CASE STUDY ON HUMAN-ELEPHANT INTERACTION ON THE B-35 ROAD IN SOUTHERN SRI LANKA

Report Prepared and Submitted to Serendipity Wildlife foundation by:

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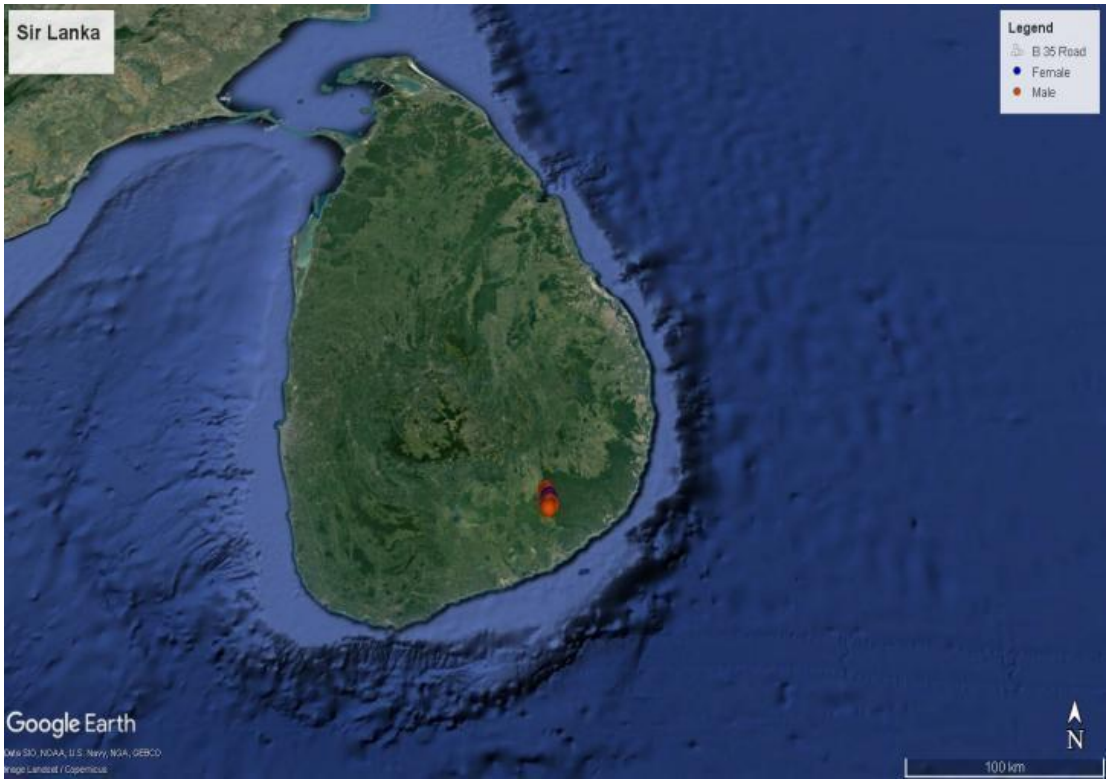
Introduction

Sri Lanka is home to 10% of the total Asian elephant population worldwide. While India and Thailand have estimated elephant densities of 0.0008 and 0.006 respectively, Sri Lanka boasts a remarkable density of 0.088. Despite these impressive statistics, the elephant population is under threat with approximately 460 elephant deaths recorded in 2016-2017 (Köpke, Sören, et al 2021). These high elephant deaths are primarily attributed to anthropogenic impacts accounting for 57% of the decrease, natural deaths contributing to 15%, and unspecified reasons making up 28% (Köpke, Sören, et al 2021). Factors such as habitat reduction, degradation of forage resources, fragmented forest corridors, and a significant reduction in elephant numbers compared to historical levels can be traced back to the rapid expansion of human settlements and agricultural lands.

