

# Special Issue

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# CAT FLOWS

## 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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# Situation of the Eurasian lynx in the Vosges Mountains

**The Eurasian lynx *Lynx lynx* became extinct in the Vosges Mountains in the early 17th century. Between 1983 and 1993, 21 lynx were released during a reintroduction program. However, only 10 lynx survived notably because of illegal killings. Besides, tensions appeared between local stakeholders: the return of the lynx in the Vosges Mountains was not unanimously accepted. Almost 30 years later, the lynx is still critically endangered in the Vosges Mountains and acceptance remains still fragile. Thus, its conservation status needs to be improved urgently. This is a challenge for the species in the Vosges Mountains as well as for the Upper Rhine lynx metapopulation. In that context, a Regional Action Plan focusing on lynx in the Vosges Mountains has been written from 2016 to 2019 according a participative approach. A total of 18 actions answering to four topics (coexistence with hunters and breeders, ecological connectivity, monitoring, awareness) have been identified. The implementation phase of this action plan will occur during 10 years, from 2020 to 2029, to restore durably the lynx conservation status in the Vosges Mountains.**

## Historical context and current situation

The Eurasian lynx became extinct in the Vosges Mountains in the early 17<sup>th</sup> century (Stahl & Vandel 1998). The extinction causes are the same as for other European lynx populations: hunting, trapping, decrease of prey density and modification of habitats (Breitenmoser et al. 2003). During the 20<sup>th</sup> century, the evolution

of European legislation gave way to a favourable ecological context for the return of the species (reforestation, increase in the density of prey, protection law). As in other regions of Western Europe, where a natural return of lynx appeared compromised or even impossible, a reintroduction program was organised in the Vosges Mountains (Vandel et al. 2006).

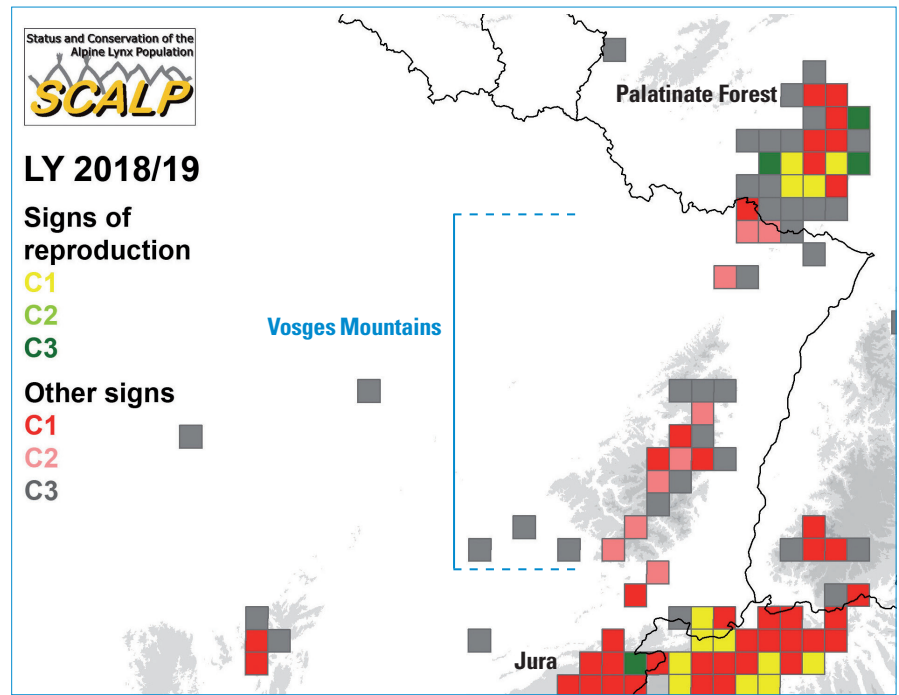
Between 1983 and 1993, a total of 21 lynx (9 females and 12 males) were released during 13 operations at 4 sites located in the Alsatian side of the Hautes-Vosges (Climont, Taennchel, Grand Ballon and Rossberg; Vandel et al. 2006). During these 10 years, 9 of the released lynx disappeared because of illegal killing (3 confirmed, 3 presumed), malnutrition (1), unknown causes (2), and 2 lynx were recaptured because too familiar with humans. Finally, only 10 lynx (4 f and 6 m) survived and thus, contributed to the establishment of the Vosges side of the Vosges-Palatinian lynx population (Vandel et al. 2006). In addition, during this reintroduction program, tensions appeared between the various stakeholders, particularly due to a lack of communication and concerted actions accompanying the lynx releases (Herrenschmidt 1990). As a consequence, this reintroduction program and so, the return of the lynx to the Vosges Mountains were not unanimously accepted. Then, the situation became even more fragile (Charbonnel & Germain 2020). Almost 30 years later, the future of the lynx remains still uncertain in this part of its French range area. Indeed, after the reintroduction period, lynx regular presence area in the Vosges Mountains progressed reaching in

