

habitat fragmentation due to transportation infrastructure



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EDITORIAL

The highway project between Toledo and Córdoba fails to meet requirements of the Environmental Impact Evaluation

Although in many cases corrective measures succeed in reducing the barrier effect of roads, occasionally the only option for preventing the effects of habitat fragmentation is to choose an alternative stretch. This is reflected in the conclusion of the Environmental Impact Declaration (DIA) of the 29th of May 2007 that the Toledo-Ciudad Real-Córdoba toll highway project is incompatible with the conservation of priority species and natural habitat types and threatens the integrity of the Natura 2000 network.

Additional Information

Dirección General para la Biodiversidad. Ministerio de Medio Ambiente.

Infra Eco Network Europe (IENE)

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Suggestions or contributions to the bulletin

All comments and information you might have on the different sections of the bulletin are welcomed, please send all your comments and suggestions to the following address:

habitats.transporte@mma.es

The project, some 300km long and promoted by the Ministry of Public Works consists of the construction of a highway formed by two 7 metre wide lanes separated by a median strip. All of the alternatives directly affect sites Natura 2000 including Montes de Toledo, Sierra Morena and the Sierras de Cardeña and Montoro; also, the National Park Sierras de Andújar is found in the near vicinity of the project. The DIA emphasises the great importance of the wildlife in the area affected by the project, including some sectors which have been considered as "critical areas" in the Castilla-la Mancha region for the conservation of species which have approved Conservation Plans, such as the Iberian lynx, the Imperial Eagle and the Black Stork, along with other vulnerable species such as the Black Vulture. The analysis of significant impacts highlight the problems in these areas, especially in Sierra Morena and Montes de Toledo, pointing out, amongst many other impacts, the importance of territorial permeability loss for terrestrial vertebrates. This would be aggravated in some sections by

the accumulated effect of the new toll road with the High Speed Railway from Madrid to Sevilla and the N-401 road. The barrier effect of this combination of transport networks would have particularly negative effects on the endangered lynx populations and the wolf, the populations of which to the south of the Duero are also considered fragile.



Throughout the environmental evaluation of the project, all the environmental administrations implicated (autonomous administrations of Castilla-la Mancha and Andalucía and the Ministry of Environment) stated that all the alternatives considered in the project caused significant impacts in 8 sites included in the Natura 2000 network, above all through the fragmentation of the lynx habitat, which includes one of the best nucleus of its distribution area, in Sierra Morena and its surroundings, and is the object of notable effort and investment in population conservation and

recovery.

Given the magnitude of the identified impacts it was established that the project affects priority species and natural habitat types and species and that according to the DIA, although dealing with a project of public interest, no justifications have been shown which prove that this highway is motivated by absolutely necessary reasons such as is required by article 6.4 of the 1997/1995 regulation (see as a reference, amongst others, the cases of the European Court of Justice C-57/89 and C-355/90 which condemn both state members for non-fulfilment of the Bird Directive, based on this argument). Therefore, the DIA concludes that the project is not compatible with the environment, causing significant negative effects, and affecting sites of the Natura 2000 network, entering into contradiction with conservation aims, and as a consequence with the maintenance of the network's coherence.

This declaration, without a doubt establishes an important reference in the environmental evaluation of transport network projects and clarifies the interests to be considered in the initial stages of planning, the possible effects on priority habitats and species in order to avoid serious risks to their conservation, and also the necessity to maintain and carry out an adequate management of those elements of the territory which act as ecological connectors (article 10 of the Directive 92/43/CEE). Lastly, the declaration is exemplary in rigorously observing the legal structures of the conservation strategies and plans of the species mentioned, as regards the evaluation of environmental impact.

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WORKING GROUP

The Working Group on Habitat Fragmentation caused by Transport Networks, integrated in the National Commission of Nature Protection, includes representatives from all the transport and environmental administrations, from both the Autonomous Communities and the State, and other implicated organisations. The Group's 9th meeting took place last March in Madrid, in the Directorate Generale for Biodiversity headquarters which holds the Group's technical secretary.