The issue of human-elephant conflict presents a formidable challenge in Asia, where rapid economic expansion exerts immense pressure on natural resources and territories, intensifying the clash between humans and elephants. Deforestation plays a pivotal role in driving elephants towards agricultural lands, resulting in instances of crop raiding. This also increases human-elephant interface, often resulting in negative interactions between the two. In Sri Lanka, the human-elephant conflict is exacerbated by the encroachment of human activities into elephant habitats, restricting the animals' access to vital resources and heightening their struggles. Unlike other nations, the human-elephant conflict in Sri Lanka persists throughout the year due to the limited availability of space for both the human populace and wildlife. The incursion of elephants into human settlements poses significant risks to both parties, with elephants causing damage to property, consuming crops thereby endangering livelihoods, and posing threats to human lives. Elephants venturing beyond protected areas are particularly susceptible to adverse human interventions, such as retaliatory killings or accidental fatalities from road collisions. Addressing this complex issue necessitates the implementation of a diverse array of strategies to alleviate conflicts and cultivate harmonious coexistence between humans and elephants.



Map1: Location of B35 Road Sri Lanka

Problems surrounding the B35 road

While conflict is widespread throughout Sri Lanka, there seems to be a distinct type of conflict in the southern region. Yala National Park, situated in Sri Lanka, entices visitors from across the globe. In Yala, wild elephants, both male and female, have been known to halt traffic on public roads in an effort to solicit or beg for food from humans. This behavior is particularly noticeable on road B35, a route that runs west of Yala National Park and East Of Lunugamwehera National Park . Forming part of the highway Buttala-Kataragama Road linking Buttala town to Kataragama town, this arterial road experiences moderate traffic, especially for transporting goods from north to south. Despite the road's total length of 45 kilometres, the conflict zone spans 18 kilometres from GPS LOCATION GPS N 6.450962°, E 81.310466° to N 6.597937°, E 81.269447°.

Within this 18-kilometer stretch, elephants have been observed initiating contact with humans in search of food. These elephants either directly impede vehicles using their trunk, tusks, or body weight, or indirectly seek food by standing at the roadside,

prompting human interaction. Tourists, pilgrims visiting the local temple, and locals have been seen feeding these animals from their vehicles. People are often seen feeding elephants with jackfruit and bananas and sometimes this feeding activity is promoted by the local businesses as a “wildlife experience”. As a result of this active feeding behavior, elephants are often found lingering on the road for extended periods, awaiting food from humans. This interaction between humans and elephants poses a dilemma not only for the elephants themselves but also for the individuals who utilize the road for various purposes directly or indirectly.

Interestingly, there has been a noticeable shift in the behavior of elephants in response to feeding interactions. Even the female individuals, who would typically avoid human contact for the safety of the young calves, are now venturing onto the roads in hopes of receiving treats. Initially cautious, these elephants gradually overcome their trepidation and return for more sustenance once they realize that humans pose no imminent danger. This alteration in behavior underscores the impact of human interaction on wildlife and prompts contemplation on the enduring repercussions of such practices. Moreover, elephant conduct could also influence humans. Despite the elephants' non-aggressive demeanor, there are inherent risks associated with close encounters, particularly when humans approach them to take photographs.

Methodology

In partnership with Serendipity Wildlife Foundation, A Rocha India carried out a comprehensive vehicular survey along the specified road over a span of three days, specifically from June 27 to June 29, 2024. This survey was conducted to observe individual elephants and elephant behaviour opportunistically along the B35 road. Surveys were conducted to determine the traffic intensity of the B35 road, which is classified as a highway that cuts through national park territory known for frequent elephant movements. The surveys involved stationed observers positioned at different points along the B35 road during specific time frames. For instance, in the morning

hours from 8 to 9 AM and in the evening from 3 to 4 PM, these observers diligently recorded the flow of vehicles over a span of 3 consecutive days.
During the survey period, vehicles were meticulously classified into distinct categories based on the number of wheels they possessed. These categories included 2-wheelers, such as motorcycles and bicycles, 3-wheelers like auto-rickshaws, and 4wheelers encompassing cars, trucks, and buses. By categorizing the vehicles in this manner, the surveyors were able to obtain a comprehensive understanding of the types of vehicles plying the B35 road and potentially the profile of the commuters using this road.

