

# habitat fragmentation due to transportation infrastructure



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## EDITORIAL

### Promoting links between the development of transportation infrastructures and nature conservation

The participants from over 30 countries who gathered at the Infra Eco Network Europe (IENE) International Conference, in Germany, approved the [IENE 2012 Potsdam Declaration. Overcome barriers. Europe-wide and now](#). At the conference, over 200 presentations and workshops were given, in which numerous initiatives and projects were described, showing that the transport infrastructure network can be developed in a much more sustainable way. The Declaration firmly supported the need to promote a European Defragmentation Programme for habitats affected by transport infrastructure.



IENE

The objective of the EU Biodiversity Strategy is to halt the loss of biodiversity in Europe. Targets include the restoration of 15% of degraded ecosystems and the development of *Green Infrastructure*. The targets involve the need to restore connectivity between habitats and to reduce the barrier effect of infrastructure.

The construction of new transport routes in regions that already have a certain level of habitat fragmentation is an obstacle to reaching these targets. The habitat fragmentation level is determined by the physical and biological characteristics of the region and by the existing *Green Infrastructure* and *Grey Infrastructure* (including urban areas and transport routes), and is reflected in the values of habitat fragmentation indexes and other conservation indicators for a region.

Even in the context of landscapes with acceptable levels of fragmentation, new roads should be constructed from the perspective of environmental responsibility. Thus, they will have less impact than existing roads. In turn, the greening of roads that are already open could help to conserve biodiversity, with appropriate planning and design of actions to reduce the impact of habitat fragmentation, including the barrier effect and wildlife mortality.

The Potsdam Declaration seeks to bring about a situation of this kind, with safer transport routes that contribute to environmental improvement. The Declaration identifies a series of actions to promote alliances that enable both green infrastructure and the transport network to be strengthened. The year 2013 will mark the start of drawing up a strategic map for defragmentation at European scale, which will prioritize conflictive points where ecological corridors and major transport routes intersect. The identification of areas to defragment in Spain, which is being carried out by the *Working Group*, is in line with this work at European level. Other highly relevant projects clearly contribute to meeting the target of increasing ecological connectivity and the mobility of organisms, by overcoming the barriers caused by transport infrastructure. Such projects include the cross-border initiative of the Great Ecological Connectivity Corridor, which runs from the Cantabrian Range to the Alps, mitigation of the impact of roads on the Iberian lynx, and the reduction of accidents caused by wildlife, to name just a few examples described in the *News* section.



## WORKING GROUP

In recent months, the group's activity has focused on drawing up volume no. 6 of the series *Documents for the reduction of habitat fragmentation caused by transport infrastructure* on the identification of areas to defragment to reduce the impact of transportation infrastructure on biodiversity. A Technical Committee has been formed to write the document. In turn, the next few months will see the publication of the

document entitled *Habitat defragmentation. Guidelines to reduce the effects of operating transport networks* (number 5 in the series), which was interrupted for some time, but is now in press.

The group has also started to prepare the technical symposium that will be held in Extremadura in November and will focus on aspects related to ecological connectivity and transport infrastructures (see [Events](#) section).

The next Working Group meeting is scheduled for April.



## NEWS

### **Work begins on the Strategic Plan for the Great Ecological Connectivity Corridor Cantabrian Range – Pyrenees – Massif Central – Western Alps**

The Plan for creating a wildlife corridor from the Cantabrian Range to the Western Alps is coordinated by the Spanish Committee of the International Union for Conservation of Nature (IUCN), with the support of the IUCN French Committee, and the collaboration of the Biodiversity Foundation of the Ministry of Agriculture, Food and the Environment (MAGRAMA).



Great Corridor Project

The initiative arose from the *Fundació Territori i Paisatge* of the Caixa de Catalunya Savings Bank, which

carried out a baseline survey in 2005 and was then supported by the IUCN by means of Resolution 4,061 adopted at the fourth World Conservation Congress, which was held in Barcelona in 2008.

