

STATUS OF THE LYNX IN THE CZECH-AUSTRIAN BORDER REGION

Bohemian-Bavarian-Austrian lynx population
Lynx year 2021

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1. Introduction

The Eurasian Lynx (*Lynx lynx*) is the largest European wild felid species, highly endangered and therefore strictly protected on the European as well as Czech and Austrian levels. This species became locally extinct in most of Western and Central Europe over the course of the 19th and mid-20th centuries (Breitenmoser 1998). Due to reintroduction programs beginning in the 1970s in several European countries the species returned to the Western and Central European part of its range. The reintroduced lynx populations currently occur in several isolated areas (subpopulations), and one of them is the Bohemian-Bavarian-Austrian population in the Bohemian Forest region (Chapron et al. 2014).

Lynx was extirpated from the Bohemian Forest during the 19th century. The last records from Austria and the Czech Republic are: around 1830 (Austrian part of Bohemian Forest; Festetics 1981) and 1894 (Czech part of Bohemian Forest; Vodak 1974, summary Bufka & Červený 1996). During the middle of 20th century, single records of the species were registered and interpreted as dispersing animals from Carpathian Mountains (Festetics 1981). From 1970 to 1989, lynx was reintroduced in the Bavarian and Czech part of the Bohemian Forest, respectively. In Bavaria, 5-7 lynx of eastern European origin were released unofficially between 1970 and 1974 (Festetics 1981, Stehlik 2004). From 1982 to 1989, a total of 17 lynx (7 females, 10 males) of Carpathian origin were released in the area of the later founded Šumava National Park within an official reintroduction project (Bufka & Červený 1996; Bufka, pers. comm.). This last reintroduction in former Czechoslovakia served as the nucleus of the small lynx population, which we now call Bohemian-Bavarian-Austrian (BBA) lynx population.

Both on national and regional levels various efforts were made during the 1990s to assess the status of the BBA lynx population using different methods like collecting chance signs, snow tracking and questionnaires in different intensity (Czech Republic: Anděra & Červený 1996, Bufka & Červený 1996; Bavaria: e.g. Kiener & Strunz 1996, Poost 1996, Schödl 1996, Habel 1997, Heurich 1997, Wölfl M. 1996, 1997, 1998; Austria: Huber et al. 2001; all references in Wölfl et al. 2001).

In the years 2013-2021, five reports assessing the BBA population status in the three countries have been prepared by the Czech-Austrian-Bavarian lynx team (Woelfl et al. 2015a, Woelfl et al. 2015b, Mináriková et al. 2020, Engleder et al. 2021) based on the verified hard proof field data. These reports conclude that relative increase of recorded animals in 2017-2019 in comparison to the years 2013-2014 cannot be interpreted as a population trend, since it more or less corresponds to the increase of monitoring effort and size of the monitored area. Despite that, authors postulate that a slightly positive population trend was indeed detected for the following reasons: a) some areas, which were previously monitored and negative, were recorded occupied by lynx indicating a local spreading (certain parts of Bavarian Forest), b) the density estimates in National Parks Šumava and Bavarian Forest have been increasing. Nonetheless, if there was a strong positive trend of population growth, it is expected that this would result in a clear expansion of the entire population range, with young lynx colonizing the still

available suitable habitat patches located in the outskirts of the BBA area. Instead, comparing the population distributions for lynx years 2017-2019 and 2013-2014, no such trend is visible, and many significant habitat patches result to be still uninhabited by lynx. For these reasons, authors conclude that the Bohemian-Bavarian-Austrian lynx population is slightly growing but no major changes have been detected yet.

This report is a first attempt to assess the regional status of lynx in the Czech-Austrian border region. The region of the former iron curtain between the two states - Czech Republic and Austria - is now a green belt of large forested areas with rocky outcrops, providing suitable habitat for lynx occurrence as well for its reproduction.

Working with stakeholders

To achieve high efficiency of the monitoring and ensure wide acceptance of the data produced by lynx monitoring, key stakeholders (hunters, foresters, nature conservationists) are actively involved into lynx monitoring. In order to ensure that the monitoring has also a trust-building effect, a huge effort has been put into the personal communication with regional forest services and hunting associations about lynx biology, ecology and monitoring. Common fieldwork of project experts and hunters/foresters, along with transparency of data analysis processes, should help build trust amongst these interest groups.