The data collected from these surveys not only shed light on the traffic intensity of the highway but also provided valuable insights into the types of vehicles that predominantly traverse this route. Such information is crucial for transportation planning and management, as it aids in identifying potential areas for improvement and optimization to ensure the smooth flow of traffic while considering the unique ecosystem of the national park.

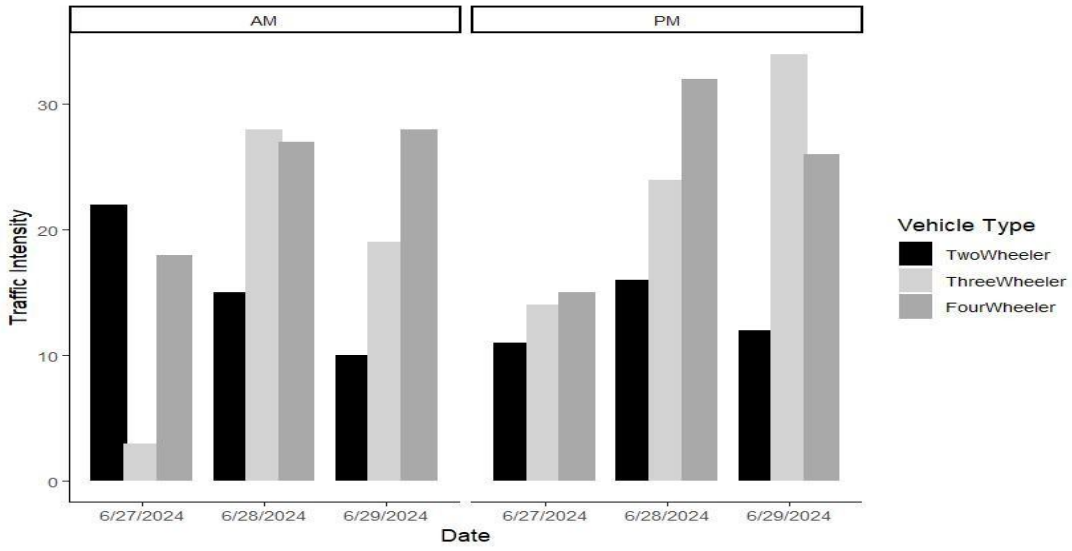
In addition to traffic intensity surveys, we also conducted an opportunistic survey to understand the demographics and profiles of the elephants engaging in interactions with humans. During the traffic intensity surveys we observed the elephants and noted aspects such as age class and sex of the animals. We also recorded aspects such as behaviour of the animal in terms of engaging in begging or aggressive behaviour towards humans. We conducted focal sampling on one elephant named “Raja”. Focal sampling involved observing this particular individual for one hour each in the morning and evening, over the course of 3 days. During these observations, we recorded the frequency of instances where people threw food to the animal, as well as the number of attempts made by the elephant to obtain the food. This was done through various behavior such as trunk waving, vocalising, body movements, and approaching the vehicles.

Results

Traffic intensity surveys

The traffic intensity surveys revealed that on an average 90 vehicles were found to use the road in an hour. We found during the three-day survey period four-wheels were seen

more frequently, followed by three-wheels and then two-wheels. Traffic on the road was more or less spread equally during the hours of the morning and evening.

