MARI

A Study on the Significant of Wildlife Crossing Build in Malaysia

Amir Akmal Jasme[1], Syamsul Qamar Abu Bakar [1], Muhammad Shamer Aiman Samsudin[1], Ahmad Hakimi Mat Noor[1],*

[1]Centre for Diploma Studies, Faculty of Civil Engineering,
Universiti Tun Hussein Onn Malaysia, 84600 Muar, Johor, MALAYSIA

*Corresponding Author Designation

Abstract : Roadkill has become one of the most common sources of wildlife mortality and one of the most serious threats to wildlife. From 2015 to 2019, the Department of Wildlife and National Parks (PERHILITAN) in Peninsular Malaysia reported a total of 2,055 wildlife deaths due to roadkill. According to the data, the number of wild animals killed in road accidents is higher than the number of wild animals killed by illegal hunters. This, however, concern many parties if the situation persists. Researchers believe that one of the most ideal techniques to reducing such incidents is to use Wildlife Crossing. The purpose of this research is to learn more about the background and advantages of building Wildlife Crossings by polling the Malaysian public and research. Animals in the matutinal area are most active in the morning, while those in the vespertine area are most active at nightfall. The study's main goal was to identify peak times and types of animals crossing the road based on the observations of the respondent and to conduct a study on the benefits of wildlife bridges on Malaysian roadways as well. In exchange, survey data on the necessity and need for wildlife crossing construction in Malaysia can be produced at the conclusion of this study. The questionnaire was used to find out when and how often animals cross the road. This is critical in assisting the researcher in better understanding the study and achieving the goals.

Keywords: Wildlife Crossing, Roadkill, Wildlife, Eco Bridge

1. Introduction

Malaysia is a develop country because of its rapid economic and social growth planned. Rapid development, on the other hand, does not guarantee favorable outcomes for animals and plants [1]. To fulfill human daily requirements, humans have pushed the demand for sleeping facilities to rise. Roads, for example, have split up natural areas, forcing animals to cross the road in order to survive [2]. The quality of ecology and ecosystem services has been severely harmed as a result of this scenario.

Corresponding author: ahakimi@uthm.edu.my
2022 UTHM Publisher. All right reserved.
penerbit.uthm.edu.my/periodicals/index.php/mari

Inventory statistics from 2018, the Peninsula Malaysia has only 250-340 leopards, 700-800 tapirs, 300-500 bears, 150-200 wildebeests, 2000-2500 deer, 700-1000 deer, and 1220-1680 elephants [3]. Roadkill is one of the most common causes of wildlife mortality, and it has become one of the major threats to wildlife. According to the data, the number of wild animals killed in road accidents is higher than the number of wild animals killed by illegal hunters. This, however, concern many parties if the situation persists. There are methods that may be utilized to reduce the number of such instances, such as wildlife crossing, which researchers believe is one of the finest initiatives to take. Wildlife crossings are facilities that allow animals to securely traverse barriers created by humans. Underpass tunnels or wildlife tunnels [4], viaducts, overpasses, or green bridges[5]; amphibian tunnels; fish ladders; canopy bridges, tunnels , and culverts; and green roofs [6] are examples of wildlife crossings. The purpose of this research is to learn more about the background and advantages of building it by polling the Malaysian public and research.

Animals on the others hand have many various species that are active at different times of the day and night. Crepuscular activity is a prominent category of animal activity. Crepuscular animals are those that are active mostly during the twilight period. This differs from diurnal and nocturnal activity, which occurs when an animal is active during daylight and night, respectively [7]. Diurnalty is a type of animal behavior in which the animal is active during the day and sleeps or does something else at night. "Diurnal" is a frequent term denoting daylight activities. For example, dogs, elephants, mallard ducks, and deer [8]. Nocturnality refers to an animal's habit of being active at night and sleeping during the day. "Nocturnal" is a frequent term for daylight activities. For example raccoon, leopard, cat, lion, wolf, and fox [9]. The study's main goal was to identify peak times for both and types of animals crossing the road based on the observations of the respondent and to conduct a study on the relevance of wildlife bridges on Malaysian roadways as well. By doing so, it assisting the researcher in better understanding the study and achieving the goals.

