In partnership with :

Feedback on escape devices for large fauna

1. Context - Presentation of the project

This project is a follow-up to the CEDR's 2018 report and, more broadly, is part of a global approach to finding a solution to limit collisions with wildlife around road and highway infrastructures.

Dealing with animal accident risk, securing Transport Infrastructures requires first and foremost the installation of restraint systems adapted to the targeted wildlife species. Indeed, regarding « The Roads and Wildlife Manual » of 2018 of the European Conference of Road Directors (ECRD), the installation of appropriate fencing, particularly when associated with wildlife crossings, is the most effective measure to prevent collisions with large wildlife species, mainly deer and wild boar, but also mesofauna: badgers, etc. In addition, with a view to preserving biodiversity, fences are also put in place to prevent the destruction of wild species by traffic, particularly along ecological corridors impacted by infrastructure and where they must also be accompanied by secure crossing structures.

Nevertheless, it happens that animals do manage to enter fenced rights-of-way due to the interruption of fences (end of equipped lines, intersection of roads or tolls, etc.), damaged areas (holes, subsidence, open equipment, etc.) or special configurations (promontories, etc). Once they enter the rights-of-way, their return is sometimes complicated and these animals are a potential risk to vehicles on the road, which makes it necessary to provide them with one-way emergency exits. Since 2002, the development of wildlife exits has been recommended in the European Handbook for identifying conflicts and devising solutions *(report COST341 translate by SETRA)* : this idea is taken up in the future guide to wildlife crossings "Preservation and restoration of ecological continuities in the context of a linear transportation infrastructure project" *(CEREMA, upcoming)*. Finally, the implementation of wildlife fences including loopholes is specifically identified as a measure to technically reduce environmental impacts in the exploitation / operation phase under the Avoid / Reduce / Compensate sequence *(CEREMA 2018, Environmental assessment: a guide to help define measures ERC)*.

In France and more widely in Europe and abroad (USA, etc.), such systems have been developed since the 1970s in 4 main types:

- Doors or combs hinged on a vertical axis,
- vertical or inclined drop-down trapdoors falling from a horizontal axis,
- drop-down trapdoors coupled to a simultaneously liftable exit trapdoor,
- exit ramps according to different dimensioning and support modalities.

For certain heritage species (bobcat, etc.), specific devices are also set up to form ladders or promontories.

The recent CEREMA guide (2019) on road and rail fences and wildlife insists on the need to specify the recommendations relating to fences and their loopholes, which are often too general in impact studies.

After 50 years of development in France and abroad, it is possible to offer extensive feedback about loopholes.

Examples of escapes route: 1) boar hatch Sanglipass, 2) tilting trapdoor, 3) deer ramp
Photo credits: 1) and 3) Cabinet X-AEQUO, 2) JF BRETAUD - CEREMA Ouest

2. Expectations

The objectives of this feedback are:

- to lead to a general review of the different devices tested and currently available,
- to identify the installation contexts, advantages or constraints specific to each type of equipment,
- to identify or propose methodological elements to locate and implement these devices.

The discussion may focus on:

- the type of fauna targeted and the conditions of effectiveness of the devices,
- the methodology for implementing the loopholes (on new or existing fencing),
- the adaptation of the configuration of the fences housing the device or the implementation of return fences,
- the possibility of related measures to enhance the identification of the device by animals,
- the constraints of maintenance and monitoring of the equipment installed,
- the costs of supplies, installation and maintenance,
- etc

Wildlife Species Targeted by the Project:

- mainly large fauna (including deer, roe deer, wild boar, etc),
- according to available references: meso-fauna (badger, bobcat, etc) and small fauna.

The results will be made available to the technical community in a form yet to be defined (technical guide).

3. Method

The study will be carried out through bibliographical research and surveys of numerous contacts in France and abroad (Europe, North America, etc.), with a focus on systems that have been the subject of formal reports and studies.

