

# habitat fragmentation due to transportation infrastructure



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## CONTENTS

Editorial

Working Group

News

Publications

Events

Documents of  
Working Group and  
Action  
COST 341

## PREVIOUS BULLETINS

Number 0

Number 1

Number 2

Number 3/4

Number 5

Number 6

Number 7

## EDITORIAL

### **Science, technology and policies on ecology and transport: conferences and current initiatives**

In 1996, the first international conference on ecology and transport was held in Orlando (Florida, the United States of America). This was the forerunner of what is now known as the International Conference on Ecology and Transportation ([ICOET](#)). The ICOET takes place every two years and has become the main forum for exchanging information on the impact of transport networks on ecology.

In Europe, the first international conference on this issue was held in 1995 in Maastricht and The Hague (Holland) and was the starting point for the Infra Eco Network Europe (IENE) organisation. This organisation was the driving force behind projects such as COST 341 Action, which brought together the work of a large team of experts from various European countries. On completion of this project in 2003, a new international conference took place in Brussels. The new IENE organisation holds periodic international conferences on ecology and transport along similar lines to the American conference, but with a focus on Europe.

The next conference, [IENE 2010](#), will be held in Velence (Hungary) from 27 September to 1 October (the deadline for [abstract proposals](#) is 17 January). It is a meeting point for scientists and experts, as well as for professionals in both environmental and transport sectors. It is also a forum for exchanging knowledge; presenting the results of the latest research and practical experiences; and identifying interdisciplinary research areas that can provide new solutions to the established problems, on the basis of cooperation between the various sectors that are involved.

This conference, and the work that is being undertaken in Europe by authorities, research centres and other organisations, is an example of sharing ideas and governance that should be considered in the creation of the [LIFEWATCH](#) project—an e-science and technology infrastructure for biodiversity observatories and data. Lifewatch is a European cooperation project that was created in the heart of the European Strategy Forum for Research Infrastructure (ESFRI). The aim is to provide tools for data generation, analysis, integration and operability, as well as virtual laboratories and a service centre for new research, training for research, and the support of biodiversity policies. Central to this project is technology's role in bringing about progress in development and knowledge, and in resolving environmental problems. The project combines work in science and technology to increase knowledge and biodiversity in Europe.

In parallel, the United Nations drew up a Biodiversity Treaty, through which it launched the [Intergovernmental Platform on Biodiversity and Ecosystem Services](#) (IPBES) initiative to bring science and governance closer together. The aim was to improve the foundations and effectiveness of policies and to increase their contribution to the reduction of biodiversity loss.

Both initiatives, which are currently in their early stages, are a frame of reference that encourages the application of results from conferences and specific seminars on the environmental impact of development. The two initiatives should be taken into account in such meetings, to ensure that there is suitable feedback in due course.



## WORKING GROUP

The 11<sup>th</sup> meeting of the Working Group on Habitat Fragmentation caused by Transport Networks, which is part of the National Commission of Nature Protection, was held in June 2009. In this meeting, a Technical Committee was formed to draw up a document entitled: *Indicators of habitat fragmentation caused by linear transport infrastructure*. This document forms part of the series "Documents for the reduction of habitat fragmentation caused by transport infrastructure".

The Technical Committee is working with the same method as that used to draw up previous documents. It met to revise the first draft of the document in September. The second draft was then drawn up using contributions from the meeting. The Technical Committee is coordinated by the Directorate General for the Environment and Forestry Policy, which belongs to the Ministry of the Environment and Rural and Marine Affairs (MARM). It is made up of 11 people who work for the environment and transport administrations in different autonomous communities and for CEDEX. To draw up the document, the Committee receives technical assistance from a team made up of staff from the consultancy Minuartia and from the CREAM (Autonomous University of Barcelona).



## NEWS

### **Alteration of motorway lights to reduce effects on the Cory's Shearwater (*Calonectris diomedea*) in Tenerife**

As part of the "Project to extend the TF-1 motorway" between Santa Cruz de Tenerife and Güímar, which is being undertaken by the Government of the Canary Islands, some measures have been taken to reduce environmental effects. One of these measures aimed to decrease the impact on birds. This was not part of the Environmental Impact Study or required by the Environmental Impact Statement for the construction project. Instead, it was implemented as a result of the Environmental Monitoring of the construction work itself.