At the meeting, the publication *Technical Prescriptions for the design of wildlife passages and perimetral fences* was presented (see publications below), and was written up from the European manual guidelines *COST 341 Wildlife and Traffic*, within the framework of a technical commission integrated in the Working Group. A new commission was also set up and has already started work on the writing up of the second document in the series which will contribute technical prescriptions for monitoring and evaluating the effectiveness of the wildlife passages. In 2008, a continuation of the series is expected with a new document about the prevention of habitat fragmentation in the planning phase of infrastructures.

The meeting was attended by the Directorate Generale of Traffic technician Manuel Francisco Avilés who presented an interesting talk about the gathering and treatment of data from accidents caused by the presence of wildlife on roads. In particular, he underlined the benefit which this information can have for the identification of stretches in which a high number of accidents are concentrated and for the design of measures which could reduce the problems.

During the meeting, the Working Group's plan for the period 2007-2009 was also presented and those who attended contributed information about different measures for reducing habitat fragmentation, and other related initiatives.

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NEWS

In a summer course run in El Escorial (Madrid), Anthony Clevenguer presents the monitoring experiences of wildlife crossing structures on the Trans Canada Highway as it crosses the Banff National Park

The Trans Canada Highway, one of the largest and most popular roads in the world, crosses magnificent natural scenery such as the Banff National Park (Alberta). In this area, a pioneer long term survey has been developed to monitor the effectiveness of wildlife crossing structures incorporated into projects for improving and widening the road and with the aim of reducing the number of



Cedida por Anthony Clevenguer

accidents caused by collisions with large deer and bears. In total, over some 75km more than 40 passages have been constructed, destined to make crossing easier for bears (grizzly and black) and deer, amongst other species (filming of the crossing structures can be seen [here](#)).

Anthony Clevenguer, responsible for the project which started in 1996, and one of the most widely renowned experts in this field, took part in the recently finished El Escorial summer course entitled *Environmental Treatment of Transport Infrastructures* (to see the complete presentation, see the Workshop section). Amongst the results obtained through this survey, the extensive use of the wildlife crossing structures by all the large mammal species present in the park stands out, as does the significant reduction in the number of accidents caused by collisions with these animals, achieved by the application of these measures. It is also notable that use of the passages has intensified progressively over time: in the Grizzly's case, during the first three years of monitoring, a maximum of 7 annual crossings through the passages were registered, whilst 9 years later, (in the period 2005 – 2006) 89 crossings were registered by this species through the same passages. Therefore, the animals' familiarity with the presence of the crossing structures is a key aspect to be kept in mind and it has been observed that as time passes, the animals living in the road's surroundings incorporate these structures into their habitual displacement routes and learn to cross the infrastructure at these points.

Another significant element from this experience is the important investment in publishing the results and the awareness action and also the growing number of different administration bodies, foundations and associations which are getting involved in the development and financing of the projects.

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The number of wildlife passages incorporated into new road projects in Spain increases

The inventory of corrective measures applied in order to increase the permeability of wildlife passages on roads and railways, which is carried out within the framework of the Working Group, allows us to appreciate a notable increase in the number of wildlife passages which are incorporated into new construction projects.



Marta Martínez, INYPSA

In particular the growing number of passages designed specifically for wildlife is noticeable, such as the large ecoducts constructed on the A-381 in Andalucía (see last bulletin) and the specific overpasses, for the main part around 20m wide and which demonstrate various different designs and constructive typologies. Other more recent constructions on the A-66 can be added (Ruta de la Plata) to those constructed on the dual carriage ways A-52 (Rias Baixas) and A-231 (Camino de Santiago) such as the false tunnel passage shown in the photograph, situated in the Plasencia-Cañaveral stretch, in Cáceres. By monitoring some of these structures such as those situated on the A-52 and A-231 where wild boar, deer and wolves have been detected crossing, it has been possible to test their functionality. In some cases however, it has been observed that some small errors in design or in the construction phase reduces the passage's effectiveness.

