

Impact of vehicular traffic on animal mortality in Horton Plains and Yala National Parks of Sri Lanka

D.M.S. Suranjan Karunaratna¹ and Sudheera M.W. Ranwala²

¹*Faculty of Graduate Studies, University of Colombo (E-mail: dmsameera@gmail.com)*

²*Department of Plant Sciences, University of Colombo, Colombo (E-mail: ranwala@pts.cmb.ac.lk)*

Background

The negative impacts of road network on biodiversity are of increasing international interest and concern (Spellerberg, 1998). Construction of road network cause habitat loss, habitat fragmentation and degradation and affect wildlife and its habitats direct and indirect manner. Much of the debate on the effects of roads on wildlife has also focused on the barrier effect of roads for movement of mammals and amphibians (Forman and Alexandra, 1998). Roads of all kinds have several broad ecological effects for plants and animals. These ecological effects include alteration of the physical and chemical environment and changes in animal behavior especially those inhabiting forested areas adjoining roads. Mortality of wild animals due to vehicular traffic on roads and highways is one of the direct impacts of anthropogenic activities with increased visitation (Chiarello, 1999).

Research problem

Road networks are often responsible for fragmentation of habitats and home range of animals which ultimately lead to reduction of the population size of animals due to various behavioural changes (Trombulak and Frissel, 2000). In Sri Lanka, the length of only the 'A' class and 'B' class roadways accounts for approximately 13,000 km. A similar length is expected to be covered by other minor roads scattered within the rural sector. Thus animals from the size of ant to elephant have met with road accidents, and these events have been paid less attention by the general public and relevant authorities due to poor awareness and negligence.

Objectives

This study aims at identifying the types of animal species that have been killed both in Horton Plains and Yala National parks, and attempts to reveal the reasons. We focus on establishing a relationship between road kills and the number of visitors and their vehicle speed limits. Finally we suggest the barriers and/ or alternatives that could minimize road killings of wild animal species.

Research methodology

Occurrences of road killings of animals were collected from 2009 to 2013 at both Yala (YNP) and roads leading to Horton Plains (HNP) National Parks in Sri Lanka. Nineteen random field sampling

trips on 27 visitation days) were used to collect data. This included 8 random field sampling trips at HNP on 12 days and 11 random field sampling trips on 15 days at YNP. The observations were recorded while walking and riding on a motor bike and confirmed by expert zoologists and field biologists. The numbers of vehicles visited to National parks were obtained by Department of Wild Life Conservation. All road killed specimens were examined and identified to species level without collecting specimens. However, they were removed from the road to avoid multiple counts of the same kill. Villagers, visitors and vehicle drivers were interviewed also using a questionnaire (e.g about over speeding). The conservation status of victims was recorded according to MOE-SL (2012).

Key findings

A total of 42 species (16 amphibians, 14 reptiles, 7 mammals and 5 birds) of vertebrate species were identified due to road killings in both national parks. Out them, 17 species (10 amphibians, 5 reptiles and 2 mammals) was endemic, while 19 species (8 amphibians, 6 reptiles, 3 mammals and 2 birds) was listed as threatened due to habitat loss in Sri Lanka (Table – 1). Among the vertebrate fauna killed due to road kills, amphibians were the most vulnerable group. During the period of study 112,883 vehicles had entered to HNP and 232,533 vehicles to YNP. The percentage of vehicles (HPN) had increased 11% from 2009 to 2010, 21% from 2010 to 2011, 22% from 2011 to 2012, 3% from 2012 to 2013; 72% from 2009 to 2013, exhibiting a sharp rise of visitation. Similarly the percentage of vehicles at YNP had increased 124% from 2009 to 2010, 21% from 2010 to 2011, 10% from 2011 to 2012, 2% from 2012 to 2013; 211% from 2009 to 2013. It was noted through interviews that over speeding are one major cause responsible for road kills.