2. Study Area

The assumed area of BBA population lynx occurrence (hereafter referred to as “BBA lynx population area”, Figure 1) stretches across the border triangle of Czech Republic (Bohemia), Germany (Bavaria) and Austria. The Danube River in the south, Krušné hory and Frankenwald in the North, Waldviertel and Vysočina in the East and Fränkische Alb in the West determine its boundaries.

The study area of the RysLuchs project encompasses the Czech-Austrian border region from Sumava NP in the west to roughly Novohradské hory/Freiwald in the east.



Figure 1: Bohemian-Bavarian-Austrian lynx population (red) and a RysLuchs study area (blue)

2.1 Area monitored with camera-traps

Photos from public and camera trapping photos were gathered from the whole study area. Active camera trapping was performed in the South Bohemian region, as an activity of the Project RysLuchs and financially supported by Interreg Austria-Czech Republic and in Upper Austria, where it was supported by the Government of Upper Austria.

3. Monitoring Methods

3.1 Standards for data analysis and evaluation

SCALP criteria data assessment

All data were classified according to criteria described by the SCALP expert group (Molinari-Jobin et al. 2003, Molinari-Jobin et al. 2012) and refined for the large carnivore monitoring in Germany (Reinhardt et al. 2015). The classification is done according to the verifiability of records. This requires the documentation of findings and a verification by an expert with several years of field experience.

Three categories are distinguished: C1 represents 'hard fact' data (e.g. dead lynx, georeferenced lynx photo, genetic proof); C2 includes confirmed data (e.g. kills or tracks, verifiable due to a substantial documentation and verified by an expert); the third category (C3) summarizes unconfirmed data (e.g. direct visual observation and calls; kills, tracks which are not sufficiently documented but seem probable).

Records which were verified and confirmed are more reliable and misidentification is less probable. Therefore, the data analyses were based only on data classified as C1 and C2.

European grid

For scaling of lynx monitoring effort and for spatial data analysis, European grid (10x10km ETRS89 grid, projection ETRS LAEA 5210) is used.

Reporting period: Lynx year

The reporting period in which the data were analysed has been chosen according to the lynx life cycle. By definition the "lynx year" begins on 1st of May (beginning of the period when lynx kittens are born) and ends on 30th of April of the following year (when the kittens complete separation from their mother). This ensures that reproductive units (female lynx with kittens, hereafter referred to as "lynx family") are only assessed once per lynx year.

Terminology

Juvenile lynx: Lynx in the first year of life (also called "kitten"). From birth till 30th of April of the following calendar year (0-1 year of age).

Subadult lynx: Lynx in the second year of life. From 1st May of the year following the birth till 30th April of the next year (1-2 years of age).

Adult lynx: Lynx older than 2 years.

Independent lynx: Lynx older than 1 year, i.e. subadult or adult.

Resident female: Female staying for minimally 12 months in the same area.

Reproducing female: Female who has kitten(s) in the given lynx year.

Family: Reproducing female with juveniles.

Orphaned lynx: Juvenile, whose mother died.

3.2 Data collection

For lynx monitoring the following monitoring methods were used:

- Camera-trapping
- Snow-tracking
- Collection of observational data and chance findings (dead lynx, kills, tracks, scat, hairs, etc.)

4. Data summary

The Czech data used for this report are all data collected by ALKA Wildlife within the RysLuchs Project in the lynx year 2021.

The Austrian data used for this report are data, which were collected by GHE in the lynx year 2021 (last update: 14.06.2022). The collecting of the data of the Upper Austrian part was supported by the government of Upper Austria.

5. Results

4.1 Distribution and range

In the lynx year 2021, in total 27 grid cells of 10 km x 10 km size were occupied by lynx in the Czech-Austrian border region. Within all these grids, C1 data confirming lynx presence (photo from camera trap, dead lynx) were collected.

