
Keywords: 8DE/Black Forest/distribution/Eurasian lynx/Lynx lynx/monitoring/observation/status

Abstract: Historical development of the lynx presence in the Black Forest is described. The objective of the present monitoring project was to provide data on lynx occurrence in Baden-Württemberg that are required for reasonable discussions on future management assessments. Monitoring was conducted from winter 1996/6 to 2003, collecting randomly registered hints on direct observations, tracks, scats, and kills from throughout the study area. Out of 154 potential signs of presence we recorded 42 observations in category Q3 and nine hints on kills, tracks or scats rated as Q2. A lynx photographed in the year 2000 represents the only case of the Q1 category. Signs of presence are distributed over almost the whole Black Forest mountain range; main evidence was however, derived from the southern part of the study area. The monitoring revealed at least temporary presence of lynx. The origin of these animals is still unknown, and rare incidences do not allow conclusions about the actual number of lynx living in the region.
Short communication

Status of the Eurasian lynx (Lynx lynx) in the Black Forest region, South Western Germany

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During the 19th and 19th centuries habitat destruction, reduced prey base and direct persecution led to the extinction of wolf (Canis lupus), brown bear (Ursus arctos), and lynx (Lynx lynx) in many parts of western Europe (Fenoglieschi 1968; Krabothaji 1988; Zimov 1978; Festetics 1980; Jacobsej 1993). Today, internation treaties as well as national law demand the restoration and conservation of these species. Recently, attention towards the return of large carnivores is increasing also in Germany as wolves sporadically re-inhabit into eastern parts of the country, and, with partially unknown origin as well as due to releasing, lynx occur in several areas (Wölfel et al. 2001; Wölfel and Kaczenski 2001; Barth 2002; Hockschlog unpublished). In the Black Forest low mountain range lynx was present until the 18th century (Goss-mann-Kölner and Eisfeld 1990). During the 18th and 19th century the lynx was hunted intensively, and population density assum-mingly was relatively low at that time. Due to decreasing human population and reduced hunting pressure in the period of the 30-year war, abundance of lynx and wolf as well as their natural prey have increased signifi-cantly. In the second half of the 17th century persecution of wolf and lynx was intensified since these species were regarded as pets (Wagner 1876). Based on hunting records from this period, abundance of lynx is estimated as 1.5 individuals per 100km² (Goss-mann-Kölner and Eisfeld 1990). Improved firearms are assumed to have a considerable impact on hunting in these times. Hence, in the 18th century direct persecution as well as reduction of the natural prey caused the extirpation of lynx in the Black Forest region. Two records of lynx killed, one in 1740 (Jennew 1961) and another one in 1778 (Wagner 1876; v. Gugum 1963), are, respectively, depicted by different authors supposedly to be the "last lynx" shot in the Black Forest.

Discussions about reintroduction of lynx into the Black Forest already emerged in 1971 (Hockenschlough, pers. comm.). Irrespective of the fact that no official discussions have been carried out to date lynx sporadically were reported in the region during about the last 20 years (Goss-mann-Kölner and Eisfeld 1990; Thor and Perl 1992 unpublished). Remarkably, in 1988 a specimen has been killed on a bailey in the Rheine valley, and a subadult lynx obviously originating from an enclosure was shot in the Black Forest region in 1994 (Eisfeld pers. comm.). In the past, signs of presence and sightings have not been recorded and verified system-atically. As a result removers of both illegal

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releases and illegal killings turned the debate into emotional quarrels in which ecologically based arguments were marginalized by the particular interests of the different stakeholders. The objective of the present monitoring project therefore was to provide data on lynx occurrence in Baden-Württemberg that are required for reasonable discussions on future management measures.

The Black Forest is located in the very southwest of Germany in the Land of Baden-Württemberg and covers about 6000 km². The topography is typical low mountain range. Altitude extends to almost 1500 m. In the higher zones snow cover lasts from November till March (Selter et al. 1996). Below about 600 m a.s.l. natural woodland plant communities are mixed forests dominated by beech (Fagus sylvatica). Above about 400 m a.s.l. forests mainly consist of beech and silver fir (Abies alba), and on the lower end of the main divide beech, silver fir and Norway spruce (Picea abies) are dominating (Müller et al. 1974).

As potential prey for deer (Capreolus capreolus) as well as red fox (Vulpes vulpes) and brown hare (Lepus europaeus) are abundant in the whole area. Due to regulations on management, red deer (Cervus elaphus) is restricted to an area of 1075 km² in the north of the Black Forest and to a small region in the southern part (275 km²). Chamois (Rupicapra rupicapra) has been introduced to the Black Forest between 1955 and 1959 (Stimmatter unpubl.). To date, the main population consists of about 700-800 individuals in total (Vinnal pers.comm.).

