

habitat fragmentation due to transportation infrastructure



e-bulletin · NOVEMBER 2004 · number 1

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Suggestions or contributions to the bulletin

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following address:
habitats.transport@mma.es

EDITORIAL

The Bases for Writing Handbooks and Technical Guidelines

What makes a better amphibian passage, a circular one or a rectangular one? Would a wild boar passage of 2m wide be wide enough? Engineers that are in charge of transportation infrastructure projects and technicians involved in environmental impact evaluation are faced with questions about the effectiveness of corrective measures on a daily basis. Professionals who are involved with biodiversity conservation are not the only ones interested in these issues. More and more often we see that safety is being compromised in many stretches of roads or rail due to wild boar, roe deer or deer collisions and means that experts must be consulted, who can recommend which corrective and preventive measures and actions should be taken in order to reduce this risk.

In 1995, the Centro de Estudios y Experimentación de Obras Públicas, of the Ministerio de Fomento, published the first volume of a handbook that provided guidelines on measures to be taken in order to reduce the barrier effect on roads, and guidelines on reducing wildlife mortality. Subsequently, in 1999, the Departament de Medi Ambient of the Generalitat de Catalunya edited a new document with recommendations on the issue. Late last year, a new reference was edited. This was the European handbook called *Wildlife and Traffic*, which was created within the framework of the Action COST 341 project and agreed on by several experts from different countries. This handbook, which will be available in Spanish next year and is published by the Ministerio de Medio Ambiente, is being used as starting point for a preliminary investigation into wildlife passages and perimeter fencings (see chapter on *Working Group*).

Behind all these recommendations is a team of scientists and technicians from the Departamento de Ecología of the Universidad Autónoma de Madrid and from the Departament de Biologia Animal from the Universitat de Barcelona. The first two manuals edited in Spain were shaped by them. The team has been monitoring the performance of the measures applied, and when these were not effective the team would find out why that was.

We know that different species have different needs: for example, a good badger passage or otter passage is completely different from the passages used by roe deer. In order to distinguish what works from what doesn't, it is necessary to have field information available. The monitoring of the effectiveness of the measures plays an essential part in the design of wildlife passages which are becoming more effective and with a better cost-benefit ratio.

To run well-designed monitoring programs should be an investment for the future, but so far, it has not been a widely used practice. There have been a number of important monitoring projects that have been carried out over several years, the results of which have been

published and presented at conferences or workshops. However, it is not standard practice to undertake programs to monitor applied measures on new projects. On a more positive side, we should be glad to see that more and more, projects have a development plan lasting a minimum of three years, and where the quality of the measures and the correct installation of the structures are being supervised. It is important to guarantee that during this supervision, the most adequate methods are being used. It is also important that long term monitoring is included in order to obtain better knowledge of the effect of the applied measures on natural processes, and that the last step, which is fundamental in achieving the objectives of the monitoring proceeding, is being carried out. Furthermore, results should be made widely available in order to promote good practices which work, and thus avoiding the need to implement measures that are proven to be ineffective and that do not meet the objectives set.

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OPINIONS

Road Technical Regulations for the prevention of Habitat Fragmentation.

The handbook on preventing habitat fragmentation, *COST 341. Wildlife and Traffic. A European Handbook for Identifying Conflicts and Designing Solutions* (2003), is a good starting point for planning the orientation of the necessary Road Technical Regulations.

The elaboration of these regulations should be a natural outcome of this positive advance in the systemisation of criteria. Even though there are still a lot of unanswered questions about this next step, the starting point for these regulations seems to be clear. Firstly, it appears logical to employ preventive planning, relying more on structural criteria which affect the design and building of roads, rather than concentrating all the effort on more or less effective corrective measures. When designing roads and removing soil, the habitat and its main functional and territorial elements should be kept in mind since to ignore them would put too much pressure on the permeability and isolation measures. These corrective measures should be applied as a last resort and possible conflicts should be anticipated and solved with an overall vision of the route the road will take. In this way, the most conflictive situations would be avoided, thanks to the flexibility of road projects, which have an essentially linear nature.

Secondly, these technical regulations have to be incorporated into the working process within the road project. This is a linear infrastructure and its conception goes through successive stages, from the analysis of necessities from a strategic point of view (planning and previous studies), to the achievement of a successful definition on a working scale (construction of the project). The criteria for the prevention of habitat fragmentation should be able to approach the problems of each and all different territorial scales, for which solutions are being studied and suggested. These should also be on a progressive scale, as with all the other design criteria of the projects.