The inventory also contributes data on new passages which are being incorporated into improvement or widening projects of roads already functioning; in this sense, the new ecoducts stand out which have been included in widening projects of fast roads such as the C-65 (Eix Transversal de Catalunya) or various access roads to the Costa Brava.

The information which has been contributed by responsible administrations, companies in charge of road construction and management and consultant businesses are of fundamental interest in evaluating progress in this field and from here we offer our appreciation for the labour of all those who have provided data. Remember that you can send information about applied measures by filling in the following [form](#).

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Monitoring of permeability for wildlife at the A26 dual carriage way as it crosses the Garrotxa Volcanic Zone Natural Park

The Environmental Impact Assessment of the N-260 widening project, the current A26 dual carriage way, in the Besalú-Olot stretch (Girona) included the obligation to execute a monitoring programme to control the functioning of the wildlife protection measures.



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This work is being carried out by the Ministry of Public Works and counts on monitoring by the autonomous administrations and in particular the Garrotxa Volcanic Zone Natural Park, of which the road crosses over 6km.

The controls of the wildlife passages are carried out using camera images activated by infrared barriers and the detection of tracks on marble dust. Besides the monitoring of drainage works and wildlife

overpasses and underpasses, this programme is particular in that controls have also been established in three viaducts and two tunnels included in the stretch which is the object of study.

After analysing the data from the campaigns carried out in the years 2004 and 2005, it has been revealed that the crossing of ungulates, in particular roe deer and wild boar, is canalised totally through the tunnels and viaducts. The rest of the transversal structures (adapted drainage and multifunctional overpasses and underpasses) show high indices of use by other smaller sized species such as fox, badger, beech marten, genet, rabbit, mice, shrews etc. Monitoring has also seen the identification of small deficiencies in the adaptations of multifunctional passages or gaps in the fences which are perfectly repairable during road maintenance work and which will permit an improvement in the structure permeability of the wildlife passages and also road safety.

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Analysis of mortality caused by road accidents from data from the Wildlife Recovery Centre in La Alfranca-CIAMA, Aragón

The La Alfranca-CIAMA Wildlife Recovery Centre, which belongs to the Environmental Department of the Aragón Government, began activity in 1985 and since 1994 has a computer register which gathers data on mortality caused by road casualties and collisions with vehicles from the collection of animals which are found dead or injured for these reasons.



Centro de Recuperación de Fauna Silvestre de La Alfranca

In Aragón, the Nature Protection Rangers are responsible for the collection of these animals and their transportation to the Recovery Centre where a complete form is filled in for each one.

Although the collection of road kill animals is not systematic (not all the dead animals are collected for this reason nor is a regular sampling carried out on all the roads) the work developed by both the rangers and the centre during these years contributes data which makes way for an analysis of the effect of road casualties and identification of critical points which require improvements in order to reduce mortality.

Analysing the data from the period 1994 – 2006, road accidents are the second cause of admittance to the centre and signifies 19% of the total of all animals entering the centre. Of the 2,385 animals admitted, 755 (32%) were alive, and of those only 167 (22%) could eventually be saved and released. This apparently modest number is not so if we consider the severity of the injuries which are caused by road accidents and the difficulty in completely recovering the affected animal.

For wildlife groups, birds are those most affected both in numbers of species (92) and in total number with 1,483 individuals. Mammals are next with 823 animals admitted from 24 different species and finally reptiles with 79 admissions from 15 different species. However, species wise, there are 2 mammals, the beech marten and the badger which are most affected. The admission of 3 bitterns, 4 great bustards and 30 otters, all of them dead by this cause, must also be mentioned.

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Prescripciones técnicas para el diseño de pasos de fauna y vallados perimetrales. First document of the series *Documents for the reduction of habitat fragmentation caused by transport infrastructures*, edited by the Ministry of the Environment. The publication takes as its starting point the guidelines from the European Handbook *COST 341. Wildlife and Traffic* and pinpoints, in a series of sheets the technical prescriptions for the correct design of 11 types of wildlife passages adequate for different taxonomic groups and landscape contexts.