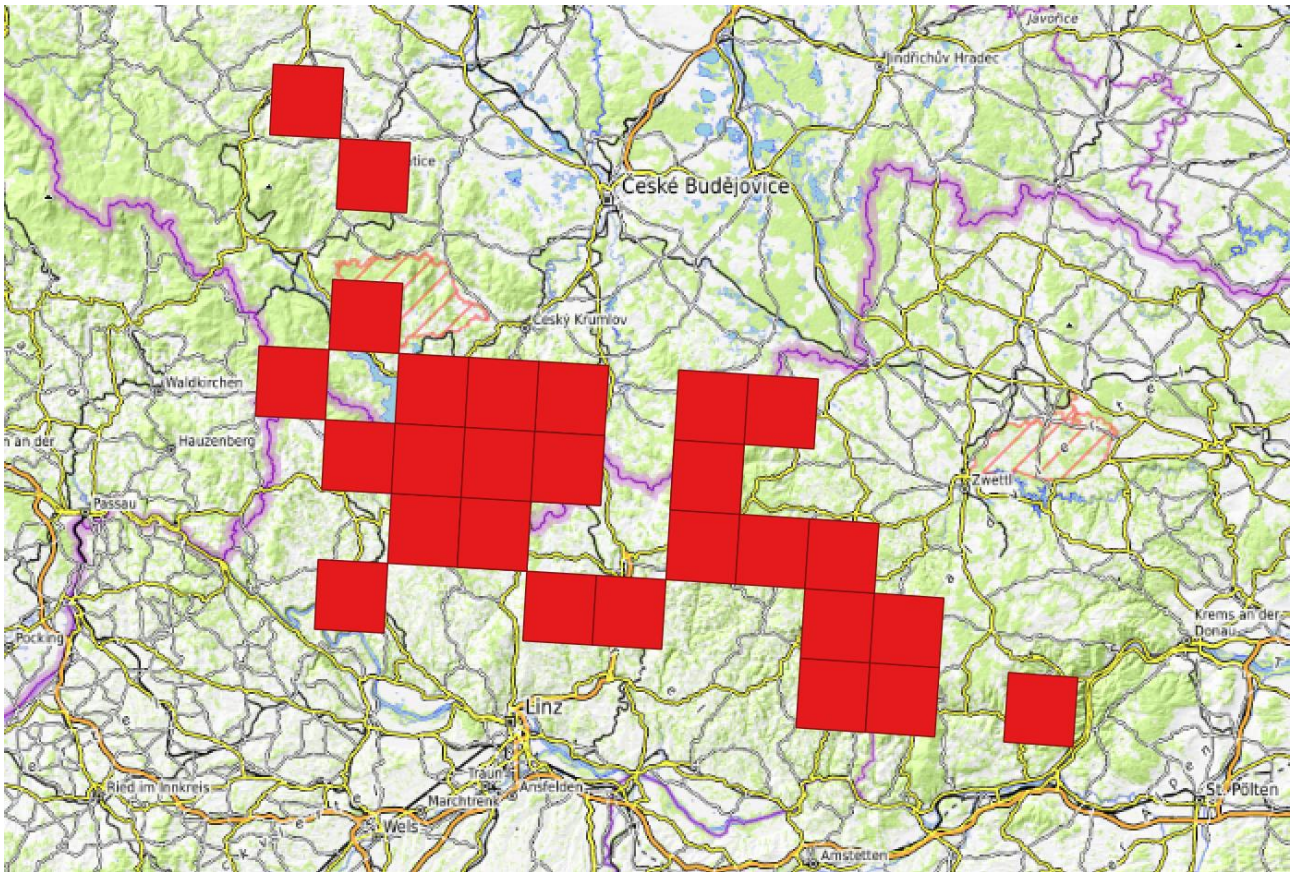


Figure 2: Lynx occupied grids in the Czech-Austrian border region are marked by red colour. The size of grid cells is 10 km x 10 km. Update to 14.6.2021

4.2 Population information

4.2.1 Lynx families

Altogether, 9 families were recorded in the wider Czech-Austrian border region in the lynx year 2021. 2 of these families were Czech-Austrian (Figure 3). Note that due to the decline of lynx in Novohradské hory/Freiwald area, there was not any lynx family recorded. Since 2016, there have always been at least two lynx families in this area. Therefore, the number of Czech-Austrian families is unusually small in the lynx year 2021.

Map of lynx families and resident females

The following map shows the approximate location and shape of home ranges of lynx families (reproducing females with kittens) recorded in lynx year 2021.

