

Wildlife Crossing Structures

Planning to avoid the need for wildlife crossing structures is the first step. But, in the right locations, wildlife crossing structures can effectively allow animals to move across roads.

BY MAKING IT POSSIBLE for animals to move across roads, wildlife-crossing structures help them maintain access to the different habitats they need and avoid wildlife-vehicle collisions. However, crossings can be expensive and only address some of the problems created by new roads. The first rule is to locate roads in the appropriate places. Wildlife crossing structures should not be used to justify inappropriately located new roads. But retrofitting existing roads, often with minor changes, presents a huge opportunity to reconnect and maintain habitats. Wildlife crossings are an emerging science and new information is rapidly becoming available. Some things to keep in mind are:

- ❑ Construction projects for wildlife are site specific, and their potential effectiveness needs to be assessed on a case-by-case basis, including up-front and long term maintenance costs.
- ❑ No one-size-fits-all solution exists for wildlife crossing structures; species prefer and adjust differently to various types of structures.
- ❑ Structures, such as fencing and culverts, need regular maintenance to be effective over time.
- ❑ Though some large wildlife crossing structures can be quite expensive, the most effective mitigation measure need not be the most expensive nor the most difficult to achieve.
- ❑ It's more economical to plan wildlife-friendly roadway expansion or major upgrade projects ahead of time than to retrofit an existing roadway.
- ❑ Ongoing resurfacing, bridge and culvert maintenance, and reconstruction often provide excellent cost-effective opportunities to mitigate for wildlife passage.

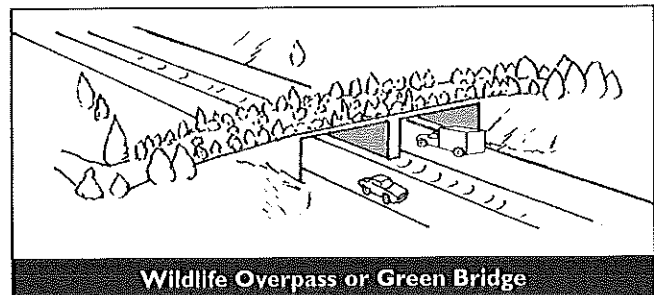
Crossing structures include directed fencing (barriers), signage, noise barriers, underpasses (small and large), and overpasses. The following illustrations from the United States Department of Agriculture Forest Service's Wildlife Crossings Toolkit show some of the common types and sizes of wildlife passage structures. For more information about wildlife crossing structures, visit www.wildlifecrossings.info.

FENCING

Fencing keeps animals—from deer and moose to frogs and turtles—off roadways while guiding them to designated crossing structures (see “Wildlife Underpasses”). Fencing, when combined with crossing structures such as overpasses or underpasses and escape ramps, is very effective in keeping

wildlife off roadways and providing habitat connections. For deer, fences are typically 7 to 10 feet high with fine mesh on the bottom 1 1/2 to 3 1/2 feet to prevent small animals from getting through. The fence may be buried 8-16 inches to prevent animals from digging under, or folded into an “L” shape that extends away from the base of the fence. Gaps or holes in the fence over 13 inches are enough for deer to get through.

Extensive fencing to keep deer and moose off controlled-access highways can be costly and must be used with escape ramps to allow animals to get out of the right-of-way areas alongside roads. Fencing does not work to keep large animals off urban or rural roads with numerous driveways.



WILDLIFE OVERPASSES

A wide range of animals, from insects to large mammals including deer, use wildlife overpasses, or “green bridges,” that range in width from 66 to 1,000 feet (most are 98-164 feet). They are designed to resemble natural habitat, with native vegetation and in some cases even small ponds. These are most successful when combined with fencing to keep animals off the road and landscaping around the entrance to provide cover for approaching wildlife. Cost for these structures may be well over \$1 million. Two wildlife overpasses are being used successfully over the Trans-Canada Highway in Banff National Park. Wildlife passageways and fencing have reduced wildlife and vehicle collisions by more than 80 percent. Moose, deer, bears, snowshoe hare, marten, and other wildlife use these overpasses. For more details go to the Trans-Canada Highway Twinning Banff National Park of Canada web site, www.pc.gc.ca/pn-np/ab/banff/docs/routes.

WILDLIFE UNDERPASSES

Many designs of small passages allow amphibians, reptiles, and small mammals to cross underneath roads. Dry tunnels two feet wide that are designed primarily for small and medium-size

mammals work well and are inexpensive. Culverts designed for amphibians range from 1 to 3 1/3 feet wide to up to 66 feet long. Concrete tunnels with earthen floors are most effective. Trenches, fencing, or curbs can direct animals to the underpass.

Waterway culverts with raised, dry ledges can help animals move along the waterway. These structures may be up to four feet wide and have ledges 1 1/2 feet wide. When replacing a culvert, use an arch shape or consider a span instead of a culvert to include some of the stream bank. Stream simulation is a new approach to culvert design to allow passage of fish and other aquatic animals and which can also be adapted to accommodate terrestrial wildlife. This method avoids constricting the stream channel and maintains the continuity of the stream bottom and hydrolic conditions by construction of a streambed within the culvert.

