HABITAT FRAGMENTATION
DUE TO TRANSPORTATION INFRASTRUCTURE

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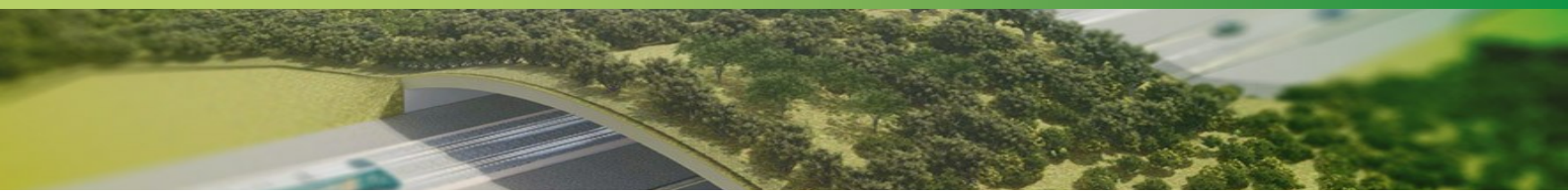
EDITORIAL



This second half of 2025 is witnessing significant progress in the implementation of the Strategy for the Defragmentation of Habitats Affected by Linear Transport Infrastructure. Its first Work Programme continues to establish itself as a benchmark for technical and inter-administrative collaboration. In this context, it is worth highlighting the dynamism of the Working Group, whose latest meeting served to review progress on key initiatives such as the update of technical guidelines for wildlife crossings, the development of the national inventory of such infrastructure, and the most relevant actions promoted by the participating administrations.

In line with this technical and knowledge-based approach, the Ministry for the Ecological Transition and the Demographic Challenge (MITECO) has launched a Bibliographic Database on Habitat Fragmentation, accompanied by a Guide to Readings and Resources that facilitates access to rigorous and up-to-date scientific literature. This tool is designed to become a practical and accessible reference for technicians, planners, and researchers working on the integration of biodiversity and transport.

Another noteworthy initiative is the launch of the Roadless Areas Project in Spain, aimed at identifying, prioritizing, and conserving areas of high ecological value that remain free from linear infrastructure. In a context marked by a rapid pace of road construction and cartography that often fails to reflect real-time changes, these areas are disappearing quickly. Preserving them represents one of the most effective —and cost-efficient— strategies for ensuring ecological connectivity, increasing climate resilience, and contributing to the global target of protecting at least 30% of the territory by 2030.

At the same time, dialogue and cooperation spaces between the transport and biodiversity sectors continue to strengthen. In April, the National Road Safety Conference was held, which for the first time included a dedicated session on the issue of wildlife on roads. This issue also includes the findings of a European study on legal liability in animal-related traffic accidents, a key aspect for advancing more effective and equitable measures.

Looking ahead, preparations are already underway for the next Technical Conference on Habitat Fragmentation, to be held on October 16 and 17 in Valladolid, in collaboration with the Regional Government of Castilla y León. Under the theme *"Digital Transformation of Transport Infrastructure and Biodiversity Management: Opportunities for Cooperation"*, the conference will offer a privileged space for the exchange of experiences, the presentation of innovative digital solutions, and collective reflection on emerging challenges.

We would like to once again thank all individuals and institutions involved in this collective process for their commitment. Thanks to their efforts, we are transforming the way we conceive, plan, and manage our infrastructure. Territorial defragmentation is already a public policy in motion: the task now is to consolidate it and project it towards future challenges.

WORKING GROUP

Over the past few months, the Working Group on Habitat Fragmentation Caused by Transport Infrastructure (GTFHT) has completed the drafting of the first Work Programme (WP) of the Strategy for the Defragmentation of Habitats Affected by Linear Transport Infrastructure (EDHILT). The WP has now been submitted to the Council of Ministers for approval. .

In parallel, the Technical Commission established to update the document "Technical Guidelines for the Design of Wildlife Crossings and Perimeter Fencing (Second Edition, Revised and Expanded) – PT1" held its second meeting on April 29, 2025, via videoconference. During this session, the first draft of the updated version was presented, and both the newly added technical sheets and the major changes to existing ones were reviewed. The final version of the document is expected to be completed by October 2025.