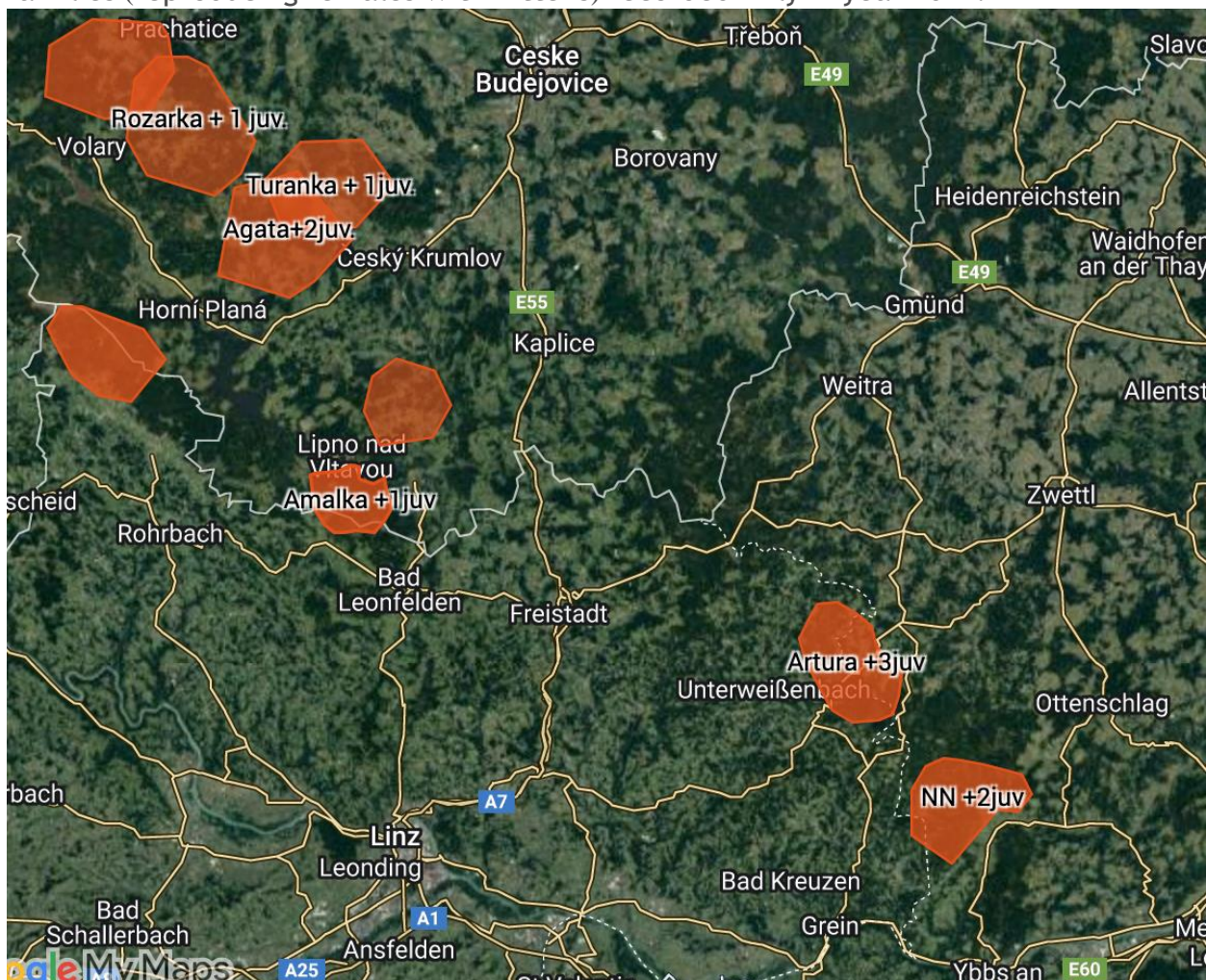


Figure 3: Map of lynx families (reproducing females with kittens) recorded in the lynx year 2021 in the CZ-AT border region. The map is based also on the preliminary data from AOPK, NP and CHKO Šumava and Hnutí DUHA (Bednářová, Belotti, Bufka, Volfová et al.). Note that the size and shape of home ranges are only approximate, based on available camera-trapping and mortality data. Update to 14.6.2021

4.2.2 Survival of reproducing females in CZ-AT region

The following table shows the long-term survival of lynx families in CZ-AT region. Unlike in the population centre of NP Šumava and Bavarian Forest, where reproducing females are often living longer than 10 years and having more than 8 reproducing seasons, in the outskirt regions of BBA lynx population the females usually live for less than three reproducing seasons and then they disappear (die). Illegal killing is most probably the reason for this high turnover of animals.

