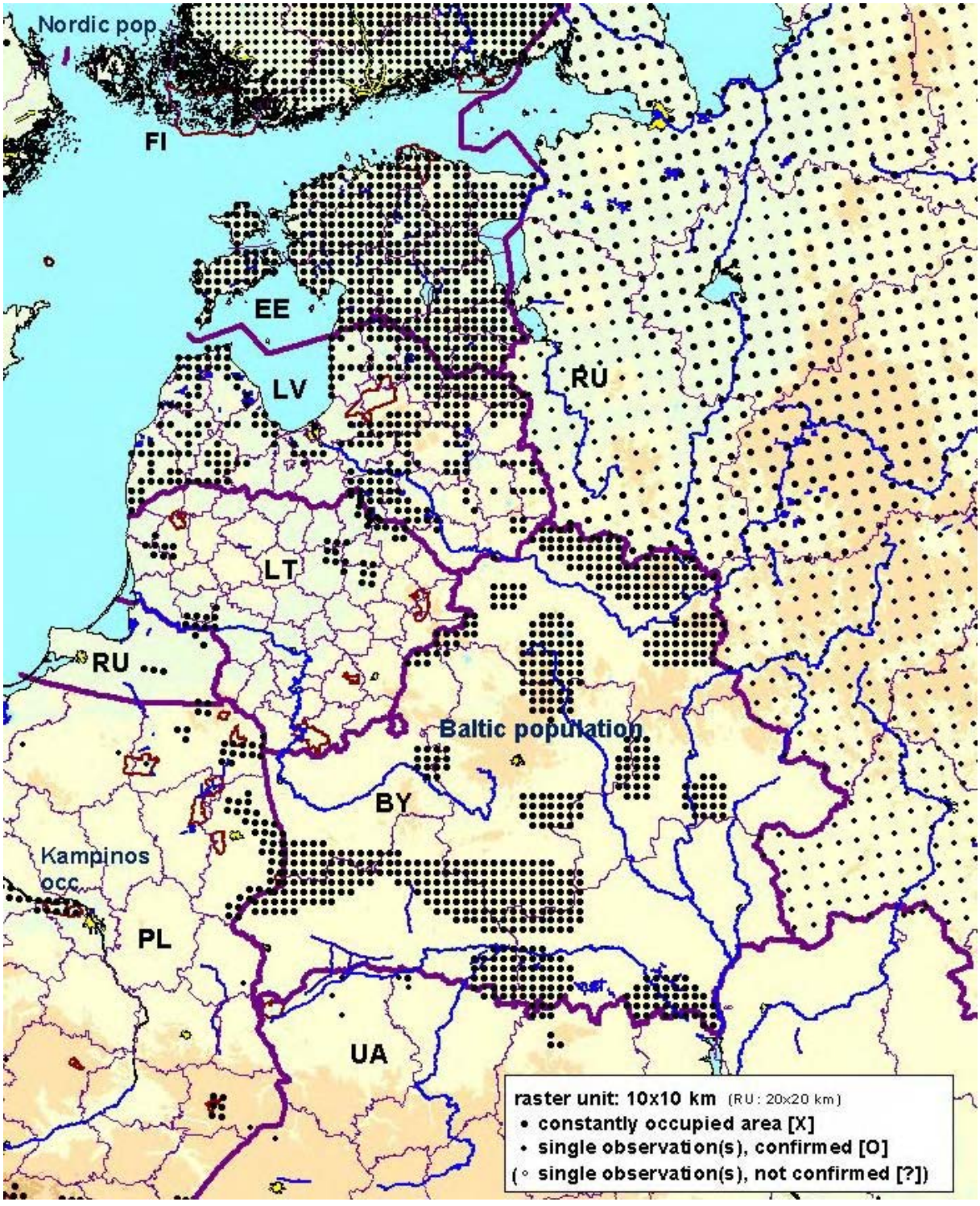
Baltic population

1. Description:

1.1. Distribution of the Baltic population in 2001



1.2. Countries (regions) and spatial trend

Countries sharing the population: *Estonia* (whole country except cities, but including the larger islands), *Latvia* (scattered patches throughout the country), *Belarus* (no reliable current information available; the map shows the distribution from the 1995 report), *Poland* (north-eastern Poland), *Lithuania* (mainly NE of the country), *Ukraine* (Polissia), *Kaliningrad Oblast* (north-eastern, south-eastern and central parts), *Russia* (not considered in this report; map shows distribution according to MATYUSHKIN & VAISFELD 2003).

Spatial trend (change in distribution area since 1995: No important changes except for *Belarus*: the western-central spot nearly disappeared, and *Lithuania*: complete loss in the south.

2. Status and trend:

2.1. Extension

Country	Lynx distribution area [km²]				Population share (% area [X] / [X+O])
	[X]	[O]	[?]	[X+O]	
Estonia	42'700	0	0	42'700	29.4 / 29.1
Latvia	29'000	0	0	29'000	20.0 / 19.8
Belarus	(61'200)	0	0	(61'200)	(42.2 / 41.8)
Poland	5'700	500	0	6'200	3.9 / 4.2
Lithuania	4'500	0	0	4'500	3.1 / 3.1
Ukraine	1'300	1'000	0	2'300	0.9 / 1.6
Kaliningrad Oblast	700	0	0	700	0.5 / 0.5
Total population	*145'100*	*1'500*	*0*	*146'600*	*100 / 100*

2.2. Fragmentation

Total area ([X+O] – isolated [O]):	143'400 km²
Number of patches:	33 without RU, 30 when Russian distribution considered
Mean patch size and range:	4345.5 km²; 100 – 55'400 km² (without RU)
Mean nearest distance between patches:	~300 km

2.3. Size of the population

Country	Estimation 1995*	Estimation 2001**	Density (lynx per 100 km² area [X])	Trend 1990-1995*	Trend 1996-2001
Estonia	1200 [a]/ 500-800 [b]	900	2.58	increasing or stable	decreasing
Latvia	703	648	2.36	unknown	stable
Belarus	n.a.	(250) [c]	-	n.a.	probably decreasing
Poland	n.a.	60	1.05	stable	decreasing
Lithuania	100 [a]/120-150 [b]	103	2.1	decreasing	decreasing
Ukraine	3	20 [a]/ 27 [b]	1.38	unknown	increasing
Kaliningrad Oblast	n.a.	8-10	1.14-1.43	n.a.	stable
Total population	*>2000*	*~2000*	*~1.8*	± *stable (partly unknown)*	*decreasing*

***** Eurasian Lynx Action Plan 2000, Table 2 (BREITENMOSER *et al.* 2000)
** or most recent estimation available, refer to the respective country report
[a] official estimation
[b] additional estimation
[c] Source: (KOZLO in MATYUSHKIN & VAISFELD 2003)

2.4. Management

Country	Legal status	National institution in charge	Conservation / Management plan status 1995*	Conservation / Management plan status 2001
Estonia	controlled hunting	Ministry of Environment	none	implemented
Latvia	controlled hunting	State Forest Service	none	implemented
Belarus	fully protected	Ministry for Natural Resources and Nature Protection	none	none
Poland	fully protected since 1995	Ministry of Environment	none	none
Lithuania	fully protected	Ministry of Environmental Protection	none	none
Ukraine	fully protected	Ministry of Ecology and Natural Resources	none	prepared
Kaliningrad	fully protected	Region State Hunt Inspection	none	none
Population	*partly protected*		*none*	*none*

* Eurasian Lynx Action Plan 2000, Table 3

2.5. Harvest and known losses (yearly average 1996-2001)

Country	Harvest number	Removal of problem animals	Illegal killings	Other mortality	Total Ø 1996-2001	Total Ø 1990-1995*
Estonia	168.7	0	0	1.3	170	54
Latvia	87	0	n.d.a.	n.d.a.	87	53
Belarus	0	n.d.a.	n.d.a.	n.d.a.	n.d.a.	n.d.a
Poland	0	0	n.d.a.	n.d.a.	n.d.a.	n.d.a.
Lithuania	0	0	n.d.a.	n.d.a	n.d.a.	n.d.a.
Ukraine	0	0	0	0	0	0
Kaliningrad Oblast	0	0	1-3	0	1-3	n.d.a
Total population	*255.7*	*0*	*n.d.a.*	*n.d.a.*	*min. 260*	*min. 110*

* Eurasian Lynx Action Plan 2000, Table 3

2.6. Depredation, compensation and prevention

Except for a few roe deer (farm animals) in Latvia and one calf in the Ukraine, there has not been any further depredation in the area of the Baltic lynx population. In general depredation is not a problem. Therefore, compensation systems and prevention methods are usually not applied.

3. Threats

Country (population share in % area [X]) ► Threat ▼	Estonia (29.4%)	Latvia (20.0%)	Belarus (42.2%)	Poland (3.9%)	Lithua-nia (3.1%)	Ukraine (0.9%)	Kalinin-grad (0.5%)	Baltic pop. 1996-2001
Agriculture								
Extraction of wood					?	X		
Infrastructure development: Industry								
Infrastructure development: Human settlement				X				
Infrastructure development: Tourism / recreation						X		
Infrastructure development: Road building				X		X		(X) [a]
Legal hunting & trapping								
Shooting (illegal)			X			X	X	XX
Trapping / snaring (illegal)				X		X		(X) [a]
Poisoning								
Vehicle and train collision								
Storms / flooding								
Wildfire						X		
Avalanches / landslides								
Competitors						X		
Prey / food base					?	X		

Country (population share in % area [X]) ► Threat ▼	Estonia (29.4%)	Latvia (20.0%)	Belarus (42.2%)	Poland (3.9%)	Lithuania (3.1%)	Ukraine (0.9%)	Kaliningrad (0.5%)	Baltic pop. 1996-2001
Pathogens / parasites								
Limited dispersal				X		X		(X) [a]
Poor recruitment / reproduction / regeneration					?			
High juvenile mortality				X		X		(X) [a]
Inbreeding								
Low densities					X	X		(X) [a]
Skewed sex ratios								
Slow growth rates								
Population fluctuations								
Restricted range				X		X		(X) [a]
Recreation / tourism					?	X		
Research								
War / civil unrest								
Transport								
Other								

[a] a problem particularly in the south

Threats 1995 (Action Plan 2000, Table 6):
Habitat fragmentation, potentially hunting.

4. Population assessment

The Baltic population is the south-western most part of the vast Russian-Siberian population. Only the countries west of Russia were included in this survey, making the definition of this population somewhat arbitrary. A compilation on the distribution and status of the lynx in Russia can be found in MATYUSHKIN & VAISFELD (2003). The distribution in Russia is indicated in the map using this recent publication. An exception is Kaliningrad Oblast, the Russian exclave between Lithuania and Poland, which was not treated by MATYUSHKIN & VAISFELD, but included in this inquiry (see respective report). Without Russia, the Baltic population is currently distributed over an area of around 143'000 km². In the north (Estonia, north-eastern Latvia, and northern Belarus) the distribution is coherent with Russia. The rest of the range (southern Latvia, Lithuania, main parts of Belarus, Poland, the Ukraine, and Kaliningrad) is very fragmented (see map and Table 2.2). Only in Belarus, larger patches can be found. However the respective map is from 1995, and there is no updated information available. The former distribution area of 61'200 km² in Belarus is supposed to have decreased (see country report). Taking into account a population estimate of 250 animals provided by KOZLO (2003), the resulting lynx density would otherwise be extremely low (0.4 animals per 100 km²). As Belarus had claimed the biggest share of the distribution area of the Baltic population before and there has been a noted decrease, we conclude that the current area of the population must actually be quite smaller.

The taxonomic status of the lynx in the Baltic region is not settled. Due to the huge area of *L. l. lynx*, genetic differentiations are assumed, but have so far not been investigated. Genetic analyses however show that the Baltic population as we define it is closely related to the lynx in Finland (see chapter 2.2. Phylogenetic history and subspecies and assessment of the Nordic population).

The history of the Baltic population is marked by a general strong decrease in the 1930s/1940s (ANDERSONE *et al.* 2003, BLUZMA 2003, KOZLO 2003, VALDMANN 2003). Numbers started to increase again after World War II. Currently, the habitat requirements in many of the countries in the range of the population are ideal: The forest coverage in Estonia, Latvia and Belarus for instant is more than 45% (in Lithuania still 31 %) and the human population density accordingly low (less than 56 inhabitants/km², in Estonia and Latvia even less than 37 inhabitants/km²). These countries share the main part of the population (Table 2.3). The density of lynx in northern parts is 2-2.5 animals/100 km², it decreases to around 1 lynx/100 km² towards the south (except for Belarus which is mentioned above).

The population in the area of the inquiry numbers around 2000 lynx at present, however there has been a decreasing tendency from 1996-2001 (Table 2.3). Estonia had the biggest loss (from 1200 animals in 1996 to 900 in 2001). This reduction was intended with more than 1000 lynx harvested during this time period. 256 lynx have been legally killed in the Baltic population annually, which is on average 12.8% of the estimated population size. Lynx is only hunted in Estonia and Latvia (which have the biggest share of the population), in all other countries the species is fully protected (Table 2.4). Legislation has in most of the countries strongly improved in the past few years due to harmonizing national laws with requirements of the European Union during the process of accession (EE, LT, LV, PL). Both Estonia and Latvia have prepared and implemented a lynx management plan (LÕHMUS 2001, OZOLINS 2002). Such a plan is also planned for Lithuania (ELF 2001). Furthermore, a cross-border network of researchers, conservationists, state officials and other stakeholder representatives from Estonia, Latvia and Lithuania was created in 2000 under the umbrella of the Large Carnivore Initiative for Europe LCIE: the Baltic Large Carnivore Initiative (http://www.large-carnivores-lcie.org/blci2.htm). A report on the status of the large carnivore conservation in the Baltic States including an action plan for the Initiative for 2001-2005 has been published (ELF 2001). The report focuses on how the national management plans fulfil the guidelines and recommendations in the European Action Plan (BREITENMOSER *et al.* 2000). The Baltic Large Carnivore Initiative has set itself six objectives for the period 2001-2005 (ELF 2001):

1. Large carnivore conservation/management is an integral part of the Baltic countries accession process to the EU.
2. Reliable methods are being used to obtain robust data that will reduce data conflicts and improve the scientific basis for large carnivore (LC) management.
3. Hunting legislation, training and education meet LC conservation requirements.
4. Ensure long term funding for LC conservation issues in the Baltics.
5. The majority within each interest group is positive towards the maintenance of LCs at favourable conservation status.
6. Develop guidelines to ensure that the exploitation of forest resources is compatible with LC conservation.

There is no such framework and strategy yet that would include all countries sharing the population. An ongoing international project of the Baltic states (EE, LV & LT) in collaboration with Poland and Norway exists, though (see http://www.large-carnivores-lcie.org/balticproject.doc). Coordinated activities with Belarus, Ukraine or Russia (especially Kaliningrad Oblast) have however not been established yet.

No real threats were at the moment identified for the Baltic population (Table 3). Belarus, the Ukraine and Kaliningrad indicate illegal killings to be a threat, however there is no data to support this (Table 2.5 and country reports). Harvest is more or less the only known mortality factor, however it is not considered having a negative impact on the population. Given the current population and distribution size, the Baltic population is judged as least concerned. Nevertheless, there are considerable long-term threats for the southern part of the population, and these are only to be solved in a strategic collaboration with the northern area. First, all countries (including Poland, from where the best scientific data on the Baltic population are available; see country report) still have a problem with the monitoring of the population. The survey of the species needs improvement and coordination. The official figures on the population are often considered to be too high (see country reports). Considering this, a known yearly toll of 13 % might be too high, especially for the northern part of the population, which must be considered the source for neighbouring sinks. Ecological data (again with the exception of Poland) are so far scarce. This aspect might be of great importance. In this part of Europe, the lynx changes from being a roe deer hunter (in the south and west) to a hare hunter (in the north and east). The historic development of lynx and roe deer in Estonia (e.g. VALDMANN 2003) indicate that the status of the roe deer population is crucial for lynx conservation. If the habitat is as suitable and the legal protection as efficient as assumed, there may be a problem with the prey base in the southern range of the Baltic population (e.g. Belarus). The tendency to strengthen the legal protection of the species (mainly in accordance with the EU Habitat Directive) may not be the best strategy to follow. Nowhere, legal harvest was considered to be a threat (although in Estonia, the lynx abundance was intentionally lowered through hunting), whereas illegal killing was assumed to be a problem. The ban of hunting will decrease the public acceptance and the information, increase the conflicts and the risk of illegal killings, and not change anything regarding the prey base and habitat fragmentation. Increasing fragmentation is a clear and probably not only potential threat to the population in the south. The patches in Poland and Belarus are isolated, and this will cause long-term problem even if the patches are well-preserved, e.g. in Białowieza national park. The population is in need of a comprehensive conservation strategy based on a metapopulation concept and considering habitat quality and connectivity, and distribution and availability of prey. The northern patches – above all the Estonian population – must be considered the source for the recovery of the southern part of the population mainly in Latvia, Belarus, the Kaliningrad Oblast, and north-eastern Poland. The Baltic Large Carnivore Initiative provides a good model for such a future co-operation. The next steps are to expand the population towards the south (southern half of Latvia and Lithuania), and to create a broad corridor towards the occurrences in north-eastern Poland across Lithuania along the border with Belarus. The habitat seems to be favourable, and a chain of protected areas providing stepping stones are already available.

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→ Proceedings of the BLCI Symposium 2001, abstracts of the 5th Baltic Theriological Congress 2002, as well as the Estonian & Latvian management plan, and the ELF report can be downloaded at: http://www.large-carnivores-lcie.org/blcipublic2.htm

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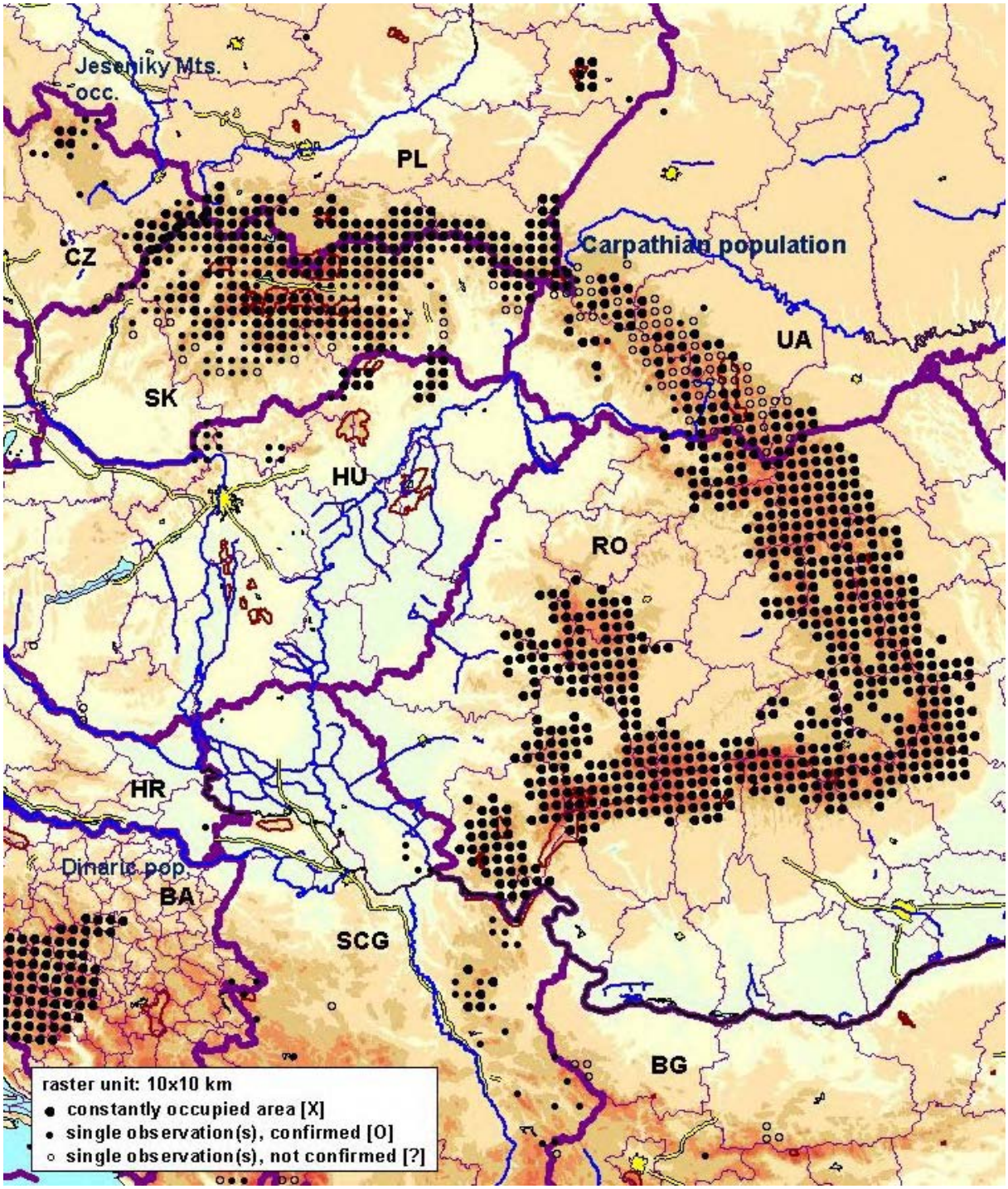
Carpathian population

1. Description:

1.1. Distribution of the Carpathian population in 2001



1.2. Countries (regions) and spatial trend

Countries sharing the population: *Romania* (all Carpathian Mts., uneven distribution within mountain forests), *Slovakia* (Slovak part of the Carpathians), *Poland* (south-eastern Poland), *Ukraine* (north-eastern Carpathians), *Czech Republic* (Beskydy Mts., N-Moravia, sporadic occurrence more to the south (Bile Karpaty Mts.) along the Slovakian border), *Hungary* (north-eastern Hungary, sporadic), *Serbia and Montenegro* (*Eastern Serbia occurrence* between the Danube (N), Morava river valley (W), and Stara Planina Mts. (S); *Southeastern Banat occurrence* in the south-eastern part of Deliblatska Pescara sands, Vrsacke Planine mountains), *Bulgaria* (scarce data of lynx presence in the western to central Balkan mountains probably of origin from the Carpathian population).

Spatial trend (change in distribution area since 1995): *Romania*: no changes, *Slovakia*: reduction, but distribution until 1995 was overestimated, *Poland*: more or less the same, *Ukraine*: unknown, *Czech Republic*: relatively stable, *Hungary*: unknown, *Serbia and Montenegro*: expanding.

2. Status and trend:

2.1. Extension

Country	Lynx distribution area [km²]				Population share (% area [X] / [X+O])
	[X]	[O]	[?]	[X+O]	
Romania	59’600	0	0	59'600	64.3 / 56.1
Slovakia	14'500	6'900	1'700	21’400	15.6 / 20.2
Poland	9'500	100	0	9'600	10.2 / 9.0
Ukraine	5’800	1’600	5’500	7’400	6.3 / 7.0
Czech Republic	1’300	600	0	1’900	1.4 / 1.8
Hungary	1’500	1'700	0	3'200	1.6 / 3
Serbia and Montenegro	500	2’400	0	2’900	0.5 / 2.7
Bulgaria	(0)	(200)	(1'000)	(200)	(0 / 0.2)
Total population	*92’700*	*13’500*	*8’200*	*106’200*	*100 / 100*

2.2. Fragmentation

Total area ([X+O] – isolated [O]):	100’500 km²
Number of patches:	11
Mean patch size and range:	9136.4 km²; 200 – 60’100 km²
Mean nearest distance between patches:	~226 km

2.3. Size of the population

Country	Estimation 1995*	Estimation 2001**	Density (lynx per 100 km² area [X])	Trend 1990-1995*	Trend 1996-2001
Romania	1500-1620	2050	3.39	stable	stable
Slovakia	400-500	400	2.67	decreasing	decreasing
Poland	n.a.	97	1.02	stable	decreasing
Ukraine	320	230	4.53	unknown, decreasing	decreasing
Czech Republic	10-15	40	3.08	stable	stable
Hungary	10-20	1-5	-	unknown	unknown
Serbia and Montenegro	40	45	-	increasing or stable	increasing & expanding / stable [a]
Bulgaria	-	single individuals	-	-	unknown
Total population	*~2400*	*~2800*	*~3*	*± stable*	*stable to decreasing*

***** Eurasian Lynx Action Plan 2000, Table 2 (BREITENMOSER *et al.* 2000)
** or most recent estimation available, refer to the respective country report
[a] Eastern Serbia occ. / Southeastern Banat occ.

2.4. Management

Country	Legal status	National institution in charge	Conservation / Management plan status 1995*	Conservation / Management plan status 2001
Romania	controlled hunting	Forest Department in the Ministry of Agriculture, Food Industry and Forests	none	(2002: Minister order No. 378/2003)
Slovakia	controlled hunting > fully protected since 2001	Ministry of Environment and Ministry of Agriculture	none	in preparation
Poland	fully protected since 1995	Ministry of Environment	none	none
Ukraine	fully protected	Ministry of Ecology and Natural Resources	none	prepared
Czech Republic	fully protected	Ministry of Environment, Ministry of Agriculture	none	none
Hungary	fully protected	National Authority for Nature Conservation as part of the Ministry for Environment	implemented	prepared
Serbia and Montenegro	fully protected	Bureau for Nature Protection of both, Serbia and Montenegro	none	none
Bulgaria	fully protected	Ministry of Environment; National Board of Forests of the Ministry of Agriculture and Forests	none	none
Population	*partly protected*		*none*	*none*

* Eurasian Lynx Action Plan 2000, Table 3

2.5. Harvest and known losses (yearly average 1996-2001)

Country	Harvest number	Removal of problem animals	Illegal killings	Other mortality	Total Ø 1996-2001	Total Ø 1990-1995*
Romania	7.2	unknown	unknown	unknown	(7.2)	20-60
Slovakia	14.7	0	0.3	3.2	18.2	n.d.a.
Poland [c]	-	0	(7)	(4)	(11)	8
Ukraine	-	0	2	0	2	unknown
Czech Republic	-	0	0.3	0	0.3	10-20
Hungary	-	0	0	0	0	1-2
Serbia and Montenegro [a]	-	0	(1.42)	(0.13)	(1.55)	(0.3)
Bulgaria [b]	-	(0) [b]	(0.67) [b]	(0.17) [b]	(0.84) [b]	-
Total population	*~22*	*0*	*~12*	*~8*	*~42*	*>40*

[a] Has several populations but no respective numbers for each of them. The numbers here are the calculated share of losses to the Carpathian population in proportion of its distribution to the total lynx distribution area in the country.
[b] In brackets as population origin (Balkan/Carpathian) is still unclear.
[c] Only data for the year 2001 available.
* Eurasian Lynx Action Plan 2000, Table 3

2.6. Depredation, compensation and prevention

Depredation due to lynx is very rare in the range of the Carpathian population. Therefore, compensation is only known in some of the countries, predominantly in those, where attacks occur (Romania and Czech Republic). Slovakia has established a compensation system in 2003. In most of the Carpathian countries some kind of prevention methods are applied, mainly sheep guarding dogs, shepherds and/or electric fences.