Large passages range from 6 1/2 to 16 feet wide for most large culverts to more than 330 feet for extended bridges or viaducts. Culvert passages may be made of metal or concrete, be bottomless (having a natural bottom) or continuous, and may be box, circular, arch, or elliptical in shape. Rocks, stumps, and plants may need to be added near the entrance to provide cover for animals moving through the underpass. Many species will use these large passages, including bear, bobcat, and moose. Deer tend to prefer passages that are at least 20 feet wide and 8 feet high with vegetation for cover nearby. The amount of light visible due to the width, height, and length of the tunnel (referred to as "openness ratio") determines whether animals are willing to use the underpass.

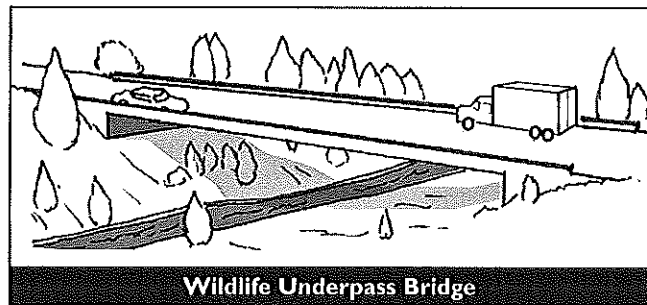
When wildlife crossing modifications are added to bridge construction projects over water, costs can be a small percentage of the overall project budget, starting from \$200,000. However, costs can range to over \$1 million for wildlife underpass bridges over land. The cost of strategically placed underpasses can be more than matched by the savings from reducing vehicle collisions and loss of human life.¹⁹

DRIVER WARNINGS

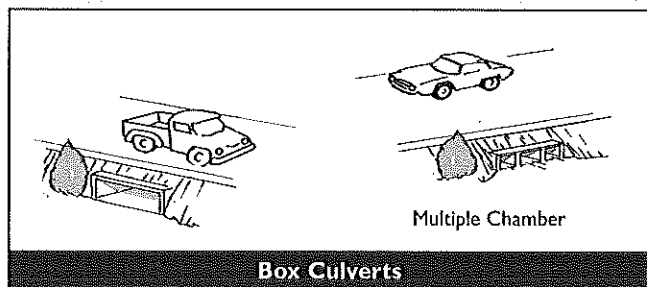
Traditional warning signs, like "Moose Crossing Next 3 Miles," have had limited success preventing collisions with deer and moose. This is unfortunate since slower speeds in areas with high rates of collisions would result in significantly fewer collisions.²⁰ However, dynamic message signs (electronic signs with changing messages) with wildlife advisory messages are showing promise in reducing motorist speed, particularly at night. Turtle crossing signs are being tested in areas around Maine's Mount Agamenticus with high concentrations of endangered Blanding's and threatened spotted turtles.

NOISE BARRIERS

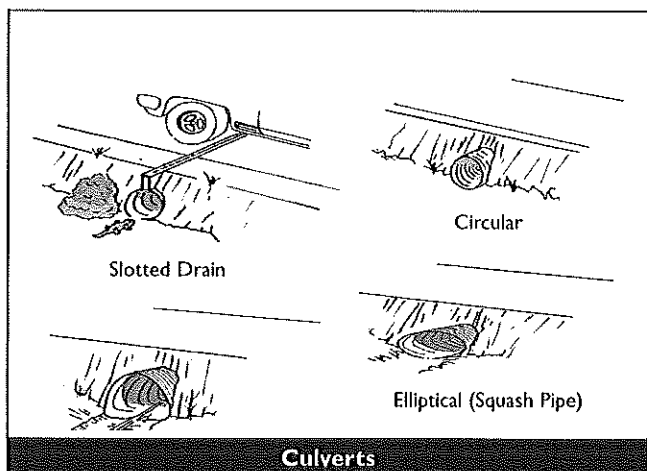
Vegetated earthen berms along roads bordering fields, wetlands, on overpasses, and above underpasses reduce highway noises disturbing to wildlife. They should be used



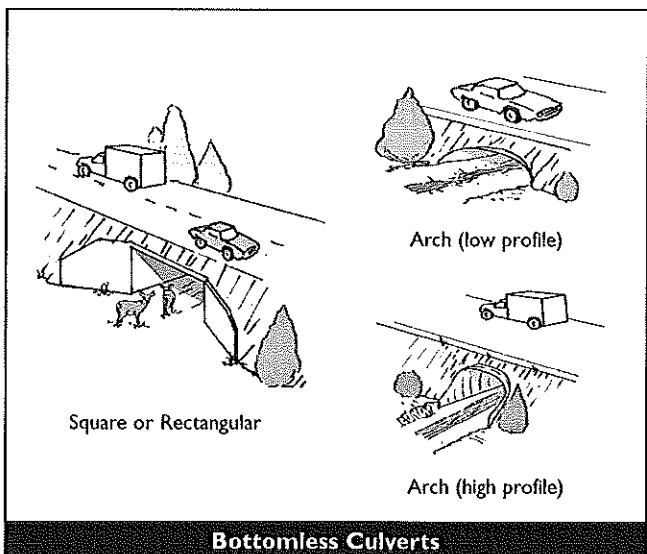
Wildlife Underpass Bridge



Box Culverts



Culverts



Bottomless Culverts

judiciously to make sure they do not cause or exacerbate habitat fragmentation. Trees are natural noise barriers and should be left where they occur next to roads.