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PRESENT KNOWLEDGE ON THE DISTRIBUTION OF THE LYNX (*LYNX LYNX*) IN AUSTRIA

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ABSTRACT - To assess the present status and distribution of the lynx in the Austrian Alps we analysed documented reports on lynx presence for the period 1995 to 1999. Records on lynx presence in Austria were collected by the hunter's associations of Carinthia, Styria, Salzburg and Upper Austria, regional NGO´s and wildlife biologists. For this five-year period, 106 records of lynx presence were documented for the Austrian Alps. Of these we classified 100 as Quality 3 data (unconfirmed prey remains, tracks and observations) and 5 as Quality 2 data (confirmed prey remains). The only hard fact (Quality 1 data) in the Austrian Alps was a male lynx killed on a highway in southern Salzburg in 1995. From these reported signs of lynx presence we concluded that 20 years after the first reintroductions there still is no established lynx population in the Austrian Alps. The reports rather indicate a few individuals scattered over a wide area. As the monitoring of the Austrian lynx population is more a passive and arbitrary collection of reports than a systematic monitoring, we believe that the distribution reported here is likely underestimating the actual distribution of the lynx in the Austrian Alps. Therefore we emphasise the need to establish a new systematic monitoring system covering the entire potential lynx habitat in Austria.

Key *words: Lynx lynx*, monitoring, distribution, Austria.

INTRODUCTION

Intensive persecution was the main cause for the extirpation of the lynx in the Austrian Alps during the second half of the 19th century (Eiberle, 1972). 100 years later the lynx was returned to the Austrian Alps when attitudes towards the large predators had apparently changed. To re-establish the Austrian Alpine lynx population, nine individuals were released into Styria between 1976 and 1979 (Festetics *et al.*, 1980). Records of lynx presence collected in the following years document that the released lynx had dispersed in different directions. Reported signs of lynx presence indicated a few scattered individuals rather than an established population (Gossow and Honsig-Erlenburg, 1986). In later years reports on lynx presence concentrated on the district of Carinthia, where the district's hunter's association collected data on lynx occurrence. Data from other regions was rather poor in quantity and quality, but reports were received sparsely though continuously from western Styria and southern Salzburg. Huber and Kaczensky (1998) concluded that up to 1995 the reported evidence still indicated some widely distributed individuals rather than an established population twenty years after the reintroduction of lynx into the Austrian Alps. Following the re-introduction of 18 lynx into the Czech Bohemian Forest in 1982-1989 (Bufka and Cerveny, 1996) sightings and lynx kills were recorded along the Czech-Austrian border. First signs of lynx presence were reported from forested areas along the border in 1988, numbers of reports have continually increased since then (Huber, 1995). Since the middle of the 1990's lynx presence is well documented for the region, forming a part of the Bohemian lynx population.

We describe the development of the Austrian lynx population for the years 1995 to 1999 as

concluded from submitted reports on lynx presence. Based on this data we try to give recommendations for future actions required to reach a level of data collection comparable to the other countries of the Alpine range.

LEGAL SITUATION

All nine districts (Bundeslander) of Austria regulate hunting separately. Lynx are listed in all nine district's hunting laws as a species with a year-round closed season. Special permits to shoot a lynx can be issued by the district authorities on request, but have so far never been demanded. Illegal killings of lynx are rumoured to have occurred, but there is little evidence.

Compensation for damages on livestock by lynx again is regulated separately for each district. In Carinthia and in Styria compensation is paid by an insurance maintained by the district's hunter's associations. For compensation to be paid, a damage has to be verified by someone trained in the identification of lynx signs. If depredations by lynx occur in any other district, a variety of funds are available to provide compensation payment for livestock lost.

METHODS AND DATA COLLECTION

When scientific monitoring of the released lynx ended in 1982, so did any systematic data collection on the distribution of lynx in Austria. The collection of records on lynx presence in Austria is since then essentially dependent on varying efforts by the hunter's associations of Carinthia, Styria, Salzburg and lately Upper Austria. To prevent misuse of compensation funds, hunters trained in the identification of lynx kills have to confirm the kill and keep record of all cases. Besides, members of the hunting associations were asked to report all signs of lynx presence, As most training-sessions on the identification of lynx signs have been conducted in the early 1990's, the knowledge base for reliable identification of signs of lynx presence has to be considered rather poor for most regions of Austria. The situation is a little different for Upper Austria as hunters were trained in the identification of lynx signs in 1999, when an increasing number of wildlife kills by lynx was reported from the northern part of the district.