Specifically, the aim was to alter the motorway lights to reduce effects on the Cory's Shearwater, which is included in various protected species lists.

From the beginning of October until mid-November, the chicks of this species take their first night flights from their ground nests or "burrows" towards the sea. The presence of high intensity lights makes the birds deviate from their routes and collide with lamp posts, lights, etc., which leaves them disorientated and defenceless. Therefore, for several years, voluntary environmental projects have been organised to collect juvenile Cory's Shearwaters that have collided. Various social groups, ecological organisations, public administrations, the police and the Civil Guard have taken part in these projects.

During the motorway improvement work, it was found that the new lighting could increase the impact on this species. Therefore, during 2008 and 2009, fewer motorway lights were switched on, specifically, in the stretch between Caletillas and Barranco Hondo, particularly during the period in which the juveniles fly their nests and at the times at which most of the first flights take place (from 7 pm to 12 pm). To achieve this, the Grupo de Pronto Auxilio de Arafo, an association that works on the project to collect Cory's Shearwater chicks, collaborated with the management of the construction project. This simple measure, to avoid unnecessary lighting during the time of the first flights of juveniles and at the time of the maximum number of bird flights, reduced the number of accidents caused by disorientation.

*Source: Samira Moujir Nasser-Eddine (Ministry of Public Works and Transport, Government of the Canary Islands).*



## Monitoring and control of habitat defragmentation activities due to construction work on roads in the Autonomous Community of Navarra

In recent years, structures that increase the permeability of the Navarra road network have been designed and constructed, as a result of the process of assessing the environmental impact of construction projects. A project is currently underway to assess the efficacy of different types of wildlife passages as elements that reconnect wildlife habitats. This project will be completed in 2011.



The selected roads in the project all had Environmental Impact Statements (DIA) that described the construction of wildlife passages.

The roads included the A-21 in the Noain-Monreal and Monreal-Izco stretches; the A-1 from Alsasua to the provincial boundary; the NA-178 in the port of Iso; the NA-2040, Arce-Oroz Betelu; the NA-122, Allo relief road; and the N-232 in the Castejón-Tudela and Buñuel-Cortes stretches. The points that were selected for the study were chosen for their geographic location in the autonomous community and for their varied typology. A total of twenty transverse structures in Navarra's road infrastructure were included, which represented the different types of passages found in this area.

The method was chosen on the basis of recommendations in the document: "Technical prescriptions for monitoring and evaluating the effectiveness of measures to correct the barrier effect of transport infrastructures", which was published by the Ministry of the Environment and Rural and Marine Affairs. The Ministry of Public Works, Transport and Communications of the Government of Navarra participated in drawing up this document.

The work was undertaken by the Biodiversity team of the company Gestión Ambiental, Viveros y Repoblaciones de Navarra, which gained experience in this kind of monitoring in the Life Project: "Ecosystem management of rivers with a European perspective. 2005-2007".

Depending on the type and design of the structures under study, different methods were implemented to determine the functionality of activities such as the use of camera traps to detect wildlife, traps to detect tracks or recording indications of wildlife.

*Source: Javier Forcada Melero (Ministry of Public Works, Transport and Communications, Government of Navarra).*



### Wildlife passages in the M-501 dual carriageway

The M-501 is road link located in a region of major importance due to the presence of habitats and species of great natural value. Recently, this road was made into a dual carriageway, which affects an area that is part of the Natura 2000 network: the Special Protection Area (SPA) of the rivers Alberche and Cofio. Consequently, up to 25% of the budget for the construction project was allocated to environmental measures.



Specifically, up to eight measures were undertaken to compensate for the impact, including various programmes and activities for various high interest species (the Spanish imperial eagle, the black vulture and Cabrera's vole, among others), the adaptation and regeneration of water courses and streams, and work to put 11 km of electricity cables underground.

In relation to the corrective measures, the following have been constructed or adapted: a total of 43 wildlife passages (for small vertebrates and large mammals), barriers for amphibians (in a 200 m stretch) and two overpasses, located at points where high numbers of collisions occur. These overpasses are 45 m wide and widen to 120 or 180 m at their mouths, to attract a greater number of animals towards them.

A document has been published on the corrective and compensatory measures included in this project. This document can be downloaded in PDF format [here](#).