2. Methodology

This study begins with a problem statement and then progresses to a literature review. The literature review assists researchers in obtaining basic information about the wildlife crossing and in gaining an understanding of the structure. Reference information is based on internet searches based on genuine and valid journals and theses. The method is to construct a questionnaire, distribute issues regarding wildlife crossing, and then gather data from the questionnaire. This raises the question of whether the community is concerned about wildlife and has an understanding of Malaysian wildlife crossing. Society also plays a role in creating a safe environment for both animals and humans. Respondents were asked a survey question to assist in the achievement of these objectives. Based on the views of respondents, the survey looked at the frequency of wild animals spotted roaming the streets as well as the benefits of building in Malaysia.

2.1 Questionnaire Survey

A questionnaire is a series of written questions or items. The questionnaire seeks to obtain the general knowledge of the crossing of animals and the benefits of their construction in Malaysia from respondents. Road users were chosen as the target group of respondents in this case. This is because road users are the primary road users, which is a close context to road accidents involving wild animals. In this context, emphasizing the scope of the target to road users through survey questions is very appropriate.

The platform to distribute the questionnaire is the Google Form. Questionnaire instruments are excellent for data gathering in the field of education [10]. Respondents were given a questionnaire with 17 questions including eligibility requirements to complete. Items used in the questionnaire are divided into four parts introduction, thoughts, observations, and opinions of respondents. Questions in the questionnaire consist of multiple-choice items. Before the questions were sent out, 110 participants had to sign up to take part in the poll by completing an agreement form. Following that, questions are

delivered via links and participants have 24 hours to complete them. All of the respondents were chosen based on their previous experience of using the vehicle.

3. Results and Discussion

The findings were discussed in light of the research questions. Accordingly, the findings of this study will answer the question of how far the public's concern for wildlife and understanding of wildlife crossings and advantages are related. The frequency of animals passing through observation respondents may also be shown.

3.1 Species of animal that frequently crosses the road

The species of animal that frequently crosses the road were investigated to determine how many animal species in traffic accidents are involved. The species of animal as determined from the survey are monitor lizard (36%), macaque (22%), boar (17%), fox (7%), tapir (6%), wild cat (5%), elephant (4%) and dog (3%), as shown in Figure 1. Monitor lizard had the majority of data percentages. These species CITES (the convention on international trade in endangered species of wild fauna and flora) trading is currently primarily confined to Indonesia and Malaysia [11].
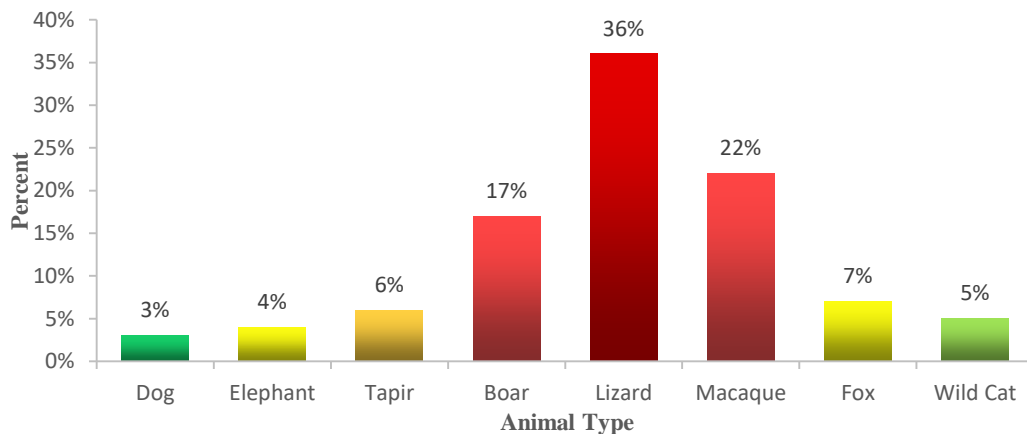

Figure 1: Data species of animal crosse the road in Malaysia

In Malaysian sites, monitor lizard occupancy was higher in regions of heavy land-use of oil palm plantings, and lizards preferred the planting of oil palm rather than the forest [12]. Increased food resources, more occupancy, and fewer homes are linked to petroleum palms in both studies. The increase in freshwater resources management and control related to land reclamation, land development, road building [13]. Water mitigation in Malaysia may have affected the monitoring of lizard ecology in disturbed habitats and have conferred substantial advantages for people in those areas. Roads divide habitats and drive animals to cross them in search of food or a partner, and road mortality is a major cause of loss for certain reptile species, especially those that dwell near human settlements [14].

