While highways bring us closer together, speed our movements, and alter the economy profoundly, they seriously affect the natural environment. Animals, birds, insects die in great numbers, and vehicle killings are only one aspect of wildlife destruction. Car exhaust pollutants, such as lead and other gasoline additives, oil to reduce dust, and winter salting poison food supplies. Wide open spaces and traffic often inhibit the normal movements of shyer animals.

The harm our roads do to nature and wildlife

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A quick review of the history of ground transportation in Canada reveals three phases since colonization by European settlers. Initially, waterways were of cardinal importance because of the difficulties of overland routes. Construction and development of railways led to a gradual decline in the importance of water travel, and the advent of the automobile initiated the decline of rail traffic and an attendant improvement of the road system.

Roads are part of our way of life, something which we take entirely for granted, although the reliance is changing with escalating fuel prices and the growing realization that fuel supplies are limited and diminishing.

Roads and the vehicles which ply them have influenced our jargon and life styles: we speak of “taking to the road,” “one for the road,” and “road hogs;” we “keep on trucking” to various drive-in movies, restaurants, bookstores, cleaning establishments, churches, and so on, and root for the night in motels (a phenomenon intimately associated with travel by motor vehicle, as the word was coined to signify).

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Although some of the large highways have overpasses, such as this one near where the Highway 401 and Yonge Street intersect in Toronto, the majority of animals living either side of a freeway would be confined to their territory bounded by the road.
It is not yet fully known to what extent common herbicides affect the deer population. The male deer prefers new grasses and herbs, but will include such food in its diet all year round, thus being affected when browsing on verges that have been sprayed.

alter the composition of wildlife populations, especially by increasing the numbers of scavengers and predators. In East Africa many civet cats and mongooses hunt on the roads and have been found to suffer a high incidence of bone fractures, due to being hit by vehicles. In parts of Ontario, the increased number of ravens, crows and turkey vultures along roadways appears to be related to the number of carcasses near the roads.

Unfortunately, the environmental impact of roads goes beyond the car noise resulting from accidents. The construction of roads destroys and disrupts habitats, often leading to local extinction of "shy" animals. Badly drained roads lead to erosion and habitat degradation. Roads to remote areas give easy access to hunters and fishermen, leading to drastic reductions of wildlife and fish populations.

Additives to gasoline and pollutants such as herbicides, salt, and oil have important effects on roadside flora and fauna. Lead and other heavy metals from vehicle exhausts accumulate along highway routes and affect wildlife. In England, mice and voles trapped near roads had higher levels of lead in their tissues than those caught away from the roads. The actual amounts of lead varied with the species, probably reflecting food habits and behaviour patterns. Near Washington, D.C., increased amounts of lead, nitrates, and cadmium were found in earthworms living near heavily used roads.

Herbicides and soil sterilizers sprayed to curb vegetation beside the roads and around signposts have important effects. One commonly used herbicide (2, 4-D) makes some poisonous weeds more appetizing to livestock, causing more deaths. The same may be true for wild plant eaters such as deer and moose.

Salt put on roads in winter has caused severe damage to sugar maple and several species of conifers in southern Ontario; the salt concentrations in pine needles affected were up to 50 times higher than normal. Porcupines and other animals which are fond of salt are attracted to salted roads and suffer increased chances of accident.

Oil used to reduce dust on gravel roads can have a devastating effect on animals. In Saskatchewan 165 dead meadow voles were found along a one-mile stretch of road which had been oiled the previous evening. Apparently all of the voles entering a two-foot-wide oily strip along the road shoulders had died.

Roads present mixed blessings to plants and animals (and man). Verge is important habitats for many plants and animals; in Britain as many as 50 species of wild plants are found only on road shoulders. However, in California many imported plants have spread through disturbed roadside soils.

Small plants frequently attract white-tailed deer to road verges, where some are killed by cars, especially in darkness or poor light. Cotton rats have exploited the ready supplies of grass along road shoulders and expanded their ranges. However, removal of plants beside highways in the United States has caused reductions in several species of game birds, perhaps because of the removal of suitable cover or food. Embankments along four-lane highways in southern Ontario and Quebec support high populations of woodchucks despite traffic hazards and predators.

Amazingly, the construction of a 1.3-mile causeway with plant-covered verges between the mainland of Nova Scotia and Cape Breton Island appears to have had little effect on the distribution of mainland animals. Striped skunks, raccoons, porcupines, and woodchucks, which are all common on the mainland, remain absent from Cape Breton. Bobcats are commonly believed to be the only species to have crossed the causeway since its completion in 1955.

