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The Eurasian lynx in Continental Europe





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Original contributions and short notes about wild cats are welcome

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Cover Photo: Camera trap picture of two Eurasian lynx kittens in north-eastern Switzerland. 11 December 2014 (Photo KORA).

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Eurasian lynx in the Dinaric Mountains and the south-eastern Alps, and the need for population reinforcement

Eurasian lynx *Lynx lynx* was reintroduced to the Dinaric Mountains in 1973 to bring back an extinct autochthonous keystone species, but also to enrich the hunting grounds. The institutions involved in the reintroduction were aware of the danger of genetic isolation and warned about the importance of connectivity between the lynx populations in the Dinaric Mountains and the Western Alps for their long-term stability. Unfortunately, these populations never connected and the once thriving Dinaric population declined dramatically. Today, lynx in the Dinaric Mountains and the neighbouring south-eastern Alps are again on the brink of extinction. To prevent this, reinforcement of the population is currently taking place within an EU-funded “LIFE Lynx” project. While the main threat is indisputable – the population is highly inbred – the relative importance of the other factors causing the decline is still under debate, especially because the reintroduced lynx in the Dinaric Mountains was legally hunted for more than two decades. Here, we describe the most important historical events which enabled the lynx to recolonise Slovenia, Croatia, Northeastern Italy and Bosnia and Herzegovina (BiH) and highlight the main management decisions that were made during the lynx population expansion. Since the hunters were the promoters of the reintroduction efforts but had also carried out all the hunting activities, we discuss also the relevance of hunting for the lynx population development in the region.

Lynx reintroduction and rapid population expansion

Eurasian lynx was extirpated from the Northern Dinaric Mountains and south-eastern Alps (Fig. 1) at the end of the 19th century and the beginning of 20th century. In 1973, Slovenian hunters and foresters reintroduced six lynx (three females and three males, including a mother and her son, as well as probably a brother and a sister; Štrumbelj 1974) from Slovakia and these animals represented the founders of the new Dinaric – SE Alpine lynx population. The main aim of the reintroduction was to bring back an autochthonous apex predator and thus restore the balance of the ecosystem. It was even emphasised that hunters cannot select for prey in the same way as native predators and that lynx will positively influence the forest growth through its selective predation of wild ungulates (Čop 1972). Čop (1994) clearly stated that an important purpose of the reintroduction, if it succeeded, was also the enrichment of the state-owned hunting ground proposing the reintroduction, with additional trophy species for hunting.

Questionnaires, designed by the Slovenian Institute for Forestry and Wood Production (SIFWP) were sent via hunting associations to gather information about lynx distribution, estimated abundance, reproductive success, and predation. SIFWP regularly informed the hunting organisations about the development of the lynx population. Encouraged by Janez Čop, Croatian forester and hunting management expert Alojzije Frković started gathering lynx data in cooperation with hunters in Croatia in 1973 (Frković, 2001). A good collaboration with Croatia enabled a constant flow of information also to the Croatian stakeholders, and vice versa, which helped building a trustful relationship between the experts and the hunters. This is an important distinction from several other reintroductions of Eurasian lynx that were conducted in the same period, sometimes including clandestine releases of lynx and often without appropriate informing of the public and hunters, e.g. in Switzerland and probably Austria (Breitenmoser and Breitenmoser-Würsten 2008). This likely still has some negative consequences for people's attitudes toward the species.

The lynx population in Slovenia was determined to be abundant enough for legal hunting in 1978, i.e. five years after reintroduction. The hunting was controlled and could be undertaken only within the defined “lynx core area”, covering roughly 4,000 km² and within the prescribed hunting season (October–February). Meanwhile, lynx had a status of a game species in Croatia and the first animal was hunted in 1978. Hunting in Croatia continued without any restrictions until 1982 when the species was protected by a Decision on Special Protection of Lynx. To ensure the cooperation with hunters and to collect data about population status, the State Bureau for Nature Protection (SBNP) in Croatia, issued yearly hunting quotas for a limited hunting season until 2013, when Croatia adopted the Habitats Directive (Sindičič et al. 2010, 2016).