Table 1: PERHILITAN data 2012-2017

No	NDX	English Name	Scientific Name	Quantity
1	Mammals	Wild Boar	Sus Scrofa	265
2	Mammals	Leopard Cat	Prionailurus bengalensis	88
3	Mammals	Malayan Tapir	Tapirus indicus	68
4	Mammals	Long-Tailed Macaque	Macaca fascicularis	439
5	Mammals	Common Palm Civet	Paradoxurus hermaphroditus	418
6	Reptile	Water Monitor Lizard	Varanus salvator	742

Mammal species are the most common species in total engaged in these incidents, according to PERHILITAN statistics on the rate of wildlife accidents from 2012 to 2017, including 2444 wild animals. Water lizards of the reptile type had the largest number of deaths on the road, with 742 based on **Table 1**.

3.2 Identify peak times for wild animals crossing the road

The identify peak times for wild animals crossing the road were scrutinized to learned what time that animal regularly carrefour traffic. There are two times to aspect, during an equinox that refers to twenty-four hour period with an even day and night. The peak time for an animal cross on daylight hours was 10.00 am-12.00 pm. The number of respondents as much as 49.3%. The second time was 6.00 am-9.00 am as much as 21.7%. That because many animals active in the morning for food search, match, and migration [15]. At midday, it shows that the time is a break for employees and a maximum period for traffic. Those interviewed often observed wild creatures during that period shown Figure 2.
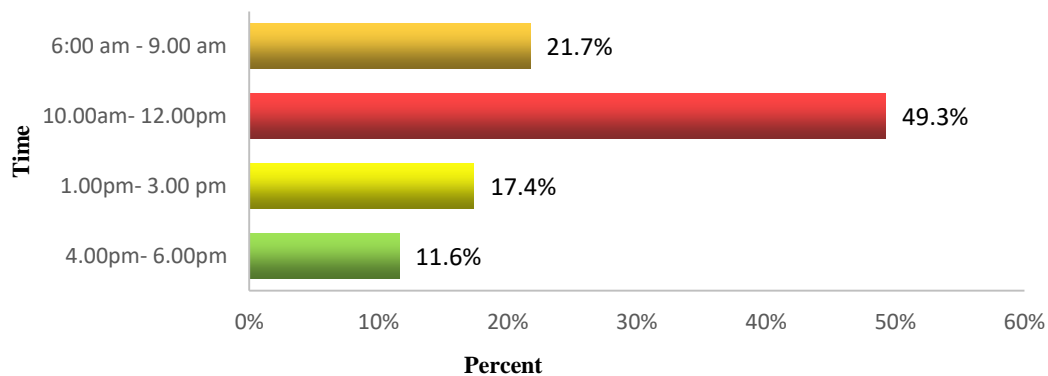

Figure 2: Animal data that often cross daylight hour

The peak hour at night was 10.00 pm-12.00 am. There were as many as 39.0% of respondents. Human activities, according to studies, cause animals to become more active at night in every part of the world. Many animals are moving into the night to avoid becoming entangled in humans, which is causing them to worry. It was much easier for them to cross the roads around midnight when the traffic was substantially lighter [16] shown at Figure 3.
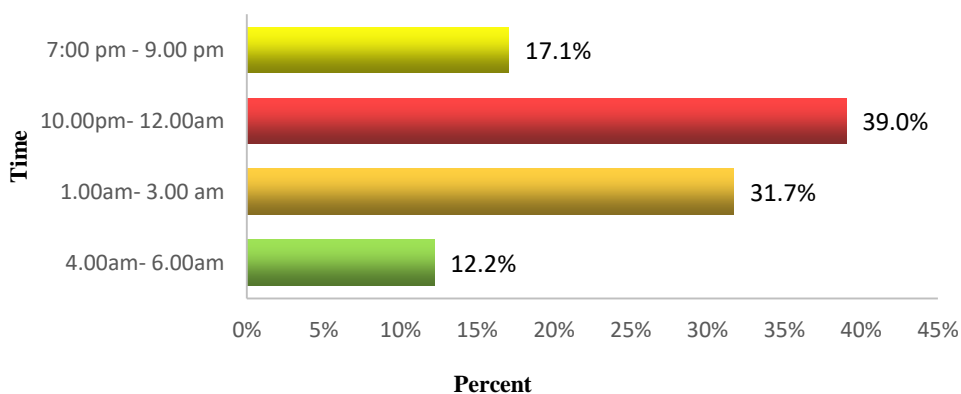

