The Roaded Landscape: Science and Solutions

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The problem of road effects on wildlife are global and can be mitigated in part with similar actions and research across the continents. This presentation highlights some of the solutions and trends occurring in the United States that help to provide connectivity for wildlife across roads. The effects of roads and traffic on wildlife include wildlife deaths due to collisions, population instability from loss of members to collisions, habitat fragmentation, animals' avoidance of roads, pollution from de-icing salts, sound pollution, and overall decreased natural area connectivity. All animals need to move across the landscape, and wide ranging carnivores such as the puma and wolf are especially prone to collisions with vehicles as they cross multiple roads in their daily activities, and especially during dispersal movements. The solutions to road effects on wildlife include actions that address wildlife needs, and motorists needs for safety. The 'hook' for the transportation agencies is to establish there is a problem with wildlife-vehicle collisions and how this is a safety concern. This relies on data collection on the number and severity of crashes with wild animals, mapping problem areas, and estimating the cost of these crashes to society. The solutions to these problems involve planning, avoiding wild areas for future transportation projects, creating wildlife mitigation such as wildlife crossing structures, researching the effectiveness of those structures, and adaptively managing the infrastructure to increase its effectiveness. Drawing from multiple mitigation efforts and studies, we learn that:

1. Openness of crossing structures, which is the height times the width divided by the length, is positively correlated with higher success rates of mule deer, elk, and other ungulates (prey species), and that in Utah, the length of a culvert is the most important dimension, the shorter the culvert, the higher success rate for mule deer;

2. The U.S. states with the most active programs of creating wildlife crossing structures have cooperative relationships and memoranda of understanding between the transportation and wildlife agency in collecting carcass data, planning, and paying for wildlife mitigation;

3. States such as Vermont build structures for smaller animals, such as salamanders to cross beneath roads;

4. A common trend in western U.S. states is to begin creating standardized prioritization processes within state transportation agencies so that there is a consistent, transparent process to prioritize wildlife-vehicle collision areas that are in need of mitigation, and that funds go to the most urgent areas;

5. The future trends in the U.S. include concern for migrating insects, such as the monarch butterfly, creating new options with new technologies such as electric pavement and in vehicle driver warning systems, retrofits of existing bridges and culverts, and a world wide sharing of guide lines for transportation ecology, facilitated by several international conferences including IENE, ICOET, CIBIV, and ANET.