These organizations have convened a participatory workshop that will take place in April at MónNatura Pirineus, an environmental education centre in Les Planes de Son. The aim of the workshop is to draw up the strategic plan and define the objectives, the areas, and the elements to conserve or improve. This will be achieved by identifying the problem, the underlying causes and the strategies to follow.

Road and rail infrastructure are a major element in the region that must be taken into account. The contents of the document *Identificación de las áreas a desfragmentar para reducir los impactos de las infraestructuras de transporte en la biodiversidad* (under preparation, Identification of areas to defragment to reduce the impact of transportation infrastructure on biodiversity) include information that is of great relevance to the Great Ecological Connectivity Corridor and will be made available to this project.

The Great Ecological Connectivity Corridor was presented at the last *Congreso Nacional de Medio Ambiente* (CONAMA 2012). The conference paper can be consulted [here](#).

Information source: Georgina Álvarez, Directorate General of Quality and Environmental Assessment and the Environment, Ministry of Agriculture, Food and the Environment.



### **The GreenInfraNet project encourages the exchange of experiences on green infrastructure**

The Green Infrastructure Network (GreenInfraNet) is a partnership of 12 regions from across Europe. The partners are working together to promote the development and implementation of green infrastructure in EU regions. The three-year project was launched in 2012 and is co-funded by the EU



programme INTERREG IVC. The aim is to promote measures to conserve biodiversity and ecosystem services, in close relation with other sectors such as regional planning, agriculture and tourism. Members include Barcelona Provincial Council and the Regional Government of Valencia.

The results will be in the form of three main products: a publication entitled 'The Green Infrastructure Action Toolkit', a database of interested parties and the transfer of good practices between members.

The project focuses particularly on aspects such as ecology-based regional analysis, methods to analyse and assess environmental services, climate change, and the development of strategies, plans and policies to introduce green infrastructure in urban and rural areas, among others.

After a year of the project, the planned mechanisms for dissemination have been set up, including a [website](#) containing all of the information on the project.

Information source: Carles Castell, Barcelona Provincial Council, GreenInfraNet.



### **Implementation of measures reduces ungulate-vehicle collisions at hotspots in the Catalan road network**

A recent study has assessed the effectiveness of measures implemented along stretches of roads on which there are high numbers of collisions with wild boar and cervids. These accident hotspots were identified in a study carried out in 2007 on the road network managed by the Regional Government of Catalonia.



Minuartia

On the 113 stretches along which standardized warning signs were placed, the number of accidents dropped on average by around 60%. However, there was considerable variability in the results for different

stretches and in some cases, there were no significant reductions in the number of collisions. On the 14 stretches along which perimeter fences and wildlife passages were installed, the number of collisions fell by around 90%.

Given these results, the identification of high-risk stretches of road has been updated and a plan has been drawn up entitled "Plan to improve road safety on stretches with high numbers of ungulate-vehicle collisions". This kind of accident is more difficult to reduce in the standard road network, in which it is often unfeasible and inadvisable to erect perimeter fences. For these cases, experimental measures have been designed that are based on roadside management and increased signposting. These measures are being applied in the most conflictive periods that coincide with autumn and winter months when ungulates increase their movements.

To carry out the study, 6,000 accidents were analysed that had involved animals and had taken place on non-urban roads in 2007-2011. Although only 8% of these collisions result in victims, there has been a high rise in this kind of accident in recent years. This is in contrast to the general trend towards a lower accident rate. The economic cost of these accidents has been estimated at a minimum of 16.5 million euros per year (2011 data). Wild boar is the most problematic species: it is involved in 85% of the accidents for which the animal species is known.

The study was carried out by the Directorate General for Roads, with technical assistance provided by Minuartia, an environmental consultancy. Many other organizations participated, including the Mossos d'Esquadra police force, the Catalan Traffic Service, road maintenance teams from various districts and the Directorate General for the Environment and Biodiversity from the Regional Government of Catalonia's Department of Agriculture, Livestock, Fisheries, Food and the Environment. Cooperation is essential to bring together the knowledge of ungulates and road safety that is required to tackle this conflict rigorously. The study will be presented at the next [International Conference on Ecology & Transportation](#) (ICOET), which will be held in June in the United States.

