

## Road Systems as Environmental Barriers: An Overview of Roadways in Their Function as Fences for Wildlife Movement

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**Abstract :** Roadways have a significant impact on the environment in so far as they function as barriers to wildlife movement, both through road mortality and through resultant road avoidance. Roads have an immense presence worldwide, and it is predicted to increase substantially in the next thirty years. As roadways become even more common, it is important to consider their environmental impact, and to mitigate the negative effects which they have on wildlife and wildlife mobility. In a thorough analysis of several related studies, a common conclusion was that roads cause habitat fragmentation, which can lead split populations to evolve differently, for better or for worse. Though some populations adapted positively to roadways, becoming more resistant to road mortality, and more tolerant to noise and chemical contamination, many others experienced maladaptation, either due to chemical contamination in and around their environment, or because of genetic mutations from inbreeding when their population was fragmented too substantially to support a large enough group for healthy genetic exchange. Large mammals were especially susceptible to maladaptation from inbreeding, as they require larger areas to roam and therefore require even more space to sustain a healthy population. Regardless of whether a species evolved positively or negatively as a result of their proximity to a road, animals tended to avoid roads, making the genetic diversity from habitat fragmentation an exceedingly prevalent issue in the larger discussion of road ecology. Additionally, the consideration of solutions, such as overpasses and underpasses, is crucial to ensuring the long term survival of many wildlife populations. In studies addressing the effectiveness of overpasses and underpasses, it seemed as though animals adjusted well to these sorts of solutions, but strategic placement, as well as proper sizing, proper height, shelter from road noise, and other considerations were important in construction. When an underpass or overpass was well-built and well-shielded from human activity, animals' usage of the structure increased significantly throughout its first five years, thus reconnecting previously divided populations. Still, these structures are costly and they are often unable to fully address certain issues such as light, noise, and contaminants from vehicles. Therefore, the need for further discussion of new, creative solutions remains paramount. Roads are one of the most consistent and prominent features of today's landscape, but their environmental impacts are largely overlooked. While roads are useful for connecting people, they divide landscapes and animal habitats. Therefore, further research and investment in possible solutions is necessary to mitigate the negative effects which roads have on wildlife mobility and to prevent issues from resultant habitat fragmentation.

**Keywords :** fences, habitat fragmentation, roadways, wildlife mobility

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