Members of the GTFHT have also provided data on the existence of wildlife crossings within their respective territories through a dedicated form, as part of MITECO's initiative to develop a national inventory of wildlife crossings.

Finally, on June 17, 2025, a new meeting of the Working Group was held, with the participation of 53 technical experts, 32 attending in person and 21 remotely. The main actions currently being carried out by MITECO within the framework of the WP were presented. In addition, there were presentations on the status of the PT1 update, the preliminary results of Phase 2 of the SAFE Project, and the most relevant initiatives implemented by the participating public administrations.

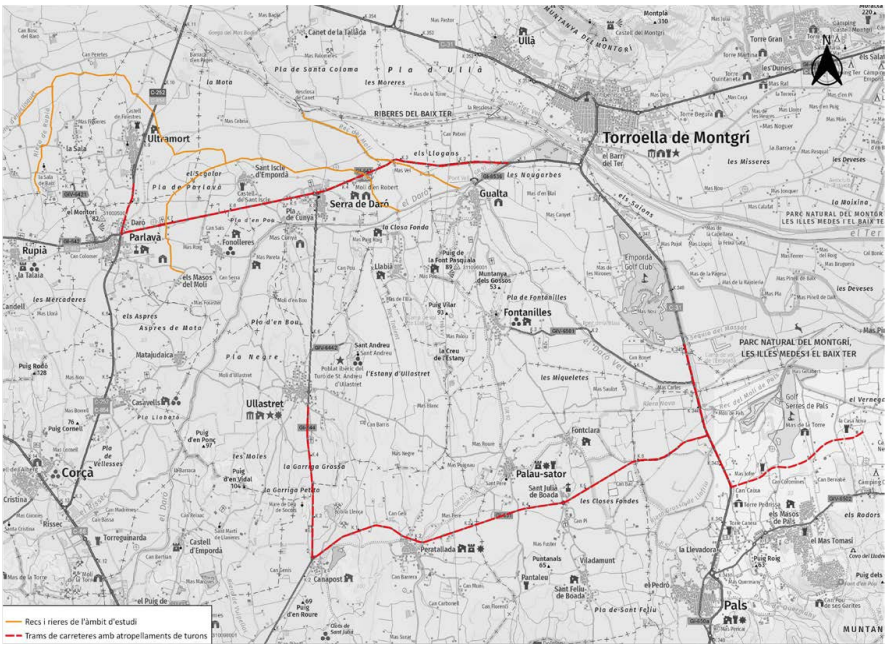
NEWS

Improving connectivity between polecat (*Mustela putorius*) populations in Empordà

The Green Infrastructure Programme of Catalonia (PIVC), promoted by the Departament de Territori, Habitatge i Transició Ecològica of the Government of Catalonia, addresses the need to act proactively and strategically to reverse biodiversity loss and the increasing fragmentation and degradation of ecosystems. The PIVC has been implemented through the study, development, and promotion of more than one hundred environmental actions across Catalonia. These are funded through both regional resources and European instruments such as the Recovery and Resilience Facility (Next Generation EU)—as is the case with this project—or the European Regional Development Fund (ERDF).

Among the various defragmentation-related actions, the project to improve connectivity between different polecat populations in L'Empordà stands out. This species is currently listed as endangered and is threatened, among other factors, by road mortality across several highways in the region and by the lack of suitable habitats connecting isolated population nuclei.

Prior to the drafting of the construction project mproving Connectivity of the Polecat Populations in Empordà (June 2023), a study was commissioned to *Identify and characterize potential ecological connectors between polecat population clusters across the plains of Baix Ter and Baix Fluvià.*



On the left, the project intervention area is shown along watercourses (in orange) and roads (in red). On the right, a detail of the works carried out at the outlet sump of a drainage structure that has been adapted.

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This study included mapping road segments with the highest rates of wildlife-vehicle collisions and identifying priority ecological corridors, often following natural and artificial watercourses (such as streams, irrigation channels, and ditches) or vegetated margins.