3. Threats

Country (population share in % area [X]) ► / Threat ▼	Romania (64.3%)	Slovakia (15.6%)	Poland (10.2%)	Ukraine (6.3%)	Czech Republic (1.4%)	Hungary (1.6%)	Serbia and Montenegro (0.5%)	Bulgaria	Carpathian population 1996-2001
Agriculture	X								X
Extraction of wood	X	X		X				X	XX
Infrastructure development: Industry						Unknown			
Infrastructure development: Human settlement		X	X						X
Infrastructure development: Tourism / recreation	X	X		X					XX
Infrastructure development: Road building		X	X				X		X
Legal hunting & trapping		X							
Shooting (illegal)	X	X		X	X		X	X	XX
Trapping / snaring (illegal)		X		X			X		X
Poisoning	X	?							X
Vehicle and train collision		X					X		
Storms / flooding									
Wildfire								X	

Country (population share in % area [X]) ► / Threat ▼	Romania (64.3%)	Slovakia (15.6%)	Poland (10.2%)	Ukraine (6.3%)	Czech Republic (1.4%)	Hungary (1.6%)	Serbia and Montenegro (0.5%)	Bulgaria	Carpathian population 1996-2001
Avalanches / landslides				X					
Competitors	X			X			X	X	X(X)
Prey / food base	X			X				X [b]	X(X)
Pathogens / parasites	X								X
Limited dispersal		X	X					X	X
Poor recruitment / repro-duction / regeneration									
High juvenile mortality			X	X					
Inbreeding									
Low densities							X	X	
Skewed sex ratios	X								X
Slow growth rates									
Population fluctuations	X								X
Restricted range		X	X						X
Recreation / tourism	X	X		X					XX
Research									
War / civil unrest									
Transport							X		
Other								X [a, b]	

[a] illegal trophy hunting
[b] most important current threats: rapid decrease of prey base (roe deer and chamois) and the poaching for trophy

Threats 1995 (Eurasian Lynx Action Plan 2000, Table 6):
Habitat fragmentation, prey base, MVP (population size, genetics).

4. Population assessment

The Carpathians belong to the largest mountain ranges in Europe: 1500 km long, up to 350 km wide, and 209'256 km² large (WEBSTER, HOLT & AVIS 2001; about 160'000 km² without the Transylvania plain in Romania, SALVATORI 2002). Seven countries share the Carpathians (CARPATHIAN ECOREGION INITIATIVE; www.carpathians.org): Romania (55.2%), Slovakia (17.2%), Ukraine (10.6%), Poland (9.6%), Hungary (3.8%), Czech Republic (3.3%), and Austria (0.4%). 16-18 million inhabitants live in the region, a comparatively low human population density for Europe. Large areas are forested, and it is assumed that the Carpathians host the largest continuous populations of large carnivores in Europe (WEBSTER, HOLT & AVIS 2001, CARPATHIAN ECOREGION INITIATIVE). Considering the lynx numbers, this rank goes equally to the Nordic and Carpathian population (according to the definition of populations used in this report), which at present consist of some 2800 animals each (Table 2.3). However, the distribution range of the Nordic lynx population is more than nine times bigger than for the Carpathian population, which currently covers around 100'500 km². This implies major differences in the lynx densities between the two populations: 3 animals/100 km² in the Carpathian, versus <0.5/100 km² in the Nordic. However, the official population numbers from the Carpathians are by most experts considered to be overestimated (OKARMA *et al.* 2000, SALVATORI *et al.* 2002, LINNELL & OKARMA 2003; see also respective country assessments).

The average lynx density depends (among others) on the productivity of the habitat, mainly on the abundance and availability of the main prey species. In general, we observe an increasing density (or decreasing home ranges) from north to the south. In that respect, it is not surprising that the lynx abundance is higher in the Carpathians than in Scandinavia. However, there is another tendency to be observed in all population estimations and rather consistently across Europe: Wherever the census data have been calibrated by means of information gained from field work using radio-telemetry, the assumed population density is lower. It is impossible to "count" lynx, especially outside the areas where terrain and snow cover allows for large-scale snow tracking. Lynx have large home ranges, typically larger than the wildlife management sample units (e.g. hunting grounds or a ranger's

district), and the consequence is a strong tendency to overestimate the population. On the other hand, the land tenure system of lynx is rather stable, and with a relative small sample of radio-tagged lynx, information can be gained allowing to calibrate the census data in a given area. Such data are almost completely lacking for the Carpathians, and it is strongly recommended to perform such field projects in different parts of the Carpathians in order to improve the monitoring and census systems. All the same, the Carpathian population belongs to the most important lynx populations in Europe.

The distribution area covers at present almost the entire mountain chain of the Carpathians, and is further expanding into Serbia and Montenegro, and most probably south into Bulgaria (see map and point 1.2). The share of the population among the countries (Table 2.1) corresponds well with the respective share of the Carpathian region (see above). More than half of the Carpathian population is situated within Romania – which has therefore a special responsibility for the conservation of the entire population – followed by Slovakia. There is however one exception, the Ukraine. If the distribution of the species in the Ukrainian part of the range is indeed as broken as indicated in the map, this is a potentially dangerous gap in the continuous distribution. Considering the negative tendency in Poland, Slovakia, and the Ukraine (Table 2.3), the northern half of the population may no longer be safe. The uneven distribution in the Ukraine may be a consequence of less suitable habitat or just due to a lack of sufficient data (see SALVATORI 2002, and country reports, respectively). Nevertheless, the fragmentation, at least in the north, is rather high (Table 2.2, but not obvious at first sight from the distribution map), and will likely increase.

Population trends are usually easier to assess than absolute size and densities. According to Table 2.3, the total number of lynx of the Carpathian population has slightly increased during the past years, but the overall trend is stable or even decreasing, when cumulating the tendencies described for the single countries. For Romania, the Czech Republic, and Hungary, the current numbers and trends for 1996-2001 do not match with the estimations for 1995. According to the former estimates, the population in Romania has actually increased by 400-500 animals. An increase would also have been observed in the Czech Republic (from 10-15 to 40 animals). In Hungary, the estimates for 2001 are much lower. However trends have never been really known (Table 2.3). OKARMA *et al.* (2000) assumed the general trend for the Carpathian population to be decreasing or stable for the period from 1990-1999, and only increasing in Romania. The same authors, on the other hand, considered current Romanian estimates to be overrated by 30% (see country report). Due to these uncertainties, the general tendency is difficult to judge and is finally not really known. It again stresses the significance of more accurate information, especially in Romania, which hosts more then half of the total population.

Nevertheless, we can conclude that the Carpathian population, at least in the southern part, is at the moment least concerned. The negative population trend observed in Slovakia, Poland, and the Ukraine, which share more than one third of the population, is however worrying. In all these countries, lynx is completely protected by law, though only recently in Slovakia (Table 2.4). Until 2000, the annual legal harvest was almost 15 animals in Slovakia (Table 2.5) and considered a threat to the population (Table 3). In Poland, the legal status is also different compared to the former inquiry: Lynx has received full protection in 1995. Of the Carpathian population, Romania is therefore the only country left were lynx is legally hunted (Table 2.4). Yet the number of lynx shot has been very modest compared to the number of lynx estimated (Table 2.5) and the potential quota of 250 per year (see country report). It is however assumed that there is no control over the real extent of hunting, as numbers differ in the literature found (see report Romania). OKARMA *et al.* (2000) concluded that the overall protection status in the Carpathians is quite satisfying. One aspect to observe is that, according to the information and expert opinions gathered for this report, the negative tendency in the northern part of the population was not halted in spite of the legal protection of the species. There are three possible explanations: (i) the legal protection is not effective, (ii) the population is suffering from other significant losses, or (iii) the figures and trends are inaccurate.

The likely threats to the Carpathian population are, according to the assessment of the country contacts (Table 3), extraction of wood, infrastructure development due to tourism/recreation, illegal killing, and recreation/tourism, followed by competitors and insufficient prey base. There are indications that poaching indeed might be high in many countries (see country reports). The hunting tradition is deeply rooted in the culture of the local people, and in some countries (e.g. Poland, also Ukraine) a lynx trophy values high (SALVATORI *et al.* 2002). Besides the legal harvest, illegal killing are the second most known mortality factor (Table 2.5), however information is sparse. The recent change in the hunting regime may have had effects on the hunters' attitude that are not yet fully understood. Likewise, data to support or reject the other assumed threats is missing. Lynx depredation is not a problem in the Carpathians because here, where wolf and brown bear are still widespread and have never been eradicated, the livestock herders never lost the tradition to protect their livestock against large carnivores. Furthermore, there was no privately owned livestock in the Carpathians during the socialist period, and the herdsman may not have considered depredation as personal losses the same way as a private livestock owner. Again, attitudes may now change in this respect. So far, there has been very little research on the lynx in the Carpathians. Although the population does not seem to be threatened at all, there is a general need to improve the basic knowledge on the lynx status and biology as well as on human attitudes in this region. Furthermore, a reliable monitoring system should be established throughout the Carpathians.

The 2003 Carpathian Workshop on Large Carnivore Conservation (http://www.large-carnivores-lcie.org/brasovreport.pdf) aimed to start the elaboration of a Carpathian Action Plan for large carnivores, a measure recommended by the Standing Committee of the Bern Convention (Recommendation No. 100 (2003) of the Standing Committee, adopted on 4 December 2003, on conservation of large carnivores in the Carpathians). According to this action plan the countries are then requested to draft and implement national action plans. In Romania, Slovakia, Ukraine and Hungary, such a paper has already been prepared (Table 2.4), but not implemented yet. A conservation and management strategy for the lynx (and other large carnivores) in the Carpathians would be important and urgent because all countries (except the Ukraine) are about to join the European Union. By doing so, radical changes are expected, supposed to have an impact on the Carpathian landscape and also on the large carnivores (WEBSTER, HOLT & AVIS 2001, CARPATHIAN ECOREGION INITIATIVE). According to information by the CARPATHIAN ECOREGION INITIATIVE (established in 1999; www.carpathians.org), the development of transport networks has a high priority in all Carpathian countries. National policy aims to adapt the road network to EU standards, and some motorways and fast roads will be built within a few years. As a consequence, habitat loss and fragmentation are suspected. These "communication corridors" (traffic lines), planned on the regional, national and international level, will connect major cities within and between countries, and may therefore affect the whole population. As a consequence, a sound cooperation between the countries for the conservation and management of the lynx in the Carpathians is required. OKARMA *et al.* consider the lynx the most vulnerable large carnivore species in the Carpathians. Up to now, the Carpathians have been considered a safe haven for the large carnivores. This was a result of the relatively low (infrastructure) development and the fact that people did not care for their property and rights the same way they may do now as they became the owners of land and livestock. It is now to be feared that socio-political changes and the accelerated development may have a negative impact on wildlife in general and lynx in particular. Foresight and a clever conservation strategy is needed to mitigate these possible new threats.

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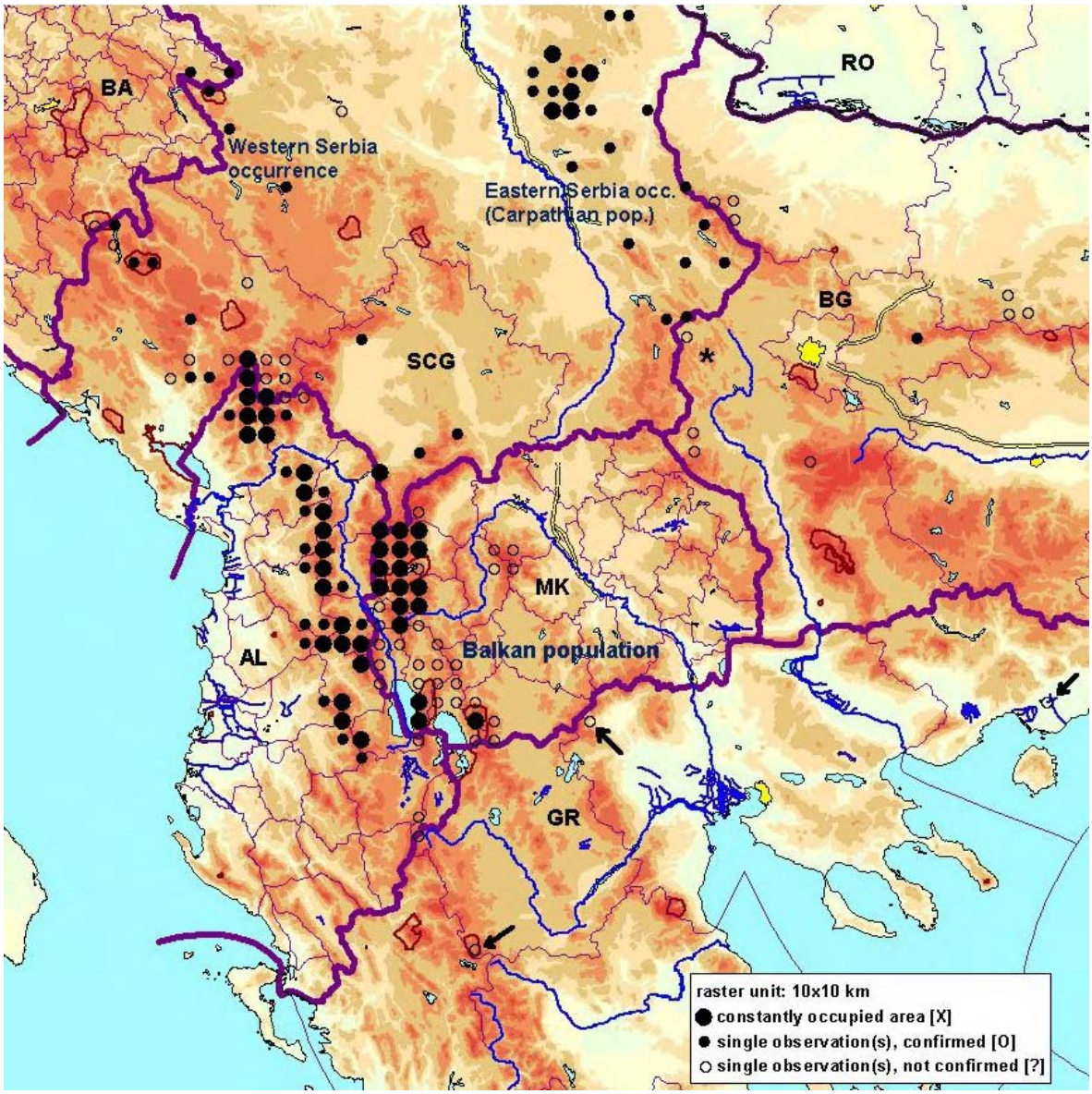
Balkan population

1. Description:

1.1. Distribution of the Balkan population in 2001



(***** new data from March 2003: lynx tracks)

1.2. Countries (regions) and spatial trend

Countries sharing the population: *Albania* (Albanian Alps & Central-Central East Albania), *FYR Macedonia* (Mavrovo-, Galicica- & Pelister NP), *Serbia and Montenegro* (S-, SW- & W- Kosovo and Metohija province, W-, SW-, Central & N- Montenegro), *Greece* (Voras Mt. & Tzena and Pinovo Mt., Nestos Delta, Vassilitsa & Valia Kalda NP (both N. Pindos)), *Bulgaria* (Unconfirmed data in SW-Bulgaria (Osogovo, Rui, Kraishte, Maleshevska and Vlahina mountains) of possible origin from the Balkan population).

Spatial trend (change in distribution area since 1995): Real changes are unknown. The distribution area is larger due to better information available.

2. Status and trend:

2.1. Extension

Country	Lynx distribution area [km²]				Population share (% area [X] / [X+O])
	[X]	[O]	[?]	[X+O]	
Albania	2'300	1'500	500	3'800	56.1 / 56.7
FYR Macedonia	1'700	0	2'600	1'700	41.5 / 25.4
Serbia and Montenegro	100	900	1'300	1'000	2.4 / 14.9
Greece	0	0	300	0	0 / 0
Bulgaria	(0)	(200)	(1'000)	(200)	(0 / 3)
Total population	*4'100*	*2'600*	*5'700*	*6'700*	*100 / 100*

2.2. Fragmentation

Total area ([X+O] – isolated [O]): 5600 km²
Number of patches: 8
Mean patch size and range: 700 km²; 100-1'400 km²
Mean nearest distance between patches: 60 km

2.3. Size of the population

Country	Estimation 1995*	Estimation 2001**	Density (lynx per 100 km² area [X])	Trend 1990-1995*	Trend 1996-2001
Albania	15-37	15-25	0.65-1.09	(decreasing)	unknown
FYR Macedonia	unknown	35	2.06	unknown	decreasing
Serbia and Montenegro	30	30	-	decreasing	decreasing
Greece	unknown	(no confirmed evidence)	-	-	unknown
Bulgaria	-	single individuals	-	-	unknown
Total population	*n.d.a.* [a]	*~80-105*	*~1.5*	*decreasing*	*decreasing*

***** Eurasian Lynx Action Plan 2000, Table 2 (BREITENMOSER *et al.* 2000)
** or most recent estimation available, refer to the respective country report
[a] Population size 1995 according to Eurasian Lynx Action Plan (page 17) = 50 lynx; status, distribution and number unclear

2.4. Management

Country	Legal status	National institution in charge	Conservation / Management plan status 1995*	Conservation / Management plan status 2001
Albania	fully protected	General Directorate of Forest and Pastures (GDFP)	none	none (planned)
FYR Macedonia	fully protected	Ministry of Agriculture and Forestry	-	none
Serbia and Montenegro	fully protected	Bureau for Nature Protection of both, Serbia and Montenegro	-	none
Greece	fully protected	Ministry of Agriculture	none	none
Bulgaria	fully protected	Ministry of Environment; National Board of Forests of the Ministry of Agriculture and Forests	-	none
Population	*fully protected*			*none*

* Eurasian Lynx Action Plan 2000, Table 3

2.5. Harvest and known losses (yearly average 1996-2001)

Country	Harvest number	Removal of problem animals	Illegal killings	Other mortality	Total Ø 1996-2001	Total Ø 1990-1995*
Albania	-	0	3.8	0	3.8	-
FYR Macedonia	-	0	0	0.33	0.33	-
Serbia and Montenegro [a]	-	0	(0.41)	(0.04)	(0.45)	(0.21)
Greece	-	0	0	0	0	-
Bulgaria	-	(0)	(0.67) [b]	(0.17) [b]	(0.84) [b]	-
Total population	-	*0*	*~5*	*~1*	*~5*	*n.d.a.*

[a] Has several populations but no respective numbers for each of them. The numbers here are the calculated share of losses to the Balkan population in proportion of its distribution to the total lynx distribution area in the country.
[b] in brackets as population origin (Balkan/Carpathian) is still unclear
* Eurasian Lynx Action Plan 2000, Table 3

2.6. Depredation, compensation and prevention

Depredation: There has only been one incidence in Bulgaria in 1996 (one sheep killed). Otherwise lynx depredation has either been absent in 1996-2001 (Albania, FYR Macedonia) or unknown (Serbia and Montenegro, Greece, Bulgaria 1997-2001). Depredation in the Balkan lynx population seems to be very rare and therefore no matter for conservation measures.

Compensation: FYR Macedonia is the only country applying a compensation system for lynx damage. There is no such system in Albania, Serbia and Montenegro, and Greece. Bulgaria pays for bear and wolf damage only because of the unclear lynx status.

Prevention: The use of sheep guarding dogs to protect sheep herds is known for Albania, Bulgaria and Greece (primarily against wolf attacks). As lynx depredation in all Balkan countries is very rare, removal of problem animals is not foreseen and illegal retaliation killings have most probably not been connected with damage prevention.

3. Threats

Country (population share in % area [X]) ►	Albania (56.1 %)	FYR Macedonia (41.5 %)	Serbia and Montenegro (2.4 %)	Greece	Bulgaria	Balkan population 1996-2001
Threat ▼						
Agriculture	X					X
Extraction of wood	X	X	X		X	XX
Infrastructure development: Industry						
Infrastructure development: Human settlement						
Infrastructure development: Tourism / recreation		X				X
Infrastructure development: Road building				X		
Legal hunting & trapping						
Shooting (illegal)	X		X [b]		X	XX
Trapping / snaring (illegal)	X		X			XX
Poisoning						
Vehicle and train collision						
Storms / flooding						
Wildfire					X	
Avalanches / landslides						
Competitors	X		X		X	XX
Prey / food base	X	X			X [d]	XX
Pathogens / parasites						
Limited dispersal	X		X		X	XX
Poor recruitment / reproduction / regeneration	X					X
High juvenile mortality	X					X
Inbreeding		X	X			X
Low densities	X		X		X	XX
Skewed sex ratios	?					
Slow growth rates	X					X
Population fluctuations			X			
Restricted range	X	X	X			XX
Recreation / tourism		X				X
Research						
War / civil unrest		X	X			X
Transport						
Other		X [a]			X [c, d]	

[a] Feeding at urban waste collection centres
[b] Data are very scarce. Access to the population in Kosovo and Metohija province is difficult or even impossible. There are indications that poaching by local and international groups in these provinces is very frequent.
[c] illegal trophy hunting
[d] most important current threats: rapid decrease of prey base (roe deer and chamois) and the poaching for trophy

Threats 1995 (Eurasian Lynx Action Plan 2000, Table 6):
MVP (population size, genetics), habitat fragmentation, illegal killings, prey base

4. Population assessment

The Balkan population is the smallest and most threatened autochthonous lynx population of Europe and deserves special attention. This is in particular relevant because the Balkan lynx has been described as an own subspecies *Lynx lynx martinoi* (MIRIC 1978); see also (SIMEONOVSKI & ZLATANOVA 2001). This original description did not get much attention and was not widely accepted. HEMMER (1993) considered the phylogenetic independence of the Balkan lynx (under the name *Felis lynx balcanica*) but rejected it. MIRIC's (1978) proposal was ignored for two reasons: (1) the geographic proximity of the Balkan population to the Carpathian and the (extinct) Dinaric and Alpine populations, and (2) the fact that the distribution of the Balkan lynx at that time had already been reduced to Albania and the south of former Yugoslavia and no ecological knowledge and only few museum specimen were available. We do not have the information needed for a final judgment of the taxonomic status of the Balkan lynx. However, preliminary genetic analyses indicate that the Carpathian and the Balkan population may differ considerably (CH. BREITENMOSER-WÜRSTEN and G. OBEXER-RUFF, pers. comm.). This differentiation could be the result of the long-term isolation of the Balkan lynx population; it is however also possible that the two populations or sub-species, respectively, originated from different refugial regions as a consequence of the zoo-geographic history during the late Pleistocene and early Holocene. The taxonomic status of the Balkan lynx population is a priority question in the light of the recent spread to the south-east and south of the Dinaric population in Bosnia-Herzegovina and of the Carpathian population in Serbia and Bulgaria, respectively (see Western and Eastern Serbia occurrence in the map and population reports).

The total size of the population is estimated to be about 100 individuals at best (Table 2.3), distributed over an area of 4'100-6'700 km², and split into eight patches, indicating a strong fragmentation (Table 2.2). It is impossible to assess the recent trend in population size or distribution. The Balkan lynx population experienced a severe bottleneck in 1935-1940 with an estimated number of only 15-20 individuals left. After World War II the population started to recover, especially in Kosovo and the FYR Macedonia (MIRIĆ 1981). In the 1960-70s, it also reappeared in Montenegro. The population estimation was some 280 lynx in 1974 (MIRIĆ 1981). In the first European status report (BREITENMOSER & BREITENMOSER-WÜRSTEN 1990), no information was available for Albania as it was impossible to find an expert contact at that time, and only very limited distribution data for the rest of the area. For the 1995 status report (BREITENMOSER *et al.* 2000), expert contacts had been established in all range countries, but the information available were guesses and did not base on field surveys. In a comprehensive report from 2001 all information available for the range countries were summarised: Bosnia and Herzegovina (SOLDO 2001), FYR Macedonia (HRISTOVSKI 2001), FR Yugoslavia (PAUNOVIC, MILENKOVIC & IVANOVIC-VLAHOVIC 2001), Albania (BEGO 2001), Bulgaria (ZLATANOVA, TZVETKOVSKI & TZINGARSKA-SEDEFEHEVA 2001); (SPASSOV, SEORGIEV & SPIRIDONOV 2001), and Greece (PANAYOTOPOULOU 2001). Although these reports as well as the newest inquires presented in this document were still not the result of systematic field surveys, they now based on an network of people and institutions made increasingly sensitive for large carnivore conservation and on a growing number of observations and records. The most obvious shortcomings of the status report presented here are: (1) no standardised monitoring is established in any of the range countries, quality of information depends on the incidental presence of trained staff, and it is hence impossible to compare and judge the reliability of the data; (2) no systematic field survey using adequate methods has ever been done for the whole potential distribution area; (3) no scientific field project addressing the ecology and life history of the Balkan lynx was ever carried out; (4) earlier assessments based on qualified guesses for parts of the distribution area at best and do not allow to judge the trend of the population in the recent past (see 1.2) . It is a general believe that the Balkan population is decreasing, but we do not have any data to confirm it. The most important areas for the lynx were recently zones of war and social disturbances. Peace and economic welfare must have first priority for local people and national authorities. This must, however, not conflict with nature conservation projects, which may offer a chance for co-operation in favour of the common natural heritage.

In spite of the lack of coherent data, the information on the distribution of the species seems to be consistent between the countries involved (see map) and confirm earlier guesses. Lynx still occur in the mountains along the Albanian-Macedonian border, but the Drin valley splits the population. In FYR Macedonia, the known distribution is mainly in national parks. This might be an artefact of the presence of observers and an established reporting system; the area outside and between national parks must be investigated using adequate survey techniques. The abundance estimated from the number of lynx given for Albania and FYR Macedonia, respectively, differ between the two countries (Table 2.3), but they are within the range of possible densities if compared with the information from radio-telemetry projects from other regions.

The main threats are considered to be forest management (extraction of wood), illegal killing (no data available for FYR Macedonia), limited prey base and competition (wolf) (Table 3). Furthermore, intrinsic factors such as restricted range, low density and limited dispersal were mentioned by all contacts, no surprise given the smallness of the population. From the size and the distribution, the Balkan lynx population must be considered critically endangered – Europe's only autochthonous population in this category (see Conclusions, chapter 3) – and needs effective protection and immediate conservation actions. However, before a conservation and recovery programme can be started, basic information on the ecology of the lynx, on the environmental conditions, the threats, and the human dimension aspects must be available.

The next steps towards a recovery programme for the Balkan lynx population could be:

1. To carry out a field survey in the whole potential distribution range of the Balkan lynx by means of interviews with local people, snow-tracking, kill assessment etc.
2. To perform a habitat suitability and prey base assessment for the entire range.
3. To rise awareness among public and private institutions and to encourage international co-operation.

Based on the existing knowledge, an assessment of the ecological potential (habitat and prey), and with a clear commitment of the authorities in charge in the range countries, all partners should then work out a recovery plan for the Balkan lynx population.

