The importance of wildlife crossing in roads

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Abstract: The effects of roads on wildlife populations have been the focus of many studies in the last decade and increasing concern for transportation and natural resource management agencies. Roads affect populations in numerous ways, from habitat loss and fragmentation, to barriers to animal movement, and wildlife mortality. The impact of roads on wildlife populations is a significant and growing problem worldwide. Wildlife crossing structures are intended to increase permeability and habitat connectivity across roads and reduce wildlife–vehicle collisions. These are above-grade (wildlife overpasses) or below-grade (wildlife underpasses) structures designed to facilitate movement of animals and connections among populations. Like landscape corridors, the conservation value of wildlife crossing structures are gaining attention as applied measures to help adapt changes in species ranges and animal distributions to climate change. The siting of wildlife crossing structures is equally as important as their design. Identifying the proper location of crossing structures is critical for designing effective mitigation of the barrier effect caused by roads. The number of methods used to determine these key locations on roads has increased in recent years. However, few attempts have been made to critically review the techniques that are currently available to transportation agencies.

1955—First wildlife crossing built in United States: Black bear underpass, Florida
1974—First wildlife crossing built in Europe: Badger tunnel, The Netherlands
1975—First wildlife overpass built in United States: Interstate 15, Utah
1982—First wildlife crossing built in Canada: Trans-Canada Highway wildlife underpass, Banff National Park
1982—First wildlife overpass built in Europe: Le Hardt, France
1990—First wildlife overpass built in Canada: Coquihalla Highway, British Columbia

Planning and designing wildlife crossings will often be focused on a certain species of conservation interest (e.g., threatened or endangered species), a specific species group (e.g., amphibians) or abundant species that pose a threat to motorist safety (e.g., Deer, Elk). Their ecological requirements and how roads affect them are described along with some sample wildlife species for each group.

- Large mammals (ungulates [Deer, Goat, Mouflon], carnivores [Bears, Wolves]) – Species with large area requirements and potential migratory behavior; large enough to be a motorist safety concern; traffic-related mortality may cause substantial impacts to local populations; susceptible to habitat fragmentation by roads.
- High mobility medium-sized mammals (Lynx, Coyote, Fox) – Species that range widely; fragmentation effects of roads may impact local populations.
- Low mobility medium-sized mammals (Raccoon, Skunk, Hare, Groundhog) – species with smaller area requirements; common road-related mortality; relatively abundant populations.
- Semi-arboreal mammals (Marten, Red Squirrel, Flying Squirrel) – Species that are dependent on forested habitats for movement and meeting life requisites; common road-related mortality.
- Semi-aquatic mammals (River Otter, Mink, Muskrat) – Species that are associated with riparian habitats for movement and life requisites; common road-related mortality.
- Small mammals (Ground Squirrels, Voles, Mice) – Species that are common road related mortality; relatively abundant populations.
- Amphibians (Frogs, Toads, Salamanders, Turtles) – Species with special habitat requirement; relatively abundant populations at the local scale; populations are highly susceptible to road mortality.
- Reptiles (Snakes, Lizards) – Species with special habitat requirement; road environment tends to attract individuals; relatively abundant populations.

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