Aside from the hunter's associations, data on the distribution of lynx was collected by the Austrian Youth Association for the Protection of the Environment in Haslach (ONJ Haslach) for the northern part of Upper Austria, the Kalkalpen National Park for the southeastern part of Upper Austria, wildlife biologists Martin Forstner and Thomas Huber for the northwestern part of Lower Austria and Carinthia respectively, and the Austrian League for the protection of Nature (ONB) for Salzburg. Although a large number of people were involved, the intensity of data collection was rather low, with many areas ofpotential lynx habitat not being covered.

All these institutions and groups have in common that data collection is more of a passive arbitrary collection of data rather than a systematic active monitoring for the species. Most of the reports have not been re-examined by people with a detailed knowledge of the species. **A** later assessment regularly proved difficult as many records were poorly documented.

For this report we collected accounts on lynx presence for the years 1995 to 1999 from all organisations that to our knowledge collect such data. We classified all received records according to SCALP-standards (Molinari-Jobin *et al.*, in prep.). We distinguished three levels of reliability according to the possibility to verify the observation. Quality I (QI) data represent "hard facts", e.g. lynx found dead, lynx captured, or photographed. Quality 2 (Q2) data represent livestock or wildlife kills as well as tracks examined by a person with profound knowledge of lynx. Quality 3 (Q3) data represent prey remains and tracks reported but not confirmed by people that had special training in the identification of signs of lynx presence. Furthermore reports on observations, vocalisations and scats were classified into this category. **A** few records that

Table 1 - Number of records collected on the Alpine lynx population in Austria and on the Austrian part of the Bohemian lynx population from 1995-1999, categorised into the three classes of data quality.

Data quality	Alpine population	Bohemian population	Total
QUALITY 1			
lynx found dead	1	2	3
capture			
photo			
TOTAL	1	2	3
QUALITY 2			
prey remains	4	62	66
tracks	1	53	54
TOTAL	5	115	120
QUALITY 3			
prey remains	44	44	88
tracks	21	21	42
sightings	35	59	94
TOTAL	100	124	224
TOTAL	106	241	347

seemed highly unlikely were rejected from the analysis when we re-examined the records for this reports.

Although lynx reported from the northern regions of Upper and Lower Austria, north the Danube River, are considered part of the Bohemian lynx population, we will report on the development of reports on lynx from this region, as we consider it important for an understanding of the situation of the lynx in Austria.

RESULTS

From 1995 to 1999, 106 plausible records on the presence of lynx were reported from the Austrian Alps (Fig. 1). Most records received concerned unconfirmed kills and observations of lynx and were therefore classified as Quality 3 data. We recorded 100 reports of Quality 3 for the years 1995 to 1999 (Table 1). Five records were classified as Quality 2 data. During the whole five-year period 21 cases of depredation on livestock by lynx were reported and compensated for in the districts of Carinthia and Styria. Of all those only one case of depredation by lynx was confirmed and therefore included into analysis as Quality2 data. The only "hard fact" (Q1 data) reported for this five-year period was a male lynx found dead on a highway in southern Salzburg in 1995 (Fig. 2). To assess trends in the annual number ofreported lynx signs we were restricted to data from Carinthia, the district with the longest record of comparable data. Table 2 shows that the number of records documented decreased constantly since a peak in the early 1990's to present. In these years the number of reported records decreased from 78 in 1991, to 7 in 1999, the lowest number of records ever recorded within a year.