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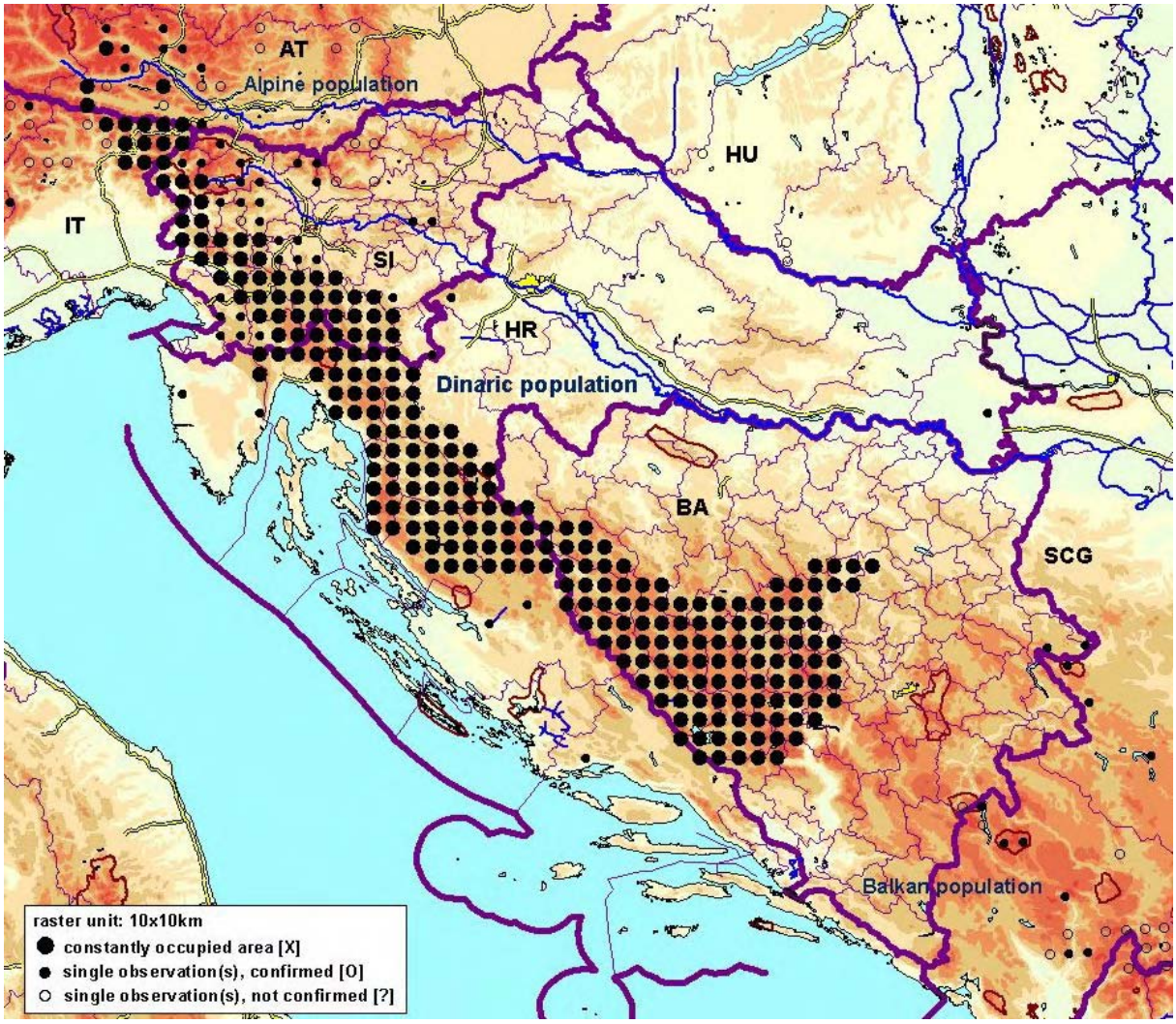
Dinaric population

1. Description:

1.1. Distribution of the Dinaric population in 2001



1.2. Countries (regions) and spatial trend

Countries sharing the population: *Bosnia-Herzegovina* (West Bosnia; no data available for sporadically present areas), *Croatia* (Gorski Kotar and Lika), *Slovenia* (Southern part of the country, i.e. S and SE of the Jesenice-Ljubljana-Triest highway).

Spatial trend (change in distribution area since 1995): *Bosnia-Herzegovina*: no reliable information on an expansion of areas, *Croatia*: no changes, *Slovenia*: slight shift of the main population to the west, but the area of lynx occurrence has not increased.

2. Status and trend:

2.1. Extension

Country	Lynx distribution area [km²]				Population share (% area [X] / [X+O])
	[X]	[O]	[?]	[X+O]	
Bosnia-Herzegovina	12'100	0	0	12'100	51.9 / 48.2
Croatia	8'400	700	0	9'100	36.1 / 36.3
Slovenia	2'800	1'100	0	3'900	12.0 / 15.5
Total population	*23'300*	*1'800*	*0*	*25'100*	*100 / 100*

2.2. Fragmentation

Total area ([X+O] – isolated [O]): 24'400 km²
Number of patches: 1
Mean patch size and range: -
Mean nearest distance between patches: -

2.3. Size of the population

Country	Estimation 1995*	Estimation 2001**	Density (lynx per 100 km² area [X])	Trend 1990-1995*	Trend 1996-2001
Bosnia-Herzegovina	n.d.a.	40	0.33	n.d.a.	stable
Croatia	60	40-60	0.6	stable	decreasing
Slovenia	(75) [a]	40	1.43	stable	stable / decreasing
Total population	200 [b]	*~130*	*~0.8*	(*stable*)	*stable to decreasing*

***** Eurasian Lynx Action Plan 2000, Table 2 (BREITENMOSER *et al*. 2000)
** or most recent estimation available, refer to the respective country report
[a] including the Alpine part
[b] according to the Eurasian Lynx Action Plan (page 17)

2.4. Management

Country	Legal status	National institution in charge	Conservation / Management plan status 1995*	Conservation / Management plan status 2001
Bosnia-Herzegovina	no legislation	none	none	none
Croatia	fully protected since 1998	Ministry for environment and physical planning	none	prepared, needs to be ratified
Slovenia	controlled hunting	Ministry of Agriculture, Forestry and Food	none	none
Population	*for the main part lynx is hunted*		*none*	*none*

* Eurasian Lynx Action Plan 2000, Table 3

2.5. Harvest and known losses (yearly average 1996-2001)

Country	Harvest number	Removal of problem animals	Illegal killings	Other mortality	Total Ø 1996-2001	Total Ø 1990-1995*
Bosnia-Herzegovina	2.3	0	0	0	2.3	n.d.a.
Croatia	(7: ø1996-1998)	0	3.67	0.34	7.5	9.7
Slovenia [a]	(1)	0	0	(0.83)	(1.83)	(3.8)
Total population	*~7*	*0*	*~4*	*~1*	*~12*	*>14*

[a] incl. Alpine part
* Eurasian Lynx Action Plan 2000, Table 3

2.6. Depredation, compensation and prevention

Depredation seems to have increased in Slovenia during the past few years, but more in the Alpine area. In Croatia there haven't been many cases, and for Bosnia-Herzegovina there are no losses known for the time period considered. As a conclusion, depredation in the Dinaric population occurs, but the dimension is still far from the scale in other populations (e.g. Alpine or Nordic).
Croatia and Slovenia pay funds for depredated livestock; Bosnia-Herzegovina has no compensation system established. There are no preventive measures applied in the range of the Dinaric lynx population. In Slovenia, problem animals are removed.

3. Threats

Country (population share in % area [X]) ► Threat ▼	Bosnia-Herzegovina (51.9 %)	Croatia (36.1 %)	Slovenia (12 %)	Dinaric population 1996-2001
Agriculture				
Extraction of wood				
Infrastructure development: Industry				
Infrastructure development: Human settlement				
Infrastructure development: Tourism / recreation				
Infrastructure development: Road building		X		X
Legal hunting & trapping	X			X
Shooting (illegal)	X	X		XX
Trapping / snaring (illegal)				
Poisoning				
Vehicle and train collision	X	X		XX
Storms / flooding				
Wildfire				
Avalanches / landslides				
Competitors			X	
Prey / food base	X	X	X	XX
Pathogens / parasites			?	
Limited dispersal			?	
Poor recruitment / reproduction / regeneration			?	

Country (population share in % area [X]) ► Threat ▼	Bosnia-Herzegovina (51.9 %)	Croatia (36.1 %)	Slovenia (12 %)	Dinaric population 1996-2001
High juvenile mortality		?		
Inbreeding			?	
Low densities				
Skewed sex ratios				
Slow growth rates				
Population fluctuations				
Restricted range				
Recreation / tourism				
Research				
War / civil unrest				
Transport	X			X
Other				

Threats 1995 (Eurasian Lynx Action Plan 2000, Table 6):
Potentially hunting, MVP (population size, genetics), illegal killings and traffic accidents.

4. Population assessment

So far the re-introduction and recovery of the Dinaric population has been a story of success. The animals originating from the Slovak Carpathians and released in southern Slovenia in 1973 reproduced and spread quickly. The first lynx reached Croatia in 1975 (COP & FRKOVIC 1998), the first signs in Bosnia-Herzegovina were found in 1980 (SOLDO 2001). The expansion to the north-west went not as fast as to the south/south-east, but in 1984 the first lynx arrived in the Julian Alps and crossed over to Italy (COP & FRKOVIC 1998). Currently, the population seems to inhabit almost the whole range of the Dinaric mountain chain (see map), although the situation in southern Croatia and south-east Bosnia-Herzegovina is not clear, i.e. information on sporadically occupied areas is missing (Table 2.1). This might mainly be due to the war 1991-1995, when only in the north of the population range a basic monitoring was still going on (COP & FRKOVIC 1998), whereas in the south of the potential range, access, and therefore information, was and partly probably still is limited. Nevertheless, compared to the former inquiry in 1995, where no information on Bosnia-Herzegovina was available at all (BREITENMOSER *et al.* 2000), we now have at least some basic data.

According to the present information the population occupies a cohesive range of 24'400 km² (Table 2.2; without the Slovenian Alpine part of another 3'000 km² adjacent to the Dinaric distribution area). If there is a connection to the Balkan population is actually not known but would potentially be possible: signs of lynx presence are reported just at the border between Serbia and Montenegro/Bosnia-Herzegovina (see map). A specific survey in southern Bosnia-Herzegovina would be required to clarify whether there is a connection between the Dinaric and the Balkan population. This knowledge would be of great importance for the assessment of the status of the Balkan population (see respective report).

Only five years after the release of the first animals, legal lynx hunting started in the south of today's Slovenia (e.g. STANISA 1998). So far, some 370 dead lynx are known (data from COP & FRKOVIC 1998, SOLDO 2001, and from this survey). Far the biggest known mortality (> 80%) were legally hunted animals (also FRKOVIC 2001), followed by traffic accidents and death due to unknown cause. Data on illegal killings are often not known, but current data from Croatia (ø 3-4 lynx yearly for 1996-2001, Table 2.5) indicate that illegal killing might considerably increase the number of losses. As there is no proper legislation yet, no differentiation can be made for Bosnia-Herzegovina. Hence legal and illegal shooting and collisions with vehicles/trains are amongst the major threats for the Dinaric population. The only threat, though, consistently mentioned by all country contacts, is the limited prey base (Table 3). This assumption seems to be based on subjective judgements rather than real information on lynx-prey relationship in the Dinaric population. However, the startling differences of the population density between the three countries (Table 2.3) could indicate that there is indeed a gradient in prey availability from the north to the south. The lynx "density" in Bosnia-Herzegovina (calculated from the population estimated and the distribution indicated) is extremely low, and even in Croatia below average. We cannot exclude that the hunting of prey species was exhaustive during the times of war and economic instability and e.g. the roe deer population to be low, today.

The current size of the population is estimated to be about 130 animals (Table 2.3). In Bosnia-Herzegovina, the population is thought to be stable at presence, in Croatia and Slovenia, a decrease was reported since 1995 (as a consequence, the lynx was granted legal protection in Croatia in 1998). The estimation for the entire population indicates a decrease compared to the previous reporting period (Table 2.3). The 1990-95 data, especially for Bosnia-Herzegovina, were however mere guesses. On the other hand, both Slovenia and Croatia indicate a strong and moderate decrease, respectively. This is worrying especially in the case of Slovenia, which has, in the south of the country, hosted the source population for the expansion to the south as well as for the recolonisation of the Alps. Since in the larger part of the range, the monitoring does not base on reliable data, the overall trend is finally not clear.

A coherent strategy for the entire population is missing, as clearly indicated by the "legal status" of the lynx, which differs among the three countries concerned (Table 2.4). To the north-west, an expansion is desired, as indicated in the Pan-Alpine Conservation Strategy PACS for the lynx (MOLINARI-JOBIN *et al.* 2003), to strengthen the population in the SE Alps. To the south-east, a further expansion of the Dinaric population could lead to a reunion with the Balkan population. This would, on one hand, be welcome as a support for this critically endangered population; on the other hand, the assumed unique taxonomic status of the Balkan lynx might be corrupted through immigrating lynx from the north.

As a conclusion, the Dinaric population is potentially viable in the long-term, but is presently still endangered. Available information indicate a decrease since the previous reporting period. The situation in each country depends much on the lynx management in the neighbouring ones. A clear recommendation is to develop, above national management plans, a common cross-border conservation strategy. The knowledge on population number, distribution and trend – hence monitoring – needs improvement and continuation. Some open questions need to be addressed in more specific studies, especially the hypothesis regarding an insufficient prey base seems to be crucial for the further conservation of the Dinaric lynx population.

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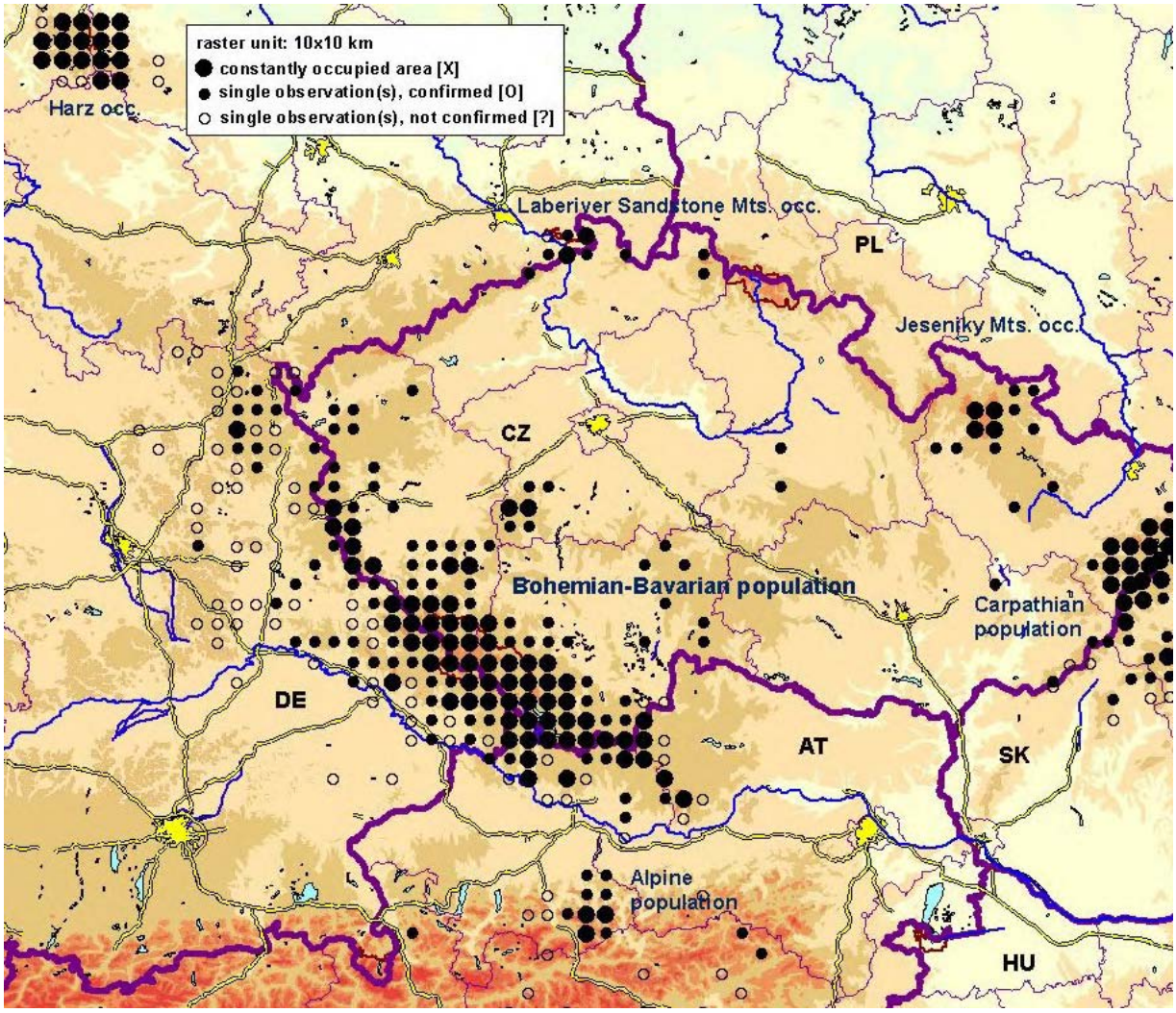
Bohemian-Bavarian population

1. Description:

1.1. Distribution of the Bohemian-Bavarian population in 2001



1.2. Countries (regions) and spatial trend

Countries sharing the population: *Czech Republic* (Sumava Mts., NW-part of the Cesky les Mts. = Oberpfälzerwald, the Sumava foothills, S-Novohradske Mts.; in the north more isolated, small but constant occurrence in the Brdy highlands in connection with the core population), *Germany* (Bayerischer and Oberpfälzer Forest, Fichtelgebirge, Frankenwald), *Austria* (Böhmerwald, Mühlviertel, Waldviertel).

Spatial trend (change in distribution area since 1995): Since 1999 there has been a remarkable decrease in the area occupied that was noticed in all three countries.

2. Status and trend:

2.1. Extension

Country	Lynx distribution area [km²]				Population share (% area [X] / [X+O])
	[X]	[O]	[?]	[X+O]	
Czech Republic	4'500	4'700	0	9'200	57 / 53.5
Germany	1'700	4'000	5'500	5'700	21.5 / 33.1
Austria	1'700	600	1'200	2'300	21.5 / 13.4
Total population	*7'900*	*9'300*	*6'700*	*17'200*	*100 / 100*

2.2. Fragmentation

Total area ([X+O] – isolated [O]): 14'200 km²
Number of patches: 2
Mean patch size and range: 7'100 km²; 1'000-13'200 km²
Mean nearest distance between patches: 14 km

2.3. Size of the population

Country	Estimation 1995*	Estimation 2001**	Density (lynx per 100 km² area [X])	Trend 1990-1995*	Trend 1996-2001
Czech Republic	70-100	60	1.56	expanding	decreasing
Germany	10-15	12	0.97	increasing & expanding	decreasing
Austria	3-5	4	0.35	increasing	decreasing
Total population	*~100*	*~75*	*~1*	*increasing & expanding*	*decreasing*

***** Eurasian Lynx Action Plan 2000, Table 2 (BREITENMOSER *et al.* 2000)
** or most recent estimation available, refer to the respective country report

2.4. Management

Country	Legal status	National institution in charge	Conservation / Management plan status 1995*	Conservation / Management plan status 2001
Czech Republic	fully protected	Ministry of Environment, Ministry of Agriculture	none	none
Germany	fully protected	none	planned	none
Austria	fully protected	none	none	none
Population	*fully protected*		*none*	*none*

* Eurasian Lynx Action Plan 2000, Table 3

2.5. Harvest and known losses (yearly average 1996-2001)

Country	Harvest number	Removal of problem animals	Illegal killings	Other mortality	Total Ø 1996-2001	Total Ø 1990-1995*
Czech Republic	-	0	6.5	0.7	7.2	(11-21) [a]
Germany	-	0.33	0.17	0.17	0.67	(1.2)
Austria	-	0	0.3	0.17	0.5	(0.2) [a]
Total population	*0*	*~1*	*~7*	*~1*	*~9*	*n.d.a.*

[a] From 1990-1995, there are only total numbers per country available. The share of the Bohemian-Bavarian population is not known but assumed to be high (as it is from 1996-2001).
* Eurasian Lynx Action Plan 2000, Table 3

2.6. Depredation, compensation and prevention

Depredation on livestock occurs, but only occasionally. From 1996-2001, deer in enclosures were mainly affected (particularly in Germany). In the Czech Republic, statistics do not exist. All together however, depredation does not seem to be a problem in the Bohemian-Bavarian population. Responsible for compensation payments are: the state (Czech Republic), NGOs (Germany), and hunters' assurances (Austria), respectively. Only the Czech Republic applies prevention measures (electric fences, exceptionally sheep guarding dogs).

3. Threats

Country (population share in % area [X]) ► Threat ▼	Czech Republic (57 %)	Germany (21.5 %)	Austria (21.5 %)	Bohemian-Bavarian population 1996-2001
Agriculture				
Extraction of wood				
Infrastructure development: Industry				
Infrastructure development: Human settlement			X	
Infrastructure development: Tourism / recreation			X	
Infrastructure development: Road building		X	X	X
Legal hunting & trapping				
Shooting (illegal)	X	X	X	XX
Trapping / snaring (illegal)			X	
Poisoning				
Vehicle and train collision			X	
Storms / flooding				
Wildfire				
Avalanches / landslides				
Competitors				
Prey / food base		X		
Pathogens / parasites				
Limited dispersal				
Poor recruitment / reproduction / regeneration				
High juvenile mortality			X	

Country (population share in % area [X]) ► Threat ▼	Czech Republic (57 %)	Germany (21.5 %)	Austria (21.5 %)	Bohemian-Bavarian population 1996-2001
Inbreeding				
Low densities			X	
Skewed sex ratios				
Slow growth rates				
Population fluctuations			X	
Restricted range				
Recreation / tourism			X	
Research				
War / civil unrest				
Transport				
Other			X [a]	

[a] hunters' attitude

Threats 1995 (Eurasian Lynx Action Plan 2000, Table 6):
MVP (population size, genetics), potentially illegal killings and habitat fragmentation.

4. Population assessment

After its extinction in the middle of the 19th century, lynx re-appeared occasionally in the Czech Sumava (Bohemian forest) region in the 1950s. The origin of these animals has not completely been clarified; it was supposed that they had dispersed from the Carpathian mountains in eastern Czech Republic / western Slovakia (HELL 1961, CERVENY, KOUBEK & ANDÉRA 1996). Sporadic observations between these two areas since (for example in the middle of the 1990s, CERVENY & BUFKA 1996) might support this assumption. Between 1970 and 1972, 5-9 lynx were unofficially released in the German Bavarian Forest. They soon spread over to Sumava, where first evidence of breeding was noted in 1973. Between 1982 and 1989, the population establishing in this region was reinforced by 18 individuals (11 males and 7 females) from the Slovak Carpathian mountains (CERVENY & BUFKA 1996, CERVENY, KOUBEK & ANDÉRA 1996, BUFKA & CERVENY 1996). From 1990 to 1997, a 2-3 fold increase of the population was noticed, resulting in an expansion west and east, along border areas, but also through corridors with dense forest into Czech inland (BUFKA, CERVENY & KOUBEK 1997). The population was then estimated to be 70-100 individuals (BUFKA, CERVENY & KOUBEK 1997, WÖLFL *et al.* 2001, see also Table 2.3). In Austria, first signs of lynx presence were reported in 1988 from forested areas along the border (HUBER, LAASS & ENGLEDER 2001). Due to the development in the Czech Republic, a continuous increase in the 1990s has also been observed in Austria and Germany (HUBER, LAASS & ENGLEDER 2001, WÖLFL *et al.* 2001). Some of these animals may however occupy cross-border home ranges (CERVENY & BUFKA 1996, ENGLEDER 2003), leading to a slight overestimation of the population. The current estimate is around 75 animals (Table 2.3). Since 1999, a marked decrease has been noticed, particularly in the Czech Republic. This is especially negative, as the Czech Republic hosts almost 60 % of the entire population (Table 2.1), and acted so far as a source for the neighbouring countries (see also above). The Czech Republic therefore has a special responsibility for the future existence of the Bohemian-Bavarian population.

The current distribution area is around 14'000 km² (Table 2.2). The Bohemian-Bavarian population is so a medium-sized population, larger than the Balkan, Vosges-Palatinian, and the Jura population. However, almost half of the area is only sporadically occupied (Table 2.1). In the northern part of the range, the distribution is less coherent than in the south. If the negative tendency continues, fragmentation could become a problem, particularly in the north-west (see map). The decrease of the lynx abundance in the northern part of the population intimidates the potential link with the Carpathian population over the Laberiver Sandstone Mts., as suggested by WÖLFL *et al.* (2001). According to SCHADT *et al.* (2002b), there seem to be suitable corridors at least as far east as the Laberiver Sandstone Mts. (which were the easternmost point of their study area). So far, there is no evidence of movements between the Bohemian-Bavarian and the Alpine population (WÖLFL *et al.* 2001). In Austria, occupied areas are actually quite close (see map), but the Danube river and a motorway separate them. On the German side, several motorways in the plain between the Bavarian forest and the Alps make it very unlikely for the lynx to expand to the south and south-west. To the west (direction Black Forest) the barriers are even worse (see map), as Germany has one of the most dense road networks in Europe (SCHADT *et al.* 2002a).

Experts have explored the idea of a series of subpopulations north and south of the central Czech plateau, connecting the Bohemian-Bavarian and the Carpathian populations into one metapopulation (WÖLFL *et al.* 2001,

SCHADT *et al.* 2002b, WÖLFL 2003). The southern connection would be via Moravia, where lynx have occasionally been observed before (see above). However, migration corridors between the existing or potential (sub-) populations will need improvement. To achieve this, an intensified co-operation between the countries concerned (CZ, SK, PL, AT and DE) will be required (WÖLFL *et al.* 2001, WÖLFL 2003).

Co-operation and exchange of information amongst scientists has started some years ago, and the establishment of a discussion platform for management issues was suggested (CELTIC – Conservation of the European Lynx: Management and International Cooperation, WÖLFL *et al.* 2001). However, there is no common management approach yet. In Germany and Austria, wildlife management is in the responsibilities of the federal states (Bundesländer), and there is no national management strategy for the large carnivores (Table 2.4). Hence, it is difficult to implement international co-operation. Regarding the Bohemian-Bavarian population and its connection with the Carpathians, a joint conservation and management strategy is strongly recommended. To start with, the present populations and occurrences need a sound and coordinated monitoring. So far, the monitoring relied upon personal initiatives and the verification of data has usually been rare (WÖLFL *et al.* 2001).

