

Mitigation measures to reduce the effects of fragmentation of the natural habitats deriving from the infrastructure development

Nicoletta Bajo¹ & Anna Di Noi²

¹Landscape Architect, Italian Agency for the Environmental Protection and for the Technical Services; e-mail: nicoletta.bajo@apat.it; ²Biologist, Italian Agency for the Environmental Protection and for the Technical Services - e-mail: anna.dinoi@apat.it

Abstract. Referring to the current infrastructures modernization Italian programme, it appears necessary to write up norms to integrate the last addresses of UE relatively to the biodiversity conservation with the transport development and the infrastructures implementation policy.

Within a specific APAT initiative, the “Ecological Network and Territorial Defragmentation” work group has been engaged coordinating Public Administrations as the Environmental Protection Agencies System, the Ministry of Transport, the Ministry of Cultural Activities, “La Sapienza” University of Rome, Perugia University, the Italian Agency for the Ecology of the Landscape, companies dealing with the infrastructure networks, and NGO as WWF and LIPU.

The main project of such a multidisciplinary work group is to produce “Guidelines for the sustainable planning of mitigation interventions to reduce the effects of the natural habitats fragmentation due to the linear infrastructures”.

Particular attention will be given to the management of ecological and functional hotspots connections as elements of the ecological network.

From the analysis of the collected data and from the study of the eventual critical points evidenced, the work group will define new criteria and lines of address in order to suggest to the planners and to the administrators methodologies and techniques to plan sustainable mitigation interventions in the respect of the Habitats Directive.

Key words: ecological network, transport infrastructure, habitat fragmentation, guidelines for the sustainable planning, mitigation measures

1. State of the arts

The Italian Agency for Environmental Protection and Technical Services is involved in nationwide technical and scientific efforts for protection of the environment and the water supply. It operates under the political jurisdiction of the Ministry of the Environment and offers counselling services to other government departments.

Within the agency, the Nature Preservation Department focuses on the protection of nature, biodiversity and ecological networks; the measurement of the environmental impact of human activities on species and ecosystems; and landscape restoration.

At present, the Department is studying the relationship between linear infrastructure and habitat fragmentation. These activities are aimed at producing projects to preserve habitat and biodiversity and the promotion of safer and more fauna-consistent infrastructures.

As a matter of fact, the loss of biodiversity due to the rising volume of transporation represents a serious problem for our planet today.

Animals being killed on roads by cars, and the pressure of the infrastructures over habitat and biodiversity (housing, farming, heavy industry, light, sound and atmosphere pollution) are such many species are at risk of extinction.

An helpful contribution to this situation is provided by the planning of ecological networks together with infrastructure networks, so that the industrial building activities, meet the need to maintain the “connectivity” which is one of the first ecological values according to the Habitats Directive.

The concept of making the infrastructural, meet the ecological needs is not yet popular enough in Italy, despite the ‘General Plan of Transport’, approved in 2001, has fixed some basic environmental quality targets involving the infrastructural network, the national ecological network and landscape. This latter aspect became more important as a consequence of the recent approval of the European Landscape Convention by Italy.

The ‘permeability’ of infrastructures for fauna represents one of the important issues to be considered when infrastructures are planned. Another important issue is the negative impact of altering the bio-geochemical fluxes.

The guidelines issued by ‘Road Ecology’ stress an integrated approach wherein all environmental problems are considered simultaneously in the design process. Furthermore, the design process must allow for developments that arise and discoveries that are made during the initial inspection of a new construction site.

Modern improvements of rural lands, as well as cities, requires a high level of commitment from everyone in the design process. When the interests of diverse stakeholders cannot be politically unified, conflict will arise as we recently witnessed in Italy.

Thus, an important component of progress in our kind of environmental management will be the development of methods for identifying and unifying all stakeholders for a given project.

Indeed, at present, our agency is preparing a report that will provide these kinds of comprehensive guidelines for eco-compatible planning and design of linear infrastructures including both road systems and electric power distribution systems.

With the intention of gathering the best planning experiences where safety, technical skills, eco-compatibility and respect for the landscape are concerned, APAT has involved several Institution such as the Ministry of Transport, the Ministry of Cultural Activities, “La Sapienza” University of Rome, Perugia University, the Italian Agency for the Ecology of the Landscape, companies dealing with the infrastructure networks, and ONG WWF and LIPU.

The purpose of the document is to promote correct planning and monitoring methods for the mitigation of habitat fragmentation and other impacts on fauna for all who are involved in the planning, design and administration of the environment.

These guidelines, which are now being completed, have been devised to “find a solution” to two basic issues: the correct placement of infrastructures in the environment and the best techniques for making roads “permeable” to biodiversity.

As to the planning of large areas, some methods (based upon the Geographic Information System) will be available to understand the fauna permeability at this scale and to find solutions that are less damaging to the ecosystem connectivity.

The fragmentation of habitat signals represent in helpful to monitor the present trend and to understand the future one as far as the planning of the ecological network, and more specifically the design of linear infrastructures, are concerned.

Planning huge infrastructures demands instruments that give synthetic information about a wide range of aspects.

The second part of the document focuses on smaller scale planning and It shows ways to control the environment and the basic techniques of defragmentation consistent with fauna.

Data is organized in synthetic reports. Each report covers a specific design target: road barriers, underpasses and overpasses, warning signs and the likes.

2. Publications of the Italian System of Enviromental Agencies relative to the infrastructures, ecosystems and fauna, and ecological networks

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