Based on the study's findings, several interventions were proposed, including: 1) elimination of invasive alien species along priority corridors—primarily giant reed (*Arundo donax*) —across a total area of approximately 33,500 m², 2) morphological restoration of watercourse margins, including live staking on approximately 32,500 m² and live fascines along 70 meters, among other bioengineering techniques and, 3) tree and shrub planting to create attractive habitat structures for polecat mobility, as well as for other vertebrate species that will benefit from the project.

In addition, several interventions are planned for the road network, including:The adaptation of four drainage structures that currently have sumps at their inlets or outlets, to improve their accessibility for wildlife, installation of dry ledges in two culverts and floating platforms in three culverts that maintain permanent water and low, and fencing around modified culverts, designed to guide animals toward safe crossing points under the road, while ensuring it does not create unintended barrier effects.

These actions are also part of TuroCat, the polecat recovery project in Catalonia, which encompasses a broader set of coordinated actions aimed at the conservation of this threatened species.

The project is scheduled for completion within 8 months, with an estimated budget of €427,000.

Source: Projecte constructiu. Millora de la connectivitat de les poblacions del turó a l'Empordà (June 2023).

Preliminary results of conservation status assessment of the Spur-Thighed Tortoise and recovery guidelines in the province of Almería

Adif Alta Velocidad awarded a contract to the Miguel Hernández University of Elche for the development of the project titled "Assessment of the Conservation Status of the Spur-Thighed Tortoise and Recovery Guidelines in the Province of Almería. Preliminary works for the drafting of compensatory measures for the spur-thighed tortoise, resulting from the construction of the high-speed Mediterranean Corridor, Murcia–Almería section."

One of the key objectives of this contract is to evaluate the impact of linear infrastructure on the spur-thighed tortoise (Testudo graeca). To this end, the research team from Miguel Hernández University conducted camera trap monitoring of transversal structures located on various linear infrastructures within Special Areas of Conservation (ZEC): *Sierra de Almagrera, de los Pinos y el Aguilón, and Sierra de Cabrera-Bédar*. Prior to installing the camera trap systems, each structure was fully characterized.

The selected monitoring points were located near known tortoise populations and included a variety of infrastructures differing in type, scale, and permeability. The monitoring campaign included 43 structures of different characteristics, monitored between April and June 2023, coinciding with the period of highest activity for the species.

Among the preliminary results, it is worth noting that spur-thighed tortoises were recorded 42 times, using 8 out of the 43 monitored structures. Particularly notable was their almost daily use of a crossing structure on the regional road AL6109.

The structures used by the tortoises were mainly concrete drainage culverts (not specifically designed for wildlife passage, as they are older infrastructures), including circular culverts (1.80 m diameter) and box culverts (3.5 x 2.5 m), as well as an underpass and an overpass for road realignment.

Spur-thighed tortoise crossing through a monitored structure.

Most of the crossings were recorded during daylight hours, within a temperature range of 21.8°C to 25.2°C. Only three crossings occurred at night. Based on these results, the tortoise appears to prefer short structures, with no internal steps, natural vegetation near the exits, and low-traffic roads.

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Camera trap equipment used for monitoring.

The absence of crossings in areas with high traffic volumes aligns with previous monitoring conducted along the AP-7 motorway between 2005 and 2007, where no tortoise crossings were detected—neither through structural monitoring nor radio-tracking. It is believed that the species' high sensitivity to vibrations may alter its behavior, causing it to avoid areas with significant vibration sources.

Source: ADIF Alta Velocidad.

Review of Legal Liability for Animal-Related Traffic Accidents in Europe

Who is held liable for collisions involving animals? Legislation across Europe remains fragmented, and according to an article published in the *Journal of Environmental Management*, which reviews procedures applied in 36 European countries, this lack of harmonization influences both the number of accidents that are officially reported and, ultimately, the ability to implement effective measures to reduce collision risk.