2004 a maximum of around 2,000 km<sup>2</sup> (Marboutin 2013). From 2005, this regular presence area began to decrease until reaching its lowest value in 2016 with 100 km<sup>2</sup> (Marboutin 2013, Réseau Loup-Lynx 2014, 2016, 2019). In 2018 (01/04/2015–31/03/2018 period), it reached 400 km<sup>2</sup> spread over all the Vosges Mountains (Vosges du Nord, Vosges centrales, Hautes-Vosges and Vosges du Sud; Réseau Loup-Lynx 2019). All maps are available at <https://carmen.carmencarto.fr/38/Lynx.map>.

A lynx distribution map for the whole Vosges Mountains and neighboring mountains – notably from the Upper Rhine lynx metapopulation – for the biological year 2018–2019 was produced following the SCALP framework (Fig. 1; SCALP 2018/2019). Based on 10 x 10 km grid cells, the distribution in the Vosges Mountains was 1.400 km<sup>2</sup> (C1 and C2 categories), without any signs of reproduction.

### Lynx monitoring in the Vosges Mountains

One important aspect of the monitoring of the lynx situation in the French Vosges Mountains, is the development of different field monitoring procedures over time to answer questions of lynx conservationists fearing its decline. In France, lynx monitoring and conservation status evaluation are under the responsibility of the French Office for Biodiversity OFB, formerly French National Game and Wildlife Agency ONCFS, since 1988 and relies on 4,500 (status January 2021) trained volunteers with different background, so-called correspondents, forming the lynx monitoring network (“Réseau Loup-Lynx”). In 2013, the method to evaluate the lynx conservation status was newly reviewed for being more reactive (Réseau Loup-Lynx 2013). As the lynx is a discrete species and in order to avoid observation errors, the current method analyzes the abundance and recurrence of indices by successive and overlapping biennial periods of one year (Réseau Loup-Lynx 2013). These periods are fixed on the biological cycle of the species (for example from 1 April 2015 to 31 March 2017, and from 1 April 2016 to 31 March 2018 with 1 April 2016 to 31 March 2017 as overlapping year). The cartographic restitution of the regular and the occasional areas of lynx detected presence is produced annually according to the 10 x 10km standard European grid (Réseau Loup-Lynx 2013). With this “overlapping biennial method”, the decrease of the lynx regular presence in the Vosges Mountains is documented in 2005



**Fig. 1.** Observed lynx distribution in the Vosges Mountains according to the SCALP monitoring report lynx year 2018/2019 (biological period: from 01/05/2018 to 30/04/2019) based on 10 x 10 km grid (SCALP 2018/2019). A distinction is made between different SCALP categories and eventual reproductive events (see Molinari-Jobin et al. 2021).

whereas the previous method documented it only in 2011 (Marboutin 2013).

