MaineDOT Caribou Wildlife and Aquatic Habitat Crossing Project

Monitoring Research Prospectus

Background

Wildlife-Vehicle Collisions (WVCs) have the potential to negatively impact human safety and wildlife survival (Huijser et al. 2006, Sawyer et al. 2012). Based on conservative estimates from property damage, human injury and fatality, and lost hunting license revenues, the cost of a WVC is likely to be in the tens of thousands of dollars for large mammals. Therefore, particularly in areas where traveled roadways coincide with optimal habitat and higher wildlife population densities, it becomes critical to implement solutions that facilitate the safe crossing of wildlife (Center for Large Landscape Conservation 2022), especially for large-bodied species such as white-tailed deer (*Odocoileus virginianus*) and moose (*Alces alces*) which arguably cause the greatest risk to motorist safety.

Research on factors associated with the overall effectiveness of crossing structures for wildlife has produced variable results which may in part be explained by the difference in focal species and measured habitats in these studies (Clevenger and Waltho 2005). For large mammals, Gagnon et al. (2011) found that the overall structure and placement of wildlife underpasses was the most significant factor associated with wildlife use, whereas research in Banff National Park found that human influence and activity was more of a determining factor (Clevenger and Waltho 2003). For small-to-medium sized mammals, traffic volume as well as associated noise levels and road width was found to impact use of culverts for road crossings (Clevenger et al. 2001). Financial feasibility is an additional factor that must be considered when designing wildlife crossing structures. Construction of passageways large enough to accommodate large-bodied wildlife can be very costly (McCollister and van Manen 2010). However, wildlife crossing structures when placed in conjunction with exclusionary fencing have been found to be a cost-effective method for reducing vehicle collisions (Cramer and Hamlin 2017). McCollister and van Manen (2010) found that underpasses with fencing may have reduced vehicle collisions with white-tailed deer in their study area by as much as 58%, and Sawyer et al. (2012) documented an over 80% reduction in deer-vehicle collisions following the installation of an underpass with continuous fencing.

In the northeastern United States, there is limited data on the effectiveness of crossing structures at reducing WVCs and improving habitat connectivity for wildlife. In southern Vermont, Bellis (2008) found that use of crossing structures within their study area increased almost three-fold between the first and second years of study by large mammals, although numerous mid-sized mammals may have been avoiding the newly constructed structures. In New Hampshire, Barnum et al. (2007) found that the individualistic needs of a focal species must be considered alongside needs that may benefit multiple species when considering WVC mitigation options. These studies collectively illustrate the importance of understanding the focal species and pertinent habitat features of a site when planning for the construction of a wildlife crossing structure as well as subsequently assessing its efficacy. Within their 2022 Strategic Highway Safety Plan (Maine Department of Transportation (MaineDOT) 2022), the State of Maine has highlighted the need to address vehicle impacts with deer and moose as an area of focus. This identified need aligns well with the MaineDOT's proposed "Caribou Wildlife and Aquatic Habitat Crossing

Project". Comprehensive crash data available in the area illustrates a comparatively high rate of WVCs involving deer and moose as well as GPS-collared adult female deer being documented repeatedly crossing the roadway (A. DeMusz, Maine Department of Inland Fisheries and Wildlife, Personal Communication, July 17, 2023). If replaced, this new planned culvert will be sized to accommodate species as large as moose which should greatly mitigate these issues.

Objectives

1. Using motion-sensor triggered infrared game cameras, MaineDOT will document the seasonal and temporal frequency of use as well as the composition of wildlife using the Caribou crossing structure post-construction for a period of three years.
2. Following completion of the monitoring phase of the study, MaineDOT will statistically assess the importance of certain environmental variables that may predict use of the Caribou crossing structure by various wildlife species.

Approach

The approach of this study will be to empirically assess the overall wildlife use of a newly constructed crossing structure in Caribou, Maine. This would provide clarity for the MaineDOT and other transportation entities as to the effectiveness of this approach to mitigate for WVC's and increase habitat connectivity for numerous wildlife species. It will also provide a greater understanding of the application of this method within the unique northern New England landscapes.

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