		LY13	LY14	LY15	LY16	LY17	LY18	LY19	LY20	LY21 temp
1	Temp24									
2	L017AT									
3	NN_Ysper									
4	NN Fb									
5	NN Bw									
6	Medvedice									?
7	Marylin									
8	Jiskra									
9	Svit									
10	Boure									
11	Horecka									
12	Viola									
13	Lee									
14	Leila									
15	Eos									
16	Amalka									
17	Artura									
18	NN SE?									

Table 1: Survival of reproducing females in CZ-AT region

4.2.3 Lynx mortality

Two mortality cases were documented in the lynx year 2021 in the Czech-Austrian border region.

No	Date	Country	District	Individual	Sex	Age	cause of death	Notes
1	26.10.2021	AT	Freundorf	juv. of Hořečka or Medvedice?	F	juvenile	orphaned	3.5 kg, lungs infection
3	02.7.2021	AT	Saggraben		F	adult	natural	4-5 years old, 12,3 kg, sick, no hints to poaching or accident; (3 uterine scars - should have had 3 births)

Table 2: Mortality cases in LY21 in CZ-AT region

4.2.3 Documented Czech-Austrian lynxes

In total 12 CZ-AT lynxes were documented in the lynx year 2021 in the Czech-Austrian border region.

Code	Name	Sex	Born	Mother	Juv. Code	Comment
B024AT	Lesk	M	2017	Jiskra	Jiskra_Juv.17-4	
B048AT	Laura	F	2020	Eos	Eos_Juv.20-1	
B053AT		M?	2019?			
B97		M	2019	Geli	Geli_Juv.19-2	
B754	Bjorn		2019	Viola	Viola_Juv.19-1	
R722			2019	Anna	Anna_Juv.19-2	
B771			2020	Leila	Leila_Juv.20-2	
B721	Amalka	F	2017	Agata	Agata_Juv.17-1	
R735			2021	Amalka	Amalka_Juv.21.1	
UN mother	Medvedice?					UN family
UN kitten					MedvediceJuv21_1?	UN family
UN kitten					MedvediceJuv21_2?	UN family

Table 3: List of animals recorded in the lynx year 2021 in the CZ-AT border region. Date of assessment: 27.5.2022.

4.2.4 Cases of Czech-Austrian lynx migration

Altogether, 3 cases of long-distance migration of CZ-AT lynxes were documented in the lynx year 2021 in the Czech-Austrian border region.

First case is lynx female B048AT Laura, the daughter of Austrian mother Eos. Laura came to Novohradské hory/Freiwald area from Austrian Weinsberger Wald.