Table – 1: Road killings were recorded from two national parks in 2009-2013 (bold = endemic species to Sri Lanka; IUCN status: LC = Least Concern; NT = Near Threatened; VU = Vulnerable; EN = Endangered; CR = Critically Endangered).

Yala national park			Horton plains national park		
Taxa	Species	Status	Taxa	Species	Status
Amphibians	<i>Duttaphrynus atukoralei</i>	NT	Amphibians	<i>Duttaphrynus melanostictus</i>	LC
	<i>Duttaphrynus melanostictus</i>	LC		<i>Microhyla zeylanica</i>	CR
	<i>Microhyla ornata</i>	LC		<i>Ramanella palmata</i>	CR
	<i>Uperodon systoma</i>	LC		<i>Fejervarya greenii</i>	EN
	<i>Hoplobatrachus crassus</i>	LC		<i>Hylarana temporalis</i>	NT
	<i>Hylarana gracilis</i>	LC		<i>Pseudophilautus alto</i>	EN
	<i>Polypedates maculatus</i>	LC		<i>Pseudophilautus femoralis</i>	CR
	<i>Melanochelys trijuga</i>	LC		<i>Pseudophilautus schmarda</i>	CR
Reptiles	<i>Geochelone elegans</i>	NT	<i>Pseudophilautus silus</i>	EN	
	<i>Calotes versicolor</i>	LC	<i>Taruga eques</i>	EN	
	<i>Hemidactylus leschenaultii</i>	LC	Reptiles	<i>Calotes nigrilabris</i>	EN
	<i>Eutropis carinata</i>	LC		<i>Ceratophora stoddartii</i>	EN
	<i>Varanus bengalensis</i>	LC		<i>Cophotis ceylanica</i>	EN
	<i>Gongylophis conica</i>	VU		<i>Lankascincus taprobanensis</i>	EN
	<i>Amphiesma stolatum</i>	LC		<i>Aspidura trachyprocta</i>	EN

	<i>Oligodon taeniolata</i>	LC	Birds	<i>Saxicola caprata</i>	EN
Birds	<i>Caprimulgus atripennis</i>	LC		<i>Turdus merula</i>	EN
	<i>Saxicoloides fulicatus</i>	LC	Mammals	<i>Srilankamys ohiensis</i>	EN
	<i>Pycnonotus cafer</i>	LC		<i>Suncus montanus</i>	EN
Mammals	<i>Felis chaus</i>	NT			
	<i>Panthera pardus</i>	EN			
	<i>Sus scrofa</i>	LC			
	<i>Funambulus palmarum</i>	LC			
	<i>Lepus nigricollis</i>	LC			

Conclusion

This study reveals that the impact of vehicular traffic on amphibians and reptiles is more severe. Data suggest that there could be a relationship between rainfall and road-killed amphibians which could be proven later. Under the Fauna and Flora Protection Ordinance, the DWLC should monitor the speed limit on these public roads leading to HNP and within the YNP. Creating speed bumps or even prohibiting the use of the road at night could be a more practical way to minimize the disastrous impact on animal life. Also, it can be minimized through public awareness, and notices can be posted on road sides.

References

- Chiarello, A.G. (1999). Effects of fragmentation of the Atlantic forest on mammal communities in south-eastern Brazil. *Biological Conservation*, 89: 71-82.
- Forman, T.T.R. & Alexander, L.E. (1998). Roads and their major ecological effects. *Annual Review of Ecological System*, 29(2): 207-231.
- MOE-SL (2012). *The National Red List 2012 of Sri Lanka: Conservation status of the Fauna and Flora*. Ministry of Environment, Colombo, Sri Lanka.
- Spellerberg, I.F. (1998). Ecological effects of roads and traffic, a literature review. *Global Ecological and Biogeography Letter*, 7(2): 317-333.
- Trombulak, S.C. & Frissell, C.A. (2000). Review of ecological effects of roads on terrestrial and aquatic communities. *Conservation Biology*, 14(1): 19-29.