

Culvert design important to vertebrates

Roads and railway tracks are among the main obstacles to movement by land vertebrates. The consequences may be a reduction of genetic diversity from increased inbreeding, risk of local extinction because of population dynamics and catastrophic events, and decreased recolonization. In central Spain, analyses of movements by vertebrates through 17 culverts under roads and railways during one annual cycle revealed that adequately designed culverts aid the conservation of vertebrate populations and can eliminate costly construction of special passages for fauna. Most crossings were by small mammals (77%). The crossings of mammals, including carnivores, did not differ by season, but the number of crossings by reptiles was greater in summer than in other seasons and seemed to depend on animal abundance.

Detritus pits impaired the passage by reptiles. Rabbits and carnivores did not use culverts with detritus pits. The number of crossings by small mammals

was lower when roads were surrounded by pasture. The crossing of medium-size mammals (rabbits and carnivores) was affected by the total width of the road and not by the width of the portion of the road used by traffic. The height of boundary fences may prevent access to culverts by some animals. The authors (Yanes, M., J.M. Velasco, and F. Suarez. 1994. Permeability of roads and railways to vertebrates: the importance of culverts. *Biological Conservation* 71:217-222) recommend that fences be constructed to funnel animals toward culverts but not impede access to them and to eliminate detritus pits or modify them with ramps. Further study of culvert design that eases passage by animals is necessary.