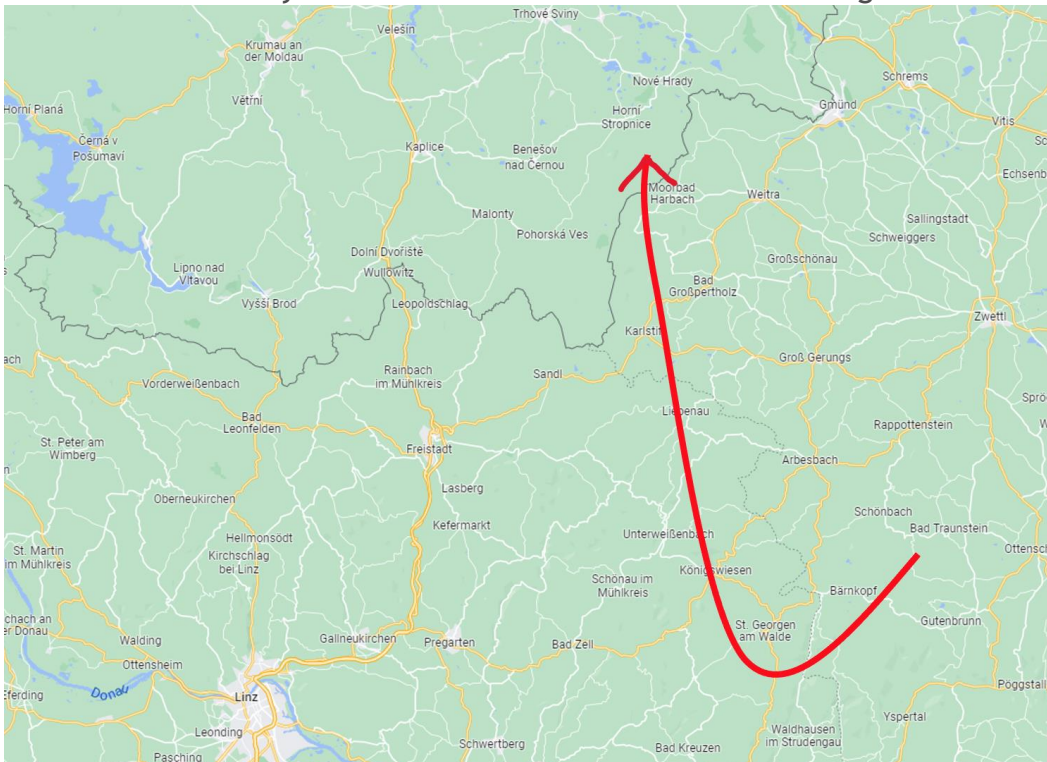


Figure 4: The route of lynx female Laura



B048AT Laura

On the other hand, lynx R722_Anna Juv.19-2 went in the opposite direction: from the Czech Rožmberk region to nearby the Danube River.