Information source: Ferran Camps, Directorate General for Roads, Department of Territory and Sustainability, Regional Government of Catalonia.



### **ADIF starts new studies to increase knowledge of the ecological permeability of the high speed rail network**

Over recent years, the Administrator of Railway Infrastructures (ADIF), in collaboration with technical consultant teams, has carried out pioneering work in the field of applied ecology: a study of the real impact of high speed rail lines on wildlife. High speed railways have been operating for a relatively short time. Even today, they are not widely used worldwide; the Spanish network is one of the longest. In addition, their structural and functional characteristics are quite unique. As a result of these factors, there is little information on the impact of high speed railways on animal communities in the areas through which they pass.



ADIF

As high speed railways are surrounded by perimeter

fences, it is accepted that they have a barrier effect.

Consequently, the study focuses mainly on assessing the capacity of various elements – including specific wildlife passages, viaducts and drains – to increase permeability. The effectiveness of these elements is now recognized for a considerable list of species. Extensive sampling has also shown that the trackbed itself may be used by some local species to cross the infrastructure. Furthermore, it may form a habitat that is regularly used by a small community of vertebrates, including herbivores (lagomorphs and rodents), insectivores (reptiles) and predators (such as stone marten).

Fences are essential to guarantee the safety of trains, people and animals that could be involved in accidents on the tracks. Fences have proved efficient at keeping people and larger animals out. However, it is impossible to completely prevent small and medium-sized species from getting onto the tracks. This clearly has theoretical implications for the maintenance of connectivity among populations on either side of the high speed railway, but it is essential to consider the real scope of permeability.

In 2012, monitoring began on four new stretches, distributed along the Madrid-Valencia and Ourense-Santiago de Compostela lines. The aim of this three-year study is to increase knowledge of the sites that have already been assessed and to focus on making progress in the new line of research. This should help us to develop better understanding of the complex relationship between the high speed rail network and Iberian wildlife.

Information source: Deputy Directorate General for the Environment, ADIF.



### **The LIFE+ Iberlince project faces new habitat fragmentation challenges in areas where the species has been reintroduced or expanded**

September 2011 marked the start of the third of the LIFE projects coordinated by the Regional Government of Andalusia for the recovery of the Iberian lynx (LIFE10NAT/ES/570). On this occasion, the targets of the project go beyond regional and national borders, as actions are carried out in Portugal, Extremadura, Castilla-La Mancha, Murcia and Andalusia to help to recover the historical distribution of the species in these areas. Eighteen stakeholders, including government entities, private companies, associations and foundations, have joined forces to make this LIFE project successful. The project has received the most



LIFE+ Iberlince project

financial support from the European Commission in the entire history of these funds (see [website LIFE+ Iberlince](#)).

For several decades, the decline in numbers of the Doñana lynx population due to collisions was a factor that could have slowed population growth. In the first stage of the project, the aim was to reduce direct mortality. In the second stage, the focus was on preventing collisions by means of actions to boost connectivity between population centres, and on verifying that the wildlife passages were being used by lynxes.

Work on LIFE+ Iberlince began with the observation of a considerable drop in the incidence of mortality along the roads of Doñana on the entire lynx population (average incidence for the 2002-2006 period [LIFE02NAT/E/8609]: 7.1%; and for the 2006-2011 period [LIFE02NAT/E/8609]: 3.2%). These encouraging results were obtained in a considerably more complex scenario, as the species distribution and numbers were found to be rising, with a stable population from Aljarafe in the Province of Seville to a few tens of kilometres from Huelva. This expansion led to a rise in mortality risk, as more roads became involved. No actions had been carried out to mitigate the impact of some of these roads, as just a few years previously they had been far from the species distribution.

The expansion of the lynx populations in Doñana-Aljarafe and Andújar-Cardena, as well as the areas where the species was reintroduced in the valley of the rivers Guarrizas and Guadalmellato, is increasing the extent of transport routes that represent a general risk for the conservation of the species. The proximity of the lynx population to highways has become more continuous, as it has to other transport structures, such as railways, that did not greatly affect the populations in the past. To be successful in this new stage, the regional Government of Andalusia is defining and prioritizing risk areas and has organized various meetings with the Spanish Ministry of Public Works, the Regional Department of Public Works and Housing and the ADIF, so that the specific proposals drawn up by the Iberlince technical team can be analysed and implemented by each one of the aforementioned organizations, which are all responsible for the conservation of the Iberian lynx.