Because of the low number of Q1 and Q2 data we base the description of the distribution of lynx in Austria on all reported records with the exception of single unconfirmed kills or observations. Nevertheless reports were widely distributed over the Austrian Alps, showing only a few clear concentrations of lynx signs (Fig. 1). 52 records were reported for Carinthia. The Hohe Tauern, Gailtaleralpen

and Nockberge in the north-western part of Carinthia, as well as the Karnische Alpen along the Carinthian/Italian border seem to be centres of lynx activity. For Styria reports (n= 28) were concentrated around the former release area in the Niedere Tauern and in the eastern part of the Nordliche Kalkalpen. In the district of Salzburg half of the district's eight reports centred on the Osterhorn-range close to the city of Salzburg. A single plausible record was reported from Lower Austria as well as Tyrol. Aremarkable increase in reported lynx observations and other lynx signs was observed in Upper Austria. Although lynx signs had been reported from nearby regions in Styria earlier, no records had been reported prior to 1995 from the Upper Austrian Kalkalpen. During this five-year period 16 records originated from Kalkalpen National Park and surrounding areas. As confirmation of prey remains proved difficult, we had to categorise all prior reports as Q3 data. But it has to be noted that both in 2000 and early 2001 a lynx was photographed by a camera trap in the Kalkalpen national park, yielding the only Q1 record for 2000 for the Austrian Alps. A number of confirmed wild prey remains (Q2) were reported as well for the region in 2000.

In contrast to the situation in the Alps, a continuing increase in reported lynx signs from the Bohemian lynx population could be observed. For the time period 1995 to 1999, 241 plausible records on lynx presence were noted for northern regions of Austria (Table 1), including a high number of Q2 data, 115 records. Two lynx were found dead in the north-western part of Upper Austria. Both were young of the year, providing a good indication for reproduction in the area. Another kitten was shot accidentally in the same region in 2000 (Engleder, 2001).

Table 2 - Lynx observations (sightings, kills, tracks) collected in Carinthia (Austria) 1985-1999 by means of questionnaires distributed by the hunters association.

Year	Lynx observations reported
1985	17
1986	24
1987	26
1988	19
1989	50
1990	50
1991	78
1992	52
1993	24
1994	20
1995	19
1996	11
1997	7
1998	8
1999	7

Discussion

Within a five-year period 106 records on lynx presence were recorded for the Austrian Alps. The low number of records and the scattered distribution of these records indicate that the situation of the lynx in the Austrian Alps has not changed much since the last SCALP report 1990-1995 (Huber and Kaczensky, 1998). The records still give no reliable evidence for the existence of an established lynx population in the Austrian Alps more than twenty years after the first releases. Gathered reports are distributed over most parts of the Austrian Alps with the exception of the most western regions of Vorarlberg and Tyrol. A few wide-ranging, solitary individuals could nevertheless be responsible for the observed distribution of the reported signs of lynx presence. This interpretation is supported by the almost complete lack of hard facts (Q1 data) for the entire period of 1995-1999. The last confirmed reproduction dates back to 1993 (see Huber and Kaczensky, 1998). The last documented mortality was reported in 1995. Breitenmoser (1998) reported much higher numbers of lynx found dead for the established lynx populations in Slovenia and Switzerland. In contrast to the Alpine population, the population of the Bohemian Forest seems to be striving. Two dead kittens reported within five years and 115 data points of Quality 2 seem to confirm this assessment. The considerable difference in the number of Q2 data

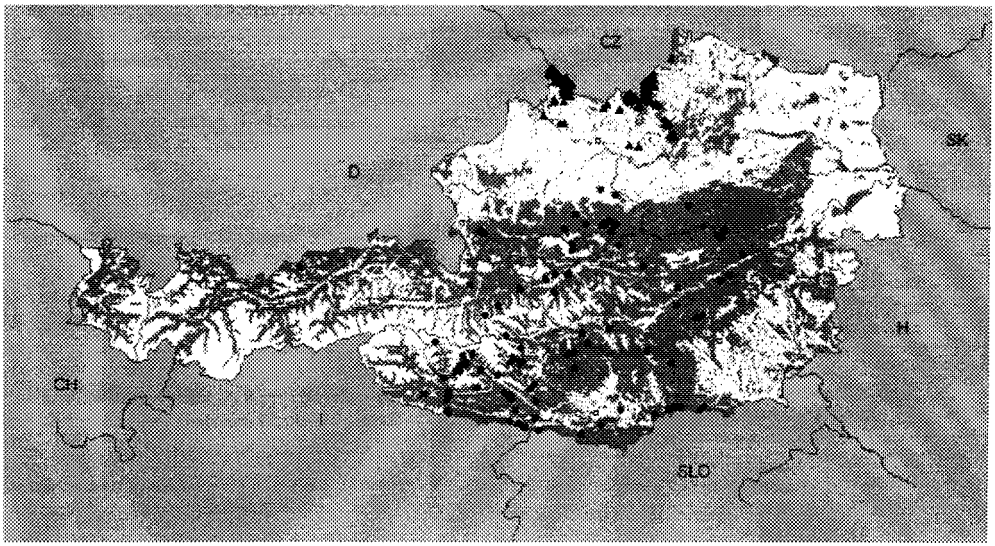

Figure 1 - Distribution of all records reported on lynx presence in Austria for the five-year period 1995-1999. Circles represent reports on the Alpine region, triangles represent reports on the Bohemian lynx population (forest cover in dark grey).