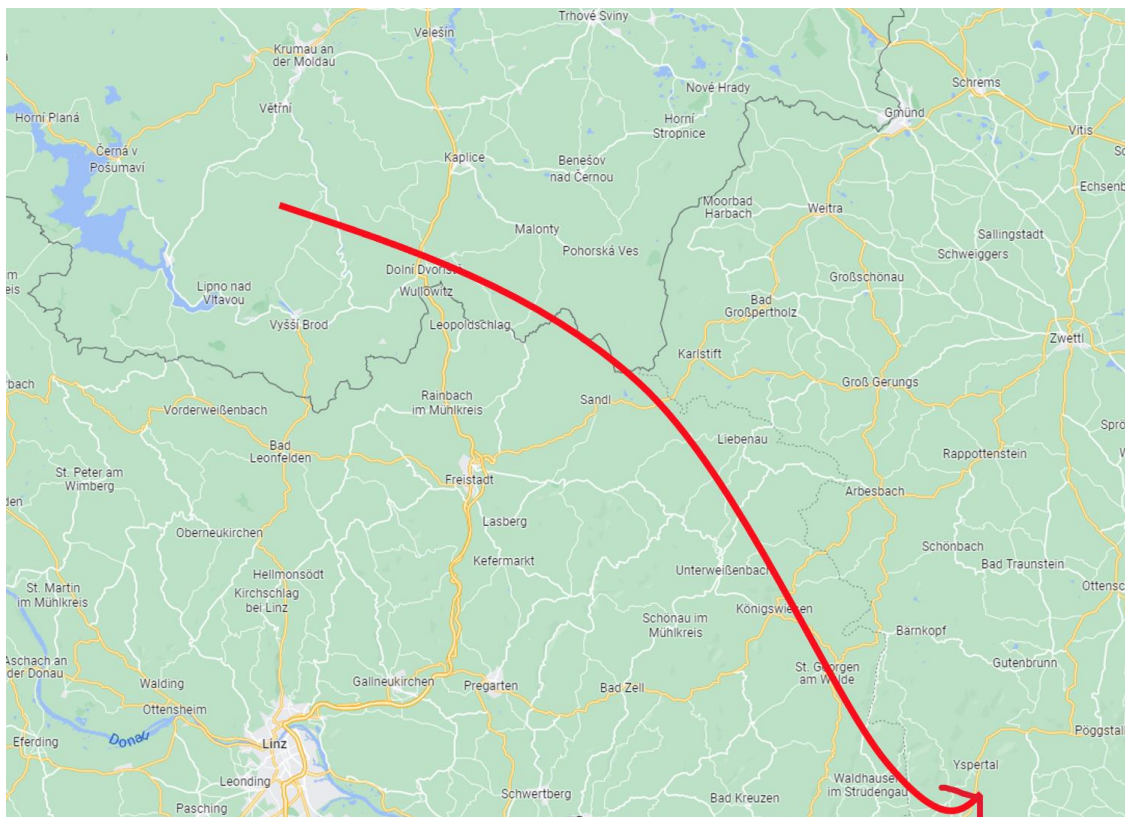


Figure 5: The route of lynx R722_Anna Juv.19-2



R722_Anna Juv.19-2

The third case is the route of B771_Leila_Juv.20-1 who, as a kitten, left her mother's territory and headed for Novohradské hory/Freiwald, where it was camera trapped in February 2021. And in Autumn it was already in Rožmberk region. This unusually early dispersal was probably due to the early death of Leila in winter 2020/2021.



Figure 6: The route of lynx B771_Leila_Juv.20-1



B771_Leila_Juv.20-1

6. Conclusions

The Lynx Monitoring, implemented within the RysLuchs Project by ALKA Wildlife and Green Heart of Europe, covered the green belt of the Czech-Austrian border region and its adjacent areas. In 27 grids has been confirmed lynx presence, mostly by internal camera trapping data, but sometimes also by photos from hunters, foresters and public. Nine lynx families were proved in the wider Czech-Austrian border region, thus demonstrating that it is suitable not only for lynx presence and migration, but also for reproduction.

However, high turnover of reproducing females over the last 9 lynx years shows, that the survival of the females is not good and may cause gaps in the lynx distribution and even absence of reproduction in some areas, e.g. Novohradské hory/Freiwald in the lynx year 2021. Despite that Novohradské hory/Freiwald has been permanently occupied by lynx minimally since 2013 and lynx reproduction has been regular here, lynx year 2021 was one of the worst ever recorded with only one male Lesk and later on newcomer female Laura roaming the area, where in 2017 have been minimally one male, three females and seven kittens. Regional decline of lynx and a disappearance of reproducing females has been also described in several other forested border regions (Lipno area, Vyšebrodsko, Malše river valley) and a number of reproducing females has gone recently missing (e.g. Viola, Marylin, Bouře, Lee,...), see Table 1.

Data from the whole Bohemian-Bavarian-Austrian lynx population show, that the major threats, endangering the lynx, are road mortality and illegal killing. Growing number of road casualties has been recorded mainly in the population centre of two national parks. However, traffic incident, in which lynx female Amálka was hurt on road near Studánky in 2018 demonstrates the danger of even small roads, cutting the good lynx habitat. Despite that, illegal killing remains the most important population threat, causing high turnover and low longevity of animals mainly in the outskirt areas. Only minority of these cases are investigated by the police (e.g. the case of illegally killed male at Mnichovice) yet number of proofs from the field are mounting up to show that the impact of illegal killing is very significant and may affect the survival of the whole population.

Despite the odds, CZ-AT border area remains a lynx heaven with large forests, rocky hideouts and plenty of prey (roe deer, red deer, hare...) which must be protected against habitat fragmentation and destruction. The new construction projects, esp. of linear infrastructure such as. roads and railways, can have seriously negative impact on lynx population and should be therefore always assessed by EIA procedure with special regards to lynx. The data from young animals dispersing both to and from Austria (see Figure 4, 5 and 6), travelling south and north, west and east, show that the protection of migration corridors and their permeability is a key thing for lynx survival in the CZ-AT region. Otherwise, it may happen that eastern patches of lynx distribution in Austria, as well as Novohradské hory/Freiwald will get isolated from the central part of the population, leading to a local extinction of lynx in the East and shrinking of the whole BBA population.

For these reasons, the green belt of forests on the Czech-Austrian border, which replaced the former iron curtain, is a crucial area for connectivity and survival of the lynx population and should always be protected by Czech and Austrian authorities as well as local people. The future of the lynx is in their hands.

7. Acknowledgement

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