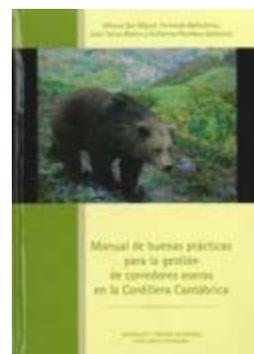
Both Castilla-La Mancha and Extremadura are preparing various meetings between government entities whose specific areas have the same objectives, as well as training and information days.

Information source: LIFE+ Iberlince (LIFE10NAT/ES/570). Department of Agriculture, Fishing and the Environment, Regional Government of Andalusia.



## PUBLICATIONS

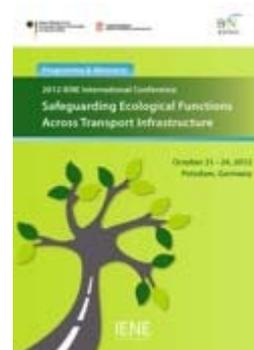
***Manual de buenas prácticas para la gestión de corredores oseros en la Cordillera Cantábrica*** (Good practice manual for the management of brown bear corridors in the Cantabrian mountain range). The Cantabrian brown bear population is currently divided into two subpopulations separated geographically by an area about 50 km wide. The manual provides management guidelines to preserve and improve habitats that are suitable for the bear in this corridor, identifies infrastructure and human activities that have a barrier effect and describes corrective measures to address these problems. It includes a section on defragmentation of transport infrastructure. The document, which was published by the National Parks Autonomous Agency, was created by the *Fundación Oso Pardo* as part of the LIFE + Bear Corridors project and has been developed with the participation of numerous experts.



Reference:

San Miguel, A., Ballesteros, F., Blanco, J.C. and Palomero, G. (Eds.) 2012. *Manual de Buenas Prácticas para la gestión de corredores oseros en la Cordillera Cantábrica*. Fundación Oso Pardo, Ministry of Agriculture, Food and the Environment. Threatened species series. Madrid. 210 pp.

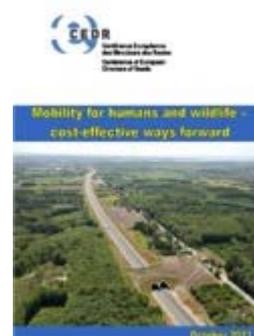
***2012 IENE International Conference. Safeguarding Ecological Functions Across Transport Infrastructure. Programme & Abstracts.*** The document contains the conference papers and abstracts for the international conference organized by the *Infra Eco Network Europe* (IENE) in Potsdam, Germany, on 21–24 October 2012. It includes the abstracts of around 200 oral and poster presentations given by researchers and specialists from 33 countries, including 20 papers presented by Spanish teams. These are on aspects such as the identification of wildlife corridors and areas in need of defragmentation, wildlife mortality, accidents caused by wildlife, effects of roadsides and the interaction between green and transport infrastructure, among other topics.



Reference:

IENE, 2012. *IENE 2012 International Conference. Safeguarding Ecological Functions Across Transport Infrastructures. Programme & Abstracts*. Berlin-Potsdam (Germany), 21 – 24 October 2012. Swedish Biodiversity Centre. 274 pp. Available at: <http://www.iene-conferences.info/abstracts/>.

***Mobility for humans and wildlife. Cost-effective ways forward.*** The document prepared by the Project Group Wildlife and Traffic, which is part of the Conference of European Directors of Roads (CEDR) organization, assesses the impact of the *COST 341 Wildlife and Traffic* handbook and identifies good practices for planning the road network and conserving nature in the European Union. In particular, the document highlights the need to regularly update both the European handbook and the technical prescriptions drawn up in various countries on the basis of this publication. In addition, it proposes the promotion of cooperation among European countries and public-private partnerships to introduce measures to mitigate impacts.