*Source: F. Javier Cantero (Ministry of Transport and Infrastructure, Autonomous Community of Madrid).*



## Results of measures to prevent collisions with large ungulates tested in Castilla y León

The Autonomous Community of Castilla y León is one of the communities that record the highest numbers of collisions with large ungulates every year. Consequently, and as a result of the increased awareness of this issue by officials in this Autonomous Community's Directorate General of Roads and Infrastructures, tests of innovative measures have been undertaken with greater frequency than in other autonomous communities.



Two of the measures that were tested recently were not very effective. Firstly, a discontinuous perimeter fence was erected in the sections of the roads where most accidents occur. This reduced the number of collisions in specific stretches, but the conflict moved to other areas where there was no fence, which had not previously been the scene of a high number of accidents.

Secondly, trials were carried out with reflectors installed along the edges of the roads, and along conflictive stretches. The results showed that this measure did not help to reduce the number of collisions.

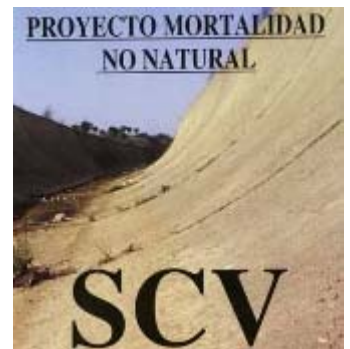
In June 2007, luminous markers were installed along a 1 km pilot stretch of mountain road, to prevent collisions with wild boar that pass by every day on their way to a nearby river (on this stretch, around 4 to 7 collisions occur every year). These markers work with solar power and are embedded in the layer of tarmac. They are only activated at night and emit light away from the road. Although the experiment has not been completed, the first results are encouraging. By June 2009, no accidents had been recorded in this stretch, whilst accidents had continued to occur in adjacent stretches. However, a significant limitation is the useful life of the markers. As they are embedded in the tarmac, they must be dismantled and reinstalled every time the road is resurfaced.

*Source: Carlos Martín, Encarna Pérez Aguilera (Ministry of Public Works, Autonomous Government of Castilla y León).*



## Non-natural mortality project – Vertebrate Conservation Society

The Vertebrate Conservation Society (SCV) was formed in 1994. One of its first activities was the "Project to Monitor the Mortality of Vertebrates on Roads". The results were presented in 2003. During this project, 4,145 trips were made to collect data, over 60,000 km of roads were covered and 43,505 records of collisions with vertebrates on Spanish roads were registered. The collisions involved 301 different species.



Subsequently, another project was undertaken to find out in more detail the causes of non-natural mortality of wildlife. A three-page leaflet that describes the results has been published recently.

The main causes of mortality that were identified include crashes, electrocution and collision with electrical cables, or animals being trapped in tanks or channels. The results stressed the importance of reducing the impact of transport, electrical and hydraulic infrastructure on wildlife. In addition, it was shown that wildlife mortality is affected by poisons, toxic or pollutant products, non-native species and domestic animals that have escaped into the wild, as well as the change and manipulation of habitats and ecosystems and even factors such as hikers, climbers, photographers, etc.

The aim of publishing the [three-page leaflet](#) was to disseminate this project to raise awareness of these problems in the media, as well as with politicians and NGOs, etc. and to promote the application of measures that enable these conflicts to be reduced.

*Source: Vertebrate Conservation Society (SCV).*



## PUBLICATIONS

**Actes de colloque 4e rencontre Routes et faune sauvage. Infrastructures de transport et petite faune.** The Road and Highway Technical Studies Department (SETRA), an organisation which is part of the French Ministry of Transport, has recently published the conference minutes of the fourth meeting on *Roads and wildlife. Transport infrastructure and small animals*. This meeting was held in Chambéry on 21 and 22 September 2005. The publication includes summaries of conference papers on European experiences of preventing effects on small vertebrates, including mammals such as the otter, the European mink and the lynx, as well as amphibians. In addition, the document includes descriptions and images of the various field trips undertaken in the framework of this meeting.



The publication is available on the [SETRA](#) webpage, which also contains the poster presentations.

Reference:

SETRA (2008). *4e rencontre "Routes et faune sauvage". Infrastructures de transport et petite faune*. Service d'études sur les transportes, les routes et leurs aménagements. Bagneux Cedex (France) 153 pp.