Between 1996 and 2001, at least 9 lynx were annually removed from the population (Table 2.5). In the Czech Republic alone, 39 animals are known to have been illegally killed during this time period, making it the main mortality factor. Some cases were also reported from Germany and Austria. The contacts of all three countries consider illegal shooting to be the major threat to the population (Table 3). Poaching seems to have occurred mainly in newly occupied areas. The re-introductions in the 1980s, leading to an increase of the population, caused a controversy with hunters. Contrary to the nature conservation legislation in the Czech Republic, which lists the lynx as an endangered and therefore specially protected species, the hunting law actually provides a legal option for lynx hunting within a defined season. This however requires a special permission from the Ministry of Environment, a procedure hunters seem to regard as far too complicated (WÖLFL *et al.* 2001). Road constructions are regarded to have a negative impact as well, at least in Austria and Germany (Table 3). There is no scientific evidence for this assumption, but as mentioned above, the road network around the area of the Bohemian-Bavarian population is very dense and could hinder a further expansion. In the Czech Republic, an increase of tourism and road traffic has since 1989 been noted in the border area of the Sumava national park. This park was established in 1991 in the previously forbidden military zone (BUFKA, CERVENY & KOUBEK 1997).

Due to the limited population size and the negative tendency observed during the past years, the Bohemian-Bavarian population has to be judged as endangered. The most important measures are to find solutions against the widespread illegal killing, and to improve connectivity first within the population, but then also to neighbouring occurrences. A clear commitment and a more strenuous involvement of the regional and national authorities regarding a cross-border co-operation is needed.

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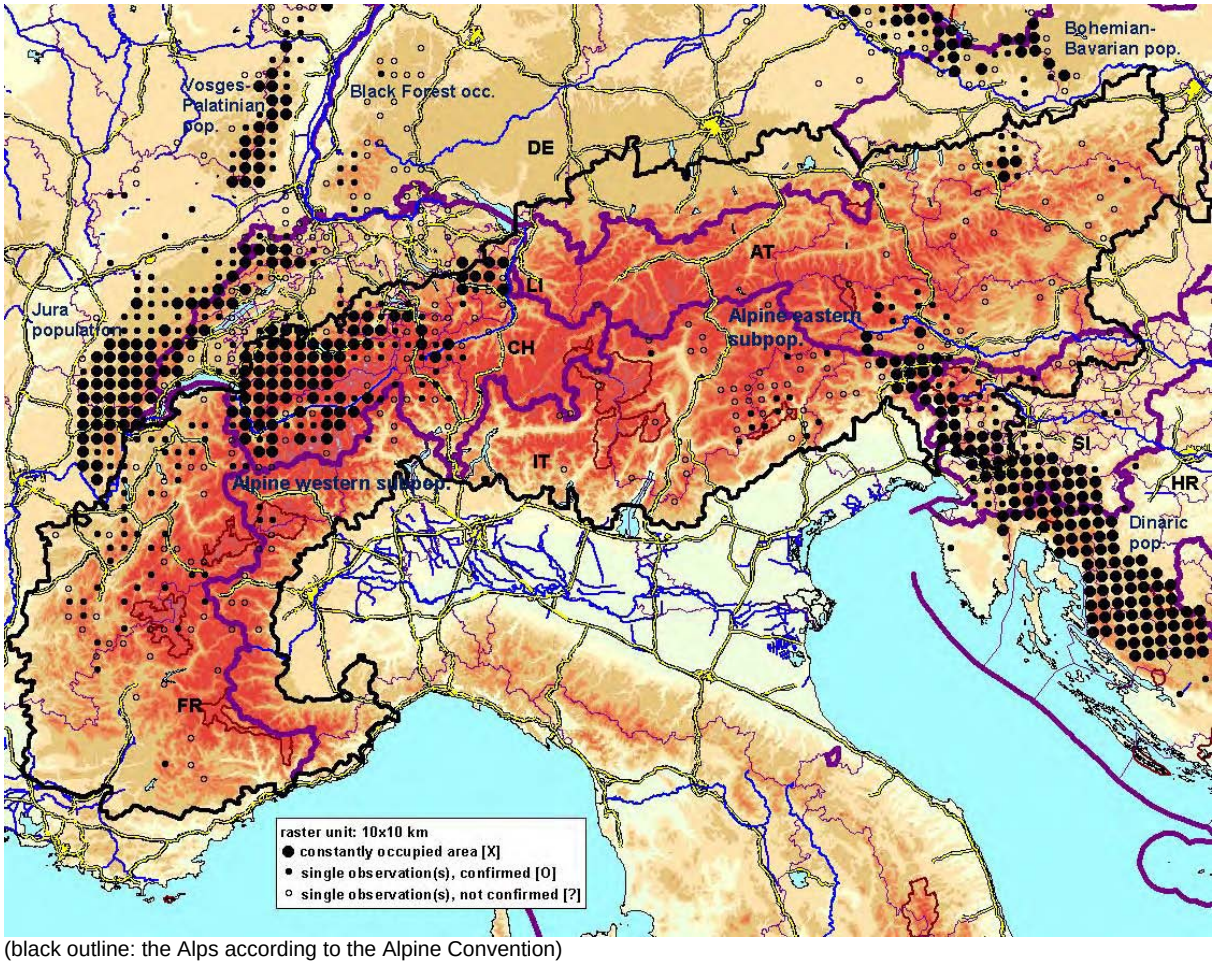
Alpine population

1. Description:

1.1. Distribution of the lynx in the Alps in 2001



(black outline: the Alps according to the Alpine Convention)

1.2. Countries (regions) and spatial trend

Countries sharing the population: *Switzerland* (north-western Swiss Alps, north and central Valais, western central Alps; a few indications in the eastern central Swiss Alps and in the cantons of Grison and Ticino; in 2001 translocations to eastern Switzerland), *Slovenia* (western part of the country i.e. west of the Jesenice-Ljubljana-Triest highway; here adjacent to the Dinaric population), *Italy* (in the east: Friuli VG, Veneto (Bellunese), in the west: Aosta, Piemonte (Verbania)), *Austria* (northern Kalkalpen, Upper Carinthia, Niedere Tauern), *France* (south-east of the country, from the lake of Geneva as far south as to the department of Hautes-Alpes), potentially also in *Germany* and *Liechtenstein* but no confirmed lynx presence in these parts of the Alps yet.

Spatial trend (change in distribution area since 1995): *Switzerland*: artificial expansion to the eastern Swiss Alps through translocations in 2001, *Slovenia*: slight shift of the main population to the west, but the area of lynx presence has not increased, *Italy*: no considerable changes, *Austria*: unknown, *France*: data collected indicate expansion towards the south, but exact diagnosis for the French Alps is difficult to be made as the area of lynx presence might have been underestimated.

2. Status and trend:

2.1. Extension

Country	Lynx distribution area [km²]				Population share (% area [X] / [X+O])
	[X]	[O]	[?]	[X+O]	
Switzerland	7'900	4'300	4'300	12'200	67.5 / 48.0
Slovenia	1'900	1'500	600	3'400	16.2 / 13.4
Italy	1'200	1'800	5'100	3'000	10.3 / 11.8
Austria	700	1'600	3'300	2'300	6.0 / 9.1
France	0	4'500	3'800	4'500	0 / 17.7
Total population	*11'700*	*13'700*	*17'100*	*25'400*	*100 / 100*

2.2. Fragmentation

Total area ([X+O] – isolated [O]): 18'100 km²
Number of patches: 6
Mean patch size and range: 3016.7 km²; 100 – 11'200 km²
Mean nearest distance between patches: ~196 km

2.3. Size of the population

Country	Estimation 1995*	Estimation 2001**	Density (lynx per 100 km² area [X])	Trend 1990-1995*	Trend 1996-2001
Switzerland	100	70	0.89	increasing or stable	stable / expanding
Slovenia	n.a.	10	0.53	stable	stable to decreasing
Italy East	10	10	0.58	unknown	increasing & expanding
Italy West	unknown	3	-	increasing	stable
Austria	a few	20	-	decreasing	inconsistent
France	unknown	single individuals	-	unknown	expanding
Total population	*~120*	*~120*	*~0.7*	*± stable*	*± stable, partly expanding*

***** Eurasian Lynx Action Plan 2000, Table 2 (BREITENMOSER *et al.* 2000)
** or most recent estimation available, refer to the respective country report

2.4. Management

Country	Legal status	National institution in charge	Conservation / Management plan status 1995*	Conservation / Management plan status 2001
Switzerland	fully protected	Swiss Agency for the Environment, Forests and Landscape SAEFL (BUWAL)	drafted	implemented
Slovenia	controlled hunting	Ministry of Agriculture, Forestry and Food	none	none
Italy	fully protected	Istituto Nazionale per la Fauna Selvatica I.N.F.S.	none	none
Austria	fully protected	none	none	none
France	fully protected	Ministère de l'Environment, Office national de la chasse et de la faune sauvage	none	implemented / in preparation [a]
Population	*mainly protected*		*none*	*PACS 2003 (Action Plan)* [b]

* Eurasian Lynx Action Plan 2000, Table 3
[a] implemented: protocol for the elimination of lynx to reduce repeated livestock depredation / in preparation: restoration plan
[b] Pan-Alpine Conservation Strategy for the Lynx (MOLINARI-JOBIN *et al.* 2003)

2.5. Harvest and known losses (yearly average 1996-2001)

Country	Harvest number	Removal of problem animals	Illegal killings	Other mortality	Total Ø 1996-2001	Total Ø 1990-1995*
Switzerland	-	0.7	1.8	7.2	9.7	7.5
Slovenia [a]	0	0	0	n.a.	n.a.	n.a.
Italy	-	0	0	0	0	0.5
Austria	-	0	0	0	0	0.2
France	-	0	0	0.33	0.33	0
Total population	*0*	*~1*	*~2*	*~8*	*~11*	*~11*

* Eurasian Lynx Action Plan 2000, Table 3
[a] Dinaric and Alpine part are not separated. Harvest only in the Dinaric population.

2.6. Depredation, compensation and prevention

Depredation: Livestock depredation occurred regularly in the Alps of Switzerland, Slovenia and, to a much lesser extent, in Austria and France. Affected were mainly sheep, but also some goats and other species like fallow deer kept in game farms. Depredation occurred predominantly between June and October.

Compensation: All countries with lynx presence have established compensation systems; Switzerland, Slovenia and France on a national, Italy and Austria on a regional level.

Prevention: Switzerland and France apply methods particularly aiming to prevent lynx attacks (e.g. guarding dogs, fencing). In these countries and in Slovenia, animals causing too much damage are legally removed. It is assumed that illegal killings of lynx may occur as a reaction to depredation on livestock.

→ Depredation therefore is a potential source of conflict in the Alps.

3. Threats

Country (population share in % area [X]) ►	Switzerland (67.5 %)	Slovenia (16.2 %)	Italy (10.3 %)	Austria (6 %)	France [b]	Alpine population 1996-2001
Threat ▼						
Agriculture						
Extraction of wood						
Infrastructure development: Industry						
Infrastructure development: Human settlement			X	X		X
Infrastructure development: Tourism / recreation				X		
Infrastructure development: Road building	X		X	X		XX
Legal hunting & trapping						
Shooting (illegal)	X		X	X		XX
Trapping / snaring (illegal)						
Poisoning	X					X
Vehicle and train collision	X			X		XX
Storms / flooding						
Wildfire						
Avalanches / landslides	X					X
Competitors		X				X
Prey / food base		X				X
Pathogens / parasites	X	?	?			X
Limited dispersal	X	?	X			XX
Poor recruitment / reproduction / regeneration		?	?			
High juvenile mortality			?	X		
Inbreeding		?	?			
Low densities			X	X		X
Skewed sex ratios			?	X		
Slow growth rates			X			
Population fluctuations			?	X		
Restricted range			X			
Recreation / tourism				X		
Research						
War / civil unrest						
Transport			?			
Other				X [a]		

[a] hunters' attitude
[b] The available data do not allow to know the possible threats that could affect the lynx population in the French Alps.

Threats 1995 (Eurasian Lynx Action Plan 2000, Table 6):
MVP (population size, genetics), illegal killings, traffic accidents, potentially depredation.

4. Population assessment

The Alpine lynx population is a “hypothetical” population. The historic population – originally more connected to the populations in the surrounding lowlands than coherent within the Alps – was increasingly isolated as all plains of West and Central Europe were altered into arable land and cleared of forests. The lynx in the Alps went extinct during the 19th century, with the last specimens surviving in the western Alps of Italy and France until the 1930s. The systematic status of the original lynx of the Alps is a matter of discussion (see Phylogenetic history and subspecies 2.2). The lynx brought back to the Alps after 1970 were all taken from the Carpathians, which was at that time the geographically nearest autochthonous population. Today, the Alpine population consists of several occurrences all originating from re-introductions in the 1970s (Switzerland 1970-76, (BREITENMOSER, BREITENMOSER-WÜRSTEN & CAPT 1998); Slovenia 1973, (COP & FRKOVIC 1998); Austria 1977-79, (HUBER & KACZENSKY 1998)). Although lynx immigrated into neighbouring countries (France, Italy) the thirty years since the first releases have not allowed establishing a continuous population throughout the Alps.

In addition to the inquiry done for this report, data on the Alpine population are available from the status reports published by the expert group of the programme “Status and Conservation of the Alpine Lynx Population” (SCALP), describing in a first series the status in 1995, and, in a second series, in 2000: (STAHL & VANDEL 1998, STAHL & VANDEL 2001) for France; (BREITENMOSER *et al.* 1998, MOLINARI-JOBIN *et al.* 2001) for Switzerland; (FASEL 2001) for Liechtenstein; (RAGNI *et al.* 1998, MOLINARI 1998, MOLINARI *et al.* 2001) for Italy; (KACZENSKY 1998, WÖLFL & KACZENSKY 2001) for the German Alps; (HUBER *et al.* 1998, HUBER, LAASS & ENGLEDER 2001) for Austria; and (COP & FRKOVIC 1998, STANISA, KOREN & ADAMIC 2001) for Slovenia. The monitoring differs regarding the method and quality between the countries (see country reports and publications cited above), according to the national wildlife management system, and the lynx presence. It is relatively well established in France and Switzerland, but would need to be improved in all other Alpine countries with lynx presence. The SCALP expert group has defined common standards to interpret the monitoring data collected (MOLINARI-JOBIN *et al.* 2001), and the status reports published in 2001 have followed these standards.

Currently, there are two core areas of lynx distribution, one in the western Alps (Switzerland and France), and one in the Slovenian Alps, expanding into Italy and Austria. There is no permanent lynx presence with reproduction in between, and even single confirmed observations are not very numerous (see map). The present lynx distribution does not reflect the potential range of the species in the Alpine countries. Switzerland, which holds only 13% of the area of the Alpine arc (according to the definition of the ALPINE CONVENTION, outlines in map), and Slovenia with a share of 3.5% host more than 80% of the population range, whereas Italy (27.5% area of the Alps), Austria (28.5%) and France (21.5 %) share the remaining 16% (Table 2.1). At present, 18’100 km² (Table 2.1; less than 10% of the 190’912 km² of the entire Alpine arc according to the ALPINE CONVENTION) are more ore less permanently occupied, representing about 120 resident lynx (Table 2.3). Habitat models predict that the Alps could potentially host as many as 960-1800 lynx, depending on the density assumed (ZIMMERMANN 2003).

The overall population trend has been ambivalent in recent years (Table 2.3). There was a local increase in numbers (density) in the north-western Swiss Alps and in the Tarvisiano, the Italian part of the triangle population, but no clear expansion. The area of observations has however increased in the French Alps (probably also due to immigration from the Jura population), and recently, new observations were reported from the Kalkalpen in Austria. On the other hand, local occurrences such as in the Trentino (eastern Italian Alps) have vanished, and the tendency in the Slovenian Alps seems to be decreasing. Considering the colonisation capacity of the species in the 30 years since the re-introductions, the observed trend in the past five years will not allow for a natural fusion within the next 30 years. In Switzerland, nine lynx from the north-western Alps and the Jura Mountains were translocated to the eastern Swiss Alps in 2001 and 2003 (RYSER *et al*. 2004). This was a first step to bridge the gap between the two subpopulations, but yet the distance is about 300 km.

The reason for the slow expansion is the limited dispersal capacity of the lynx (ZIMMERMANN *et al*. subm.) – recognised as an important threat (Table 3) – according to the land tenure system of the species in combination with the strong habitat fragmentation in the Alps. The alpine and nival zones above the timberline are no lynx habitat, and the forest belt in the lower parts and along the foothills are bisected by broad valleys. These valleys were turned into farmland and are nowadays densely inhabited, holding townships and traffic arteries. Not surprisingly, road constructions are mentioned as one of the main threats affecting the Alpine lynx population, together with losses due to traffic accidents, which indeed are a high mortality factor in Switzerland and Slovenia (see Table 2.5, Table 3 and respective country reports). The illegal killing of lynx (in the case of Slovenia potentially legal harvest) is assumed to be the most important mortality factor, as inevitably, the number of unrecorded cases of illegal killings must be higher than of road kills. Illegal killings were another possible reason for the lack of population expansion (MOLINARI-JOBIN *et al.* 2003). An additional potential future danger for the population in the Alps arises from the narrow genetic base: All of the relatively few founder animals came from the same population (Slovak Carpathian Mountains) and some of them were probably closely related. First genetic analysis made by BREITENMOSER-WÜRSTEN & OBEXER-RUFF (2003) indicated that the Alpine population has a reduced allelic diversity compared to the Carpathian population, and that it has today the smallest level of heterozygosity of all European lynx populations.

The Alpine population must be considered endangered. This is mainly a consequence of the still limited

distribution of the species, and hence, conservation efforts should aim to further the expansion of the area occupied. The Alps are the area in western Europe, which can host the largest viable lynx population, although they are fragmented and large parts are no lynx habitat, either naturally or as a consequence of human activity. The recovery and the maintenance of an Alpine lynx population in coexistence with people however require active management. Lynx are at present fully protected by law in all Alpine countries except Slovenia, where a hunting quota can be issued each year (Table 2.4). (To allow emigration of lynx from the Alpine part to neighbouring regions, hunting in Slovenia is currently restricted to the Dinaric core area in the south of the country; however, "problem" lynx will also be removed in the Alps, C. STANISA & I. KOREN, pers. comm.) In accordance with the European Action Plan (BREITENMOSER *et al.* 2000), the SCALP expert group has drafted a Pan-Alpine Conservation Strategy (PACS; MOLINARI-JOBIN *et al.* 2003), which was adopted by the Standing Committee of the Bern Convention (Recommendations No. 89, 2001, and No. 101, 2003). The goal of the PACS is to re-establish and maintain, in co-existence with people, a viable lynx population covering the whole of the Alpine arc. Four objectives have been formulated to reach this goal (MOLINARI-JOBIN *et al.* 2003):

1. The lynx populations in Slovenia and Switzerland maintain their vitality and must be helped to expand.
2. The populations in Slovenia and Switzerland are joined through colonisation of the area in between (Alps of Austria, Germany, Italy and Liechtenstein).
3. This unified population in the central Alps is allowed to expand to the north-east (Austria) and the south-west (France, Italy).
4. Gene flow is assured between the Alpine sub-populations and the population of Slovenia and Croatia, the population of the Jura Mountains and the population of the Bohemian/Bavarian forest.

Considering the current status and distribution of the Alpine sub-populations, these objectives might only be reached by means of further active translocations and re-introductions (MOLINARI-JOBIN *et al.* 2003, ZIMMERMANN 2003). As this is a controversial issue, a close co-operation between the seven countries sharing a future Alpine population is ultimate, and one prerequisite to achieve this is the raise of public awareness (MOLINARI-JOBIN *et al.* 2003).

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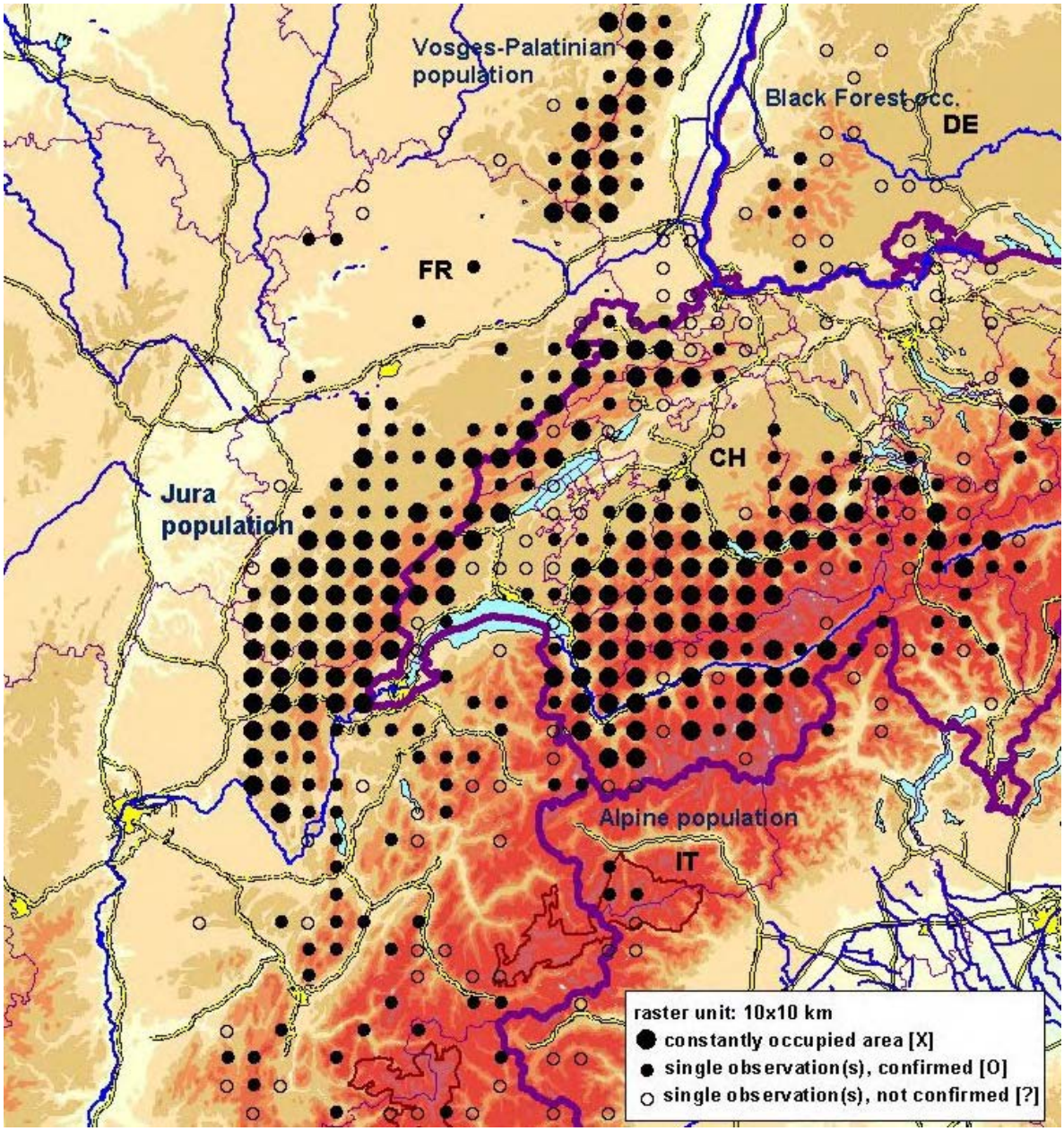
Jura population

1. Description:

1.1. Distribution of the Jura population in 2001



1.2. Countries (regions) and spatial trend

Countries sharing the population: *France* (Jura Mts., central-eastern France north of the Rhone), *Switzerland* (Jura Mts., western Switzerland between Geneva and Basel).

Spatial trend (change in distribution area since 1995): In both countries there has been an expansion of the area of lynx presence.

2. Status and trend:

2.1. Extension

Country	Lynx distribution area [km²]				Population share (% area [X] / [X+O])
	[X]	[O]	[?]	[X+O]	
France	5'300	3'000	800	8'300	73.6 / 72.2
Switzerland	1'900	1'300	1'600	3'200	26.4 / 27.8
Total population	*7'200*	*4'300*	*2'400*	*11'500*	*100 / 100*

2.2. Fragmentation

Total area ([X+O] – isolated [O]): 11'500 km²
Number of patches: 1
Mean patch size and range: -
Mean nearest distance between patches: -

2.3. Size of the population

Country	Estimation 1995*	Estimation 2001**	Density (lynx per 100 km² area [X])	Trend 1990-1995*	Trend 1996-2001
France	50-150	54 (-94)	0.89	stable	expanding
Switzerland	30	20-25	1.05-1.32	stable	increasing & expanding
Total population	*~100*	*~80*	*~1.0*	*stable*	*expanding & partly increasing*

***** Eurasian Lynx Action Plan 2000, Table 2 (BREITENMOSER *et al.* 2000)
** or most recent estimation available, refer to the respective country report

2.4. Management

Country	Legal status	National institution in charge	Conservation / Management plan status 1995*	Conservation / Management plan status 2001
France	fully protected	Ministère de l'Environment, Office national de la chasse et de la faune sauvage	none	implemented / in preparation [b]
Switzerland	fully protected	SAEFL (BUWAL) Swiss Agency for the Environment, Forests and Landscape	drafted	implemented
Population	*fully protected* [a]		*none*	*none*

* Eurasian Lynx Action Plan 2000, Table 3
[a] but "problem animals" causing too much damage regarding livestock depredation are in both countries removed
[b] implemented: protocol for the elimination of lynx to reduce repeated livestock depredation / in preparation: restoration plan

2.5. Harvest and known losses (yearly average 1996-2001)

Country	Harvest number	Removal of problem animals	Illegal killings	Other mortality	Total Ø 1996-2001	Total Ø 1990-1995*
France	0	0.33	0.33	4.17 [a]	4.83	(2.06) [b]
Switzerland	0	0	0.17	1.53 [a]	1.7	(3.1) [b]
Total population	*0*	*<1*	*<1*	*~6*	*~7*	*(~6)*

* Eurasian Lynx Action Plan 2000, Table 3
[a] mainly traffic accidents (France = 2.5, Switzerland = 0.5)
[b] Has several populations and there are no numbers per population available for this period. The numbers here are the calculated share of losses to the Jura population in proportion of its distribution to the total lynx distribution area in the country in 1995.

2.6. Depredation, compensation and prevention

Depredation: In the French Jura Mts., livestock depredation by lynx is common: 732 animals have been killed between 1996 and 2001. In the Swiss Jura Mts., where sheep are rare, depredation occurred in the late 1980s and increased again after 1999. It remained however restricted to an area in the northern part (canton of Jura), and has never reached the dimensions as in France.

Compensation: Financial compensations are in both countries paid by the state. In Switzerland the respective cantons contribute 20% of the amount.

Prevention: In France parks at risk are abandoned at night, or alternatively, guarding dogs are used to prevent lynx attacks. Additional measures used in Switzerland comprise electric fences, shepherds and flashing lights. Both countries remove problem lynx causing too much damage. It is assumed that illegal actions against lynx are a consequence of depredation, however most known cases of illegal lynx killing in the Swiss Jura Mts. occurred in the canton of Vaud, where depredation has not been a problem.