We conducted monitoring from winter 1995/96 to 2000. We established and registered hints on direct observations, tracks, scats, and kills from throughout the study area. In order to derive contemporary information about lynx presence we called for direct transmission of information. About 50 offices of the forest administration the administrative structure of the hunting association, and two tourist information centres, respectively, located in the north and in the south of the study area, served as information network. Additionally, public awareness has been increased by providing information events throughout the region and by reports in regional newspapers and TV. During the study period, status reports sustained the awareness of foresters and hunters.

For categorizing signs of lynx presence, most of the European alpine countries implemented criteria stated in the "Memorandum of the Status and Conservation of the Alpine Lynx Populations (SCALP)" (Meloni-Arioni et al. 2001). Due to this convention, hard facts, as specimens, which were found dead, photographs of lynx, or lynx actually caught are classified as quality level 1 (Q1). Indirect signs like kills, tracks and scats, identified by experts, refer to quality level 2 (Q2). Vocalization, direct observation and non-verified cases of indirect indications are assigned to quality level 3 (Q3). Regarding the situation in the Black Forest Region – lynx occurrence was unproven, and forestry’s administration as well as hunting associations could not provide staff with appropriate field experience – we tightened the criteria of Q2 and Q3 for a better explanatory power:

All direct observations respected in this study have been evaluated by personal interviews with the observers. In consideration of the heterogeneous background and a probable bias due to initial knowledge of the observers, data analysis and questions were asked according to a check list (Attelander et al. 2000). Indirect signs of presence were examined according to approved procedures (Mlinari et al. 2000). Kills were identified by injuries characteristic for lynx attacks and additional indications in the surrounding of the location where the kills have been found. As we did not try to ring the lynxes sticking over a certain distance was "obtainable for the identification of tracks of lynx. Scats were identified by deposition in the field, undigested remains, and characteristic smell. Verification by experts directly in the field or laboratory was a prerequisite for the confirmation of kills, tracks, and scats. As a result of intensifying the SCALP criteria, in
our study the Q3 category exclusively consists of direct observations whereas tracks, kills or scats are allocated to Q2 or have been excluded as not being confirmed.

During the study period, out of 154 potential signs of presence we recorded 42 observations in category Q3 and nine hints on kills, tracks or scats rated as Q2. A lynx photographed in the year 2000 represents the only case of the Q1 category (Tab. 1).

In 1996 we assumed six cases of direct observation as being consistent. These sightings were registered in the middle and in the northern part of the study area. In 1997 none out of five announced sightings could be actually judged as reliable. Spatial distribution of lynx evidence from 1998 to the end of 2003 is shown in figure 1. Snow tracking a lynx in 1998 as the northern part of the study area provided first and up to now single Q3 evidence in the northern Black Forest whereas remaining indications from this area are restricted to category Q3.

From the middle part of the study area information on lynx is very scarce. However, in November 2003, a single sheep has been killed by a lynx in this region. We derived the majority of indications from the southern Black Forest. Apart from reliable observations, which occurred regularly over years, a few tracks, scats, and kills gave sporadic evidence on lynx. In summer 1999 a lynx scat has been found, and while tracking a lynx on two different occasions in winter 1999/2000, we found a killed stamnus and a fresh scat, respectively. In addition a lynx was photographed by chance in 2000. Several sightings are denoted from the very southeast of the Black Forest in close proximity to the Swiss border since 2000. In 2001 tracks indicated two cases of lynx presence. No indirect signs of presence could be confirmed in 2002. Nevertheless, all 2001 and 2003 reliable observations have been reported rarely but regularly.

In summary, signs of presence are distributed over almost the whole Black Forest mountain range; main evidence was, however, derived from the southern part of the study area. Frequency of indications increased slightly from the beginning of the study in winter 1995/1996, culminating in 2000/2001, but numbers of proven signs of presence remained constantly low (Tab. 1). Increasing numbers of signs of presence may result from reporting subsequent sightings of the same specimen within a certain area or due to the public awareness growing after the observation of a lynx was announced. To judge the status of the species, therefore, it may be more appropriate to concentrate on the area visited by lynx rather than interpreting numbers of signs of presence. Accumulating data from 1998 to 2000 and 2001 to 2003, respectively, demonstrates that the extension of the area visited by lynx

