THE EVOLUTION OF REPTILE MITIGATION MEASURES ON HIGHWAY 69

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ABSTRACT

MTO is actively expanding Highway 69 from a two-lane rural highway to a four-lane controlled access freeway. This is being completed through the eastern Georgian Bay area, some of the most pristine habitat for numerous species at risk reptiles. MTO obtained a permit under the Endangered Species Act for the project, prescribing extensive mitigation measures, including a requirement to prevent snakes and turtles from accessing the highway while still being able to access habitat on both sides.

To fulfill this condition, MTO is constructing one of the most permeable highways in Canada. At this stage, MTO has completed 13 passage systems (crossings underneath the highway) and is planning to construct another 80 passages, including approximately 140 kilometres of fencing to keep the animals off the roadway and funnel them towards the passages.

There have been many challenges over the years, both in design and implementation.

The challenges with these passage systems include:
- Materials (durability, mesh size, multiple species of snakes and turtles);
- Installation (bedrock and swamp);
- Design (where/how to end fencing, locating crossings, making culverts attractive to reptiles);
- Monitoring effectiveness, and
- Maintenance.

Keywords: Highway 69, species at risk, reptiles, fencing, mitigation

1. REPTILES AND ROADS

Reptiles are particularly prone to road mortality because: they are attracted to roads to bask and/or lay eggs; they readily attempt to cross roads; they are relatively small and not easily seen by drivers; and they move slowly, increasing the risk of being hit.

Species at risk reptiles are found on both sides of the existing Highway 69 corridor. The highway functions as a general barrier to the movement of these animals because few individuals of are likely to successfully cross the highway.

1.1 Reduce Reptile Road Kill

The first step in reducing the number of reptiles killed on the highway each year is to prevent them from accessing the road in the first place. Constructing a barrier that is effective and stopping snakes and turtles, that requires minimal maintenance, that is economically feasible, and that is not a road-side hazard has been a priority. The first generation of barrier consisted of a heavy-duty geotextile fabric that is attached to the ungulate fence (or highway fence) with a portion of the fabric buried. While the barrier system is effective, it requires frequent maintenance to remain functional. The second generation of fencing consists of a heavy steel quarter inch mesh installed with wooden posts and top rails. Again, the design is very effective, but the wooden rails were often stolen and required
frequent replacement. The current design consists of the same heavy steel mesh installed using steel posts and a steel pipe-style top rail.

Installation challenges have also led to various design and contract changes. The corridor consists largely of rock and swamp, both of which challenge the fence installation. Rock drills and concrete grout are used to install the posts, and granular backfill is brought in to bury the bottom of the mesh. In swamp areas, a granular bench is often constructed at the toe of slope to allow the fence to be installed in the dry.

1.2 Design Features to Attract Use

The second step in reducing road impacts on reptiles is to provide the connectivity to habitat on either side of the road and remove the barrier that has been in place for many decades. This is accomplished through the installation of large culverts. These culverts, in conjunction with the fencing that not only keeps them off the road but also funnels them to the culverts, are referred to as passage systems.

As the scientific community’s understanding of these protected reptiles broadens (Rouse, J.D., 2005; Eco-Kare International. 2016), the infrastructure required to protect them is also evolving to improve effectiveness. In order to increase light penetration, the culverts must be large enough (minimum 1.8 metre box), as short as possible (often requiring wing-walls), and open in the median. The goal is to ensure the openness ratio (length to height) is large enough to maintain light through the entire length of the culvert, and therefore provide enough heat to keep it hospitable for reptiles.

Reptiles also exhibit strong site fidelity and travel patterns year to year. Locating crossings in areas of higher travel will increase the likelihood of use. Ensuring that the approaches are graded properly (i.e. avoid perched culverts or steep rock fills) and include sufficient hiding features (woody debris, rocks, vegetation) to make the animals feel safe also increases the likelihood of use.

2. ONGOING CHALLENGES

The issue with fence ends continues to be a challenge. It is not possible to entirely fence the right-of-way and gaps in the barrier must be designed to minimize the animals’ access to the road. Escape structures have been included that allow animals trapped on the road side of the fence to return to the habitat side. Ongoing monitoring of the barriers constructed to date will continue to affect the future installations, as we see what is and is not effective.

Another challenging aspect to these mitigation measures is the long-term maintenance. While the frequency of inspection is a requirement that can be easily quantified in a contract, the amount of repairs and materials required is not. This becomes a challenge when trying to include the maintenance requirements in the Area Maintenance Contracts.

Despite the challenges and the unknowns, the data collected to date shows that the passage systems are successful. The 2015 monitoring program has successfully captured both snakes and turtles utilizing the crossings, and road surveys have indicated the fencing is successful at preventing road kills. MTO will continue to monitor the infrastructure that has been constructed to date and utilize an adaptive management approach to continue to improve the effectiveness of future installations.

REFERENCES