Partenrs will include:

- infrastructure managers (public and private roads and motorways, railways, airports, etc.) and their exchange groups: LIBC - Linear Infrastructures and Biodiversity Club, ECRD - European Conference of Road Directors, etc),
- Infra Eco Network Europe (IENE),
- the hunting authorities (national, regional and departmental hunters' federations),
- State technical services (CEREMA, OFB French Office for Biodiversity),
- design offices and their professional associations (AFIE, UPGE, etc),
- naturalist bodies and associations,
- equipment manufacturers and distributors.

This work is carried out in technical partnership with:

- CEREMA,
- OFB (ex-ONCFS).

This study is carried out and self-financed by the Cabinet X-AEQUO :

- additional funding may be sought,
- this work will be initiated within the framework of a 6-month engineering internship starting in April 2020.

4. Project leader

For 20 years, Cabinet X-AEQUO has been assisting managers in securing infrastructures against the risk of animal collisions and the impact on animal populations:

- analysis of areas at stake and points of conflict,
- technical specifications related to managers, hunters and naturalists,
- monitoring of achievements and external control,
- monitoring of the effectiveness of the systems and experience feedback.

Cabinet X-AEQUO carries out Research and Development actions to design technical solutions in permanent contact with infrastructure operators and designers, hunting actors (hunting federations, etc), naturalists and institutions (CEREMA, ITTECOP, IENE). It has participated in the deployment of more than 200 different types of loopholes. In this context, Caryl BUTON, manager of the firm, is the director of a co-patent on an escape device for wild boar with the company ESCOTA (VINCI Autoroutes Group) at the request of which this device was developed: the Sangli-pass ®.

It should be noted that all the data relating to these achievements which will be exploited within the framework of the present project have been the subject of efficiency studies and expertise carried out independently, in particular by the hunting authorities.

C. BUTON, is regularly involved in technical exchange networks and has been associated for his experience with CEREMA's recent reflections and publications. He is assisted by Clément SORTAIS, 3rd year engineering student at VetAgro Sup (Lempdes, AEST specialization - Agriculture, Environment, Health and Territory) who specialises in wildlife monitoring and management, and wishes to combine operational research and development actions.

5. Partners and Technical Committee

This project will be carried out in consultation with a technical committee comprising:

- **CEREMA** (Centre for studies and expertise on risks, the environment, mobility and development) is a public institution focused on supporting public policies, placed under the dual supervision of the Ministry of Ecological and Solidarity Transition and the Ministry of Territorial Cohesion and Relations with Local Authorities. CEREMA is involved, for the benefit of local authorities and State services, in the development and implementation of public policies for the restoration, rehabilitation and preservation of ecological continuity. CEREMA provides public stakeholders and

project owners with scientific and technical support in terms of operational expertise and methodological guides for land management and the consideration of biodiversity issues in development projects. It also contributes to the dissemination of knowledge about species and environments and the preservation of biological diversity. It has published numerous reference documents on wildlife facilities (fences and structures for wildlife). Luc CHRETIEN (IDAE) is head of the Biodiversity, EU and development division. François Nowicki (ITPE) is project manager for the Biodiversity - Ecological Continuity and Transport Infrastructures project.

- **OFB** (French Biodiversity Office). Since 1 January, the French Agency for Biodiversity and the National Hunting and Wildlife Office have been grouped together within the new French Biodiversity Office, a new force to meet the challenge of protecting and restoring biodiversity in France and its overseas territories. The OFB integrates the skills of the ONCFS, particularly in terms of knowledge, studies and research on wildlife and its habitats. Understanding the functioning of environments and the interactions between biodiversity, territory and society makes it possible to better assess the state of biodiversity and the impacts of human activities such as habitat fragmentation. Research work highlights solutions to limit these impacts. The knowledge acquired over several decades of studies and monitoring of wild ungulates by Christine Saint-Andrieux, the scientific studies conducted on the problem of collisions and the expertise on spatial fragmentation make it possible to establish a link between the biology of these species and the concrete solutions to be found.

6. Contacts and Details

Project leader :	*Partners and Technical Commitee :*	
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