3. Threats

Country (population share in % area [X]) ► Threat ▼	France [a] (73.6 %)	Switzerland (26.4 %)	Jura population 1996-2001
Agriculture			
Extraction of wood			
Infrastructure development: Industry			
Infrastructure development: Human settlement			
Infrastructure development: Tourism / recreation			
Infrastructure development: Road building		X	X
Legal hunting & trapping			
Shooting (illegal)		X	X
Trapping / snaring (illegal)			
Poisoning		X	X
Vehicle and train collision		X	X
Storms / flooding			
Wildfire			
Avalanches / landslides			
Competitors			
Prey / food base			
Pathogens / parasites		X	X
Limited dispersal		X	X

Country (population share in % area [X]) ► Threat ▼	France [a] (73.6 %)	Switzerland (26.4 %)	Jura population 1996-2001
Poor recruitment / reproduction / regeneration			
High juvenile mortality			
Inbreeding			
Low densities			
Skewed sex ratios			
Slow growth rates			
Population fluctuations			
Restricted range			
Recreation / tourism			
Research			
War / civil unrest			
Transport			
Other			

[a] No threats mentioned by the contacts but the following comment: In the Jura Mts. the area of lynx presence increased from 1998-2001 in spite of several cases of illegal and legal removal of lynx. The lynx population in this region has therefore endured these losses and those that have not been noticed.

Threats 1995 (Eurasian Lynx Action Plan 2000, Table 6):
Illegal killings, traffic accidents, MVP (population size, genetics), and depredation.

4. Population assessment

The Jura population originated from re-introductions in the Swiss Jura Mts. during the years 1974/75 (BREITENMOSER *et al.* 2002). Already the same years some first animals were observed in the French Jura Mts. (VANDEL & STAHL 1998). Currently, the population makes up around 80 animals (Table 2.3), distributed over nearly the entire mountain chain (see map). From the 11'500 km² permanently or occasionally occupied area, France makes up roughly two third (Table 2.1). From 1996-2001 the population was expanding, an ongoing tendency in the north-eastern Swiss Jura Mts. However, the main part of the available habitat is already occupied (VANDEL & STAHL 2000, BREITENMOSER *et al.* 2002, STAHL, VANDEL & MIGOT 2002). According to a habitat model, ZIMMERMANN & BREITENMOSER (subm.) predict that the Jura Mountains could host about 74-101 resident lynx. Potential corridors to neighbouring lynx occurrences (Alps, Vosges-Palatinian and Black Forest) exist, but there are some barriers like highways and rivers that have to be crossed. Connections to the Chartreuse (French Alps) are the less costly and may indeed have been used, as indicated by signs of lynx presence (ZIMMERMANN & BREITENMOSER subm.). For genetic reasons an exchange with other populations would be important as the Jura population turned out to have lost part of its original variability compared to the source population from the Slovak Carpathians (BREITENMOSER-WÜRSTEN & OBEXER-RUFF 2003).

Lynx is legally protected in both countries (Table 2.4). Stock-raiding animals can however be removed. In France lynx attacks on sheep increased for the first time in 1988. Since then, depredation has been comparatively high (STAHL *et al.* 2001a, Table 5.1 country report). In the Swiss Jura Mts. there was a peak in 1987 and then again in 2000/2001, with almost no cases in between (BREITENMOSER *et al.* 2002). In France as well as in Switzerland the attacks only concerned a few restricted areas (so-called "hot spots"; STAHL *et al.* 2001a, BREITENMOSER *et al.* 2002). Similar criteria for the removal of problem animals have been established in both countries. Nevertheless, shepherding techniques have to be improved to reduce attacks, as removed lynx might soon be replaced by other individuals causing damage (STAHL *et. al.* 2001b, ANGST, HAGEN & BREITENMOSER 2002).

The Jura population is facing the same potential threats as in 1995 (Table 3), particularly illegal killing and traffic accidents. From the 7 lynx mortalities known each year, an average of three die in a traffic accident and one due to an illegal act, respectively (Table 2.5; a compilation for the years 1974-2001 in BREITENMOSER *et al.* 2002, and for the years 1974-1998 in France in STAHL & VANDEL 1999). But it goes without saying that the number of unknown illegal killings is higher than of traffic accidents.

The continuation of the monitoring of the population size and distribution, as well as the genetic surveillance is recommended as the overall status of the population has yet considered to be "endangered". Improved connectivity to other lynx populations or occurrences, allowing individuals to migrate between adjacent

populations would be an effective way to mitigate the general risk of extinction. For this, a close co-operation between the countries concerned is needed.

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ZIMMERMANN, F. & BREITENMOSER, U. (subm.): Potential distribution and population size of the Eurasian lynx (*Lynx lynx*) in the Jura Mountains and possible corridors to adjacent ranges.

6. Contacts

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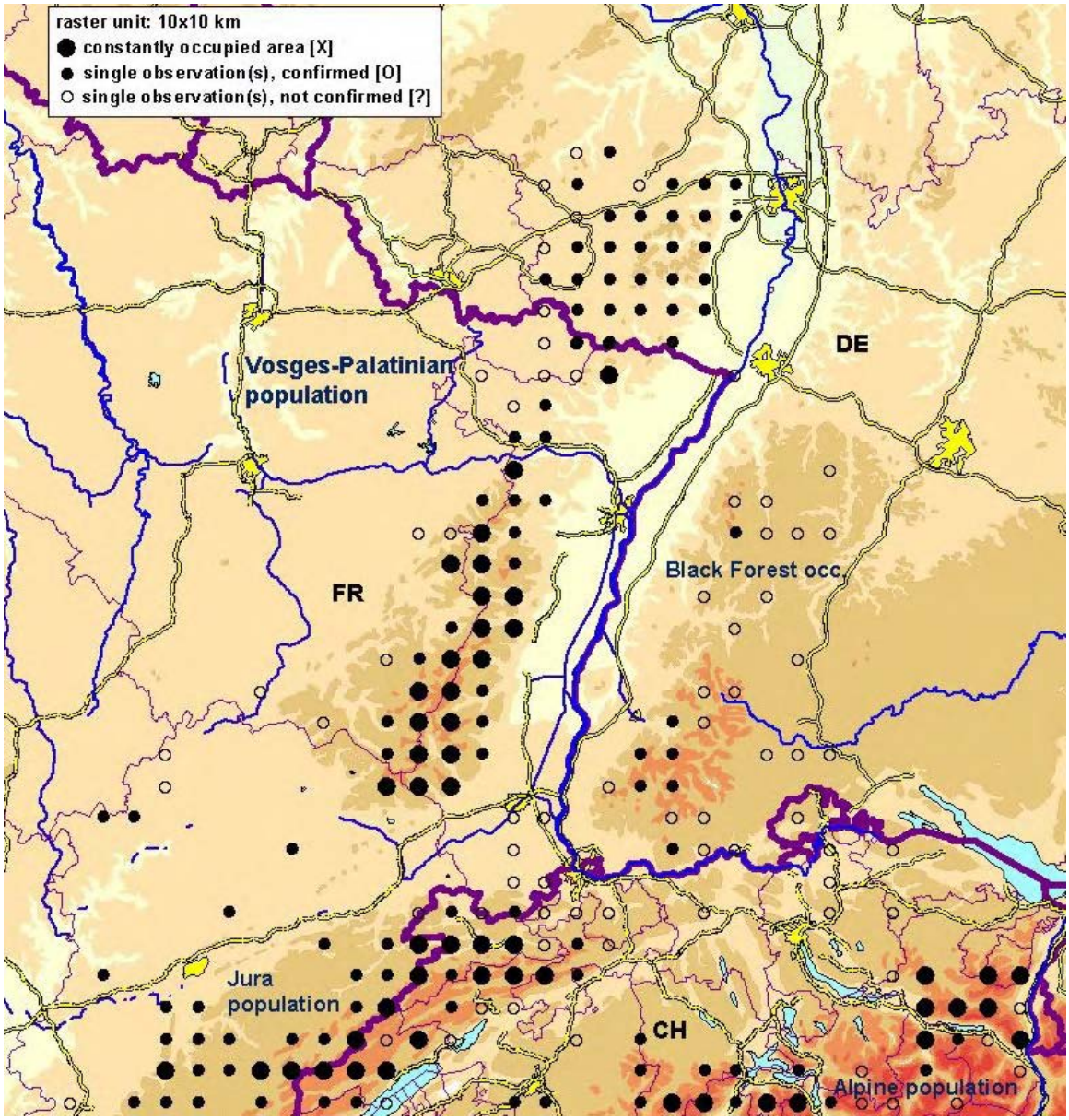
Vosges-Palatinian population

1. Description:

1.1. Distribution of the Vosges-Palatinian population in 2001



1.2. Countries (regions) and spatial trend

Countries sharing the population: *France* (Vosges Mountains), *Germany* (Palatinian Forest and surroundings).

Spatial trend (change in distribution area since 1995): *France*: The area of lynx presence increased in the range of the south and central Vosges Mts., whereas it decreased in the northern Vosges, *Germany*: unknown as monitoring only started after 1995.

2. Status and trend:

2.1. Extension

Country	Lynx distribution area [km²]				Population share (% area [X] / [X+O])
	[X]	[O]	[?]	[X+O]	
France	2'000	1'500	1'300	3'500	100 / 54.7
Germany	0	2'900	600	2'900	0 / 45.3
Total population	*2'000*	*4'400*	*1'900*	*6'400*	*100 / 100*

2.2. Fragmentation

Total area ([X+O] – isolated [O]):	6'400 km²
Number of patches:	2 (the northern patch consists however more or less of sporadically occupied area only)
Mean patch size and range:	3'200 km²; 3'000-3'400 km²
Mean nearest distance between patches:	10 km

2.3. Size of the population

Country	Estimation 1995*	Estimation 2001**	Density (lynx per 100 km² area [X])	Trend 1990-1995*	Trend 1996-2001
France	10-50	18 (-37)	0.8	increasing	expanding [a]
Germany	8-11	3-4	-	unknown	decreasing
Total population	*~30*	*~20*	*~0.8*	*increasing*	*S: expanding N: decreasing*

***** Eurasian Lynx Action Plan 2000, Table 2 (BREITENMOSER *et al.* 2000)
** or most recent estimation available, refer to the respective country report
[a] with the exception of the northern Vosges

2.4. Management

Country	Legal status	National institution in charge	Conservation / Management plan status 1995*	Conservation / Management plan status 2001
France	fully protected	Ministère de l'Environment, Office national de la chasse et de la faune sauvage	none	implemented / in preparation [a]
Germany	fully protected	none	none	none
Population	*fully protected*		*none*	*none*

* Eurasian Lynx Action Plan 2000, Table 3
[a] implemented: protocol for the elimination of lynx to reduce repeated livestock depredation / in preparation: restoration plan

2.5. Harvest and known losses (yearly average 1996-2001)

Country	Harvest number	Removal of problem animals	Illegal killings	Other mortality	Total Ø 1996-2001	Total Ø 1990-1995*
France	0	0	0	0.33	0.33	(0.75)[a]
Germany	0	0	0	0	0	0
Total population	*0*	*0*	*0*	*~1*	*~1*	*(~1)*

* Eurasian Lynx Action Plan 2000, Table 3
[a] Has several populations and there are no numbers per population available for this period. The numbers here are the calculated share of losses to the Vosges-Palatinian population in proportion of its distribution to the total lynx distribution area in the country in 1995.

2.6. Depredation, compensation and prevention

From 1996-2001 only 24 domestic animals have been killed by lynx in the Vosges Mts.; no losses have been noticed in the Palatinian Forest. In both countries, livestock losses due to lynx are financially compensated: in France by the central government, in Germany by the regional ministry in charge. Some prevention measures are applied in France, but particularly in the Jura Mts. were the extent of depredation is much higher. In the German Palatinian Forest, no prevention methods were needed so far.

3. Threats

Country (population share in % area [X]) ► Threat ▼	France (100 %)	Germany (0 %)	Vosges-Palatinian population 1996-2001
Agriculture			
Extraction of wood			
Infrastructure development: Industry			
Infrastructure development: Human settlement			
Infrastructure development: Tourism / recreation			
Infrastructure development: Road building			
Legal hunting & trapping			
Shooting (illegal)	X		X
Trapping / snaring (illegal)			
Poisoning			
Vehicle and train collision			
Storms / flooding			
Wildfire			
Avalanches / landslides			
Competitors			
Prey / food base			
Pathogens / parasites			
Limited dispersal			
Poor recruitment / reproduction / regeneration			
High juvenile mortality			
Inbreeding			
Low densities			
Skewed sex ratios			
Slow growth rates			
Population fluctuations			

Country (population share in % area [X]) ► Threat ▼	France (100 %)	Germany (0 %)	Vosges-Palatinian population 1996-2001
Restricted range			
Recreation / tourism			
Research			
War / civil unrest			
Transport			
Other			

Threats 1995 (Eurasian Lynx Action Plan 2000, Table 6):
Illegal killings, MVP (population size, genetics).

4. Population assessment

In the former inquiry (BREITENMOSER *et al.* 2000), the Vosges population and the Palatinian occurrence were treated separately. It might be still too optimistic to define a merged Vosges-Palatinian population, as the connection of the two areas is apparently not well established yet (see map). During the last few years, signs of lynx presence were decreasing in the North Vosges and only sporadic in the Palatinian Forest. Consequently, the trends of the two occurrences (Table 2.3) do presently not favour the unification. Nevertheless, considering the habitat and the fact that no barriers exists between the northern Vosges and the Palatinian Forest, a Vosges-Palatinian population potentially exists. To regard the Palatinian Forest occurrence as a subpopulation of a larger metapopulation is the only sensitive conservation approach, and formal contacts regarding the conservation of the entire population have already been established ("Initiative Pro Luchs", founded in 2000).

According to the current estimations, about 20 (at most 40) animals roam over 6'400 km², but less than one third of this area is permanently occupied at present (Table 2.1 and Table 2.3). An expansion to the east across the Rhine valley is unlikely (STAHL, VANDEL & MIGOT 2000, 2002, SCHADT *et al.* 2002), and to the west probably also limited due to lack of forest habitats (STAHL, VANDEL & MIGOT 2000, 2002). There is a potential connection to the Jura Mts., which may however not be easy to overcome (ZIMMERMANN & BREITENMOSER subm.). Nevertheless, since 1997 some indications were reported from the Haute-Saône, which lies in between the two massifs (STAHL, VANDEL & MIGOT 2000). To connect the two mountain chains would be very favourable for the long-term conservation of both populations.

The Vosges occurrence had been re-founded through the release of 21 lynx between 1983 and 1993 in the regions of Haut-Rhin and Bas-Rhin (south and central Vosges Mts.; STAHL, VANDEL & MIGOT 2000, 2002). However, according to VANDEL & WECKER (1995) only 4-5 females and 6-8 males reproduced; the other disappeared shortly after their release (mainly due to illegal killings). The arrival of the lynx in the Palatinian Forest differs according to the reference: 1980 (WÖLFL & KACZENSKY 2001, website "Initiative pro Luchs") or 1986 (VANDEL & WECKER 1995). The origin of these animals is not known, but natural immigration seems to be unlikely (WÖLFL & KACZENSKY 2001, VANDEL & WECKER 1995). Since then, lynx have only been permanently present in the regions where they had been released, the other parts of the Vosges Mts. have either not or only periodically been occupied (STAHL, VANDEL & MIGOT 2000). The northern Vosges Mts. are separated from the central Vosges Mts. by a main road and the "canal de la Marne au Rhin" in the district of Saverne, which are however not assumed to be a barrier (VANDEL & WECKER 1995).

The current number and range of the population indicate that it still has to be regarded as critically endangered. The contacts of both countries mention further re-introductions as the most urgent action to start with (Table 8 country reports). However, possible sites for doing so need to be carefully evaluated as the potential for the spreading of the lynx into other suitable habitat is limited (SCHADT *et al.* 2002). Potential corridors need to be improved. Further, the problem of illegal killings needs to be mitigated. Even though there are no reliable numbers (Table 2.5), illegal shooting is considered to be the major threat to the lynx in the Vosges Mountains (Table 3). Little is known about other potential threats, as not much research has actually been conducted in the Vosges-Palatinian population. The monitoring of the lynx in the German Palatinian Forest has only started in 1999. Continued monitoring on both sides of the national border is as crucial for the evaluation of further conservation activities as is the co-operation between the two countries concerned.

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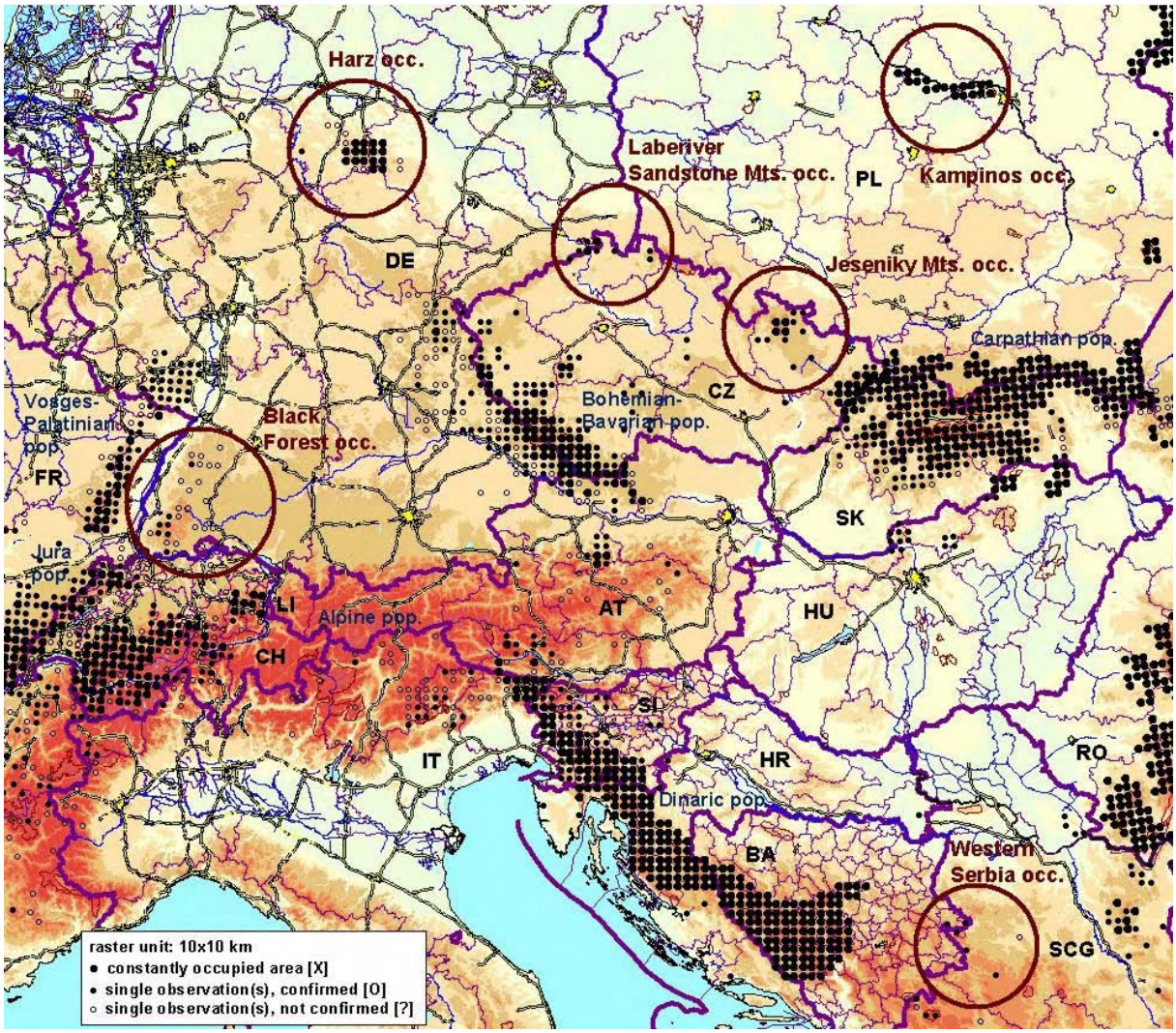
Additional lynx occurrences

1. Description:

1.1. Distribution of the additional occurrences in 2001



1.2. Countries (regions) and spatial trend

Kampinos occurrence: *Poland* (Central Poland, Kampinos NP, re-introduced 1993).
Jeseniky Mts. occurrence: *Czech Republic* (Jeseniky Mts. and foothills, in the central-east of the country).
Laberiver Sandstone Mts. occurrence: *Czech Republic (*Northern CZ, sandstone area on the border Czech-Saxonian), *Germany* (Saxon and Bohemian Switzerland, Osterzgebirge, Westlausitz).
Western Serbia occurrence: *Serbia and Montenegro* (Western Serbia incl. Tara Mt., Mokra Gora Mt., Zlatar Mt., Uvac gorge; origin unclear).
Black Forest occurrence: *Germany* (Black Forest, south-west Germany).
Harz occurrence: *Germany* (Harz NP, central Germany, introductions since 2000).
For the **Trentino** and the **Abruzze Mts.,** as well as for the **Metz occurrences**, all likely extinct, see country report Italy or France, respectively.

Spatial trend (change in distribution area since 1995): *Kampinos occ.*: expanding, *Jeseniky Mts. occ.*: no changes, *Laberiver Sandstone Mts. occ.*: decreasing, *Western Serbia occ.*: (new phenomenon), *Black Forest occ.*: unknown, *Harz occ.*: (exists since 2000 only).

2. Status and trend:

2.1. Extension

Occurrence	Country	Lynx distribution area [km²]			
		[X]	[O]	[?]	[X+O]
Kampinos	PL	1'900	100	0	2'000
Jeseniky Mts.	CZ	400	900	0	1'300
Laberiver Sandstone Mts.	CZ / DE	200	700	100	900
Western Serbia	SCG	0	500	100	500
Black Forest	DE	0	700	2'100	700
Harz	DE	1'600	100	800	1'700

2.2. Fragmentation

Occurrence	Total area ([X+O] – isolated [O]):	Distance (min.) to nearest population
Kampinos	1'900 km²	150 km to Baltic population
Jeseniky Mts.	1'100 km²	70 km to Carpathian population
Laberiver Sandstone Mts.	600 km²	120 km to Bohemian-Bavarian population
Western Serbia	0 km² (only [O])	95 km to Dinaric population [a]
Black Forest	0 km² (only [O])	50 km to Vosges-Palatinian population [b]
Harz	1'600 km²	160 km to Bohemian-Bavarian population

[a] (130 km to Balkan population)
[b] (55 km to Jura population)

2.3. Size of the occurrences

Occurrence	Estimation 1995*	Estimation 2001**	Density (lynx per 100 km² area [X])	Trend 1990-1995*	Trend 1996-2001
Kampinos	n.a.	22	1.16	unknown	increasing & expanding
Jeseniky Mts.	5-10	10	2.5	decreasing	stable
Laberiver Sandstone Mts.	6	10 (CZ) / 1-3 (DE)	5	increasing?	decreasing
Western Serbia	(new occ.)	5	-	(new occ.)	increasing & expanding
Black Forest	? (few)	a few individuals	-	unknown	unknown
Harz	(new occ.)	12	0.44	(new occ.)	increasing

***** Eurasian Lynx Action Plan 2000, Table 2 (BREITENMOSER *et al.* 2000)
** or most recent estimation available, refer to the respective country report

2.4. Management

Occurrence	Legal status	National institution in charge	Conservation / Management plan status 1995*	Conservation / Management plan status 2001
Kampinos (PL)	fully protected	Ministry of Environment	none	none
Jeseniky Mts. (CZ)	fully protected	Ministry of Environment, Ministry of Agriculture	none	none
Laberiver Sandstone Mts. (CZ / DE)	fully protected	Ministry of Environment, Ministry of Agriculture / none	none	none
Western Serbia (SCG)	fully protected	Bureau for Nature Protection	none	none
Black Forest (DE)	fully protected	none	none	none
Harz (DE)	fully protected	none	none	none

* Eurasian Lynx Action Plan 2000, Table 3

2.5. Harvest and known losses (yearly average 1996-2001)

Occurrence	Harvest number	Removal of problem animals	Illegal killings	Other mortality	Total Ø 1996-2001	Total Ø 1990-1995*
Kampinos (PL)	0	0	0	0	0	n.a.
Jeseniky Mts. (CZ)	0	0	0	0	0	n.a.
Laberiver Sandstone Mts. (CZ / DE)	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	n.a.
Western Serbia (SCG)	0	0	0	0	0	-
Black Forest (DE)	0	0	0	0	0	0
Harz (DE)	0	0	0	0	0	-

* Eurasian Lynx Action Plan 2000, Table 3

2.6. Depredation, compensation and prevention

One year after the first releases, 4 sheep have been killed in the Harz in 2001. In the other lynx occurrences, depredation did either not occur or there are no data available (Czech Republic).

3. Threats

Occurrence ► / Threat ▼	Kampinos	Jeseniky Mts.	Laberiver Sandstone Mts.	Western Serbia	Black Forest	Harz
Agriculture						
Extraction of wood						
Infrastructure development: Industry						
Infrastructure development: Human settlement	X					
Infrastructure development: Tourism / recreation						
Infrastructure development: Road building	X				X	
Legal hunting & trapping						
Shooting (illegal)		X	X	X		
Trapping / snaring (illegal)	X			X		
Poisoning						
Vehicle and train collision						
Storms / flooding						
Wildfire						
Avalanches / landslides						
Competitors				X		
Prey / food base						
Pathogens / parasites						
Limited dispersal	X					
Poor recruitment / reproduction / regeneration						
High juvenile mortality	X					
Inbreeding						
Low densities					X	
Skewed sex ratios						
Slow growth rates						
Population fluctuations						
Restricted range	X					
Recreation / tourism						
Research						
War / civil unrest						
Transport						
Other						

Threats 1995 (Eurasian Action Plan 2000, Table 6):
(No information available.)

4. Assessment additional occurrences

General:

All additional lynx occurrences are small in range (Table 2.1) and number (Table 2.3). They are isolated from other populations (Table 2.2), and often, their origin is not exactly known. The Kampinos and Harz occurrences – founded through the release of captive bred animals – are the biggest in number and range (Table 2.3 and Table 2.1), but also the most isolated of all occurrences (at least 150 and 160 km, respectively, to the nearest population, Table 2.2). The origin, duration and fate of the occurrences are very diverse, so that assessments cannot be generalised. Some are most likely the result of spontaneous immigration from existing populations (Laberiver Sandstone Mts., Jeseniky Mts., Western Serbia), some are intentional re-introductions (Harz, Kampinos), and some are of unknown origin (with clandestine releases being a possible explanation): Black Forest, but also the Trentino and the Abruzze Mts. occurrences, as well as the Metz occurrence (all likely no longer existing, see country report Italy or France, respectively), the Palatinian part of the Vosges-Palantinian population (see country report Germany) and the new observations in eastern Belgium (see below). Although reproduction has been observed in most of the occurrences (except for the Black Forest and Western Serbia), their expansion has usually not been pronounced. All occurrences are fully protected and without management concept (Table 2.4). Indications of lynx presence are mainly in the form of sightings and signs, “hard fact” data is rarely available (as for example seen in Table 2.5 where there are no known losses). Therefore, there is not much known about threats to the lynx occurrences; illegal killing and partly road constructions are considered as such (Table 3). In the future, it can however be expected that they may suffer from intrinsic factors as well.