In Spain, under the revised text of the Traffic Law (Royal Legislative Decree 6/2025), liability for damages in collisions with game species generally falls on the driver of the vehicle. However, liability may also rest with the holder of hunting rights or the landowner, especially if the incident is a *direct consequence of a collective hunt for big game carried out on the same day or within the preceding twelve hours*. In some cases, responsibility may lie with the road authority, particularly *if the collision occurs due to lack of repair to perimeter fencing (where applicable) or absence of specific signage in areas with a high frequency of animal-related accidents*.

The review highlights significant variation in practices across countries. In some, drivers are always considered liable, and accident reporting is mandatory. In others, liability lies exclusively with hunting rights holders in the case of game species. In 39% of cases, including Spain, liability may be shared among different parties depending on the specific circumstances of the accident.

The article also draws attention to the rising number of animal-vehicle collisions across Europe, which is making it increasingly difficult for traffic police to respond to all incidents. As a result, a significant number of collisions go unreported, leading to gaps in data that hinder targeted mitigation.

Regarding data sources, the article distinguishes between animal-vehicle collisions that result in traffic accidents and those involving smaller wildlife species. In the former case, traffic authorities and road managers are typically responsible for recording events and producing official statistics. In the latter, volunteer citizen scientists are the primary data contributors, using various country-specific applications to report roadkill incidents. The article stresses the importance of integrating data from different sources, as official statistics often underrepresent smaller animals, while volunteer-collected data may lack spatial and temporal consistency. The application of new technologies and artificial intelligence could significantly enhance data integration and collaboration among stakeholders. This, in turn, would increase the ability to accurately identify roadkill hotspots and implement the most appropriate mitigation measures..

The study, led by researchers at the CDV – Transport Research Centre with contributions from co-authors across Europe, is available at: Wildlife-vehicle collision liability in Europe: A review of existing approaches and their implications - ScienceDirect.

Source: Carme Rosell, Minuartia; Infrastructure & Ecology Network Europe.

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Animals and Road Safety: National Road Safety Conference, April 2025

Today, the figures related to road traffic accidents remain unacceptable, both in absolute and relative terms. This presents a major global challenge, as outlined in the United Nations 2030 Agenda, which must be addressed collectively, assuming shared responsibility to ensure road safety in all its dimensions.

In this context, the 2025 National Road Safety Conference was held on April 23–24, 2025, in the city of Alicante, jointly organized by the Technical Road Association (ATC) and the Spanish Road Association (AEC), and promoted by the Ministry of Transport and Sustainable Mobility (MITMS).

Participation of the Junta de Castilla y León in the Road Safety Conference.

The conference, under the theme "*360° Road Safety: The Global Challenge of Future Roads*", served as a forum for dialogue and technical debate on road safety issues in Spain and the development of technologies applied to road safety.

The conference programme included a session devoted exclusively to *Animals and their impact on Road Safety*, featuring contributions from the Spanish Directorate-General for Traffic (DGT), road management authorities, and the Spanish Insurance Office, covering the following topics:

- Quantification of the issue in Spain and an overview of international measures to prevent wildlife-vehicle collisions.
- Issues and analysis of animal-related collisions on the State Road Network, and specific mitigation actions.
- Actions on Regional Road Networks.
- Actions on Provincial Road Networks.
- The perspective of the insurance sector.

The conference provided a valuable opportunity for sharing knowledge and experiences, and opened up discussions on future improvements to road conditions, considering emerging challenges and current pressing issues, from a multidisciplinary perspective, and incorporating the viewpoints of all stakeholders involved in the goal of achieving safe road mobility.

Source: Junta de Castilla y León.

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PUBLICATIONS

Given the large number of scientific publications related to the newsletter's topic, this section includes only those that meet the following criteria: (1) they are published documents, (2) they are representative of or applicable to the Iberian context, and (3) they focus on at least one taxonomic group rather than on individual species.