Reference:

Ujvári, M.L., Nilsson, L. y Rösten, E. 2011. *Mobility for humans and wildlife. Cost-effective ways forward*. Conférence Européene des Directeurs des Routes. 72 pp. Available at: [http://www.cedr.fr/home/fileadmin/user\\_upload/Publications/2012/e\\_Wildlife\\_and\\_Traffic.pdf](http://www.cedr.fr/home/fileadmin/user_upload/Publications/2012/e_Wildlife_and_Traffic.pdf).



## EVENTS

***Fabos Conference on Landscape and Greenway Planning: Pathways to Sustainability.*** Amherst (Massachusetts, USA), 12 and 13 April 2013. Organized by: American Society of Landscape Architects (ASLA) and the University of Massachusetts.

***IENE 2013 Scientific & Technical Workshop: Effective motorway planning and securing conservation interests during the planning, construction and operational phases of development.*** Arad (Romania), 21 to 23 May 2013. Organized by: Infra Eco Network Europe (IENE), Vasile Goldis Western University of Arad, WWF-DCP, FFI and Asociatia Zarand.

***The 2013 International Conference on Ecology & Transportation (ICOET 2013).*** Scottsdale (Arizona, USA), 23 to 27 June 2013. Organized by: ICOET and the Arizona Department of Transportation.

***International Conference on Engineering and Ecohydrology for Fish Passage.*** Corvallis (Oregon, USA), 25 to 27 June 2013. Organized by: Oregon State University.

***31st IUGB Congress.*** Brussels (Belgium), 27 to 29 August 2013. Organized by: the International Union of Game Biologists.

***Changing European Landscapes. Landscape ecology, local to global. IALE 2013 european congress.*** Manchester (United Kingdom), 9 to 12 September 2013. Organized by: International Association for Landscape Ecology – UK Region.

***SER2013 World Conference on Ecological Restoration: Reflections on the Past, Directions for the Future.*** Madison (Wisconsin, USA), 6 to 11 October 2013. Organized by: the Society for Ecological Restoration.

***EUROPARC Conference 2013.*** Hortobágy National Park (Hungary), 9 to 13 October 2013. Organized by: EUROPARC Federation.

***Transportation Infrastructure and Wildlife Corridors – learning from experience.*** Luhacovice (Czech Republic), 16 to 18 October 2013. Organized by: Infra Eco Network Europe (IENE), Transport Research Centre, Czech Republic (TRC CR), Nature Conservation Agency of the Czech Republic (NCA CR).

***Jornada técnica Conectividad ecológica y vías de transporte.*** Cáceres (Complejo Cultural San Francisco), 13 and 14 November 2013. Organized by: Ministry of Food, Agriculture and the Environment and the Regional Government of Extremadura. (Conference programme and website under preparation).

***Jornada de trabajo para actuaciones de permeabilización en vías de comunicación y conectividad de la Red Natura 2000*** in the frame of the LIFE+ IBERLINCE Project: "*Recuperación de la distribución histórica del linco ibérico (Lynx pardinus) en España y Portugal*" (LIFE10NAT/ES/570). Cáceres (Complejo Cultural San Francisco), 15 November 2013. Organized by: LIFE+ IBERLINCE.



### Events that have already been held

***Linking environment and society: 19th ialeUK conference.*** Edinburgh (United Kingdom), 4 to 6 September 2012. Organized by: International Association for Landscape Ecology – UK Region and the University of Edinburgh. Further information is available [here](#).

***UICN World Conservation Congress.*** Jeju (Korea), 6 to 15 September 2012. Organized by: International Union for Conservation of Nature. Further information is available [here](#).

***4º Foro Urbano de Paisaje. Seminario internacional de casos prácticos "Infraestructura verde urbana y regional en las redes UNESCO".*** Vitoria-Gasteiz, 18 October 2012. Organized by: Centre for Environmental Studies, Vitoria-Gasteiz City Council. Further information is available [here](#).