Kampinos occurrence (Poland):

“The Wisla river in the north, the autostrada Poznan-Warsaw-Moscow as main west-east traffic junction in the south, the big town Sochaczew with 20’000 inhabitants in the west and the capital Warsaw directly at the eastern border of the park make the Kampinoski National Park an island of nature surrounded by civilization.” (BÖER *et al.* 1994). Such circumstances would certainly not be considered appropriate for a lynx re-introduction programme, however the initiators (BÖER *et al.* 1994) were convinced that the 350 km² area available feature ideal lynx habitat with an abundant roe deer population and enough smaller vertebrates as alternative prey for the released animals which do no yet have developed sufficient hunting skills for catching roe deer. The animals used for this experiment were captive-bred. Additionally, it was hoped that the re-introduction would solve problems with feral domestic cats within the park (BÖER *et al.* 1994).

This project ignored important basics of the guidelines for re-introductions by the IUCN (1987) and was therefore internationally controversial from the very beginning. Criticism came especially from Polish experts (e.g. OKARMA 1996). Nevertheless, seven zoo-born lynx (2 males and 5 females) were released in 1994 (BÖER *et al.* 1995) pretending that an average size of 50 km² area per lynx is not the theoretical maximum, and more animals could be released later on (BÖER *et al.* 1994). The animals have been followed by means of radio-telemetry. While doing this, it was observed that, when the trackers approached carcasses of prey, the lynx would leave their resting sites and lie close to the kill to defend it – a behaviour that has also been observed in the Harz occurrence (see below; KRAH 2003) but not in wild animals. The radio-tracker could approach up to 3 metres before the lynx would flee (BÖER *et al.* 1995), suggesting that captive-bred animals are really rather tame.

Of the seven animals released, one male concentrated on catching domestic chicken and was brought back to enclosure, two other animals have been killed in traffic accidents (it was previously expected that road kills would not be a problem; BÖER *et al.* 1995). All the same, reproduction was observed (BÖER *et al.* 1995). So far, 30 individuals, all captive-bred, have been released to this 350 km² area, and lynx is reported from areas outside the national park as well (BÖER *et al.* 2000, BÖER 2001, Table 2.1). However, mortality seems to have been higher than releases and reproduction, as indicated by the current estimation of 22 individuals (Table 2.3). As a matter of fact, 13 out of the 30 animals released were found dead between 1993 and 2000. Their cause of death was traffic (6 individuals), poaching (2), and unknown cause (5) (BÖER *et al.* 2000). Until 1999, nine of the 16 lynx originating from German or Polish zoos died, from the Fennoscandian zoo animals two (out of 16) were found dead (BLOMQVIST *et al.* 1999). According to BÖER *et al.* 2000, infectious diseases transmitted from domestic cats and dogs to the lynx could be an important mortality factor, as well.

The repopulation of the large forest complexes in north-western Poland would be welcome, however not by expanding animals from the Kampinos occurrence (OKARMA 1996). As the zoo-lynx taken for the project are of different geographic European origin (BÖER 2001), their subspecific status is unclear, and interbreeding with neither of the other Polish populations, the Baltic (in the north-east) and the Carpathian (in the south-east) has to be considered problematic (see chapters 2.2. Phylogenetic history and subspecies, and 2.3. Lynx in captivity). The distance to the closest natural population, the Baltic, is however far (150 km, Table 2.2) and the habitat in-between not favourable.

Jeseniky Mts. occurrence (Czech Republic):

Lynx re-appeared in the Jeseniky Mts. at the end of the 1940s, when animals immigrated from the Carpathian Mts. Since then, signs of presence have almost continuously been recorded (KOUBEK & BABIČKA 1996). The status of the occurrence has always been closely related to the population abundance in the Moravian parts of the Carpathians (CERVENY, KOUBEK & ANDÉRA 1996). Until the end of the 1970s lynx were only occasionally present (CERVENY, KOUBEK & ANDÉRA 1996). A peak was observed in 1988, when 15-18 individuals occupied some 1'200 km². Then, illegal killings caused a dramatic reduction in number and range (KOUBEK & BABIČKA 1996, CERVENY, KOUBEK & ANDÉRA 1996). In 1996, the permanently occupied area was limited to central parts of the Jeseniky Mts., within protected areas, and the number did not exceed 5 individuals (KOUBEK & BABIČKA 1996). When considering the trends observed between 1990-95 and 1996-2001, respectively (Table 2.3), the current estimate of 10 individuals seems to be comparably high.

The potentially suitable area in the Jeseniky Mts. is 4'000 km² (KOUBEK & BABIČKA 1996), and thus the potential for expanding still rather high (currently only 400 km² are permanently occupied, Table 2.1). The range in the Jeseniky Mts. is isolated from the Beskydy Mts. (Carpathians) by a wide belt of deforested lowlands (CERVENY, KOUBEK & ANDÉRA 1996). The Jeseniky occurrence could act as a stepping stone and so play an important role in the conservation of the lynx subpopulations further west (see assessment of the Bohemian-Bavarian population). Nevertheless, as the Jeseniky Mts. are too small to host a viable population, the long-term survival of the occurrence should be secured through habitat corridors connecting the Jeseniky Mts. with the Beskydy Mts. and hence with the Carpathian population.

Laberiver Sandstone Mts. occurrence (Czech Republic / Germany):

The Laberiver Sandstone Mts. form another potential subpopulation connecting the Bohemian-Bavarian and the Carpathian populations. Lynx have been reported from the Laberiver Sandstone area as early as 1930s (CERVENY, KOUBEK & ANDÉRA 1996). However, the descriptions of killed prey (e.g. RIEBE 1994 or BENDA 1996) are not typical for lynx and rather doubtful. Further observations were again reported at the end of the 1950s (BENDA 1996, CERVENY, KOUBEK & ANDÉRA 1996). The origin of the animals remained obscure. At that time, an intense dispersal from the Carpathian population to the north and west took place, and animals settled in Bohemia and the Jeseniky Mts. (see above, and CERVENY, KOUBEK & ANDÉRA 1996). It is possible that some individuals went as far as the Laberiver Sandstone area, though the distances are long (see map) and the occurrence is rather isolated (at present 120 km to the Bohemian-Bavarian population, Table 2.2). In the 1980s and the first half of the 1990s, records increased and reproduction was noticed (BENDA 1996). (On the other hand, RIEBE (1994) reported for the same time local decreases on the German side.) The records consisted of single sightings and signs, but no confirmed evidence, making it difficult to estimate the population size. For 1995 the number was supposed to be around 6 individuals (Table. 2.3, BENDA 1996). The current estimation (11-13, Table 2.3), is rather high compared to the distribution area (Table 2.1), and presumably overestimated (the calculated density would be 5 lynx/100 km²). To enhance the knowledge about the Laberiver Sandstone Mts. occurrence, a systematic and co-ordinated survey in the area is to be recommended (also H. RIEBE, pers. comm.). The lack of data also makes it impossible assessing illegal killings as supposed major threat.

Western Serbia occurrence (Serbia and Montenegro):

The presence of lynx in western Serbia was first described by GRUBAČ (2000). Some single sightings and signs have occurred since 1990 (GRUBAČ 2000, PAUNOVIĆ 2001). According to GRUBAČ (2000), a formal proof for the lynx' presence is still missing, however PAUNOVIĆ (2001) lists 2 dead lynx for the Western Serbia occurrence, in 1996 and 2000, respectively. The occurrence deserves more attention, mainly regarding the origin of the animals. GRUBAČ (2000) and PAUNOVIĆ (2001, 2002) suppose animals immigrating from Bosnia-Herzegovina. As a matter of fact, the distance to the Dinaric population is 95 km, but to the Balkan population in southern Serbia and Montenegro 130 km (Table 2.2). It is however possible that lynx in Bosnia-Herzegovina roam further south than indicated (see country report), and might be closer to the Western Serbia occurrence than expected. As the Dinaric and the Balkan population might belong to distinct subspecies (see chapter 2.2. Phylogenetic history and subspecies), it is important to define the origin of the Western Serbia occurrence by means of genetic analyses. Such knowledge would not only be of academic interest, but also help defining a sound conservation strategy for. Currently, the occurrence is estimated to hold 5 individuals (3-6 according to GRUBAČ 2000 and PAUNOVIĆ 2002), with a positive tendency (Table 2.3).

Black Forest occurrence (Germany):

Lynx observations in the Black Forest have continued for already 20 years, however most of them have not been confirmed. The collection and verification of reports has been carried out by the University of Freiburg since the end of 1995 (KAPHEGYI & KAPHEGYI 2004). A dubious photograph (http://www.der-luchs.de/) has been considered to be the only direct evidence since; there was however a road kill in 1988 and a juvenile lynx shot on a farm in

1991. The later one was, due to its tame behaviour, suspected to have been a released captive animal (KAPHEGYI & KAPHEGYI 2004). The origin of the few individuals in the Black Forest is so far not known. Nevertheless, the future conservation and management measures for the Black Forest occurrence strongly depend on this question, as KAPHEGYI & KAPHEGYI (2004) stated. Animals escaped or intentionally released from enclosures would be a problem, whereas lynx immigrating from the Vosges-Palatinian or the Jura Mts. population would officially be welcome. According to habitat models by SCHADT *et al.* (2002b) the Black Forest is quite isolated. The direct distance to the Vosges-Palatinian population is around 50 km (Table 2.3), but the Rhine river and two highways and railways in an open landscape form a major barrier. A connection with the Jura Mts. seems more favourable (ZIMMERMANN & BREITENMOSER, submitted). A radio-tagged lynx crossing the Rhine river in the region of the canton of Schaffhausen indicated that such barriers are not impossible to overcome. Re-introduction of lynx in the Black Forest has been discussed for a long time, was however given up as a verdict in 1996 forbid the "Lynx Initiative Baden-Württemberg" to realize such a project (Juristisches Internetprojekt Saarbrücken 1997: http://www.jura.uni-sb.de/Entscheidungen/pressem97/VGH_BW/luchs.html).

Harz occurrence (Germany):

First attempts to re-introduce lynx into the Harz region go back to 1972, when a feasibility study was conducted (STAHL 1972). The discussion restarted in 1994, the year the Harz national park was established in the federal state Niedersachsen. The park consists of 158 km² and neighbours the national park Hochharz (federal state Sachsen-Anhalt), which is another 89 km². The responsible persons involved were convinced that immigration to and emigration from the national park is possible (information from the websites of the Harz national park as well as from the "Gesellschaft zur Förderung des Nationalparks e.V."). The project refers to the "positive experiences" made with captive-bred animals in the Kampinos national park (see above; http://nationalpark-harz.de/leben/luchs.htm). Responsible authorities are the Ministry of Food, Agriculture and Forests of Lower Saxony, the Ministry of Environment of Lower Saxony, and the state hunting organisation. The re-introduction is projected for 5-10 years with 3-5 lynx planned to release every year. A total of 12 lynx (8 females and 4 males) has been released in 2000/2001 (Table 2.3, http://www.nationalpark-harz.de/aktuell/nr32.htm), and another five in 2003. The animals were taken from different zoos and breeding facilities and represent an obscure mixture of several subspecies (BÖER 2001). So far, one male has migrated to the foothills of the Harz Mts. "Due to the positive development of the project, the representatives have decided to release some more animals in 2004 to compensate for the losses experienced, and to secure a broader genetic basis for the developing population" (citation from the Harz national park website: http://www.nationalpark-harz.de/aktuell/nr66.htm). However, there is no information on these losses (e.g. Table 2.5).

The Harz national park is responsible for the realization. The following has been claimed: "For a long-term conservation of the lynx in Central Europe the connection of existing occurrences is needed. The Lynx Project Harz wants to make a contribution to this" (http://nationalpark-harz.de/leben/luchs.htm). The map reveals that this is a specious argument: From all occurrences the one in the Harz is actually the most isolated (Table 2.2). SCHADT *et al.* (2002a, 2002b) conclude that a re-introduction program into the Harz Mts. does not have a high potential for lynx to spread into other suitable areas, and that the current release of animals into the Harz might actually even be counterproductive (SCHADT *et al.* 2002b). On the other hand, BÖER (2001) assumes that lynx have the ability for widespread migration, and that its habitat preference for forest does not exclude long distance movements in more open habitats.

The project released a severe controversy (e.g. WOTSCHIKOWSKY *et al.* 2001) as it has badly ignored recommendations of experts and guidelines such as those of the IUCN Re-introduction Specialist Group (IUCN 1987, 1998), e. g. regarding the animals released .

Update 2004: New occurrence in Belgium/Germany?:

Recent press releases report lynx observations in the "Hohen Venn", east Belgium. (http://www.netecho.info/schlagzeilen/rubrik.asp?a=%7BA675DE19-9A41-4D47-8F4A-EC0CF3052B35%7D, http://www.nationalpark-eifel.nrw.de/infos/archiv/schleicher.htm). There have already been single observations since 1997, but in 2003 the number increased. In the neighbouring German Eifel region, lynx have been sighted since 1997. However, no "hard facts" are available. As origin of the animals, both the possibility of natural immigration from the Palatinian Forest as well as clandestine releases are discussed. In the long-term, the whole area would only be suitable to host a small occurrence of a few individuals, and only habitat corridors to the south and the integration of such an occurrence in a larger metapopulation would allow establishing a viable population. The situation has to be further monitored to get more information.

A comment: Much has been said and written to justify or to run down the Kampinos and the Harz re-introduction projects. The fact is that these projects have neglected important recommendations from the conservation community based on experience and that the arguments used to justify both projects did largely ignore the present status of scientific knowledge on the species and on re-introductions in general. The worst mistake,

especially regarding the Harz project, was however that the responsible people have refused to set up a objective control of the project. The rejection to control the behaviour and movements of the animals released by means of radio-telemetry was justified with concern regarding the welfare of the animals; we however suppose that the project leaders intentionally did not want to take the risk to produce assessable information. Up to now, data remain obscure, the assessment of the projects bases on opinions and contentions rather than on facts. The opportunity to at least learn something from the release of captive bred animals was badly and willingly spoilt.

There can be no doubt that the lynx, to survive in central and western Europe, needs further active support and that such projects will be promoted by initiative individuals and groups. However, there are enough, and also negative, experiences from the re-introductions in Switzerland, Austria and France from the 1970s that we must not repeat the same mistakes over and over again. The scientific knowledge on lynx ecology has considerable increased over the past thirty years, and nobody today can claim a lack of information and wisdom.

The responsible people in the Kampinos and Harz project have used targeted disinformation to support their projects. However, the real problem is that the responsible authorities have neglected their duty to perform a sensible assessment. The lack of governmental responsibility, regional co-operation and a binding national concept is especially obvious in the case of Germany. On one hand, the federal states of Germany have the capacity (and the tradition) to advance such projects on their own, without co-operation with neighbouring states and without considering national and international rules. On the other hand, in no other central European country, inter-regional co-operation would so badly be needed. 19% of Germany are suitable habitat (SCHADT *et al.* 2002a), but all patches are too small to host viable populations and need to be considered in connection with neighbouring patches. Such conditions call for a nation-wide and in many cases even international co-operation and a lynx conservation strategy agreed upon by the federal states and national authorities.

Why worry? The tactic of activity groups is “to do something” in favour of the lynx, to create facts regardless to all objections. Such an approach will ultimately backfire. State sanctioned projects such as the Kampinos and the Harz re-introductions using zoo-borne animals create, beyond the reduced suitability of captive bred animals, a dangerous prejudice. The availability of captive bred lynx is almost unlimited (see chapter 2.3. Lynx in captivity). The temptation to release such animals instead of killing them is strong. Several of the lynx occurrences observed in the 1980s and 1990s are geographically so isolated that clandestine releases were the most likely, if not the only possible explanation. None of them has ever lasted. There are too many projects (approved and non-approved), which have already failed, and all these projects have produced severe controversies and have negatively influenced the public attitude and especially the willingness to co-operate among the interest groups involved.

Re-introducing carnivores is serious business implying a long-term commitment of all partners involved, also and especially from governmental organisations. All these projects are controversial, and diverging interests can only be mitigated through a clear and long-term concept regarding the goal of a re-introduction and the future management of a lynx population.

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6. Europe

This part includes summarising information from all countries across Europe to different aspects of the conservation and management of the Eurasian lynx. Several maps demonstrate the evolution of the lynx distribution from 1960 until 2001, the latest year covered by the current survey. Tables present data and information on the legal status, harvest and known losses, population sizes and trends, threats, depredation, and monitoring. They correspond to the Tables 1-6 in the Eurasian Lynx Action Plan (BREITENMOSER *et al.* 2000). Finally, conclusions are drawn regarding the current status and conservation of *Lynx lynx* in Europe.

6.1. Development of the lynx distribution area 1960-2001

2001:

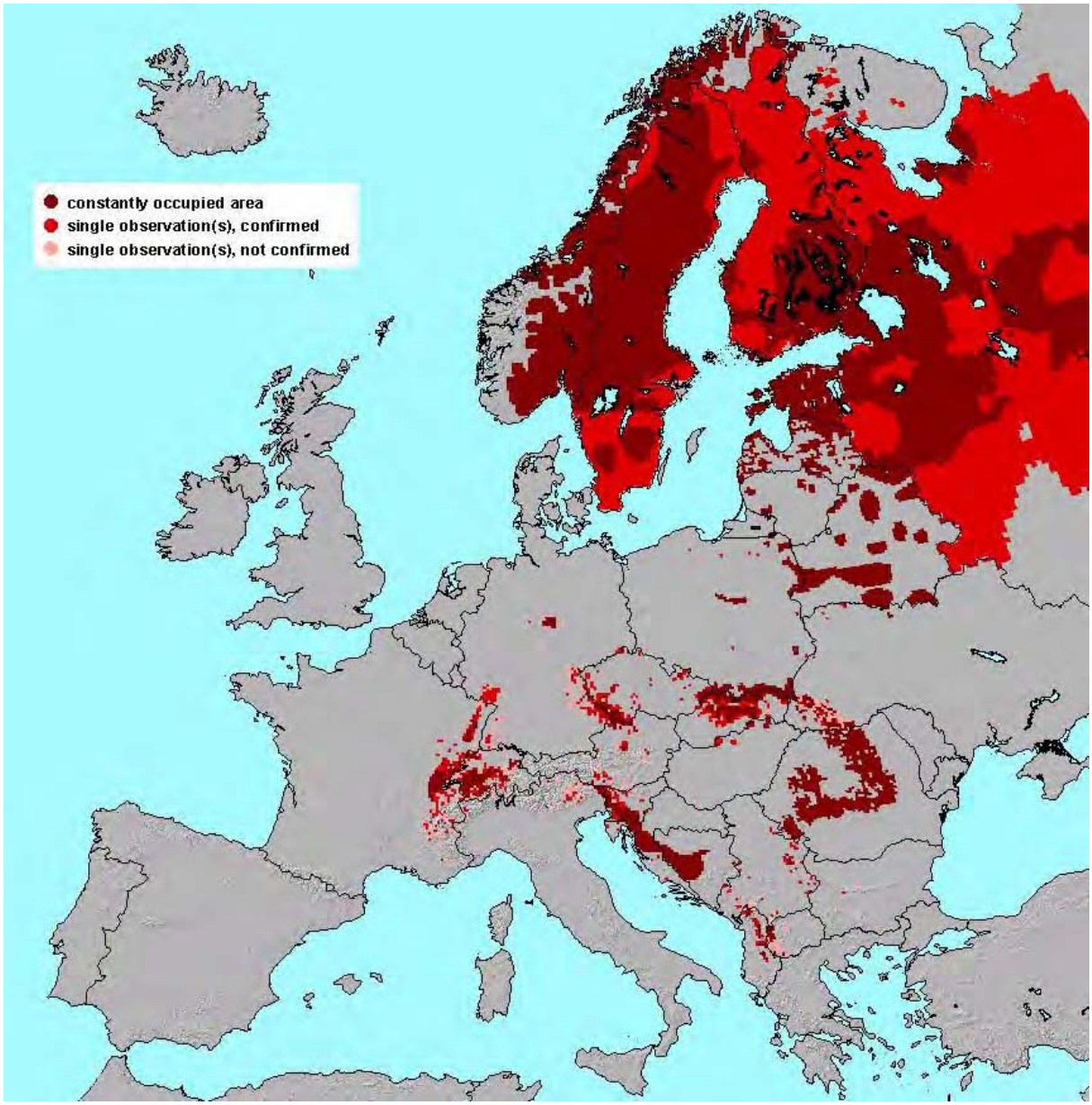

Figure 1: Recent distribution of *Lynx lynx* in Europe according to the information received during the current survey.

The contacts participating in the current European survey on the Eurasian lynx provided information on the distribution of the species per 10x10 kilometre raster of the country surface. A distinction between three different qualities was made: constantly occupied area; single observation(s), confirmed; single observation(s), not confirmed (for details see Material and methods). The compilation of all country maps gave the following picture of the current distribution of *Lynx lynx* in Europe (see Fig. 1 above).

For reasons of comparison, and to have an idea on the development of the distribution of the Eurasian lynx across Europe during the past few decades, maps for 1968, 1976, 1990 and 1995 are shown:

1968:

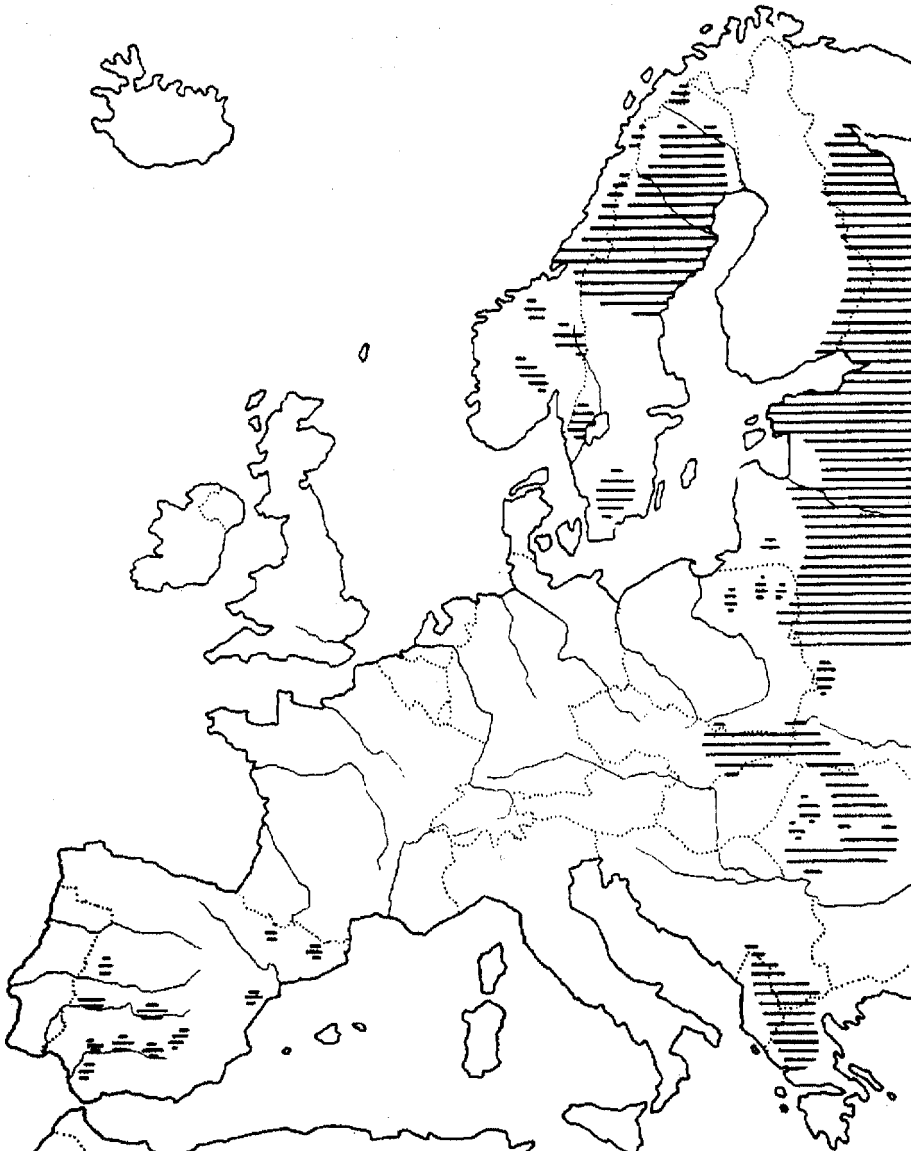

Figure 2. Distribution of the Eurasian lynx *Lynx lynx* (and the Iberian lynx *L. pardinus*) in Europe in the 1960s (KRATOCHVIL *et al.* 1968). From north-west to south: Nordic, Baltic, Carpathian and Balkan populations.

1976:

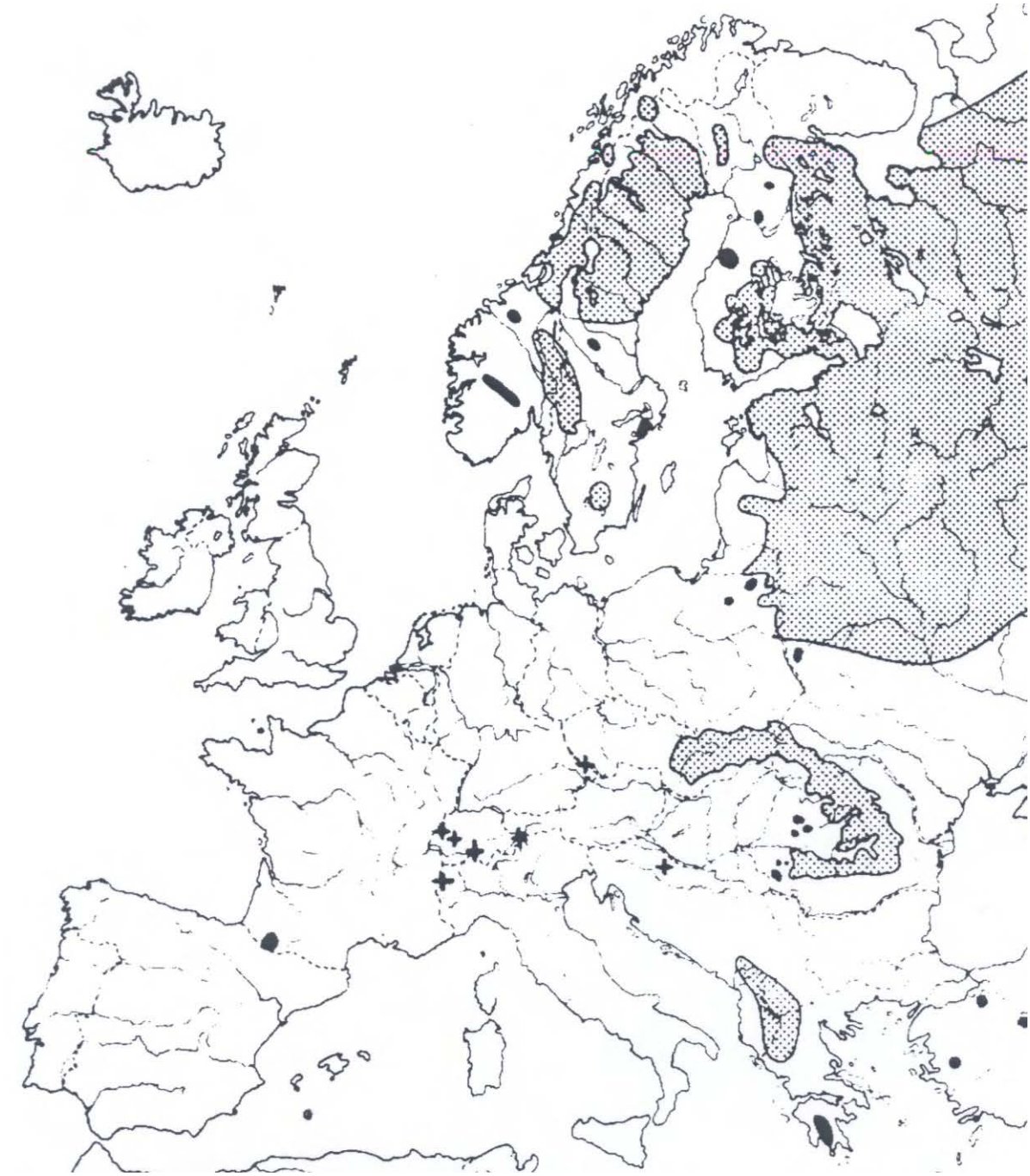

Figure 3. Distribution of the Eurasian lynx (*Lynx lynx*) in the 1970s (SMIT & VAN WIJNGAARDEN 1976). Compared to the 1960s slight expansions in Sweden and Finland (Nordic population), as well as in Slovakia and the Czech Republic (Carpathian population). First re-introductions in western Europe indicated by a "+".