Curiously, this criteria is related to the previous one, since on a larger territorial scale the worst effects of fragmentation can be prevented and can avoid, if possible, affecting the most fragile areas. The definitive design of the elements of the project can be justify for the most detailed scale. It is on this last level



Carne Rosell (MINUARTIA)

where the specific design of the permeability and isolation devices would take place.

An intermediate level should solve the last adjustments of the track and land volumes, thus broadly assessing the need of devices and the different kinds there are. This in fact is how things work in other areas of design, such as the definition of structures and the progressive design of drainage.

Thirdly, technical regulations should be applied, stressing the need for efficiency in management and application. There are many questions on how to guarantee this efficiency. Many years of road works have gone by now with attempts at trying to solve the contrast between scientific environmental considerations and scientific ecological criteria, and the need for malable executive criteria that do not compromise the viability of the values of the natural surroundings. The diversity of situations and possible solutions should be typified by a certain degree of generalization while no circumstance should be justify unattended. It is essential to assume that there is going to be a degree of discretion in the application of the generic regulation contents, depending on the characteristics of each case. At the same time, there should be technical planning in place, in order to avoid too much time being spent at the abstract stage by having inadmissible thresholds established and undefined, and where it would be too easy to end up working with the motto "everything goes".

It is also necessary to have a certain amount of technical solutions that would allow the project manager to build multiple options of the project, whilst giving clear references on the efficiency of each solution. In this sense, it is important to give criteria of reference that would work on the safety side, overcoming the limitations that could arise from imprecision or from lack of information.

Another decision that should be taken is the degree of compliance that the possible technical regulations require. There are many considerations that have to be taken into account in this area. To prevent habitat fragmentation on future roads or to apply corrective measures on the existing ones should be obligatory in all fields. This would be especially urgent where there are high conservation values. It seems necessary that an appraisal or at least some basic technical regulations should be put in place. The availability of guidelines, a technical handbook or some institutional recommendations would allow for a greater flexibility in its application, thus assuming a more facultative approach. The detail and precision of the contents of the technical regulations would be established according to the required degree introduced.

There are a lot of unanswered questions on the development of the preventive criteria on habitat fragmentation. Even though there is still a long way to go, it seems that the direction it is taking is promising.

*Ignacio Español Echaniz
Teacher of Landscape and Environmental Impact Studies
ETSI de Caminos de Ciudad Real
Universidad de Castilla-la Mancha*

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DATABASE AND OTHER ACTION PRODUCTS COST 341

As a result of this European project, several products have been produced which are described in the previous bulletin. How to purchase these products is stated below.

COST 341. Habitat Fragmentation and Transportation

Infrastructures in Spain

This can be purchased at the Publicaciones del Ministerio de Medio Ambiente.

COST 341. Wildlife and Traffic. A European Handbook for Identifying Conflicts and Designing Solutions. This can be requested [here](#). A Spanish translation will be available in 2005.

CD-ROM that gathers all documents produced during Action COST 341. This can be requested at [IENE entity](#).

CD-ROM with the programme of the closing event of Action COST 341. Obtainable on the web site [IENE](#).

Database. This database contains bibliographic entries on habitat fragmentation and entries on applied measures to reduce habitat fragmentation that occur in all participating countries in the Action project. If you wish to send information regarding the present situation in Spain to be incorporated into the database, please fill in the [bibliography](#) and [preventive and corrective measures](#) form, and send it to habitats.transporte@mma.es. The database can be consulted on the web site [IENE](#).

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WORKING GROUP

Editorial Commission of Technical Instruction on Wildlife Passages and Perimeter Fences

A demand made by the technicians involved in the corrective measures design of the barrier effect of roads and rails, has been to move forward with the technical prescriptions that are available in the European handbook *COST 341. Wildlife and Traffic*. The work of writing up the "Instrucción técnica de pasos de fauna y vallados perimetrales" has been started with this aim. The commission that was set up as a result of this necessity is integrated in the Working Group of Habitat Fragmentation Due to Transportation Infrastructures. This is made up of technicians in public works and technicians involved in environmental impact assessment from different autonomic communities and by the Ministerio de Medio Ambiente and Ministerio de Fomento. On the 21st of October, the first meeting took place at the Consejería de de Transportes del Gobierno de Navarra in Pamplona.

During the meeting, the outline of the main contents of the appraisal and a draft of the contents of one chapter was agreed upon. Furthermore, the planning of the work for the following months was clarified. It is anticipated that the first draft of the appraisal will be available in March 2005, and will be distributed amongst organizations and experts on the issue, so their comments and suggestions can be taken into account and included.