In parallel, different field protocols have been conducted since 2011 in order to clarify the conservation status of the lynx in the Vosges Mountains. During winters 2011/2012 and 2012/2013, two intensive tracking sessions have been organized in the regular presence area of lynx resulting only in nine signs of presence in the Vosges centrales (Donon sector) and one lynx track in the same area (Marboutin 2013). Besides, during winter 2012/2013, a lynx (named Van Gogh because of its right ear cut off) was photographed in the same sector thanks to camera traps placed in the field by volunteers from the Réseau Loup-Lynx (Germain 2013). Moreover, four intensive camera trapping winter sessions were organised from 2012 to 2016 in four different study areas (2012/2013: Hautes-Vosges, 2013/2014: south of A4 highway, 2014/2015: Vosges du Nord, 2015/2016: Vosges centrales). Each of them lasted two months, with around 400 km<sup>2</sup> study areas (grid with 2,7 x 2,7 km cells) and 50–60 camera traps (one site in every second cell, two camera traps per site). Camera sites were selected based on previous signs of lynx presence, local knowledge, and landscape features to optimize detectability. These camera trap sessions resulted in zero photo of lynx (Germain 2014, Germain et al. 2013, 2016, Charbonnel et al. 2017). In com-

parison, 92 lynx were identified from 2011 to 2015 in the French Jura Mountains with the same protocol applied to three study areas (Gimenez et al. 2019). At present, the lynx monitoring network enhances coordinated camera trapping in the Vosges Mountains, more particularly in the context of new lynx arrivals from the Palatinate forest where a reintroduction occurred from 2015 to 2021 (Schwoerer 2021, Scheid et al. 2021).

### Challenges for lynx in the Vosges Mountains

The critically endangered conservation status of the lynx in the Vosges Mountains can no longer be questioned and its status needs to be improved urgently. This is a challenge for the species, not only at the scale of the Vosges Mountains, but also at the western European one and, more precisely, at the “Upper Rhine lynx metapopulation” scale (Palatinate Forest–Vosges Mountains–Jura Mountains–Black Forest). Indeed, by being located between the Jura Mountains, which host the main core of the French lynx population and is linked to the Swiss lynx population (Drouet-Hoguet et al. 2021), and the Palatinate Forest in Germany where a reintroduction program occurred (Idelberger et al. 2021), the Vosges Mountains occupy a strategic position for the connectivity of western European lynx populations. Even if the ecological connectivity between Palatinate Forest, Vosges Mountains, Jura

Mountains and Black Forest remains currently far from optimal (Morand 2016, Zimmermann & Breitenmoser 2007), a natural colonisation of the Vosges Mountains by lynx may be possible, both, from the north and the south. For instance, from 2017 to 2021, five lynx (2 f and 3 m) released in the Palatinate Forest and four progeny (4 m) came to the Vosges Mountains. One female and four males installed their home ranges there, two males have a transboundary home range, and two lynx (1 m and 1 f) were observed only passing through (Idelberger et al. 2021, Scheid et al. 2021). In the same way, a male (lynx F25\_034 also named Bingo) arrived in the south of the Vosges Mountains from the Doubs region during winter 2014–2015 where he was pictured by camera traps (Hurstel & Laurent 2016, Germain et al. 2017). Before dispersing, F25\_034 had also been photographed more than 20 times north-west of Besançon (French Jura Mountains), from November 2013 to June 2014 (Source: Réseau Loup-Lynx / OFB data base). This was the first evidence of dispersal of the species from the Jura to the Vosges Mountains (Chenesseau & Briaudet 2016, Hurstel & Laurent 2016). Other lynx are detected currently or passed by in the Vosges centrales and in the Hautes-Vosges but their origin are unknown (Schwoerer 2021). In Spring 2021, a female from the Palatinate forest settled down in the Vosges du Nord gave birth to two young (M.-L. Schwoerer, pers. comm.).