<table>
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<th>Year</th>
<th>Quality level 2</th>
<th>Quality level 3</th>
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<tbody>
<tr>
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<td>Total</td>
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* A photography of a lynx in 2000 marks the only one incidence of quality level 1 during the study period.
in the Black Forest did not increase over time (Fig. 1). Eight years of monitoring truffle observations and verified tracks, kills and signs revealed at least temporary presence of lynx in the Black Forest. The origin of these animals is still unknown, and recent incidences do not allow conclusions about the actual number of lynx living in the region. These findings correspond with the situation in the Palatine Forest, Germany, where few Q2 and Q3 signs are assumed to indicate the occurrence of a small number of specimens (Hochschlag 2004 unpubl.). Comparing the different classification categories in our study reveals a considerable mismatch between direct observations and indirect signs of presence. Whereas we confirmed about 60% of the direct observations as consistent, the amount of indirect signs of presence that actually could be verified as originating from lynx was only about 10% (Tab. 1).

Sighting a lynx is an impressive event whereas tracks, scats or even kills probably do not attract the attention of most people. However, direct observations of lynx are essentially not revisable and are influenced by the observer’s subjective perception whereas indirect signs like tracks, kills or scats can be verified in the field or in the laboratory. The exceedingly high amount of indirect hints that actually could not be confirmed after verification emphasizes the need for a thorough examination of these signs of presence. This is particularly important within a region of sporadic lynx occurrence, where the main objective is to evaluate the occurrence of a few individuals rather than documenting trends within a population. Irrespective of a broad information network it is quite clear that we obtained only a certain amount of the indications that are potentially available, and since we ruled the verification very strict, our data represent a minimum estimation of signs of lynx presence.
in the Black Forest Region. Within cultural landscapes mortality of subadult lynx due to traffic accidents is remarkable (Schmidtl-Pothaus et al. 2002), and depredation on sheep is described as a common phenomenon in the range of the lynx (Kaczynski 1999). Since no killed lynx has been recorded during the 8 years monitoring period, and there was almost no evidence of depredation on livestock caused by lynx, we assume that our data correspond to the actual situation of the lynx in the Black Forest as several, non-resident specimens. As there is also no evidence for reproduction up to now, the Black Forest occurrence obviously cannot be regarded as a lynx population.

The origin of the lynx specimens occurring spontaneously in the Black Forest area is unknown. Speculations about the potentials of founding a population due to lynx dispersing from Switzerland into the Black Forest revived in 2003 as a radio-collared lynx crossed the river Rhine, a main motorway and large non-forested zones till it was live-trapped at the Swiss-German border next to the Black Forest. The fact that the animal surpassed landscape features that, to our recent understanding, are supposed to be considerable barriers, seems to support the hypothesis of lynx dispersing into the Black Forest. A closer view on the case casts considerable doubt on assumptions of a possible restoration of the lynx due to immigration. This particular adult male specimen, previously caught in the Swiss Jura Mountains, had been released in the north-eastern part of Switzerland (Ryser pers. comm.). The specific case of a translocated animal allows conclusions neither on the dispersal behaviour characteristic for the lynx nor on mechanisms that regulate the expansion of a population. All occurrences of lynx currently present in different regions of Western Europe actually originate from re-leases (Festetics 1979; Wotschowsky 1985; Herrenschmidt 1988 unpubl.; Haller 1992; Breitenmoser and Haller 1993; Cop and Frikovic 1998; Wolff et al. 2001; Barth 2002; Huckschlag 2004 unpubl.). Expansion of western European lynx populations is considered extremely limited even in areas, e.g. the North-Western Swiss Alps, where lynx is known to be abundant (Zimmermann 2004).

In conclusion, after a period of about 20 years of frequently proclaimed indications in the area, there is no evidence at all indicating an increasing lynx occurrence, and due to our current knowledge, migration into the Black Forest region will not suffice to establish a stable population in the near future. Verify-ing the origin and analysing the behaviour of the few individuals occurring in the Black Forest region seems to be an intriguing question. Provided that a genetic differentiation between populations of Eurasian lynx is possible, systematic sampling of genetic material is required. Reliable information on the behavioural aspects is exclusively achievable by means of radio telemetry investigation. However, such measurements are laborious and costly, any kind of investment should be reflected very intensively against a background of a few sporadically occurring specimens in the area. Our data provides an insight into the current situation of the lynx in the Black Forest region. Now a clear definition of goals and objectives is a basic for any kind of future measures concerning the lynx in the Land of Baden-Württemberg.

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