In Slovenia, the Hunting Association proposed unlimited hunting of lynx outside of the core area in 1986. The SIFWP strongly opposed the idea due to predicted negative effect on population expansion towards the Alps and proposed a compromise allowing hunting under restricted hunting period and a ban on hunting females with kittens. Opinion-based estimate of the lynx population size in Slovenia at the time was around 200 animals (Kos et al. 2012).

In 1990, the zonation of hunting was terminated as a management measure, although hunting was still prohibited at the border with Italy and Austria with the aim to allow lynx to immigrate into these countries. Čop (1994) and Čop & Frković (1998) warned that the hunting regime was not strict enough and proposed restrictions. Furthermore, the breakdown of Yugoslavia in 1991 caused an impediment for data collection, including mortality records (Fig. 2), as well as for control of regulated hunting, especially in Croatia and BiH.

In 1994, the Slovenia Forest Service (SFS) took over the management of the lynx in Slovenia and the hunting quotas decreased following the recommendation of Čop (1994), and new legislation was accepted by the government in 1993, which listed lynx as protected species in Slovenia with legal hunting based on a quota. The quota was established based on monitoring results of previous years. Protection was reinforced when the country joined the EU in 2004 and ratified the European legislation (Habitats Directive), which caused a complete halt of legal hunting (Sindičič et al. 2009).

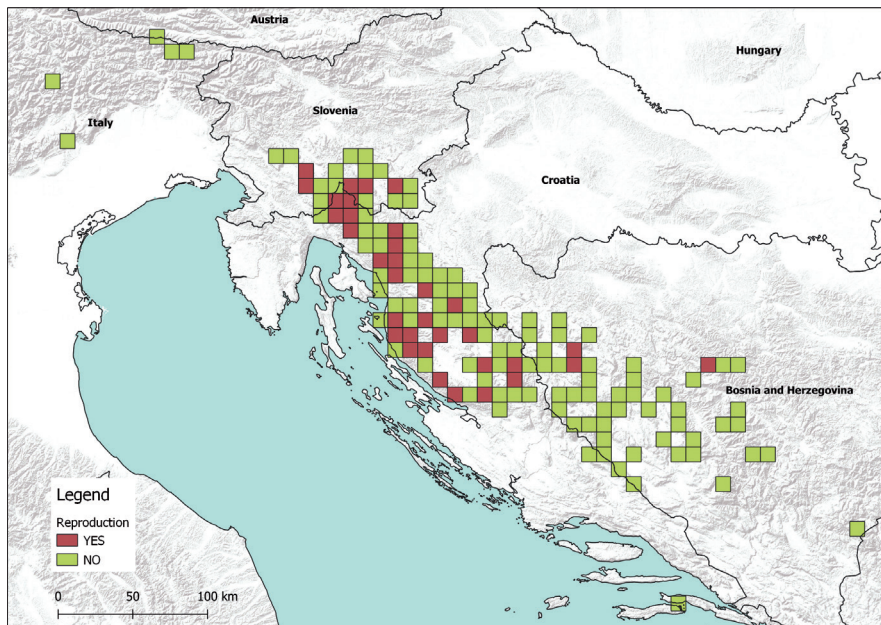


Fig. 1. Lynx distribution range according to C1 and C2 data (SCALP categorization; Molinari-Jobin et al. 2003), including data from systematic camera trapping, in the Dinaric Mountains and SE Alps between years 2018 and 2019 (data extracted from lynx.vef.hr database (21.9.2020) and Trbojević & Trbojević 2018).

In Bosnia and Herzegovina (BiH), lynx had a different status between the two governing entities (Republic of Srpska and Federation of Bosnia and Herzegovina) but did not gain full protection by law until 2009. Generally, there was also a lack of interest for the species from the governmental institutions and a lack of funding for any research or monitoring activities. The first confirmed record of lynx returning to BiH is from 1980 (tracks) and hunting started in 1984. Hunting was not restricted and the mortality data was the main information collected about the lynx population (Soldo 2001). By using questionnaires, data on mortality records for the past decades were reconstructed (Trbojević & Trbojević 2018), while other methods for

monitoring have started to be used only in recent years (Trbojević 2019).