***IENE 2012 international conference. Safeguarding ecological functions across transport infrastructure.*** Postdam-Berlin (Germany), 21 to 24 October 2012. Organized by: Infra Eco Network Europe. Further information is available [here](#).

***IUFRO Landscape Ecology Conference. Sustaining humans and forests in changing landscapes: Forests, society and global change.*** Concepción (Chile), 5 to 12 November 2012. Organized by: International Union of Forest Research Organizations and the University of Concepción. Further information is available [here](#).

***National Ecological Networks Conference.*** Edinburgh (United Kingdom), 6 and 7 February 2013. Organized by: Scottish Wildlife Trust and the Scottish Government. Further information is available [here](#).

***IV Congreso Nacional de Biodiversidad y I Congreso Ibérico de Biodiversidad.*** Bilbao, 6 to 8 February 2013. Organized by: Neiker, Regional Government of the Basque Country, Regional Council of the Basque Country, Ihobe, Diversitas and the University of the Basque Country. Further

information is available [here](#).

**2nd scientific & midterm GreenNet conference.** Vienna (Austria), 19 and 20 February 2013. Organized by: GreenNet Project. Further information is available [here](#).

**VII CONEIA - Congreso Nacional de Evaluación de Impacto Ambiental.** Oviedo, 13 to 15 March 2013. Organized by: the Asociación Española de Evaluación de Impacto Ambiental. Further information is available [here](#).



## DOCUMENTS OF WORKING GROUP AND ACTION COST 341

As part of the European project COST 341 on Habitat fragmentation due to transportation infrastructure and the Working Group that has led to the project's continuity, various resources have been created to contribute to increasing knowledge and mitigation of impacts of habitat fragmentation caused by transport infrastructures.

The following documents have been published:

- **COST 341. La fragmentación del hábitat en relación con las infraestructuras de transporte en España.** (Habitat fragmentation due to transportation infrastructure in Spain). Review of the state of the art, published in 2003.
- **COST 341. Wildlife and traffic. A European Handbook for Identifying Conflicts and Designing Solutions**  (40 MB). Published in 2003 as a coda to Action 341, drawn up by experts from various European countries.
- **COST 341. Fauna y Tráfico. Manual europeo para la identificación de conflictos y el diseño de soluciones**  (33 MB). Published in 2005; a translation of *Wildlife and Traffic*.
- Series **Documentos para la reducción de la fragmentación de hábitats causada por infraestructuras de transporte** (Documents for the reduction of habitat fragmentation caused by transport infrastructure).
  - **No 1. Prescripciones técnicas para el diseño de pasos de fauna y vallados perimetrales**  (1,8 MB) (Technical prescriptions for the design of wildlife passages and perimeter fences). In 2008 the Catalan version was published **Prescripcions tècniques per al disseny de passos de fauna i tancaments perimetrals** by the Department of the Environment and Housing, Regional Government of Catalonia.
  - **No 2. Prescripciones técnicas para el seguimiento y evaluación de la efectividad de las medidas correctoras del efecto barrera de las infraestructuras de transporte**  (2 MB) (Technical prescriptions for monitoring and evaluating the effectiveness of measures to correct the barrier effect of transport infrastructure). Published in 2008.
  - **No 3. Prescripciones técnicas para la reducción de la fragmentación de hábitats en las fases de planificación y trazado**  (45 MB). (Technical prescriptions for the reduction of habitat fragmentation in planning and alignment phases). Published in 2010.
  - **No 4. Indicadores de fragmentación de hábitats causada por infraestructuras lineales de transporte**  (31 MB). (Indicators of habitat fragmentation due to linear transport infrastructures). Published in 2010.
  - **No 5. Desfragmentación de hábitats. Orientaciones para reducir los efectos de las infraestructuras de transporte en funcionamiento.** (Habitat defragmentation. Guidelines to reduce the effects of operating transport networks). In press.

For further information, see the [MAGRAMA](#) and [IENE](#) sites.



- This publication is part of the project 'Habitat fragmentation due to Transportation Infrastructure', which is promoted by the Sub-directorate General of Environment of the Directorate General of Quality and Environmental Evaluation and Environment.
- Any information for publication can be sent [here](#).
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