

# Interactions between road infrastructure and adjacent ecosystems

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The establishment of new roads can affect ecosystem structure and diversity leading to a loss of integrity and function in adjacent semi-natural ecosystems, therefore having adverse effects on an ecosystem's ability to provide the flow of ecological services within a landscape. During the process of land conversion, services such as flood control, biocontrol, pollination and invasion resistance may be severely compromised and habitats transformed into dependent ecosystems requiring mitigation, compensation and ongoing monitoring (Dolan, in prep). Potential impacts which may arise include habitat fragmentation, loss of native species, non-native species invasion, noise/visual disturbance etc. (see Southerland, 1995; Lugo and Gucinski, 2000; Dolan, 2003). As with agro-ecosystems, roads can be considered ecosystems in that they occupy ecological space and exchange matter, energy and natural resources with adjacent semi-natural ecosystems, influencing ecological patterns, processes (Pauwels and Gulinck, 2000) and services and experiencing temporal change (Haber, 1990; Hall et al., 1992; Van Bohemen, 2002). The interaction between roads and the landscape can be defined by the "dynamics within and through a 'cylinder' (Lugo and Gucinski, 2000). Along its path, the road ecosystem interacts with other systems and environmental conditions, with the result that the cross-sectional area of the cylinder is not constant. It expands when the road traverses sites vulnerable to its presence (e.g. wetlands) and contracts when conditions are more resistant. In intensively managed landscapes, it is now recognised that new roads may actually provide an opportunity to restore former ecological services, habitat and corridors for species dispersal (see Dolan et al., 2004). This paper will detail measures being put in place on an 36km stretch of Irish road which are aimed at maintaining/restoring: (1) hydrology within adjacent wetlands, (2) habitat connectivity, and (3) experimental regimes examining (i) invasion resistance through the manipulation of abiotic and biotic conditions and (ii) promoting beneficial pollinators and carabidae as natural biocontrol agents in local crop production.