Lynx population decline and enhanced international collaboration

The reintroduction of lynx into the Dinaric Mountains was internationally recognized as the most successful of all reintroductions in Europe at the time (Breitenmoser-Würsten & Breitenmoser 2001). International collaboration strengthened in the new millennia especially in the Alpine arc, and the monitoring activities in Slovenia became more systematic in the 2000s with the implementation of the SCALP data categorization criteria (SCALP stands for the Status and Conservation of the Alpine Lynx Population; Molinari-Jobin et al. 2003).

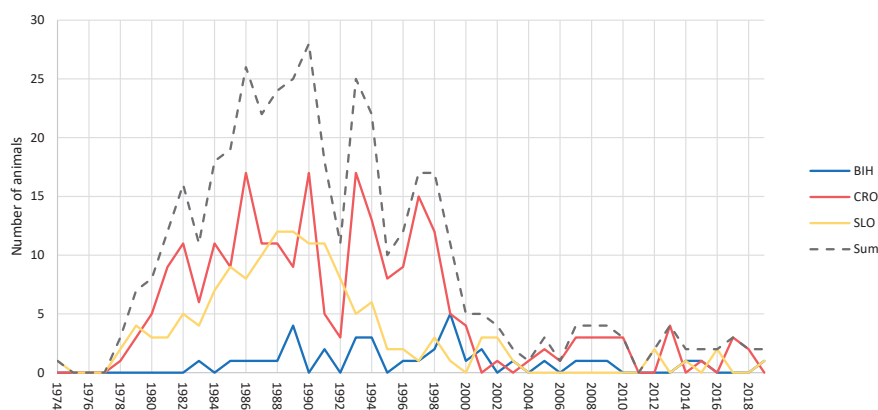


Fig. 2. Recorded lynx mortality in Slovenia, Croatia and BiH between 1974 and 2018 (Soldo 2001, Frković, 2001, Sindičić et al. 2016, Čop 1994, Slovenia Forest Service 2018, Trbojević & Trbojević 2018).

Lynx population abundance in Slovenia slightly dropped in the 1990s (Fig. 3) to 40–50 animals (Staniša et al. 2001). In the next pentad (2000–2005) stability was still officially reported despite the suspicions of increased illegal killing and local decline of lynx records. Permits for lynx hunting were issued in areas where opportunistic data and damages to livestock indicated constant lynx presence although they were often not reached in the later years (Fig. 3). According to some experts, the hunting permits reduced probability for poaching (Koren et al. 2006), but unconfirmed rumours about regular poaching of the lynx appeared simultaneously.

Likewise, suspicions of poaching started in Croatia after the species was protected, and Sindičić et al. (2016) reported 60% (18 cases per year) of all recorded mortality cases in Croatia after the protection (between 1999 and 2013) were due to poaching. That was substantially higher than the estimated poaching rate when legal hunting was permitted (10 cases per year; up to 10%; Sindičić et al. 2016). After 2009, when no lynx mortality was recorded in Slovenia and the records in Croatia drastically decreased (Sindičić et al. 2016), it became also generally accepted that the lynx population in the Dinarics is far from stable. The population of lynx in Slovenia in the early 2000s was estimated to be 15–25 and in Croatia 40–60 animals, although it is important to emphasise that the estimation was not based on coordinated monitoring. The range shrank, with the number of records dropping especially in the peripheral areas of the population distribution, in Dalmatia and eastern-central Croatia and in the SE Alps, Slovenia (Kos et al. 2012, Huber et al. 2013).

From 2007 on, research and monitoring have been improving and a common Slovenian-Croatian management strategy was prepared, but was never adopted by the governments (Majić Skrbinšek et al. 2008). Important advance in knowledge was gained from genetic studies, which confirmed high level of inbreeding in the population and demonstrated a dramatic drop in the effective population size, which became too low for the long-term persistence (10.2–17.5 95% CI; Skrbinšek et al. 2019; Polanc 2012, Sindičić et al. 2013a, 2013b). A need for genetic remedy was advocated ever since but funding for it was assured only in 2017 when the EU-funded LIFE Lynx project was launched (www.lifelynx.eu).