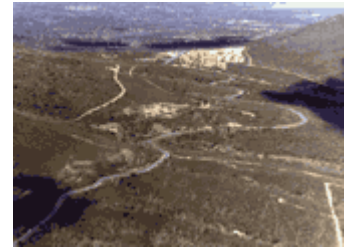
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NEWS

Construction of a Wildlife Passage for Lynx on the Road that Crosses Montes de Toledo Zone and a Critical Area for the Species.

The Puerto del Milagro road connects the locations of Ventas with Peña Aguilera

(Toledo) and with El Molinillo (Ciudad Real). This is just where the Cabañeros National Park starts. The road is 17 Km long, and crosses the area that is being promoted as "Montes de Toledo" LIC and ZEPA. This area is also a Critical Area for the Iberian Lynx, a specie that has deter-



Consejería de Medio Ambiente

mined the number and the dimensions of the wildlife passages on the road works fitting.

This work was recently carried out by the Consejería de Obras Públicas in collaboration with the Consejería de Medio Ambiente, of the Junta Castilla-La Mancha. 19 wildlife passages of different dimensions, from 2x2 m to 5x3 m, have been installed. It is hoped that these will be used by the lynx and other carnivorous animals. A viaduct of 45m wide has also been built as the best solution for the passage of large vertebrates such as deer and wild boar.

The road has been open to traffic this summer, and soon the monitoring and surveillance plan will be in place. It is expected that the results will allow conclusions to be obtained which are applicable to similar areas of the Comunidad Autónoma de Castilla-La Mancha, and other areas where the distribution of this threatened feline is known.

David Sánchez Aragonés (Consejería de Medio Ambiente, Junta de Castilla-la Mancha)

Laura Conde Ruiz and Elena Izquierdo Ramos (TRAGSATEC)

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Decrease in the Number of Vertebrate Run Over After the Cutting of the Vegetation that Grows on the Margins of the A-483 Road, at Doñana.

From 2001 to 2004, a monitoring scheme of vertebrate mortality has been carried out between kilometre 27 and 40 of this road. In 1994, two wildlife passages, 4x2 m and 12 m long, were built in the stretches where the greatest number of Iberian lynx were run over. A 2 m high fence of simple torsion was also installed. By 2002, these measures were complemented by auditory bands and road signs in order to reduce the speed of the vehicles. The monitoring of the passages questioned its usefulness for individuals just passing or in dispersion.



Francisco Robles

In 2001 and 2002, the highest number of vertebrates was registered at kilometre 36 and 37. (22 and 25 deaths respectively), coinciding with the wildlife passage of the Soriana lagoon. This passage is flooded during the rainy season. In 2003, the number of run over vertebrate species was reduced to half (11), just after the cutting and mowing took place of the herbaceous and shrub-like vegetation that grows on the margins, during December 2002 and January 2003. During 2003, the registered collisions were concentrated at those kilometric points where the vegetation cover was highest, over 100 cm tall. Data from 2004 to date, after treating the vegetation in a similar manner to that commented above, confirms the results obtained in 2003.

Francisco Robles, Parque Nacional de Doñana

Georgina Álvarez, Dirección General para la Biodiversidad, MIMAM

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High Chameleon Mortality Registered Due to the Lack of Maintenance of the Autovía del Mediterráneo Fences.

Hundreds of chameleons die every year on the Autovía del Mediterráneo on the Málaga-Nerja stretch. In August 2003, over 500 of these reptiles were found dead over a road distance of less than 30 kilometres, during a survey of a single day. It is surprising to find that this road has wide lateral fences (plastic and metallic ones) designed specifically to prevent chameleons getting onto the roads.



César Manuel Álvarez-Laó (SCV)

These were installed during the construction of the road, but the lack of maintenance (holes and some stretches badly finished), have reduced their efficiency, a fact which can be deduced from the number of registered animals that have been run over. For several years, The Sociedad para la Conservación de los Vertebrados- SCV has been monitoring this, and has been demanding that action be taken. So far, no reply from any Public Organism has been given.

The SCV has also highlighted the problem of the lack of maintenance of corrective measures that is being carried out on other roads. This would be the case of amphibian fences at the Regional Park of the Cuenca Alta del Manzanares. These fences were vandalised several months ago, and they have not been repaired since. There is a need for more agile communication between conservationists and the administration which would allow these problems to be solved and mean that correct measures and actions being taken would not end up being completely inefficient due to the lack of maintenance.