1990:

Figure 4: Distribution of *Lynx lynx* in Europe in 1990 (BREITENMOSER & BREITENMOSER-WÜRSTEN 1990). Dark grey = occupied area, light grey = occasionally occupied area or area with low population density, dotted zone = lynx area according to literature, asterix = isolated observations. Re-introduction of animals in the 1970s/1980s led to the establishment of the Dinaric (YU), Bohemian-Bavarian (CS/DE), Alpine (CH, FR, IT, AT), Jura (FR/CH), and Vosges (FR) populations. Compared to the 1970s the Nordic population has expanded, too, the Balkan population, however, has considerably declined.

1995:

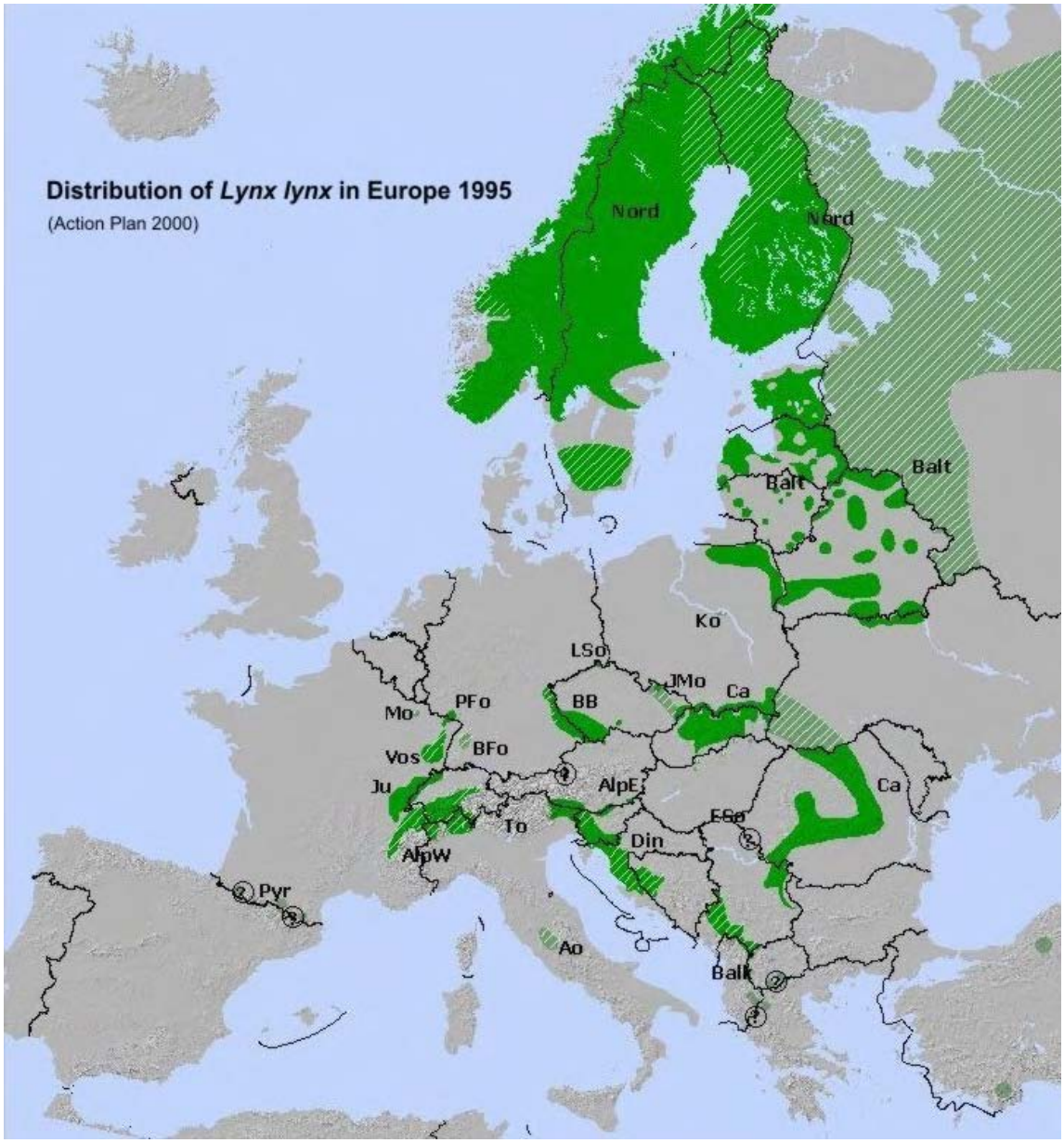

Figure 5: Distribution of *Lynx lynx* in Europe due to the information from the former inquiry (1995), and published in the Action Plan for the Conservation of the Eurasian Lynx in Europe (BREITENMOSER *et al.* 2000). Area: dark green = permanent, dark green striped = sporadic, light green-and-white striped = undetermined, ? = questionable.

References:

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BREITENMOSER, U. , BREITENMOSER-WÜRSTEN, CH., OKARMA, H., KAPHEGYI T., KAPHEGYI-WALLMANN, U. & MÜLLER, U. 2000: Action Plan for the Conservation of the Eurasian lynx in Europe (*Lynx lynx*). Nature and environment No. 112, Council of Europe Publishing, Strasbourg: 1-83.

KRATOCHVIL, J. *et al.* 1968a: History of the distribution of the lynx in Europe. *Acta sc. nat. Brno* 4: 1-50.

SMIT, C. J. & VAN WIJNGAARDEN A. 1976: Threatened mammals in Europe, Chapter 18: *Lynx lynx*. European Committee for the Conservation of Nature and Natural resources, Council of Europe, Strasbourg: 4 pp.

6.2. Populations

Table 1. Current populations and occurrences of the Eurasian lynx *Lynx lynx* in Europe. The definitions were taken from the Eurasian Lynx Action Plan (BREITENMOSER *et al.* 2000), but see also "Introduction". Origin (status): aut = autochthonous population, spo = spontaneous recolonisation, rei = re-introducted, uo = unknown origin, ext = extinct.

Population	Region	Countries	Origin
Nordic population	Fenno-Scandia and Karelia	Sweden, Norway, Finland	aut, spo
Baltic population	Russia, Baltic States, Białowieza	Russia (incl. Kaliningrad Oblast), Estonia, Latvia, Belarus, Poland, Lithuania, Ukraine	aut, (spo)
Carpathian population	Carpathian Mountains	Romania, Slovakia, Poland, Ukraine, Czech Republic, Hungary, Serbia and Montenegro, (Bulgaria)	aut
Balkan population	Albanian Alps and adjacent mountains in eastern Albania, western FYR Macedonia, Kosovo and Montenegro	Albania, FYR Macedonia, Serbia and Montenegro, Greece, (Bulgaria)	aut
Dinaric population	Dinaric Mountains	Bosnia-Herzegovina, Croatia, Slovenia	rei
Bohemian-Bavarian population	Sumava Mts. and foothills, Oberpfälzer and Bayerischer Forest, Mühl- and Waldviertel	Czech Republic, Germany, Austria	rei, (spo)
Alpine population	Alps, Julian Alps	Western sub-population: Switzerland, France, Italy; Eastern sub-population: Slovenia, Austria, Italy	rei
Jura population	Jura Mountains	France, Switzerland	rei
Vosges-Palatinian population	Vosges Mountains, Palatinian Forest	France, Germany	rei
Additional occurrences			
Kampinos NP occurrence	Kampinos national park	Poland	rei
Jeseniky Mts. occurrence	Jeseniky Mts and foothills	Czech Republic	spo
Laberiver Sandstone Mts. occurrence	Sandstone area, Saxony, Osterzgebirge, Westlausitz	Czech Republic, Germany	uo (spo or rei)
Western Serbia occurrence	Western Serbia incl. Tara, Mokra Gora, and Zlatar moutains	Serbia and Montenegro	uo (spo?)
Black Forest occurrence	Black Forest, south-west DE	Germany	uo
Harz occurrence	Harz Mountains, central DE	Germany	rei
Trentino occurrence	Trentino, north-east Italy	Italy	probably ext
Abruzze occurrence	Central Abruzze Mountains	Italy	probably ext
Metz occurrence	Western Lorraine	France	ext

6.3. Legal status

6.3.1. European treaties

For the conservation of the Eurasian lynx *Lynx lynx* in Europe two international treaties are especially relevant:

Convention on the conservation of European wildlife and natural habitats (Bern Convention, Council of Europe, 1979):

"The aims of this Convention are to conserve wild flora and fauna and their natural habitats, especially those species and habitats whose conservation requires the co-operation of several States and to promote such co-operation" (Article 1).
Lynx lynx is listed in **Appendix III** (protected fauna species). "Each contracting party shall take appropriate and necessary legislative and administrative measures to ensure the protection of the wild fauna species specified in Appendix III. Any exploitation of wild fauna specified in this Appendix shall be regulated in order to keep the populations out of danger" (Article 7, http://www.nature.coe.int/english/cadres/bern.htm).

Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EU Habitat Directive, 1992):

"The aim of this Directive shall be to contribute towards ensuring bio-diversity through the conservation of natural habitats and of wild fauna and flora in the European territory of the Member States to which the Treaty applies (Article 2.1). Measures taken pursuant to this Directive shall be designed to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest (Article 2.2). Member States shall undertake surveillance of the conservation status of the natural habitats and species (Article 11). "
Lynx lynx (except the Finnish populations) is listed in **Annex II** (Animal and plant species of Community interest whose conservation requires the designation of special areas of conservation) and in **Annex IV** (Animal and plant species of Community interest in need of strict protection). *Lynx lynx* is however not considered a priority species. "Member States shall take the requisite measures to establish a system of strict protection for the species listed in Annex IV in their natural range, prohibiting (for instant) all forms of deliberate capture and killing, and disturbance of the species" (Article 12.1). The incidental capture and killing of animal species in Annex IV has to be monitored (Article 12.4, http://europa.eu.int/comm/environment/nature/).

Table 2: The significance of the international treaties EU Habitat Directive, Bern Convention, and CITES for the individual countries sharing the range of the Eurasian lynx *Lynx lynx*. X (year) = year of ratification, (X) = signed, not yet ratified.

Country	EU Habitat Directive	Bern Convention	CITES
Albania	-	X (1999)	-
Austria	X (1995)	X (1983)	X (1982)
Belarus	-	-	X (1995)
Bosnia-Herzegovina	-	-	-
Bulgaria	-	X (1991)	X (2001)
Croatia	-	X (2000)	X (2000)
Czech Republic	(X)	X (1998)	X (1993)
Estonia	-	X (1992)	X (1992)
Finland	X (1995)*	X (1985)	X (1976)
France	X (1992)	X (1990)	X (1978)
FYR Macedonia	(X)	X (1998)	X (2000)
Germany	X (1992)	X (1984)	X (1976)
Greece	-	X (1983)	X (1992)
Hungary	(X)	X (1989)	X (1985)
Italy	X (1992)	X (1980)	X (1979)
Kaliningrad Oblast (RU)	-	-	X (1992)
Latvia	-	X (1997)	X (1997)
Liechtenstein	-	X (1980)	X (1979)
Lithuania	(X)	X (1996)	X (2001)
Norway	-	X (1986)	X (1976)
Poland	-	X (1995)	X (1989)
Romania	(X)	X (1993)	X (1994)
Serbia and Montenegro	-	-	X (2001)
Slovakia	X (2002)	X (1996)	X (1993)
Slovenia	-	X (1999)	X (2000)
Sweden	(X)	X (1983)	X (1974)
Switzerland	-	X (1981)	X (1974)
Ukraine	-	X (1999)	X (1999)

* Reservation

6.3.2. Legal status and management

Table 3. Legal status and management of *Lynx lynx* in the individual European countries. Management level: nat. = national, reg. = regional.

Country	Legal status	Institution in charge	Action plan	Management level
Norway	(reg.) quota hunting 01.02.-30.04.	National Directorate for Nature Management	government White Paper	nat. / reg.
Sweden	quota hunting 10.01.-31.03.	Swedish Environmental Protection Agency (SEPA)	yes (2000)	nat. / reg.
Finland	fully protected [a]	Ministry of Agriculture and Forestry	yes (1996)	nat.
Estonia	quota hunting 01.11.-28.02.	Estonian Ministry of Environment	yes (2001)	nat. / reg.
Latvia	hunting 01.10-15.03. [b]	State Forest Service	yes (2002)	nat. / reg.
Lithuania	fully protected	Ministry of Environmental Protection	no	nat. / reg.
Belarus	fully protected	Min. for Natural Resources and Nature Protection	no	nat.
Kaliningrad Oblast (RU)	fully protected	Region State Hunt Inspection	no	nat.
Ukraine	fully protected	Min. of Ecology and Natural Resources	prepared	nat. / reg.
Poland	fully protected	Ministry of Environment	no	nat.
Romania	quota hunting 01.09.-31.03.	Forest Dep. in the Min. of Agriculture, Food Industry and Forests	Minister order (2003)	nat. / reg.
Slovakia	hunting until 2001, since then protected	Ministry of Environment and Ministry of Agriculture	in preparation	nat.
Hungary	fully protected	Ministry of Environment	prepared	nat. / reg.
Czech Republic	fully protected	Ministry of Environment, Ministry of Agriculture	no	nat. / reg.
Serbia and Montenegro	fully protected	Bureau for Nature Protection of both, Serbia and Montenegro	no	nat. / reg.
Bulgaria	fully protected	Min. of Environment; Nat. Board of Forests (Min. of Agriculture and Forests)	no	nat. / reg.
Albania	fully protected	Gen. Directorate of Forest and Pastures	no	nat. / reg.
FYR Macedonia	fully protected	Ministry of Agriculture and Forestry	no	nat. / reg.
Greece	fully protected	Ministry of Agriculture	no	nat.
Bosnia-Herzegovina	no legislation	none	no	none
Croatia	quota hunting 15.11.-28.02., since 1998 fully protected	Ministry for environment and physical planning	yes (2003)	nat.
Slovenia	quota hunting 01.11.-28.02.	Ministry of Agriculture, Forestry and Food	no	nat.
Germany	fully protected	none (regional states = Bundesländer)	no	reg.
Austria	fully protected	none (regional hunting associations)	no	reg.
Switzerland	fully protected, removal problem lx	Swiss Agency for the Environment, Forests and Landscape SAEFL	yes (2000)	nat. / reg.
Italy	fully protected	Istituto Nazionale Fauna Selvatica	no	nat.
France	fully protected, removal problem lx	Min. de l'Environment, Office nat. de la chasse et de la faune sauvage	implemented/ in prep. [c]	nat. / reg.
Liechtenstein	fully protected	Amt für Wald, Natur und Landschaft	no	nat.

[a] protection can be derogated in accordance with article 16 of the EU Habitat Directive [resulting in a kind of quota hunting]
[b] new regulations since 2003: hunting season is now from 01.12.-31.03. with a yearly quota set
[c] implemented: protocol for the elimination of problem animals / in preparation: restoration plan

6.3.3. Harvest and other known losses

Table 4. Harvest numbers and known losses due to illegal killings, traffic, and other causes. All numbers are mean annual values for 1996-2001. Whenever numbers were available per population; they are separated, and the relative annual loss for the population indicated. "-" = not applicable, n.a. = not available, n.d.a. = no data available.

Country	Population	Legal killings	Illegal killings	Traffic accidents	Other losses	Total losses	% of population
Norway	Nordic	89.5	(incl. in other losses)		15.8	105.3	25.9
Sweden	Nordic	94	0	11.5	3.8	109.3	7.3
Finland	Nordic	58.8	0	0	0	58.8	7.1
Estonia	Baltic	168.7	0	0.17	1.17	170	15.5
Latvia	Baltic	87	n.a.	n.a.	n.a.	(87)	12.7
Lithuania	Baltic	-	n.d.a.	n.d.a.	n.d.a.	n.d.a.	-
Belarus	Baltic	-	n.d.a.	n.d.a.	n.d.a.	n.d.a.	-
Kaliningrad Oblast (RU)	Baltic	-	n.d.a.	n.d.a.	n.d.a.	1-3	n.a.
Ukraine	Carpathian only	-	2 (4 y)	0	0	n.a.	n.a.
Poland	Carpathian only	-	7 (1 y)	1 (1 y)	3 (1 y)	11 (1 y)	n.a.
Romania	Carpathian	7.2	n.d.a.	n.d.a.	n.d.a.	(7.2)	0.36
Slovakia	Carpathian	14.7	0.3	0.5	2.7	18.2	4.55
Hungary	Carpathian	-	n.d.a.	n.d.a.	n.d.a.	n.d.a.	-
Czech Republic	Boh.-Bav.	-	6.5	0	0.66	7.2	10.3
	Carpathian		0.3	0	0	0.3	0.8
Serbia and Montenegro	(unknown)	-	1.83	0.17	0	2	-
Bulgaria	(unknown)	-	0.67	0.17	0	0.83	-
Albania	Balkan	-	3.8	0	0	3.8	~19
FYR Macedonia	Balkan	-	0	0	0.33	0.33	0.94
Greece	Balkan	-	0	0	0	0	-
Bosnia-Herzegovina	Dinaric	2.3	0	0	0	2.3	5.75
Croatia	Dinaric	7 (96-98)	3.67	0.17	0.17	7.5	7.5-15
Slovenia	Dinaric/Alpine	1	0	0.5	0.33	1.83	3.66
Germany	Boh.-Bav. only	-	0.17	0.17	0.33	0.67	1.2
Austria	Boh-Bav. only	-	0.3	0.17	0	0.47	8.3
Switzerland	Alpine	-	1.8	1	6.87	9.7	13.9
	Jura	-	0.17	0.5	0.97	1.7	8.5
Italy	Alpine	-	0	0	0	0	-
France	Jura	-	0.33	2.5	2	4.83	10.3
	Vosges-Palat.	-	0	0.17	0.17	0.33	2.1
	Alpine	-	0	0.17	0.17	0.33	-
Liechtenstein	Alpine	-	0	0	0	0	-

6.4. Population size

Table 5. Number and distribution of *Lynx lynx* in Europe by countries in 2001. Distribution area: constantly occupied area / constantly + occasionally occupied area. Density: calculation see "Reference file countries". Methods: ss = sightings and signs, st = snow tracking, in = inquiry (hunters, foresters), un = unspecific survey, mo = analysis of lynx mortality data, rt = radio telemetry, pt = photo trapping, ld = data on livestock depredation. Trend: → = stable, ↘ = decreasing, ↗ = increasing, exp = expanding, ? = unknown.

Country	Population	No. of lynx 2001	Distribution area (km²)	Density (lynx/100 km²)	Methods	Trend 1996-2001
Norway	Nordic	327 [a]	215'600	0.19	ss, st, rt, mo, ld, family groups	→ (N, SE), ↘ (C, SW)
Sweden	Nordic	1400-1800 [a]	312'500 / 429'400	0.48	ss, st, rt, family groups	→, exp
Finland	Nordic	870 [a]	123'900 / 320'800	0.67	ss, st, in, family groups	↗, exp
Estonia	Baltic	900 [a]	42'700	2.58	st (hunters)	↘
Latvia	Baltic	648 [a]	29'000	2.36	ss, st, in, mo (hunting)	→
Lithuania	Baltic	103 [a]	4'500	2.1	ss, un, in	↘
Belarus	Baltic	(250)	(61'200)	-	-	probably ↘
Kaliningrad Oblast (RU)	Baltic	8-10 [b]	700	1.14-1.43	in, st	→
Ukraine	Baltic	20 [a] / 27 [b]	1'300 / 2'300	1.38	ss, st, un, in	↗
	Carpathian	230 [b]	5'800 / 7'400	4.53	ss, st, un, in	↘
Poland	Baltic	60 [b]	5'700 / 6'200	1.05	un, ss, st, rt	↘
	Carpathian	97 [b]	9'500 / 9'600	1.02	un, ss, st	↘
	Kampinos NP occ.	22 [b]	1'900 / 2'000	1.16	un, ss, st	↗, exp
Romania	Carpathian	2050 [a]	59'600	3.39	ss, st, un, in, mo	→
Slovakia	Carpathian	400 [a]	14'500 / 21'400	2.67	ss, st, un, in, mo	↘
Hungary	Carpathian	1-5 [a]	1'500 / 3'200	-	in	?
Czech Republic	Carpathian	40 [b]	1'300 / 1'900	3.08	ss, st, in	→
	Boh.-Bav.	60 [b]	4'500 / 9'200	1.56	ss, st, in, rt	↘
	Jeseniky Mts. occ.	10 [b]	400 / 1'300	2.5	ss, st, in	→
	Laberiver S. occ.	10 [b]	200 / 500	5	ss, st, in	↘
Serbia and Montenegro	Carpathian	45 [b]	500 / 2'900	-	ss, un, mo	↗, exp / → [c]
	Balkan	30 [b]	100 / 1'000	-	ss, un, mo	↘
	Western Serbia occ.	5 [b]	0 / 500	-	ss, un, mo	↗, exp
Bulgaria	(Carpathian / Balkan)	single individuals	(0) / (200)	-	ss, un, mo	?
Albania	Balkan	15-25 [a]	2'300 / 3'800	0.65-1.09	ss, st, in, mo	?
FYR Macedonia	Balkan	35 [a]	1'700	2.06	ss, un	↘
Greece	Balkan	(no confirmed evidence)		-	ss, in	?
Bosnia-Herzegovina	Dinaric	40 [b]	12'100	0.33	mo, ss	→
Croatia	Dinaric	40-60 [b]	8'400 / 9'100	0.6	ss, st, un, in, mo	↘
Slovenia	Dinaric	40	2'800 / 3'900	1.43	ss, st, in, rt	→ to ↘
	Alpine	10	1'900 / 3'400	0.53	ss, st, in, rt	→ to ↘

Country (cont.)	Population	No. of lynx 2001	Distribution area (km²)	Density (lynx/100 km²)	Methods	Trend 1996-2001
Germany	Boh.-Bav.	12 [a]	1'700 / 2'300	0.97	ss, st, un, rt	↘
	Vosges-Palatinian	3-4 [a]	0 / 2'900	-	ss	↘
	Laberiver S. occ.	1-3 [a]	0 / 600	-	ss, in	↘
	Black Forest occ.	a few individuals	0 / 700	-	ss, st, in	?
	Harz occ.	12 [a]	1'600 / 1'700	0.44	No. of released animals (ss, st, in, pt)	↗
Austria	Boh.-Bav.	4 [b]	1'700 / 2'300	0.35	ss, st, in	↘
	Alpine	20 [b]	700 / 2'300	-	ss, st, in	(inconsistent)
Switzerland	Alpine	70 [a]	7'900 / 12'200	0.89	ss, mo, pt, ld	→, exp
	Jura	20-25 [a]	1'900 / 3'200	1.05-1.32	ss, mo, pt, ld	↗, exp
Italy	Alpine	10 (E) / 3 (W) [b]	1'200 / 3'000	0.58 (E)	ss, st, in	↗, exp (E); →(W)
France	Alpine	single individuals	0 / 4'500	-	ss, st, un	exp
	Jura	54 (-94) [b]	5'300 / 8'300	0.89	ss, st, un, rt	exp
	Vosges-Palatinian	18 (-37) [b]	2'000 / 3'500	0.8	ss, st, un	exp (except N)
Liechtenstein	Alpine	(no confirmed evidence)		-	-	-

[a] official number
[b] additional estimate
[c] increasing & expanding: Eastern Banat occurrence; stable: Southeastern Banat occurrence

6.5. Depredation, compensation, prevention

Table 6. Livestock depredation, compensation paid and prevention methods applied in the range of *Lynx lynx* in Europe. Compensation: nat. = national institution, reg. = regional institution responsible for the payments. Prevention: gd = guarding dogs, ef = electric fences, sh = shepherds, ab = temporal abandonment of pastures, sy = sheep yards, dk = donkeys, fl = flashing lights.

Country	Sum of animals killed by lynx 1996-2001				Compen-sation?	Total Euro (€) paid 1996-2001	Prevention
	Sheep	Goats	Reindeer	Others			
Norway	53'108	0	(extensive)	0	yes: nat.	30'841'966 [a]	partly: ef, gd
Sweden	589 (5 y)	1 (3 y)	20'000-40'000 / y	6	yes: nat.	6'422'000 (4 y)	yes: ef
Finland	0	0	669	0	yes: nat.	n.d.a.	yes: ef, sh
Estonia	0	0	-	0	no	0	no
Latvia	0	0	-	0	no	0	no
Lithuania	0	0	-	0	no	0	no
Belarus	n.d.a.	n.d.a.	-	n.d.a.	no	0	no
Kaliningrad Oblast (RU)	n.d.a.	n.d.a.	-	n.d.a.	no	0	no
Ukraine	0	0	-	1	no	0	yes: sh, gd
Poland	0	0	-	0	no	0	no
Romania	n.d.a.	n.d.a.	-	n.d.a.	yes: reg.	n.d.a.	yes: gd
Slovakia	0	0	-	n.d.a.	(since 2003)	0	sy, ef, gd, bells
Hungary	0	0	-	0	no	0	no
Czech Republic	yes (n.d.a.)	yes (n.d.a.)	-	yes (n.d.a.)	yes: nat.	n.d.a.	yes: ef, partly gd
Serbia and Montenegro	n.d.a. (rare)	n.d.a. (rare)	-	n.d.a. (rare)	no	0	no
Bulgaria	1	0	-	0	no	0	yes: gd
Albania	0	0	-	0	no	0	no
FYR Macedonia	0	0	-	0	yes: nat.	0	no
Greece	0	0	-	0	yes: nat.	0	yes: gd
Bosnia-Herzegovina	0	0	-	0	no	0	no
Croatia	1	10	-	0	yes: nat.	720	no
Slovenia	269	14	-	10	yes: nat.	84'250	no
Germany	9 (Bohemian-Bavarian pop.)			15	yes: NGO	2'779	no
	4 (Harz occ.)		-	-	yes: reg.	200	no
Austria	26	0	-	0	yes: hunters	2'980	no
Switzerland	775	76	-	44	yes: nat.	219'704	yes: ef, dk, gd, sh, fl
Italy	0	0	-	0	yes: [b]	0	no
France	980	19	-	-	yes, nat.	198'406	yes: gd, ab
Liechtenstein	0	0	-	0	no	0	no

[a] all large predators (lynx, bear, wolf, wolverine and golden eagle plus unspecified)
[b] different for each "Provincia" and "Regione"

6.6. Monitoring and research

Table 7. Monitoring and research on *Lynx lynx* in Europe. Monitoring: ss = sightings and signs, st = snow tracking, in = inquiry (hunters, foresters), un = unspecific survey, mo = analysis of lynx mortality data, rt = radio telemetry, pt = photo trapping.