Figure 3: Animal data often cross at night

3.3 The important build wildlife crossing

The majority of respondents, based on their scale, agree that the Wildlife Cross, with 81.2% of votes, is extremely useful to overcome the problem of road animal accidents. Researchers and participants agree on the different benefits of wildlife crossing. Increased safety for motorists is among the advantages of creating a wildlife crossing bridge. Contrary to many of society's biggest issues today, solutions to Wildlife-Vehicle Collision (WVC) reduction and the weaving of our native environments[4] as shown in Figure 4.
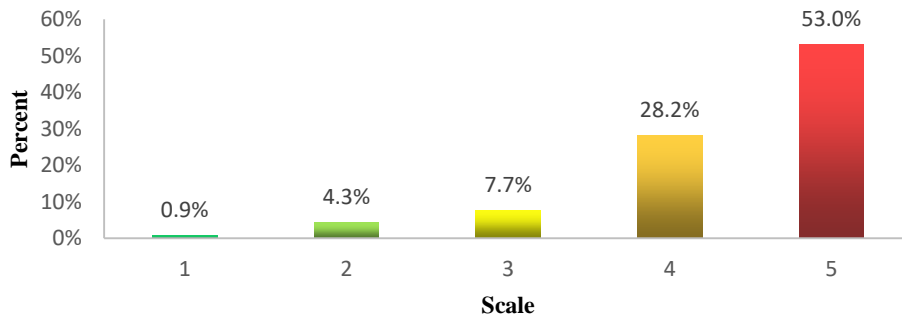

Figure 4: Scale respondents agree on the Benefits of Animal Crossing

Next is the protection for wildlife can have a substantial effect on the numbers and risk the persistence of the long-term population [17], particularly for the endangered and endangered species, with one-two million big wild animals killed by cars annually. Crossing structures safeguard individual species from death or harm by physically separating wildlife from vehicles. The amount of agreement between the respondent on the adequacy of the Wildlife Crossing construction to address the problem. Based on the scale, with a total number of votes of 86.3%, the highly agreed level received the most votes. The majority of those interviewed agree firmly that the Wildlife Crossing is extremely well though solve the accident problem and prevent bad impacts on animals and people. The high level of the agreement also demonstrates that Malaysians care for the wild.
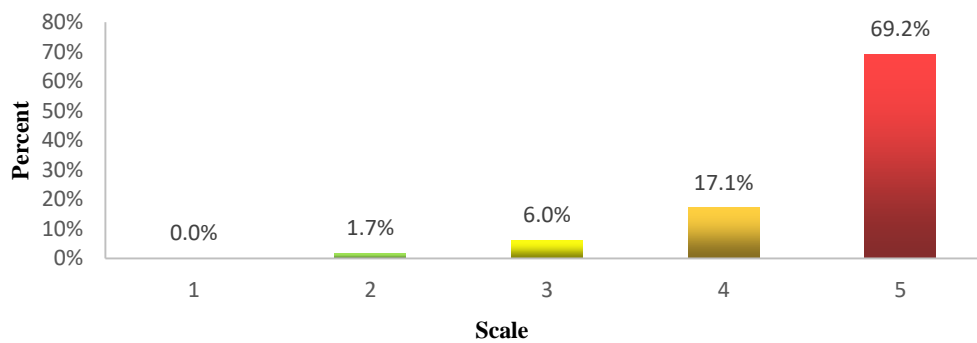

Figure 5: The agreed scale Wildlife Crossing should be constructed.

All the crossing structures were highly efficient in minimizing accidents between ungulates and cars, conserving migratory corridors, improving connection among populations, reducing habitat fragmentation inhumanly modified landscapes, and improving road safety both for wildlife and motorists [14] shown in Figure 5.