Javier López Redondo/Sociedad para la Conservación de los Vertebrados (SCV)

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Project of the Drawing Up of the White Book on Transportation Infrastructures and Cultural and Ecologically Sensitive Areas.

On January 2004, the 1st International Conference on Transportation Infrastructures and Protected Natural Areas took place in Sevilla. This event was organised by the Colegio de Ingenieros de Caminos, Canales y Puertos, the UICN and WWF/Adena. Conclusions of this meeting were compiled in the [Acuerdo de Sevilla](#) and in [Recomendaciones Transdisciplinares](#).

The Junta de Andalucía, through its Consejería de Obras Públicas y Transportes and Consejería de Medio Ambiente, has moved forward on the implementation of such conclusions. To achieve this, the two departments have worked through the public company Gestión de Infraestructuras de Andalucía S.A., to promoted the drawing up of the White Book on Transportation Infrastructures and Cultural and Ecologically Sustainable Areas. This project counts on the contribution of well known experts and technicians in the fields of engineering, nature conservation and socio-economic development, in public and private institutions

By following the methodology used during the conference, where the interdisciplinary work and participation was fundamental, the White Book aims to become a handbook that would allow the needs of roads to be harmonised with social and economical needs, territorial equilibrium and the preservation of the ecological and environmental characteristics of the area where they are going to be implemented. The conclusions and recommendations emanating from the White

Book will be, taken into account by the Andalusia administration and could be included as specifications on the different regulations which affect construction and maintenance of roads and the land that they cross, thereby, stressing the need for monitoring the possible impacts that a road might have during its lifetime.

Consejería de Obras Públicas y Transportes y Consejería de Medio Ambiente de la Junta de Andalucía

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Pioneer Proposal of an Ecoduct in the Urban Plan in the Metropolitan Area of Barcelona.

A paradigmatic example of the difficulties for ensuring a biological connection between protected natural spaces in the surrounding area of Barcelona would be the connection between the Natural Park of Sant Llorenç del Munt i l'Obac and the Collserola Park. Amongst other difficulties, this connection is intercepted at the south end by the highway A-7/B-30, which forms a barrier of over 100 m wide at some stretches.



Institut Cartogràfic de Catalunya

Besides this, the land between the highway and Collserola, on the Cerdanyola del Valles region, is urban land according to the Pla General Metropolità de Barcelona (1976) and the construction of buildings could be undertaken on the site. The Centre Direccional is foreseen to be developed in this area by a Pla Parcial.

After the drafting of several versions, modifications on the approach and negotiations amongst the administrations involved, a final version has been written and is being processed as a Pla Parcial. This will take place in an area of 340 Ha, and a pioneering proposal for an urban plan refers to the construction of an ecoduct 90 m wide at the A-7/B-30. This would become a key measure in the restoration of the connectivity between Collserola and Sant Llorenç del Munt. Included in the document, are a number of criteria of vegetation conditioning, screening, adaptation of the ecoduct access and other considerations. Furthermore, the Pla Parcial includes actions that should be undertaken to improve habitats and the permeability of several roads.

The Plan Parcial is being promoted by the Consorci Urbanístic del Centre Direccional, made up of INCASOL (Institut Català del Sòl, Generalitat de Catalunya) and of City Hall of Cerdanyola del Vallès.

Albert Civit. Institut Català del Sòl, Departament de Política Territorial i Obres Públiques, Generalitat de Catalunya

Roser Campeny, MINUARTIA Estudis Ambientals

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Fauna Mortality on Roads, an Exhibition.

Wildlife mortality is the theme of the exhibition "Així viuen, així moren" ("This is how they live, this is how they die"). The exhibition is made up of 6 photographic panels. The first three, analyse road design, its impacts on wildlife and on the territory, and the collateral damage caused by humans with these infrastructures. The central panels explain which are the most affected species and what percentage are

being run over. The last panels show some examples of the solutions that are being applied and they offer input on new corrective measures, inviting drivers to think about this issue.



Ferran Aguilar (MEDIAGRAPHIC)

“Així viuen, així moren” is designed to catch people’s attention, and by using powerful images, it invites citizens to get closer and to read the information attached to them.

The exhibition can be viewed at the different civic centers in Tarragona, during November and December. The entrance is free for educational institutions and to non-governmental organisations.

This event has been produced by the Caixa de Tarragona, organised by Mediterrània CIE and carried out by Mediagraphic. The texts are in Catalan.

Ferran Aguilar, MEDIAGRAPHIC

Txiqi López, Mediterrània CIE

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Seminar for Technicians on the Impact Assessment of Roads and Railways and on Fauna Management.