The role of hunters and Dinaric lynx today

The importance of hunters for the existence of lynx in the Dinaric Mountains is undisputable. After they reintroduced the lynx in 1973, they were in charge of lynx management, including proposing the hunting quotas and carrying out opportunistic monitoring in collaboration with the SIFWP. If hunting were not planned, it is doubtful whether hunters in that period would have carried out the reintroduction of this large carnivore to the Dinaric Mountains. Hunting of lynx was based on presumed vitality of lynx population and quotas were planned from the late 1970s until 2003 in SLO, until 1998 in CRO, and until 2009 in BIH. Between 1977 and 2008, when lynx in the Dinaric Mountains and SE Alps were legally hunted, 296 animals were legally harvested in the three countries (Zavod za gozdove 2018, Trbojević & Trbojević 2018, Sindičić et al. 2016), which represented 75% of all recorded lynx mortality in the respective countries (Fig. 2). Despite regular hunting, the population grew, spatially spread and colonised the whole northern part of the Dinaric Mountains and a part of the SE Alps.

It remains unknown to what degree hunting (legal and illegal) might have slowed down the expansion process and sped up the decline of the population. Some reintroduced populations in Europe are not spatially expanding due to high rates of illegal killing (Müller et al. 2014, Heurich et al. 2018). It remains unclear whether regular hunting quotas reduced the probability of illegal killing and the total number of removed animals from the population, as assumed for instance by Koren et al. (2006).

With a high support from and tight collaboration with the hunters, accompanied by their publicly advocated conservationist philosophy, we are confident that today the lynx reinforcement process undertaken within the LIFE Lynx project (www.lifelynx.eu), is giving lynx in the Dinaric Mountains and the SE Alps a second chance. The project aims to save the Dinaric–SE Alpine lynx population from extinction by improving the genetic and demographic perspective well into the 21st century. Before 2021, 7 lynx have already been translocated from the Carpathian population to the Dinaric Mountains and further releases are planned for the next years (Krofel et al. 2021). In addition to this, a new population nucleus (“stepping stone”) in the Slovenian Alps was created with 5 animals in 2021. The aim is to bring the SE-Alpine nucleus closer to the Western Alpine population with a vision

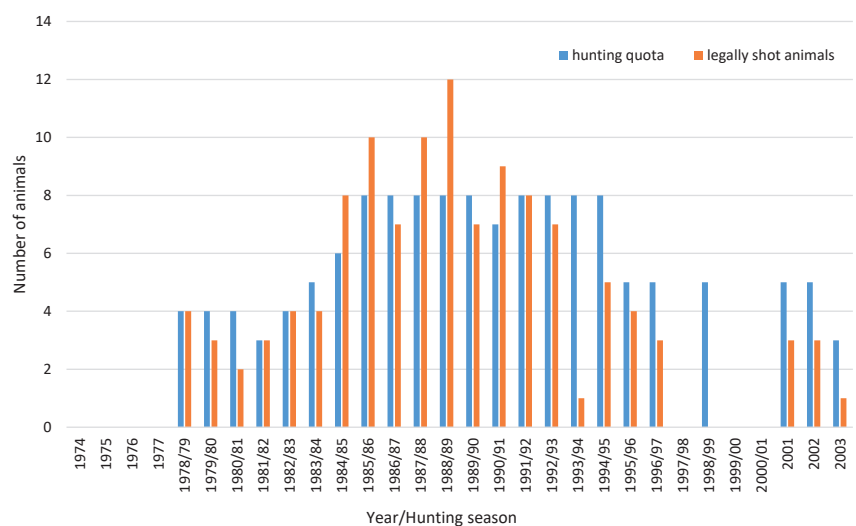


Fig. 3. Lynx hunting quotas and legally shot lynx in Slovenia between 1973 and 2004. For some years, data was available per calendar year, while the majority of the records were available per hunting season (during the winter) (Slovenia Forest Service, 2016).

of creating an interconnected metapopulation with regular gene flow, which will help reduce negative impacts of habitat fragmentation and improve the prospect of both populations.

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