4. Conclusion

In the conclusion, the majority of respondents believed that the Wildlife Crossing is extremely helpful in preventing wildlife roadkill incidents. The aim is not just wildlife crossings built for the safety of wildlife, but also the safety of road users. Any effort to limit the number of such accidents, including the building of these wildlife crossings, should not be taken lightly. Next, the researchers discovered that the peak time for animals crossing the road during the day is between 10 a.m. to 12 p.m. This

indicates that workers will be out for lunch at that hour, and the wildlife is active at this time. At night, the majority of respondents spotted wild animals between 10 p.m. and 12 a.m. This is because wild animals are more active at night to hunt for food and mates. Wild creatures, such as reptiles, are examples of species that are only active at night. As a result, the goal of conducting surveys to identify peak time and research on the value of constructing wildlife bridges on Malaysian highways was met.

Acknowledgement

References

[1] M. J. Jamilul, and Anbia Md Denin, " Korban Jalan Raya," Harian Metro, January 12, 2019. [Online]. Available: Harian Metro https://www.hmetro.com.my/utama/2019/01/411153/ korban-jalan-raya. [Accessed July 7, 2021].

[2] B. Iuell et al., "A European Handbook for Identifying Conflicts and Designing Solutions," Wildlife and Traffic, Durban , 2003.

[3] H. Yusop," Standard Asset Value of Life by PERHILITAN," pp. 90-158, 2018.

[4] V. D. Ree et al., "Wildlife Tunnel Enhances Population Viability," Ecology and Society, vol. 14, iss. 2, art. 7 ,December 2009. [Online] Available: http://www.ecologyandsociety.org/ vol14/iss2/art7/. [Accessed July 8, 2021].

[5] N. England "Green bridges: Safer travel for wildlife". Biodiversity and ecosystems, July 31, 2015, Available: https://www.gov.uk/government/news/green-bridges-safer-travel-for-wildlife. [Accessed July 8 ,2021].

[6] M. A. G. Roofs, "Competence center for blue-green solutions, Scandinavian Green Roof Association." December 2020, Available: https://greenroof.se/?pid=28&sub=19. [Accessed July 10, 2021].

[7] N. A. Mammals, "Glossary". Museum, Education, and Research. National Museum of Natural History. Smithsonian. Available: https://web.archive.org/web/20170525112844/ https://naturalhistory.si.edu/mna/glossary.cfm

[8] V. Vinne et al., "Diurnality as an energy-saving strategy: Energetic consequences of temporal niche switching in small mammals." J Exp Biol. 218, pt. 16, pp. 2585-2593, 2015, doi: 10.1242/jeb.119354.

[9] H. R. Agee and E.Orona. "Studies of the Neural Basis of Evasive Flight Behavior in Response to Acoustic Stimulation in Heliothis zea (Lepidoptera: Noctuidae)". Organization of the Tympanic Nerves. *Annals of the Entomological Society of America*, Volume 81,   Issue 6, 1 November 1988. Available: https://academic.oup.com/aesa/article-abstract/81/6/977/ 9564.

[10] B. Gillham, "Case Study Research Methods." London: Continuum, 2000.

[11] S. Khadiejah et al., "Management and Trade in Asian Water Monitors (Varnanus salvator) in Peninsular Malaysia", 2020. Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN).

[12] J. R. Steven, Allain and J. G. Mark, "An Incidence of Road Mortality in the Asian Water Monitor (Varanus salvator) in Kota Kinabalu, Sabah, Malaysia", 2020. Available: https://ircf.org/ .

[13] United Nations Development Programme, "Improving Connectivity in the Central Forest Spine (CFS) Landscape - IC-CFS Project Document." 2021. United Nations Development Program (UNDP), Malaysia, Global Environment Facility (GEF).

[14]   A. R. C. Solutions. "Highway crossing structures for wildlife: Benefits of a national commitment to increase driver and animal safety. ARC Special Publication No. 1(1), pp. 20.[2017] Available: https://arc-solutions.org/arc-special-publications/ .

[15]   M. B. Usher, "Wildlife conservation evaluation: attributes, criteria, and values". London, New York: Chapman and Hall. (1986).

[16]   C. Mata, et al., "Effectiveness of wildlife crossing structures and adapted culverts in a highway in Northwest Spain. UC Davis: Road Ecology Center". Universidad Autónoma de Madrid, Madrid, Spain. (2003). Available: https://escholarship.org/uc/item/3t24s427 .

[17]   T. V.Rytwinski, "Experimental study designs to improve the evaluation of road mitigation measures for wildlife. Journal of Environmental Management". Volume 154, pp 48- 64, 2015.