The Departament de Medi Ambient i Habitatge of the Generalitat de Catalunya is organising a lecture-practical seminar for its technicians. This seminar is going to be held in Barcelona from the 20th to the 23rd of December. The seminar is aimed at broadening the knowledge of the administration technicians involved in methods to prevent or reduce the barrier effect and other impacts on fauna due to transportation infrastructures.

During the course, and using the European Handbook COST 341 *Wildlife and Traffic*, information will be handed out about methods of selecting the best spot to place a wildlife passage and the technical prescriptions that the passage has to meet depending on the species it is for. There will also be information on other actions to take to prevent animals crossing roads and to reduce mortality caused by traffic accidents , as well as guidelines on preventing risks on the road.

The seminar includes a fieldwork visit where efficient applied measures plus the most frequent mistakes on the installation or construction of the measures will be seen.

Antoni Sorolla. Departament de Medi Ambient i Habitatge. Generalitat de Catalunya

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PUBLICATIONS

Vertebrate Mortality on Roads.

This report is being distributed on a CD-

ROM. It has been written as a result of the *Proyecto provisional de seguimiento de la Mortalidad de Vertebrados en Carreteras* (PMVC). These are the results from the first monitoring carried out on vertebrates run over on roads at a state level. This was possible thanks to the hundreds of volunteers that worked on it between 1990 and 1992.



The results on each kind of vertebrate and on each species are presented. There is also a compilation of the black spots where wild animals have been run over by vehicles on the Spanish road network, as well as the incidence of these accidents on road safety. It also includes a large bibliographical collection where results with other studies can be compared. One chapter is about corrective measures that can be applied to reduce the number of dead animals on roads. The CD-ROM can be requested at the *Sociedad para la Conservación de los Vertebrados*, who edits the report, at the Apartado de Correos 270, 28220 Majadahonda (Madrid).

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EVENTS

1st Seminar: "Traffic Accidents Involving Wildlife: Who is Responsible? Prevention, Safety and Responsibility. Possible Solutions". 18th of November, 2004. Madrid. Organised by: Oficina Nacional de la Caza.

More information at: info@oficinacionalcaza.org

VII Environmental National Congress. 22nd-26th November, 2004. Madrid. Organised by: Fundación CONAMA. Within the congress framework, the Working Group *Planning, Construction and Infrastructure Sustainable Management* will meet. There will also be a workshop on Environmental Restoration in Large infrastructure work.

More information at: <http://www.conama.es/>

Infrastrutture viarie e biodiversità. Impatti ambientali e soluzioni di mitigazione 25th of November, 2004. Pisa (Italia). Organised by: Lega Italiana Protezione Uccelli

More information at: <http://www.lipu.it>

ECOSUD 2005. Fifth International Conference on Ecosystems and Sustainable Development. 3rd-5th of May, 2005. Cádiz. Organised by: Wessex Institute of Technology (United Kingdom), Universidad de Cádiz and Universidad de Siena (Italy).

More information at:

<http://www.wessex.ac.uk/conferences/2005/eco05/index.html>

ESA-INTECOL 2005 Joint Meeting: Ecology at Multiple Scales. 7th-12th of August, 2005. Montreal (Canada). Organised by: International Association for Ecology (INTECOL) and Ecological Society of America (ESA). There will be a symposium on: *Reducing habitat fragmentation by roads: A comparison of measures and scales*, within the conference framework.

More information at: <http://www.intecol.net/>; <http://www.esa.org>

The International Conference on Ecology & Transportation (ICOET). 29th of August – 2nd of September, 2005. San Diego, California (USA). Organised by: California Department of Transportation and Road Ecology Center.

More information at: <http://www.icoet.net/ICOET2005.html>

Sustainable Planning 2005. Second International Conference on Sustainable Planning & Development. 12th-15th of September, 2005. Bologna (Italia). Organised by: Wessex Institute of Technology (UK). One of the topics of the conference will be on Environmental Impact Assessments.

More information at:

<http://www.wessex.ac.uk/conferences/2005/spd05/index.html>

World Conference on Ecological Restoration. 12th-18th of September, 2005. Zaragoza. Organised by: Society for Ecological Restoration International (SERI) and Instituto Pirenaico de Ecología-CSIC.

More information at: <http://www.ser.org/content/2005Conference.asp>

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- This publication comes out every six months within the framework of the Fragmentation Habitat Due to Transportation Infrastructure Project. It is promoted by the Dirección General para la Biodiversidad del Medio Ambiente. MINUARTIA, *Estudis Ambientals* is undertaking the technical administration of the project.
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