Besides the description of the basic characteristics of each measure, they provide indications on the dimensions of the structures and conditioning of the entrances and the surface of the crossing structure. They also show examples of errors and most common bad practices which compromises these structures' functionality. The dimensions which are established as minimum or recommended, depending on the case, are the consequences of a detailed revision of monitoring results and were approved by the Technical Commission which was in charge of the writing up of the document and, later, for the rest of the Working Group on Habitat Fragmentation caused by Transport Infrastructures.

The document provides a reference to be adopted by different autonomous and state administrations in the processes of Environmental Impact Evaluation and with the intention of constituting a future standard norm. Currently, various administrations are already using the document to establish suitability of the proposed wildlife passages in transport infrastructure projects and for the writing up of the Environmental Impact Declaration.

Reference:

MINISTERIO DE MEDIO AMBIENTE (2006). *Prescripciones técnicas para el diseño de pasos de fauna y vallados perimetrales. Documentos para la reducción de la fragmentación de hábitats causada por infraestructuras de transportes*, number 1. OAP Parques Nacionales. Ministerio de Medio Ambiente. Madrid. 121 pp. A version of the document can be downloaded in PDF [here](#) (1,8 MB)

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Pasos de fauna para vertebrados. Minimización y seguimiento del efecto barrera de las vías de comunicación. This is included in the series of monographs edited by CEDEX (Ministry of Works). The publication presents the results of monitoring the wildlife crossing structures carried out on the A-52 dual carriage way (Rias Baixas) and also on the A-231 (Camino de Santiago). From these, considers different recommendations for the improvement of the passage designs and the definition of

their positions. In this way, different techniques are described, applicable to the control of the vertebrates' use of the structures.



It includes a chapter which comments on the most common deficiencies observed in the implementation of the measures and finishes with a section in which descriptive sheets of corrective measures are included.


Reference:

HERVÁS, I., SUÁREZ, F., MATA, C., HERRANZ, J. & MALO, J.E. (2006). Pasos de fauna para vertebrados. Minimización y seguimiento del efecto barrera de las vías de comunicación. Ministerio de Fomento. CEDEX. Madrid. 139 pp. It can be obtained through the CEDEX Publications Sales Service.

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Guidance on the maintenance of landscape connectivity features of major importance for wild flora and fauna. Report elaborated by the Institute of European Environmental Policy, with the participation of the IUCN and *Ecological Solutions*. The document directs the application of Article 3 of the Bird Directive (79/409/CEE) and Article 10 of the Habitats Directive (92/43/CEE), making a firm stand on the importance of connectivity for biodiversity conservation. To this effect, it comments on some methodologies for the planning and implementation of measures destined to improve ecological connectivity in different topics (territorial planning, agricultural policies, water management and coastal environment etc). It also reflects on the effects of climate change in species and their habitats and helps identify those species most vulnerable to habitat fragmentation. Although the report does not go into depth on the aspects of fragmentation caused by transport networks, some key concepts are provided for the analysis and prevention of the barrier effect caused by these networks and points to necessary future investigation. In the Annex dealing with different developed initiatives by European Union state members, construction work on wildlife passages which make roads permeable are shown.

Reference:

KETTUNEN, M, TERRY, A., TUCKER, G. & JONES A. (2007). *Guidance on the maintenance of landscape features of major importance for wild flora and fauna - Guidance on the implementation of Article 3 of the Birds Directive (79/409/EEC) and Article 10 of the Habitats Directive (92/43/EEC)*. Institute for European Environmental Policy (IEEP). Brussels, 114 pp. A version of the document in PDF can be downloaded [here](#)  (1 MB)

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Manual de buenas practicas en la conservación de carreteras. Publication edited within the project *Programme for the Sustainable Conservation of Road Infrastructure*, developed by the Asociación

Española de la Carretera and co financed by the European Social Fund and the Fundación Biodiversidad. The handbook has been conceived as an element in training professionals working in the field of conservation and maintenance of road infrastructures and provides precise instructions so that these activities are carried out minimising the environmental impacts which they might generate. Amongst the aspects considered the prevention of the impacts on wildlife of different activities is included, although not in depth.