### The first regional action plan for lynx conservation in France

To respond to the urgent need of improving the lynx conservation status in the Vosges Mountains, the drafting of a Regional Action Plan PRA occurred from 2016 to 2019 (see Charbonnel & Germain 2020). The regional action plan for restoring the conservation status of the Eurasian lynx in the Vosges Mountains was first named “Programme Lynx Massif des Vosges”. At this time, no National Action Plan existed for France, but in the continuity of Breitenmoser et al. (2003)’s action plan for lynx conservation in Europe, the PRA aims to define and develop concrete actions to restore durably the conservation status of the Eurasian lynx in the Vosges Mountains through a participative, concerted and shared process involving local stakeholders (hunters, sheep breeders, scientific, NGO, government agencies, etc.). A knowledge synthesis has identified five conservation needs and issues, ordered by priority:

1. Improving coexistence with human activities (hunting, livestock) to enhance lynx acceptance.
2. Restoring the ecological connectivity between mountain ranges (Jura-Vosges-Palatinate-Black Forest) and conserving a favorable habitat within the massif.
3. Reducing human-caused mortality (collisions with traffic and illegal killings).
4. Consolidating the network of observers and developing cooperation (regional and cross-border) for better monitoring and protection of the lynx.
5. Disseminating knowledge about the lynx and the issues of its conservation.

To address these needs and issues, governance and decision-making were based on a steering committee, a reading committee, five working groups (“Coexistence with hunting”, “Coexistence with livestock”, “Habitat and connectivity”, “Monitoring and conservation”, “Representations and awareness”), external advisors, and a coordination unit. Decisions were taken by consent in order not to look for the best/ideal solutions, but for decisions which respect the limits of those who will have to implement them, and which in no way compromise the capacity of the group to carry out its objectives (Charbonnel & Germain 2020). After three workshops with each working group, a total of 18 actions have been identified (Table 1). These actions are classified according to four topics (“Coexistence with human activities”, “Habitat and ecological connectivity”, “Monitoring and conservation”, “Representations and awareness”) – answering to the conservation issues and working groups themes – and three domains (“Study”, “Protection and management”, “Communication”). Each of these 18 actions are detailed in action sheets that specify its topic, its domain, its context, its objectives, its coordinators, its calendar, etc. During 10 years (from 2020 to 2029), the implementation phase of the PRA will be coordinated by the Regional Directorate for the Environment, Planning and Housing (DREAL Grand Est), and will occur within the consistency of the governmental National Action Plan (PNA) which is currently emerging.

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**Table 1.** List of the 18 actions of the regional action plan (PRA) for restoring the conservation status of the Eurasian Lynx in the Vosges Mountains (2020-2029). Topic: 1 = Coexistence with human activities (hunting and livestock), 2 = Habitat and ecological connectivity, 3 = Monitoring and conservation, 4 = Representations and awareness. Domain: S = Study, P/M = Protection and management, C = Communication.

Topic	Domain	N°	Title of the action
1	P/M	1	Consider the presence of lynx in hunting activities
		2	Support sheep breeders to improve coexistence with lynx
		3	Fight against illegal killing of lynx
	C	4	Communicate with hunters
		5	Communicate with sheep breeders
2	S	6	Refine knowledge about lynx habitat, corridors, and movement barriers
	P/M	7	Maintain, restore areas of favorable habitat and corridors
		8	Facilitate the crossing of linear transport infrastructures and reduce mortality
C	9	Communicate on lynx habitat with managers, planners and decision makers	
3	S	10	Monitor the evolution of lynx distribution with methods adapted to the Vosges Mountains
		11	Study the future of the lynx in the French Vosges Mountains and complement PRA actions
	P/M	12	Strengthen the regional/cross-border cooperation and boost the existing monitoring network
		13	Taking care of orphans and injured lynx
4	S	14	Identify, complete and evaluate studies on representations
	C	15	Strengthen awareness and communication projects around the lynx
		16	Value the image of the lynx and reinforce acceptance thanks to local development
		17	Continue and generalise concertation meetings with local stakeholders
	C	18	Coordinate and implement the regional action plan

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