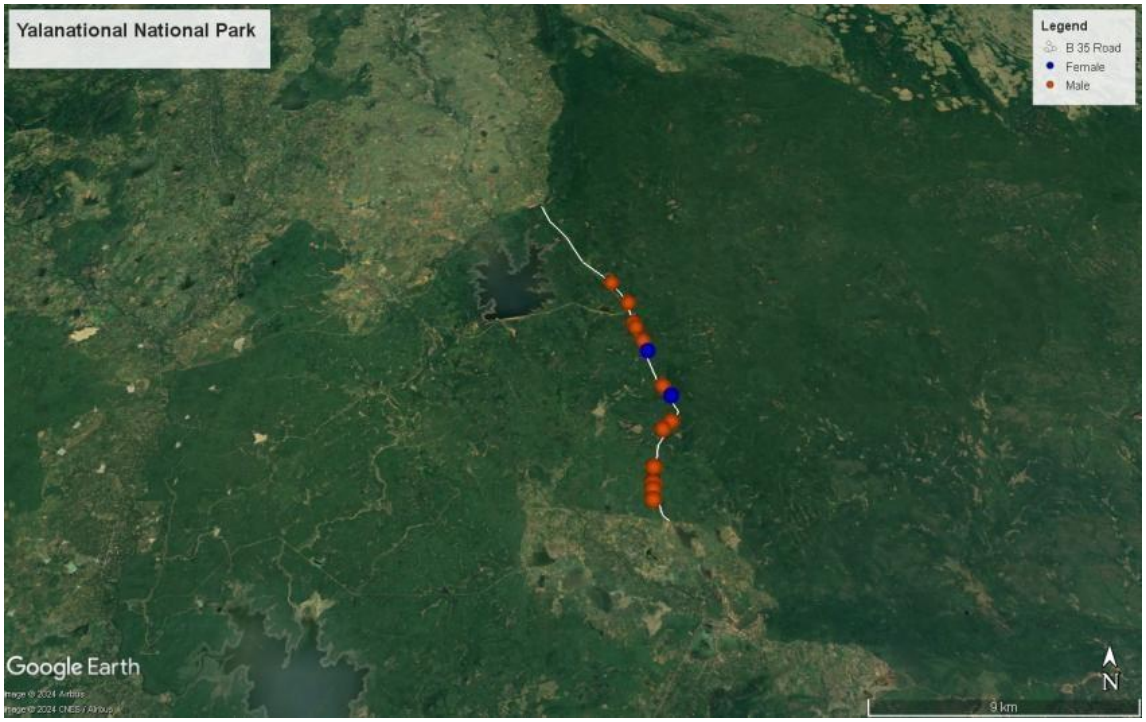


Graph 2 : Traffic intensity vs time

Since this was only a three-day study we do need to understand traffic intensity over a long-term period. To explore any trends, researchers could study the influence of different seasons and weather conditions on traffic intensity. Analyzing traffic volume fluctuations during peak summer or winter holidays could provide insights in how this could potentially influence conflict and elephant behaviour. In addition to traffic surveys, interviews with commuters and residents could offer qualitative data to complement quantitative traffic intensity findings. Understanding their perspectives may reveal travel habits, timings, and reasons for consistent traffic volume.

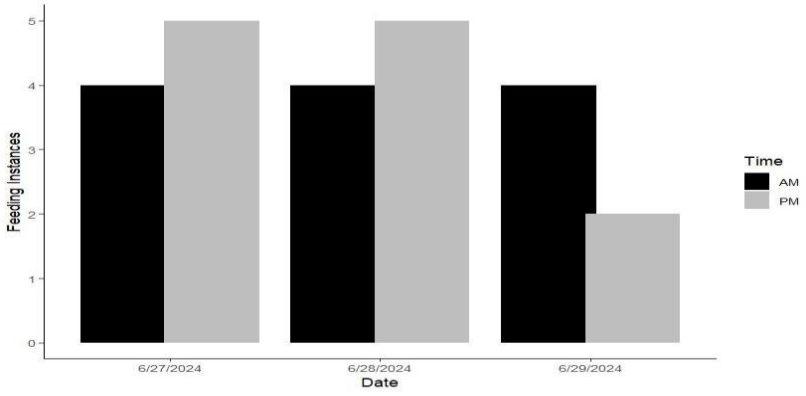
Demographic information of elephants

We observed a total of six individual male elephants and two groups of females consisting of three individuals. The female groups were spotted twice during the study period, while three out of the six males were seen twice. Two of the males were spotted in pairs of two or three, whereas only one elephant was seen to be all time of survey .



Map 2: Elephant sightings along the B35 road. Red dots indicate male elephants, and blue dots indicate sightings of female elephants B35

On average, elephant Raja attempted to obtain food 16 times and was successful (managed to get food) four times. People gave Raja food such as bananas, jackfruit, and watermelon. However, the quantity that the animal was fed was negligible, only a couple of fruits. Given that elephants spend approximately 18 hours a day feeding and consume over 150 kgs of food, this human provisioned amount that they are receiving isn't in proportion to what they should ideally eat. Such dietary inadequacies can significantly impact the physical and mental health of the elephant.