## EVENTS

**Fourth conference of civil engineering, the region and the environment: the coast, planning and models for the future.** Malaga, 17 to 19 February 2010. Organised by the Spanish Association of Civil Engineers (CICCP).

**III International Landscape and Infrastructures Congress.** Córdoba, 15 to 17 April 2010. Organised by the Consejo de Europa, Gobierno de España and Consejería de Obras Públicas and Transporte, Junta de Andalucía.

**7th SER European Conference on Ecological Restoration.** Avignon (France), 23 to 27 August 2010. Organized by the Society for Ecological Restoration (SER) Europe.

**III International Symposium on Ecological Restoration.** Ciudad de Santa Clara, Villa Clara (Cuba), 13 to 19 September 2010. Organized by the Society for Ecological Restoration International (SERI), the National Enterprise for Flora and Fauna Protection (ENPFF) and the Cuban Group of Ecological Restoration (GCRE).

**2010 IENE International Conference on Ecology and Transportation. Improving Connections in a Changing Environment.** Velence, Hungary, 27 September to 1 October 2010. Organised by the Infra Eco Network Europe.

**4th SER International World Conference on Ecological Restoration.** Mérida (Mexico), 21 to 25 August 2011. Organized by the Society for Ecological Restoration International (SERI).

**Events that have already taken place:**

**IX SECEM Conference.** Bilbao, 2 to 5 December 2008. Papers were presented on aspects related to the mobility of fauna and road networks, the use of wildlife passages, etc. Further information [here](#).

**Workshop on the use of roads and the environment.** Madrid, 22 October 2009. Organised by the Technical Road Association (ATC). Further information [here](#).

**Convegno Ambiente, paesaggio e infrastrutture. Rome (Italy), 1-2 October 2009.** Coordinamento delle Associazioni Tecnico-scientifiche per l'Ambiente e il Paesaggio (ATAP); Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA). Further information [here](#).




**International Conference on Ecology & Transportation: Adapting to Change.** Duluth (Minnesota, United States of America), 13 to 17 September 2009. Organised by ICOET and the Minnesota Department of Transportation. Further information [here](#).

**19th Conference of the Society for Ecological Restoration International: Making Change in a Changing World.** Perth (Australia), 23 to 27 August. Society for Ecological Restoration (SER) International. One of the topics of the conference is ecology in relation to transport infrastructures and restoration. Further information [here](#).



## DOCUMENTS OF WORKING GROUP AND PRODUCTS ACTION COST 341

Within the framework of the European project and the Working Group, which has given continuity to the project, various materials have been generated which contribute to the knowledge and reduction of the effects of habitat fragmentation caused by transport infrastructures. Specifically, the following documents have been published:

- **COST 341. La fragmentación del hábitat en relación con las infraestructuras de transporte en España.** Revision of the State of the Art published in 2003.
- **COST 341. Fauna y Tráfico. Manual europeo para la identificación de conflictos y el diseño de soluciones**  (8,4 MB). Published in 2005; translation of the document *Wildlife and Traffic* editado el 2003 as colophon of the project.
- **Prescripciones técnicas para el diseño de pasos de fauna y vallados perimetrales**  (1,8 MB) Published in 2006 and constitutes the first in the series **Documents of the reduction of habitat fragmentation**.
- **Prescripcions tècniques per al disseny de passos de fauna i tancaments perimetrals** Published in 2008 by Departament de Medi Ambient i Habitatge (Generalitat de Catalunya); translation of the document in Spanish edited in 2006.
- **Prescripciones técnicas para el seguimiento y evaluación de la efectividad de las medidas correctoras del efecto barrera de las infraestructuras de transporte**  (2 MB) Published in 2008; second issue of the series **Documents for reduction of the habitats fragmentation**.

Further information on the products drawn up in the Framework of the COST 341 project and the Working Group on Habitat Fragmentation caused by Transport Infrastructures can be found at [MARM](#) website and the [IENE](#) website.



- This publication comes within the framework of the Fragmentation Habitat Due to Transportation Infrastructure Project. It is promoted by the Dirección General de Medio Natural y Política Forestal of the Ministerio de Medio Ambiente y Medio Rural y Marino. The technical secretary's office of the project runs in charge of MINUARTIA.
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