Highways not only affect food supply and habitats, but may attract animals for unexpected reasons. Some reptiles and eastern cottontail rabbits increase activity along roads in summer, apparently enjoying road surfaces which warm up and dry more rapidly than nearby dew-soaked vegetation. Roads and other countries roads may be used for travel by larger animals and by pests, geese and other poultry. In Algonquin Park wolves regularly travel roads in winter when off-road travel is more difficult. The rare Florida Key deer often come to road-sides to pick up tobacco from cigarette butts, and to browse on the vegetation. This liking for road-sides results in more deaths.

Some animal species are very reluctant to cross roads. In Scandinavia some highways seem to discourage the movements of wild reindeer, but do not seem to bother domesticated reindeer. In a study conducted in eastern Ontario and neighbouring Quebec, we found that road surface, noise, and traffic volume had little effect on road-crossing behaviour of some small forest mammals. However, increased road width had a highly significant inhibiting effect on the movements of squirrels, chipmunks, and deer mice. These animals regularly crossed two-lane highways with 120-160 ft. cover to cover, but would not venture on four-
lane highways with open spaces over 400 ft wide. The movements of small mammals such as meadow voles or some ground squirrels adapted to prairie or field conditions are not affected adversely by roads.

The fragmenting effects of roads upon animal or bird populations cannot be predicted. However, if these populations depend on a genetic completeness of continuity for survival and are fragmented or scattered by highways, their long-term survival may be threatened.

Research into wildlife management has expanded only recently beyond certain limited aspects of road development. Many studies are concerned primarily with improving habitats and reducing deaths among selected species of game. For example, the interactions of roads and deer have been examined in an effort to reduce highway deaths and to maintain high populations (so that the deer can be killed by hunters using firearms or bows and arrows rather than cars). Recommendations to achieve these results have included guidelines for placing of fences along verges, removal of browse from roadsides, construction of roads to bypass winter feeding areas, and providing alternate methods for deer to cross roads. In Colorado and Utah underpasses for deer have been built with some success in reducing highway deaths of deer.

Gradually the need for better management practices along roads, especially for verges, is being recognized. Verges should not be covered with grass for small shrubs might provide better cover and less expensive upkeep. Where verges are sodded, the grass should not be mowed, or if mowing is essential, it should be postponed until ground-nesting birds have left their nests. Either course would simultaneously reduce maintenance and road clearance, although it would probably cause more collisions between vehicles and wildlife. Similarly, to stop spraying with herbicides and soil sterilizers would result in better roadside habitat and a saving for taxpayers.

Raising the subject of roads in national or provincial parks at a social gathering is an effective way of changing the atmosphere. Many consider highways an inevitable part of modern living. Advocates of an expanded highway network in parks point to the need of a road system to develop tourism or to help control outbreaks of fire, and stress that more highways offer more vantage points to view scenery and wildlife. Roads through wildlife habitat help to compensate man for his poor senses of smell and hearing when searching for wildlife. Although people are more "at home" on the highways, animals are more easily and often fatally confused by the speed and bright lights of traffic. Although animal road deaths continue to grow, the opportunity for education of park visitors who may observe wildlife along roads may be a form of compensation in helping to preserve the natural environment.

The opponents of an expanded road system emphasize the disadvantages of roads, including the death of plants and animals due to highway construction, the alteration of wildlife habitats and populations, and restriction of movements of timid species. They maintain that the increase in highway victims and the easier accessibility to areas vulnerable to human overse is not worth the price. Considering that some parks, and areas within many parks, are set aside to preserve local flora and fauna, it seems shortsighted to build more roads in these parks for the sake of public education. Less potentially disruptive alternatives, such as canoe routes or hiking trails, might just as easily serve the same purpose.

The impact of roads on the natural environment is something that many, if not most, people will consider a necessary byproduct of "progress." Certainly in the 1960s, few would have given this a second thought. Perhaps in the 1970s it is time for us to review our position. There is little point in building new roads and in enlarging and embellishing many existing roads, if scarcity of gasoline may soon make the roads less accessible and useful.

Animals such as black bears, are best observed from the safety of a car. Most animals, being shy, are more likely to be found away from the highways in the quiet of a woodland glen or beside an unfrequented lake.

Roads and the uses made of them have important effects on natural environments. It is well past the time when road planners and builders and wildlife biologists, having considered these effects, revised their plans accordingly. We should remember that, when there are no more fossil fuels, our descendants (should there be any) will have to cope with the environmental havoc associated with our roads and wonder at the selfishness of our times.