between Alps and Bohemian population is possibly not only explained by differences in lynx densities. The Eastern Alps are more densely forested, less accessible and for most regions much less densely populated by humans than the Swiss Alps or the range of the Bohemian lynx population in Austria. Secondly, public awareness, knowledge of the species and on the fact that reports on lynx signs are being collected is much more common in the range of the Bohemian population. How much the number of lynx signs reported is dependent on existing management or research projects, the commitment of single persons and the public awareness of the species, is demonstrated by the development of report numbers from the district of Carinthia (Table 2). The Carinthian hunter's association has continuously collected records on lynx presence since 1982. The development in the number of reports very much follows the public's and the hunter's awareness of the species. High numbers of lynx reports were reported from 1989 to 1992 when a considerable number of sheep were found dead and an information campaign on lynx was carried out. When the district hunter's association initiated courses in the identification of lynx signs and supported experts in the examination of reported signs-numbers of reports increased rapidly. When public awareness of the issue and support for the expert groups resided in the middle of the 1990's, so did the number of reports as seen for the last five-year period reported. All of these factors reduce the probability that signs of lynx presence are found (see Stahl and Vandel, this volume). Consequently we think that the distribution of lynx is likely to be underestimated for the Austrian Eastern Alps.

The biggest problem hindering a reliable assessment of the situation for lynx in the Austrian Alps are deficits in the present way signs of lynx presence are recorded and collected. There is no extensive network of persons able to confirm reports and no nation-wide uniform system of data collection and categorisation. No data were collected for large areas of the Austrian Alps (especially Tyrol and southern Lower Austria) and for most areas no records were examined thoroughly, resulting in a large proportion of unconfirmed records. Consequently the establishment of an exhaustive monitoring system as well as a renewed public awareness campaign has to be a priority for Austria. Reliable data on dis-