- Balčiauskas, L., Kučas, A., & Balčiauskienė, L. (2025). A Review of Wildlife–Vehicle Collisions: A Multidisciplinary Path to Sustainable Transportation and Wildlife Protection. Sustainability, 17(10), 4644. https://doi.org/10.3390/su17104644

- Bíl, M., Balčiauskas, L., Bílová, M., Cellina, S., Favilli, F., Gačić, D., Guinard, E., Heurich, M., Ivanova, N., Junghardt, J., Keuling, O., Kruuse, M., Kukalaj, Q., Langbein, J., Laube, P., Licoppe, A., Masaryk, P., Maślanko, W., Mayer, M., … Zihmanis, I. (2025). Wildlife-vehicle collision liability in Europe: A review of existing approaches and their implications. Journal of Environmental Management, 380. https://doi.org/10.1016/j.jenvman.2025.124986

- Dawson, C., Villamagna, A. M., Martin, R. A., & Moll, R. J. (2025). More connected, more collisions? Documenting nonlinear relationships between habitat connectivity and wildlife-vehicle collision hotspots. Environmental Management. https://doi.org/10.1007/s00267-025-02188-0

- Fernández-López, J., López-Galán, N., Acevedo, P., Blanco-Aguiar, J. A., Vicente, J., Santamaría, A. E., Truchado-Quintana, G., Pinedo, S. O., Gabaldón, L., & Pérez de Ayala, R. (2025). Rabbits on the road: Disentangling the factors driving the warren's abundance on motorways. Global Ecology and Conservation, 60, e03598. https://doi.org/10.1016/j.gecco.2025.e03598

- Flego, M., Mangiacotti, M., Coladonato, A. J., Scali, L., Pozzoli, A., Scali, S., & Sacchi, R. (2025). Modelling amphibian road crossing points in a dynamic environment. Journal of Applied Ecology. https://doi.org/10.1111/1365-2664.70056

- Grilo, C., Neves, T., Bates, J., le Roux, A., Medrano-Vizcaíno, P., Quaranta, M., Silva, I., Soanes, K., Wang, Y., Abate, S. D., D' Abra, F., Cedeño, S. A., de Alencar, P. R., de Almeida, M. F. P., Alves, M. H., Alves, P., de Assis, A. A., Ament, R., Andrášik, R., … Guinard, E. (2025). Global Roadkill Data: a dataset on terrestrial vertebrate mortality caused by collision with vehicles. Scientific Data, 12(1), 505. https://doi.org/10.1038/s41597-024-04207-x

- Li, H., Harvey, J., Airey, G., Leng, Z., & Wang, Y. (2025). Ecological effects of road transportation. Transportation Research Part D: Transport and Environment, 144, 104763. https://doi.org/10.1016/j.trd.2025.104763

- Mestre, F., Bastazini, V. A. G., & Ascensão, F. (2025). Effects of road density on regional food webs. Conservation Biology. https://doi.org/10.1111/cobi.70007

- Pinto, T., Santos, S. M., Mira, A., & Sillero, N. (2025). Tell me where you go, and I'll tell you where you die: landscape connectivity as a tool to predict amphibian roadkill risk. Journal of Environmental Management, 381, 125273. https://doi.org/10.1016/j.jenvman.2025.125273

- Rodrigues, L. F., Herranz Barrera, J., García de la Morena, E. L., Mata Estacio, C., & Malo, J. E. (2025). Infrastructure profile and surrounding land use determine bird-train collision risk in a High-Speed Railway. Global Ecology and Conservation, 59, e03538. https://doi.org/10.1016/j.gecco.2025.e03538

- Showers, M. M., & Rotman, R. M. (2025). Integrative highway rights-of-way management to reduce stormwater run-off and enhance habitat. Restoration Ecology, 33(1). https://doi.org/10.1111/rec.14350

- Torres, R. T., Neves, T., Grilo, C., Leite, P., Rossa, M., & Carvalho, J. (2025). Wrong place at the wrong time: patterns explaining ungulate-vehicle collisions in Portugal. Mammalian Biology. https://doi.org/10.1007/s42991-025-00487-x

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UPCOMING CONGRESSES AND CONFERENCES

October 16-17, 2025 - Valladolid

Digital Transformation of Transport Infrastructure and Biodiversity Management: Opportunities for Cooperation

Biennial Technical Conference of the Working Group on Habitat Fragmentation Caused by Transport Infrastructure. This edition will focus on successful case studies where digital tools have improved infrastructure management by integrating associated habitats and surrounding ecosystems.