Country	Monitoring	Research
Norway	winter census (st)of family groups	population dynamics, social organisation, predation, depredation
Sweden	winter census (st) of family groups	lynx-roe deer, lynx in reindeer area
Finland	triangle transect scheme (st), no. of family groups	no
Estonia	(hunting data)	LC project with LV, LT, PL & NO
Latvia	(hunting data)	game management, analysis of hunting bag, LC project with LV, LT, PL & NO
Lithuania	(hunters' data, unspecific survey)	LC project with LV, LT, PL & NO
Belarus	no	no
Kaliningrad Oblast (RU)	no	no
Ukraine	(inquiry, ss, st)	population status of rare predators
Poland	no	ecology
Romania	(ss, hunting data; by game management admin.)	(Carpathian Large Carnivore Project)
Slovakia	(ss, mo)	no
Hungary	(inquiry game managers)	LIFE Nature project LC conservation
Czech Republic	st, rt (Boh.-Bav.), in	no
Serbia and Montenegro	(ss, un, mo)	no
Bulgaria	(ss, un, mo)	predator-prey, conservation status
Albania	(ss, st, in, mo)	no
FYR Macedonia	(ss, un)	no
Greece	(ss, in)	no
Bosnia-Herzegovina	(mo, ss)	no
Croatia	ss, st, un, in, mo	fossil and recent LC
Slovenia	mo, livestock depredation, ss, st, in, rt	no
Germany	(only on regional level, partly volunteer work: mainly ss, st)	regional monitoring initiatives and information campaign
Austria	(unsolicited reports by hunters' associations)	regional monitoring on volunteer basis
Switzerland	in game wardens, ss, mo, depredation, pt, rt	monitoring, ecology, genetics
Italy	(ss, st, in on volunteer basis)	no
France	"réseau lynx": network of trained local correspondents who collect, verify and transmit data (ss, mo)	no
Liechtenstein	no	no

6.7. Threats

Table 8. Major threats to the lynx *Lynx lynx* populations (and the species) in Europe, compiled from the country reports. Populations: Alp = Alpine, Balk = Balkan, Balt = Baltic, Boh.-Bav. = Bohemian-Bavarian, Carp = Carpathian, Din = Dinaric, Jura, Nord = Nordic, VosPf = Vosges-Palatinian.

Population ► Threat ▼	Alp	Balk	Balt	Boh. -Bav.	Carp	Din	Jura	Nord	VosPf	*Lynx lynx* Europe
Agriculture		X			X					
Extraction of wood		XX			XX					XX
Infrastructure development: Industry										
Infrastructure development.: Human settlement	X				X					
Infrastructure development: Tourism / recreation		X			XX					X
Infrastructure development: Road building	XX		X	X	X	X	X			XX
Legal hunting & trapping						X		X		
Shooting (illegal)	XX	XX	XX	XX	XX	XX	X	XX	X	XXX
Trapping / snaring (illegal)		XX	X		X			XX		XX
Poisoning	X				X		X			
Vehicle and train collision	XX					XX	X			XX
Storms / flooding										
Wildfire										
Avalanches / landslides	X									
Competitors	X	XX			X					X
Prey / food base	X	XX			X	XX				XX
Pathogens / parasites	X				X		X			
Limited dispersal	XX	XX	X		X		X			XX
Poor recruitment / reproduction / regeneration		X								
High juvenile mortality		X	X							
Inbreeding		X								
Low densities	X	XX	X							X
Skewed sex ratios					X					
Slow growth rates		X								
Population fluctuations					X					
Restricted range		XX	X		X					X
Recreation / tourism		X			XX					X
Research										
War / civil unrest		X								
Transport						X				
other					X					

For the future the most often named threats were: Road constructions, illegal killings, and prey/food base, followed by extraction of wood, infrastructure development due to tourism/recreation, limited dispersal, and recreation/tourism.

7. Conclusions

This status report bases on information for the year 2001 and follows six years after the inquiry made for the Action Plan for the Conservation of the Eurasian Lynx in Europe (BREITENMOSER *et al*. 2000). Since then, considerable progress has been made in many European countries regarding the survey of the lynx populations. Furthermore, the Action Plan was not meant to be a status report at the first place, and did therefore not list the information gathered for each country in detail. It was nevertheless clear that the country approach is not the best possible way to address the conservation of a large carnivore such as the lynx. Most of the populations expand over several countries, and the "populations" within many countries would not be viable. Although countries are (and will remain) the monitoring and management units, goals regarding the conservation of the species should be defined on the level of the populations. To facilitate such an approach, we have summarised the country reports for the populations.

Table 1. Status of the Eurasian lynx *Lynx lynx* populations in Europe in 2001. For comparison, the population size 1995 and the trend 1990-1995 are included. Origin: aut = autochthonous, spo = spontaneous recolonisation, rei = re-introduced. Area: cont. = continuous range, frag. = fragmented range. Trend: → = stable, ↗ = increasing, ↘ = decreasing, exp = expanding. Judgement: LC = Least Concern, EN = Endangered, CR = Critically Endangered.

Population	Origin	Area (km²)	Size 2001	Size 1995	Trend 96-01	Trend 90-95	Judgement 2001 *
Nordic	aut, spo	965'800 (cont.)	~2800	~2500	→	↗	LC
Baltic	aut, (spo)	143'200 (frag.)	~2000	>2000	↘	(→)	LC
Balkan	aut	5'600 (frag.)	~80	n.d.a.	↘	↘	CR
Carpathian	aut	100'500 (± cont.)	~2800	~2400	→	→	LC
Bohemian-Bavarian	rei, (spo)	14'200 (± cont.)	~75	~100	↘	↗ & exp	(EN)
Dinaric	rei	24'400 (cont.)	~130	~200	→ to ↘	(→)	(EN)
Alpine	rei	18'100 (frag.)	~120	~120	→, exp	→	(EN)
Jura	rei	11'500 (cont.)	~80	~100	exp, ↗	→	(EN)
Vosges-Palatinian	rei	6'400 (± cont.)	~20	~30	exp/↘	↗	(CR)

* Judgement according to the „Guidelines for Application of IUCN Red List Criteria at Regional Levels" (IUCN 2003). Judgement for re-introduced populations in brackets as 30 years of existence are obviously not enough to fulfil the criteria for the not threatened categories.

The assessment of the populations has revealed several methodical problems. First, the definition of the population – taken from the Action Plan (BREITENMOSER *et al*. 2000; Europe Table 1) – is not always easy and needs to be reconsidered for future works. Second, the compilation of the country reports into population reports is not a straight-forward procedure and was often done as a subjective interpretation of the editors. Third, the information provided from the country contacts did in some cases differ from one to the other side of the border in such way that a comprehensive judgement was not possible. This is, however, part of the process: Such inconsistencies should motivate all of us to review the procedures applied and the information gathered.

There are some points, which we think can be listed as general conclusions from this inquiry and status report:

1. The Eurasian lynx in Europe as a whole is not a threatened species. There was, in spite of local fluctuations and cutbacks, a continuous increase both of the area occupied and the number of lynx since the 1950/60s. The general situation of the lynx across Europe is today better than it was in any of the previous Pan-European status reports (see previous chapters).

2. The one exception is the Balkan population. This population has very likely significantly decreased over the past decades. All previous reports were suffering from a lack of data for this population, and even now, the information is limited. Nevertheless, the population must be considered Critically Endangered, and this is even more alarming as we have good indication that the Balkan lynx should be considered an own subspecies *Lynx lynx martinoi*.
3. The lynx has a high potential to recover and to spread further in Central and Western Europe. However, habitat fragmentation and conflicts with human interests hamper this process. This is true for the south-eastern part of the Baltic population – where the subpopulations in Poland and Belarus are now completely isolated – and even more for all reintroduced populations. All these strongly fragmented populations should be considered and managed as metapopulations. This requires even more an international approach and a strong co-operation between the countries sharing the population. In some cases, the country-approach (as depicted in the country reports) provides a too optimistic picture: A local population may do quite well, but the increasing fragmentation and isolation is a potential threat for the future.
4. The monitoring and survey of the species has generally improved. Compared to the earlier inquiries, we see less discrepancy regarding the distribution areas in neighbouring countries. The big challenge, however, remains the estimation of the population size. Here, we do not only see a north-south gradient (what is an expected cline) but also a difference between areas where intensive (research) fieldwork was used to gain the monitoring data. Wherever radio-telemetry was used to calibrate the data gathered extensively, the population density tends to be lower. This indicates that from “traditional” methods, the lynx abundance is normally overestimated. According to so far unconfirmed assumptions the range of overestimation could be 20-30%.
5. The threats listed in the country reports represent the subjective judgement of the contacts and often lack supporting evidence. A more differentiated assessment of threats was not possible, given the fact that a standardised list of threats was provided in the questionnaire to grant compatibility between countries. We must however evaluate new approaches to assess the threats at the population level.
6. Even in the country reports, it is often obvious that the threats listed and the data provided do not match. The threats most often mentioned were (1) illegal killing and (2) infrastructure (road) construction. There is almost no data available regarding illegal killing of lynx, and yet most contacts believe that this is a major threat.
7. Depredation is relatively limited in the whole of Europe – with the exception of Norway –, but can nevertheless be a source of conflicts. The other conflict (although impossible to quantify) is the competition with human hunters for game. It is again more a belief than a fact that a legal harvest (e.g. quota hunt) can mitigate this conflict. Yet, on the other hand, there is no proof that the stop of legally hunting lynx is an efficient conservation measure. Several countries, which have recently legally protected lynx, have still reported declining populations. Restrictive measures to protect a species such as lynx are no option in today’s Europe. Instead acceptable conservation goals must be formulated and interest groups must be informed and involved.
8. The way to advance public awareness and involvement is to develop national conservation strategies and management plans. This was one of the main messages of the Pan-European Action Plans published by the Council of Europe in 2000. Eight out of 27 countries have implemented national action plans over the past years (Europe Table 3), 4 more plans are in preparation, but 15 countries do not yet have started to draft action plans.
9. To promote the preparation of national action plans, we recommend developing conservation strategies on the population level. Long-term conservation goals should be defined for each population or metapopulation, and such strategies can provide a framework for national management plans.

The ELOIS has chosen a new approach compared to earlier inquires for the Eurasian lynx in three points: (1) the questionnaire was adapted to the IUCN standards, (2) the assessment was not only made for the countries, but also for the populations, and (3) the whole project is not only published as a report, but as an online system allowing the easy access to the whole data set. In all three aspects, further improvement is needed, and we are grateful to all comments, critics, and help. The idea is to develop a system that can be easily updated as new information becomes available. To do this is, above all, a challenge on the population level. In spite of the fact that this will be a never-ending task, it is the hope of the editors and of all contributors that the ELOIS may facilitate the conservation of the lynx and its co-existence with people across Europe.

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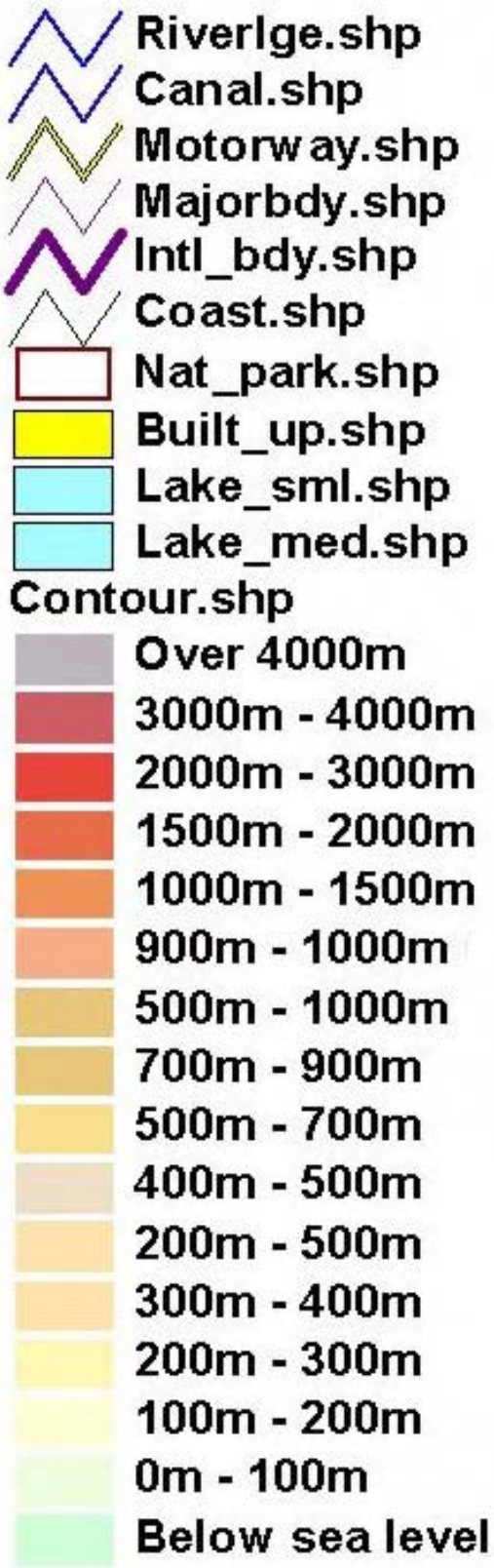
► Many of the articles are available in the Digital Cat Library of the IUCN/SSC Cat Specialist Group (www.catsglib.org), more will follow…

Legend to the maps:



Large rivers (broken lines – impermanent)

Canals (broken lines – through tunnel)

Toll and other motorways (broken lines – under constr.)

Major internal boundary lines

International boundary lines

Coast line

National parks

Built-up urban areas

Large lakes

Medium lakes

Hypsometric tints, indicating height of land above or below see level

Status Report Eurasian Lynx 2002

QUESTIONNAIRE

Please return the completed form to info@kofa.ch or Manuela von Arx, KORA, Thunstrasse 31, CH-3074 Muri b. Bern, Switzerland

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0 Country, Authors, Addresses

01 Country:

02 Main Contact:

021 Surname:

022 First name:

023 Address:

024 Phone:

025 Fax:

026 E-Mail:

03 Collaborator(s):

031 Surname(s):

032 First name(s):

033 Address(es):

034 E-Mail(s):

04 Date of response:

---

1 Status, Distribution and Development of the Populations

11 Distribution:

111 List of current populations or isolated subpopulations within the country. *Please fill in*:

ulation	Distribution (region)	Area (km²)	Remarks

112 Map of the present distribution of lynx: *You will receive one or several maps (depending on your country's size) with a 10x10 km UTM-grid. Please make three copies of each map. On the first copy indicate any grid where lynx is present following the instructions given in the separate Word-file "Map Instructions" . Indicate sites of releases if lynx have been reintroduced since 1995. Please identify the populations and subpopulations.*

Comments:

113 Changes in the distribution since 1995: *Mark in the second copy any changes (expansion, immigration, reduction) of the distribution of the lynx since 1995.*

Comments:

114 Origin of distribution data: How were the distribution data collected and analysed? *Please tick off:*

sightings and signs	☐	inquiry (hunters, foresters)	☐
snow tracking	☐	radio telemetry	☐
unspecific survey	☐	other	☐

Comments:

115 Additional information: *Please add any other available recent distribution map (ex. polygon maps, GIS layouts; preferably as e-mail attachment with information on the system of coordinates and projection used) or other relevant data on the distribution of the lynx populations within your country.*

Comments:

116 Protected areas and management zones: *Indicate in the third copy any protected areas and management zones >100 km². Please indicate the category.*

Comments:

12 General tendency of the population size 1996-2001:

121 What was the trend of the lynx populations in your country from 1996-2001? *Please tick off:*

Population	increasing	expanding	stable	decreasing	unknown
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

122 Please describe the changes and tendencies in the populations (name the population!) if the categories under 121 do not clearly match:

13 Population size:

Please give in the following section all available data on the population size, including your personal estimation if it differs from other estimations.

131 Official estimate of the population size: *Please give the numbers for each population in the respective year(s) of estimation or indicate years without any estimations with a "– ".* If there are no official data go to point 132):

Population	1996	1997	1998	1999	2000	2001

1311 Method of the official population estimation. *Please describe:*

1312 Institution(s) responsible for the estimations:

132 Additional / contrary / personal estimate of the population size. *Please give here numbers for each population if no official data are available or if your estimation is different from the official numbers:*

Population	1996	1997	1998	1999	2000	2001

1321 Method of the additional population estimation. *Please describe:*

1322 Institution responsible for the additional estimation(s):

133 Your judgement of the accuracy of the population estimations:

14 Reintroductions:

141 Have there been reintroductions / restockings (any releases) of lynx between 1996-2001?

yes ☐ * / no ☐

* If yes, please specify where, how many and what kind of animals:

142 Are there any reintroductions / restockings planned?

yes ☐ * / no ☐

* If yes, please specify:

---

2 Legal situation, harvest and losses of lynx

21 Legal status of the lynx:

211 Has your country signed the following international treaties? *Please tick off; if yes, indicate the year of ratification and whether with reservation or not:*

Treaty	**yes (year)**	**no**	**Reservation**	
			yes	**no**
EU Habitat Directive	☐ ( )	☐	☐	☐
Bern Convention	☐ ( )	☐	☐	☐
CITES	☐ ( )	☐		

212 At present, there is: *Please tick off:*

	yes	no
no legal protection of lynx (hunting is free for everybody)	☐	☐
legal, but controlled hunting (by licensed hunters)	☐	☐
legal removal of problem individuals (e.g. livestock raiders)	☐	☐
complete protection of lynx by law throughout the year	☐	☐

2121 Are there differences in the legal status or management of the populations identified under 1? yes ☐ * / no ☐

* If yes, please describe:

213 Conservation action plans or management plans: Has your country adopted a

	no	**yes (year)**	**Authorship**
Conservation action plan	☐	☐ ( )	
Management plan	☐	☐ ( )	
Combined conservation / management plan	☐	☐ ( )	

2131 Give the exact reference(s) for each of these plans and indicate a source (publisher, website, etc.):

2132 Have there been changes in the organisations in charge of the lynx management on a national / regional level since 1995?

2133 Was the management / conservation action plan initiated through the "Action Plan for the Conservation of the Eurasian Lynx in Europe" ("Pan-European Action Plan 2000, Bern Convention / LCIE")?

2134 Did the implementation of your current management plans have an effect so far? *Please describe:*

2135 Did the Pan-European Action Plan 2000 have any other effect regarding the conservation of the lynx in your country? *Please describe:*

22 Harvest:

If there are any differences between populations within your country, please indicate each scope. (If your lynx populations are completely protected you can go to point 23)

221 Start / end date of the open hunting season:

/

222 Restriction in numbers (per hunter / total quota per year):

/

2221 Who establishes the annual number of lynx hunted?

2222 How are the quotas decided upon?

223 Number of lynx legally hunted from 1996-2001 (exclusive problem animals removed). Please indicate the population name:

Population	1996	1997	1998	1999	2000	2001

Comments:

23 Other known losses:

231 Indicate the number of lynx (if available per population) that died of the following causes. Add other:

Cause of death	1996	1997	1998	1999	2000	2001
traffic accidents (roads / railways)						
other accidents						
trapping						
poaching or other illegal killings						
legal removals of problem animals						
diseases						
losses of unknown cause						

232 What kind of diseases were found in lynx?

---

3 Depredation on livestock by lynx

31 Number of losses per species and year 1996-2001

311 Indicate the number of livestock losses for the years 1996-2001:

Livestock species	1996	1997	1998	1999	2000	2001
sheep						
goat						
reindeer						
Total						

3111 If you don't have the information to fill in table 311 please note the livestock species you know that individuals have been depredated on between 1996-2001:

312 Are there remarkable differences between the lynx populations?

313 Are there any particular regions where depredation was outstanding?

314 In what season(s) / months did depredation mainly happen?

32 Compensation of losses

321 Does your country apply a compensation system for livestock losses to lynx? yes ☐ (continue with 322) / no ☐ (go to 33)

322 Describe the compensation system(s) applied in your country (per lynx population and/or livestock species if there is any differentiation):

Compensation System	Description	Lynx Population	Livestock species

323 Compensation (in Euro) paid per livestock species and year 1996-2001:

Livestock species	1996	1997	1998	1999	2000	2001
sheep						
goat						
reindeer						
Total lynx						

For reasons of comparison:

Compensation other predators						

324 Who is paying the compensation?

Please specify:

325 What procedures are applied to verify lynx kills? *Please describe:*

33 Prevention of depredation:

331 Which are the protective measures against lynx attacks in livestock herds applied in your country?

332 Which legal measures were taken in your country against lynx causing damage in the period 1996-2001?

333 Which illegal actions are known to have been taken against lynx attacking livestock in the period 1996-2001?

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4 Major threats to the lynx populations

The following list is derived from the IUCN/SSC Species Information Service (*SIS numbers in brackets*). Please enter “yes” if the threat affects all

populations in your country or indicate the name of those of your populations that have been / are / could be threatened by the following causes. (Make sure that you judge on the level of the population rather than the individual). Specify additional threats under 49 if you feel that the list is incomplete. Any further comments are welcome under 410!:

Threat	**Past (<1996)**	**Present (1996-2001)**	**Future (>2001)**
41 Habitat loss / degradation (human induced): *(1.)*			
411 Agriculture *(1.1.)*			
412 Extraction of wood *(1.3.3.)*			
4131 Infrastructure development: Industry *(1.4.1.)*			
4132 Infrastructure development: Human settlement *(1.4.2.)*			
4133 Infrastructure development: Tourism / recreation *(1.4.3.)*			
4134 Infrastructure development: Road building *(1.4.4.)*			
42 Harvest : *(3.)*			
421 Legal hunting & trapping			
43 Persecution: *(5.)*			
431 Shooting *(4.1.2.2)*			
432 Trapping / snaring *(4.1.2.1.)*			
433 Poisoning *(4.1.2.3.)*			
44 Traffic:			
441 Vehicle and train collision *(4.2.2.)*			
45 Natural disasters: *(7)*			
451 Storms / flooding *(7.2.)*			
452 Wildfire *(7.4.)*			
453 Avalanches / landslides *(7.6.)*			
46 Changes in native species dynamics: *(8.)*			
461 Competitors *(8.1.)*			
462 Prey / food base *(8.3.)*			
463 Pathogens / parasites *(8.5.)*			
47 Intrinsic factors: *(9.)*			

471 Limited dispersal *(9.1.)*			
472 Poor recruitment / reproduction / regeneration *(9.2.)*			
473 High juvenile mortality *(9.3.)*			
474 Inbreeding *(9.4.)*			
475 Low densities *(9.5.)*			
476 Skewed sex ratios *(9.6.)*			
477 Slow growth rates *(9.7.)*			
478 Population fluctuations *(9.8.)*			
479 Restricted range *(9.9.)*			
48 Human disturbance: *(10.)*			
481 Recreation / tourism *(10.1.)*			
482 Research *(10.2.)*			
483 War / civil unrest *(10.3.)*			
484 Transport *(10.4.)*			
49 other:			
491			
492			
493			

410 Comments on the above list of threats:

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5 Conservation measures

Please indicate the present status regarding the conservation of the lynx in your country for any of the following measures. Enter “yes” or the name of the population if there are differences between the lynx populations in your country: *(IUCN SIS numbers in brackets)*

Measure:	**Implemented / applied**	**Drafted / ratified but not implemented**	**Lacking / proposed**
51 Policy-based actions: *(1.)*			

511 Management plans *(1.1.)*			
5121 Legislation on an international level *(1.2.1.1/1.2.2.1.)*			
5122 Legislation on a national level *(1.2.1.2/1.2.2.2)*			
5123 Legislation on a regional level *(1.2.1.3/1.2.2.3.)*			
512 Public involvement *(1.3.)*			
52 Communication and Education: *(2.)*			
521 Formal education *(2.1.)*			
522 Awareness *(2.2.)*			
523 Capacity-building / Training *(2.3.)*			
53 Research actions: *(3.)*			
531 Taxonomy *(3.1.)*			
532 Population numbers and range *(3.2.)*			
533 Biology and Ecology *(3.3.)*			
534 Habitat status *(3.4.)*			
535 Threats *(3.5.)*			
536 Uses and harvest levels *(3.6.)*			
537 Conservation measures *(3.8.)*			
538 Monitoring / Trends *(3.9.)*			
539 Genetic status			
5310 Human attitude / Human dimensions			
54 Habitat and site-based actions: *(4.)*			
541 Maintenance / Conservation *(4.1.)*			
542 Restoration *(4.2.)*			
543 Corridors *(4.3.)*			
5441 Identification of new protected areas *(4.4.1.)*			
5442 Establishment of protected areas *(4.4.2.)*			
5443 Management of protected areas *(4.4.3.)*			
5444 Expansion of protected areas *(4.4.4.)*			
545 Community-based initiatives *(4.4.5.)*			

55 Species-based actions: *(5.)*			
551 Re-introductions *(5.1.)*			
552 Sustainable use / Harvest management *(5.3.)*			
553 Recovery management *(5.4.)*			
554 Disease, pathogen, parasite management *(5.5.)*			
555 Limiting population growth *(5.6.)*			
5561 Captive breeding / Artificial propagation *(5.7.1.)*			
5562 Genome resource bank *(5.7.2.)*			
56 other:			
561			
562			

57 Comments:

58 Most urgent conservation measures / actions:

581 What are in your opinion the most urgent conservation measures / actions to be taken for the lynx population(s) in your country?

Population	Most important conservation measures / actions needed

5811 Comments:

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6 Judgement of the lynx status according to the IUCN/SSC Red List Categories

61 Please consider the status of the lynx populations in your country. *Tick off:*

Population	extinct	endange-red	vulnerable	least concern	data deficient
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

	☐	☐	☐	☐	☐

7 Further information on the status of lynx in your country

71 Reference list:

You will find a list of references on the status of *Lynx lynx* in Europe attached. Attention was mainly paid on literature published after 1990. Please indicate here any missing reference (including reports and regardless to the language) which is important for your country:

72 Ongoing research projects:

Please list project title, running period and contact (incl. e-mail address) of ongoing research projects on lynx in your country:

73 Further information / Additional comments:

Thank you very much for your collaboration!