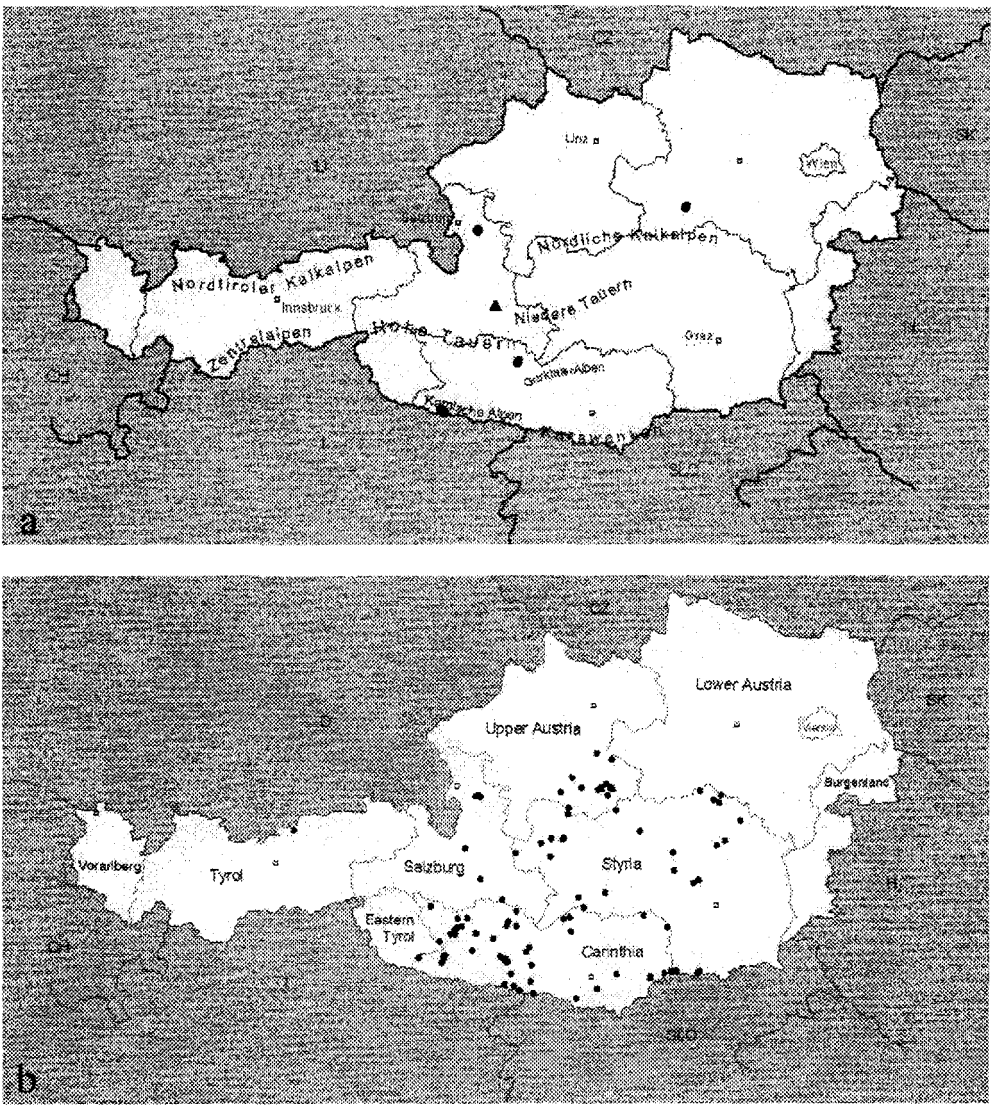

Figure 2 - Distribution of records of lynx presence in the Austrian Alps (1995-1999). a) Quality 1 data: dead lynx (triangle) and Quality 2 data: confirmed kills, tracks and scats (dots). b) Quality 3 data: sightings and unconfirmed kills, tracks and scats.

tribution are necessary for the assessment of status of the species and the development of a future management plan to ensure the long-term survival of the lynx in the Austrian Alps.

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ZUSAMMENFASSUNG

Osterreich hat Anteile an zwei getrennten Luchspopulationen. Im Norden Osterreichs, entlang der österreichisch/tschechischen Population, werden seit Mitte der 90'er Jahre immer wieder Luchse nachgewiesen, diese werden der Bohmischen Population zugeordnet. Luchsnachweise südlich der Donau können der Alpenpopulation zugeschrieben werden. Um die Situation des Luchses in Osterreich einzuschatzen, haben wir die raumliche und zeitliche Verteilung dokumentierter Luchsnachweise analysiert. Luchsnachweise werden in Osterreich lokal von den Landesjagerschaften der Bundeslander Karnten, Steiermark, Oberösterreich und Salzburg bzw. von Umweltschutzorganisationen und Wildbiologen gesammelt. Fur die Periode 1995–1999 wurden im Norden Osterreichs 241 (Q1: 2, Q2: 115, Q3: 124) Hinweise auf Luchse der Böhmischen Population dokumentiert. Im gleichen Zeitraum wurden im Osterreichischen Alpenraum 106 Nachweise (Q1: 1, Q2: 5, Q3: 100) erbracht. Aufgrund der raumlichen und zeitlichen Verbreitung der Hinweise schliessen wir, dass selbst 20 Jahre nach den ersten Wiedereinburgerungen immer noch keine etablierte Luchs-Population im Bereich der Österreichischen Alpen vorhanden ist. Die dokumentierten Nachweise weisen viel mehr auf einzelne Individuen hin, die uber weite Bereiche der Osterreichischen Alpen verteilt sind. Allerdings ist das Monitoring des Luchses in Osterreich viel mehr eine passive Sammlung von Zufallsbeobachtungen als ein systematisches Monitoring. Deshalb wird die aktuelle Verbreitung des Luchses in Osterreich durch die hier prasentierte Verteilung der Luchsnachweise aller Wahrscheinlichkeit nach unterschatzt. Daher sehen wir den Aufbau eines systematischen Monitorings als wesentlichstes Ziel fur die nachsten Jahre an.

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