Graph 1: Feeding Instances versus time.

POTENTIAL IMPACTS ON HUMANS AND ELEPHANTS

IMPACT ON ELEPHANTS

1. **Compromised Diet:** Elephants' innate foraging behavior extends up to 18 hours daily, yet as a consequence of prolonged solicitation on the thoroughfare, they are disregarding their natural sustenance. Humans also discard edibles together with plastic bags, which affect the well-being of the elephants and also poses a threat to the environment. Plastic and agricultural waste litter the road, acting as a magnet for the elephants (fig:4)

2. **Sun Exposure:** During the wait for sustenance, elephants are compelled to endure extensive periods under the sun, detrimentally impacting their dermal health.

3. **Disease transmission** - Due to the ingestion of unhealthy food by humans, elephants may potentially transmit diseases such as Tuberculosis. Tourists at elephant sanctuaries are often keen to engage with majestic creatures, but many lack awareness of negative effects of feeding. Despite good intentions, feeding can create dependency and disrupt foraging patterns. (fig:8)

4. **Learned Begging Behavior:** Mature elephants are instilling in younger counterparts the habit of beseeching humans for food, thereby impeding the acquisition of skills necessary for foraging their indigenous diet. In addition, calves also learn from their mothers at a young age on how to stop and extract food from humans(fig:10)

5. **Increased Risk of Accidents:** The act of begging draws elephants into close proximity with vehicles, heightening the likelihood of harm or fatality. Certain elephants have been documented shattering car windows in their quest for sustenance, presenting a hazard to themselves as well as to humans. Some of the commercial

vehicles have been observed speeding down the road, disregarding the presence of elephants blocking the path and even colliding with them.

6. **Restricted Movement:** Instead of traversing their habitat in a natural manner, elephants linger motionless for hours on end on the roads, disrupting their innate patterns of mobility.

IMPACT ON HUMANS

- **Perceived Threat:** Many tourists assume all elephants are friendly, but elephant behavior can be unpredictable, leading to potential attacks.
- **Threat for life and livelihood:** As elephants are wild animals, they can potentially kill or injure humans, which can affect people's safety. When in musth, elephants exhibit aggressive behavior towards passengers, such as nudging vehicles, trumpeting, obstructing paths, and gesturing with their trunks. (fig:2)
- **Local Community Risk:** People frequently stop to take selfies and photos with elephants, increasing the likelihood of dangerous encounters.
- **Psychological Stress:** The unpredictability of elephant movements has instilled fear in locals and visitors alike, causing psychological stress and anxiety about traveling on these roads.
- **Economic Benefits:** Ecotourism and the high sales of fruits along the road bring some economic benefits to local vendors, though these are accompanied by risks.
- **Traffic Congestion:** Regular encounters with elephants on the road lead to traffic gridlocks, disrupting the smooth flow of vehicles and causing delays for commuters heading to their workplaces. Two and three-wheel vehicles were seen to have difficulty in passing and had to wait for hours until the elephants were driven back, or a large vehicle came to their rescue. (fig:3)

FUTURE DIRECTIONS

A. **Expanding the Study on Human Behavior:** To understand human behavior towards elephants, we need to conduct comprehensive studies on patterns and

motivations. For example, observe different age groups interacting with elephants during feeding sessions. Study tourists' motivations for taking photos with elephants.

B. **Expanding the Study on Elephant Behavior:** When researching elephant behavior in response to human interaction, focus on habituation, movement patterns, and risks of aggression. Track elephants' daily routines in areas where they encounter humans to analyze behavior changes over time. Understanding triggers for aggressive behavior in elephants can help develop conflict mitigation strategies for safety.

C. **Targeted Interventions for Humans and Elephants**: Implementing intervention programs that actively encourage elephants to return to their natural habitat in the forest can significantly reduce their presence on roads and interactions with people. By using methods such as habitat restoration and creating wildlife corridors, it is possible to steer elephants away from human-populated areas and towards safer environments. These interventions not only benefit the elephants by preserving their natural habitat but also contribute to the overall well-being of both wildlife and local communities.