VII CONGRESO BIODIVERSIDAD Y CONSERVACIÓN DE LA NATURALEZA

September 18-21, 2025 - Sevilla

7th International Congress on Biodiversity and Nature Conservation

Aimed at fostering interdisciplinary collaboration and the development of joint proposals for biodiversity conservation in the context of global change, the congress will take place in Seville from September 18 to 21, 2025.

UICN

October 9–15, 2025 – Abu Dhabi, UAE

UICN World Conservation Congress

Held every four years, this congress brings together thousands of leaders and decision-makers from governments, civil society, Indigenous Peoples, businesses, and academia to advance environmental conservation and nature-based solutions to global challenges.

SECEM
Sociedad Española para la Conservación y Estudio de los Mamíferos

December 5-8, 2025—Évora, Portugal

17th International SECEM Congress

Taking place in Évora, Portugal, this congress aims to present the latest research results by participants and to promote the development and management of activities and projects related to mammal conservation.

CONGRESSES AND CONFERENCES HELD

ICOET 2025

ICOET 2025

Under the theme "Bridging Divides Through Collaboration," this edition focused on sharing knowledge and collaboratively addressing ecological, cultural, and institutional issues related to the impacts of transport and other linear infrastructure. Presentation abstracts are available here.

CARRETERAS SOSTENIBLES Y RESILIENTES
SEGOVIA 2025

1st Conference on Sustainable and Resilient Roads

With the theme "Commitment to Responsible Transport," this event promoted solutions for sustainable and resilient roads, with a focus on decarbonization, climate resilience, and environmental impacts. It was held in Segovia, Castilla y León, on February 25–26, 2025.

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III meeting of the Iberian Ecological Society (SIBECOL) y XVII National Congress of the Spanish Association of Terrestrial Ecology (AEET)

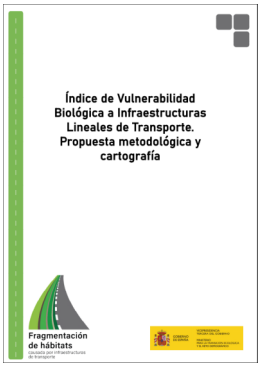
Held in Pontevedra from June 2 to 7, under the theme "Another Science is Possible: Diversity, Degrowth, and Sustainability in Ecological Research," this congress brought together researchers to explore more inclusive, sustainable, and critical approaches to ecological science.

ITF 2025: Transport Resilience to Global Shocks

This summit addressed how governments can ensure the continuity of transport systems amid current and future disruptions (natural disasters, pandemics, geopolitical crises, etc.). Conference recordings and ITF recommendations on road safety and the use of artificial intelligence can be found here

WORKING GROUP DOCUMENTS

Latest Publications



Biological Vulnerability Index to Linear Transport Infrastructure. Methodological Proposal and Cartography.

Reading Guide and Resources on Habitat Fragmentation Caused by Linea Transport Infrastructure

Bibliographic Database on Habitat Fragmentation.

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Previous publications

- Publication produced within the framework of the Habitat Fragmentation Caused by Transport Infrastructure project, promoted by the Sub-Directorate General for Terrestrial and Marine Biodiversity of the Directorate General for Biodiversity, Forests and Desertification.
- If you wish to submit information for publication, you can send it here.
- Legal Notice: the contents of this publication may be reused by citing the source and, if applicable, the date of the last update: Bulletin on "Habitat Fragmentation Caused by Transport Infrastructure" (Directorate-General for Biodiversity, Forests and Desertification, Ministry for the Ecological Transition and the Demographic Challenge, Issue No. 28, July 2025).
- Edited by: Ministry for the Ecological Transition and the Demographic Challenge. NIPO: 665-20-056-2. Catalogue of Publications of the General State Administration: https://cpage.mpr.gob.es/.

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