The manual constitutes a model which has effects in a basic line of action in the future, such as the training of professionals implicated in road conservation. One new step would be to facilitate acquired knowledge in order to adequately carry out the maintenance work on wildlife passages and their access points, or, collaborate in the detection of stretches where animal road casualties are concentrated.

Reference:

ASOCIACIÓN ESPAÑOLA DE LA CARRETERA AND FUNDACIÓN BIODIVERSIDAD. (2007). Manual de buenas practicas ambientales en la conservación de carreteras. Madrid, 189 pp. A version of the document in PDF can be downloaded [here](#)

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EVENTS

V National Congress of Civil Engineering. Development and Sustainability within the engineering framework. Sevilla, from the 26th to 28th November 2007. Organised by: Colegio de Ingenieros de Caminos, Canales y Puertos. Amongst the themes to be dealt with in the congress will be the evaluation of the sustainability of infrastructures. More information at: <http://www.ciccp.es/>

Past workshops of which the minutes can be requested

Environmental Treatment of Transport Infrastructures. Work seminar. El Escorial Summer Courses (Complutense University of Madrid). 2007. The reports presented can be consulted at <https://www.ucm.es/info/uatd/CVUCM/index.php> by indicating "inv12454" as the user and "carreteras" as the password.

ICOET 2007. The International Conference on Ecology & Transportation (ICOET). Little Rock, Arkansas (United States). 2007. Summaries available at: http://www.icoet.net/ICOET_2007/.asp

IALE 2007. Landscape Ecology: Scientific Principles in Practice (IALE). Wageningen (The Netherlands). 2007. Includes a symposium on the effects of roads and traffic in wildlife populations and on the landscape. Minutes in preparation:
<http://www.iale2007.com/programme.htm>

IV National Congress of Environmental Impact (AEEIA). Madrid. 2007. Summaries available at:
<http://www.coneia2007.com/resumenes.pdf>

I Technical Workshop. Road Safety in Conservation: Accidents with Animals (ACEX). Valladolid. 2006. Minutes available at:
http://www.acex.ws/_externo/jornada.asp?id_jornada=18#ponencias


1st European Congress of Conservation Biology (SCB). Eger (Hungary). 2006. Society for Conservation Biology. Summaries available at: http://www.eccb2006.org/files/ECCB2006_Book_of_Abstracts.pdf

III Congress of Civil Engineering, territory and environment "Water, biodiversity and engineering" Zaragoza. 2006. Minutes available at: http://www.ciccp.es/biblio_digital/Icitema_III/inicio.htm

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ACTION PRODUCTS COST 341

Within the framework of the European project, and the Working Group which has given continuity to the project, different materials have been generated with the aim of contributing to the knowledge and to the reduction of the effects of habitat fragmentation caused by transport infrastructures. In particular, 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.** Published in 2005; translation of the document *Wildlife and Traffic* edited in 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 for the reduction of habitat fragmentation**. This publication includes detailed prescriptions for designing adequate wildlife passages for making roads and railways permeable for different species of wild animals to cross.

These publications can be obtained at National Park Autonomous Organism's Publications Service (Tel. 91 596 4943, 91 596 4973, 91 596 4842; Fax 91 596 4897) or through other distributors of their products (<http://www.educacionambiental.net>; Linneo, e-mail linneo@eai.es).

Other products from the European project can be obtained through the Infra Eco Network Europe ([IENE](http://www.iene.org)) Website.

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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, Ministerio de Medio Ambiente. In this number have collaborated: Anthony Clevenguer, Jesús Antonio Insausti, Javier Martín and Marta Martínez. The technical secretary's office of the project runs in charge of MINUARTIA.
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