D. **Implementing Elephant Crossing:** In order to enhance wildlife safety and reduce the risk of accidents, it is crucial to implement wildlife crossings signage along highways and roads frequented by animals. These crossings serve as designated areas for wildlife to safely traverse from one side to the other, minimizing the chances of collisions with vehicles. By installing warning signs using the Technology that alert drivers to the presence of Elephant crossings and urging them to reduce speed in these areas, we can effectively mitigate potential conflicts and protect both animals and motorists.

E. **Public and Public Driver Awareness Campaigns:** Launching educational campaigns plays a crucial role in cultivating a sense of accountability and consciousness among diverse stakeholders, encompassing tourists, pilgrims, and local communities, regarding the adverse impacts of feeding wildlife from vehicles. By elucidating the detrimental consequences of feeding elephants, such as disrupting their natural behaviour and fostering reliance on human food sources, individuals can grasp the

significance of abstaining from such actions. Emphasizing the necessity to honour wildlife and their habitats, these initiatives can aid in diminishing instances of human-wildlife conflicts and advocating for harmonious coexistence. Educating the populace on the importance of maintaining a safe distance from wildlife and refraining from feeding them not only safeguards the welfare of animals but also ensures the well-being of individuals. Providing specialized instruction for drivers of tourist buses and vehicles to equip them with the knowledge to communicate information to passengers regarding elephant safety and the imperative nature of avoiding feeding or approaching wildlife.

F. **Law Enforcement by Vehicle Identification and Monitoring:** Strengthening law enforcement measures is imperative in upholding regulations that prohibit feeding wildlife from vehicles and imposing fines on offenders to deter such activities. By conducting routine patrols and intensifying monitoring efforts in areas prone to human-elephant conflicts, authorities can effectively prevent illicit behaviour and safeguard the well-being of both Elephants and human populations. Implementing stringent penalties for those who breach wildlife protection laws acts as a deterrent and reinforces the importance of respecting wildlife and their natural habitats. Through enhancing surveillance and enforcement mechanisms, we can establish a more secure environment for animals and humans alike, ultimately fostering harmonious coexistence. Equip the region with cameras and systems to capture the license plates of vehicles engaged in feeding elephants, facilitating the enforcement of regulations and identification of repeat offenders.

Overall, these factors underscore the complex dynamics at play in the interaction between humans and elephants in this region, highlighting the need for sustainable solutions to mitigate conflicts and ensure the well-being of both species.

Appendix

Fig 1: Vehicle moving in front of elephant

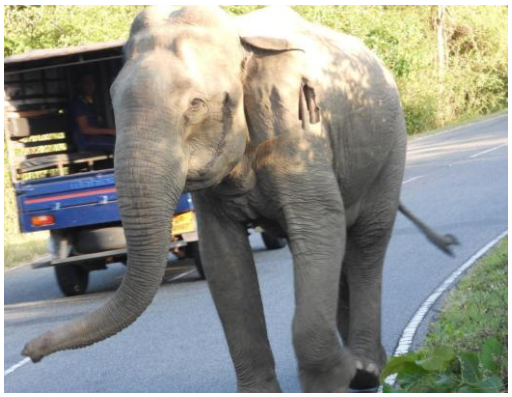


Fig 2: Musth elephant waving trunk towards vehicles

Fig 3: Commuters waiting for elephant to move

Fig 4: Plastic disposed across the B35 Road

Fig 5: Elephant standing under sun

Fig 6: Group of elephants stopping vehicle for food

Fig 7: Elephant feeding on jackfruit

Fig 8: Tourists taking picture of elephant

Fig 10: Elephant calf stopping vehicles

Fig 11: Food thrown by commuters

Reference

Fernando, Prithiviraj, et al. "Current status of Asian elephants in Sri Lanka." *Gajah* 35 (2011): 93-103.

Köpke, Sören, et al. "Human–elephant conflict in Sri Lanka: A critical review of causal explanations." *Sustainability* 13.15 (2021): 8625.