



ORIGINAL RESEARCH ARTICLE

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## WILDLIFE IN THE LINE OF TRANSPORTATION ROADWAY IN THREE CONSERVATION AREA AT WEST SUMATRA, INDONESIA

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### ARTICLE INFO

#### Article History:

Received 18<sup>th</sup> February, 2018

Received in revised form

16<sup>th</sup> March, 2018

Accepted 10<sup>th</sup> April, 2018

Published online 28<sup>th</sup> May, 2018

#### Key Words:

Wildlife, transportation,  
Conservation area, West Sumatra.

### ABSTRACT

Wildlife research in transportation lines in three protected areas at West Sumatra was done from January to March 2016. The study was conducted at three conservation areas at West Sumatra i.e. Ladang Padi, Lembah Anai and Rimbo Panti. The method used is a survey research and observation. The wildlife found in this study consisted of two classes (Reptiles and Mammals), six species: *Macaca fascicularis*, *Tupaia montana* (Mammals), *Naja sumatrana*, *Coelognathus flavolineatus*, *Dendrelaphis pictus* and *Bronchocela cristatella* (Reptile). The topography of the conservation area was flat, straight roads and wide roads lead to the speed of mobile transport that can be accelerated to the maximum, these characteristics pose a hazard to wildlife to perform the activity.

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Citation: Rivi hamdani, Djong hon Tjong and Henny Herwina, 2018. "Wildlife in the line of transportation roadway in three conservation area at West Sumatra, Indonesia", *International Journal of Development Research*, 8, (05), 20210-20214.

### INTRODUCTION

One of effort to stabilize the economy is the improvement of road infrastructure by improving the condition of national roads and local roads (Badan Perencanaan Pembangunan Nasional, 2013). The condition in Indonesia with hilly topography requires road construction that adapted to the existing natural conditions. Building the road in Indonesia apparently along the forest areas should not be disturbed by human activity, because it is a habitat for wildlife. Changes in habitat are one of the effects that affected abundance of wildlife populations. It is impacted the fragmentation of habitat, distribution and migration patterns of wildlife (Baskaran and Bominathan, 2010). The main impact of the construction of a road through the forest is the death of wildlife and habitat constriction. One of province in Indonesia which has a fairly good forest is West Sumatra. West Sumatra has a forest area that has been designated by the Minister of Forestry No. 422 / Kpt-II / 1999 dated June 15, 1999 is of ± 2,600,286 ha. The forest area is included of Conservation Forest, Protection Forest and Production Forest. Forest conservation is set at five units of Nature Reserve (Beringin Sakti, Lembah Anai,

Batang Palupuh, Harau Valley and Rimbo Panti), an Unit of Forest Park (DR. Moh. Hatta), three units of Tourism Park (Mega Overcast, Harau Valley and Rimbo Panti) and one unit of the National Park (Siberut) (Department of Forestry, 2002). Open forest cover by the way, has been automatically disconnects the path crossings and wildlife to move in search of food. Limited space for animals to make some kind of wildlife do crossings on the highway, it provides additional impact caused by the construction of roads in the forest area, passage of animals on the road will have an impact on road users and for wildlife it self. Not only street located in forest areas are at risk of accidents and deaths of animals, wild animals that have been able to coexist with humans are also susceptible to accidents, but this is not the only factor where roads that cause accidents. Wildlife behavior also plays a role in the accident, as some reptiles are interested in hot temperatures on the streets to raise body temperature. This habit is also an impetus for the death of animals caused by the existence of the road.

### MATERIALS AND METHODS

The method that used in this research was survey method as well as direct observation (Rustiati, 2009). Surveys and direct observation carried out to see where the wildlife was hit or threatened by a motor vehicle as well as the documentation is done directly in the field (Sugiyono, 2007).

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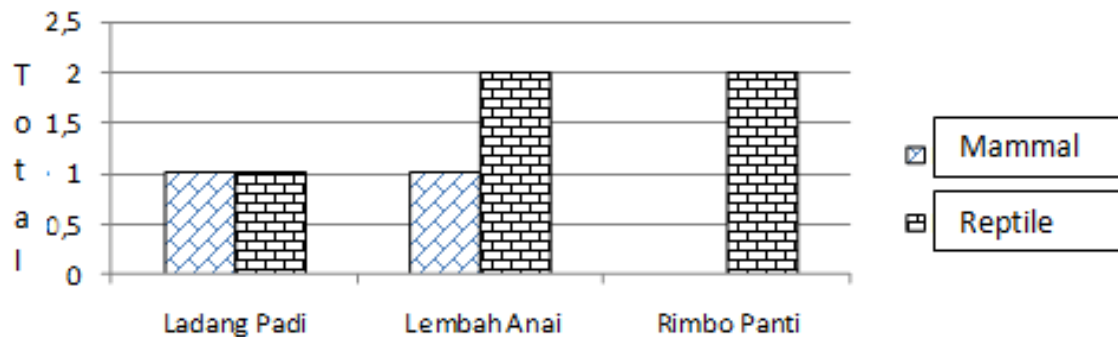
## RESULTS AND DISCUSSION

The result of the research that has been done on wildlife in the transportation lines in three protected areas in West Sumatra by using the method of survey and direct observation are shown in Table 1. Table 1. The wildlife found in transportation lines in three protected areas in West Sumatra. Table 1 showed the wildlife that killed in transportation on three conservation areas in West Sumatra, consisting of six species included into two classes (mammals and reptiles). Mammals found in this study are divided into two orders (Primates and Scandentia) as well as two families (Cercopithecidae and Tupaiidae) with two species: *Macaca fascicularis* and *Tupaia javanica*. Reptiles found in this study included into one order (Squamata) and three families (Elapidae Colubridae, and Agamidae) and four species of reptile i.e. *Naja sumatrana*, *Coelognathus flavolineatus*, *Dendrelaphis Pictus* and *Bronchocela cristatella*.

The number of species of wildlife that are at risk of getting hit on some forest areas in West Sumatra is shown in Figure 1. During investigation there are several factors that cause a high risk of getting hit by the wildlife i.e. topography, road conditions, canopy, and the intensity of the vehicle across the region. Region Anai Valley into the area that has the most traffic dense than the two other regions, Lembah Anai drivable average - average 650 units / hour, the second most populous Ladang Padi with the average - average intensity of the vehicle a total of 392 units / hour, and the area Rimbo Panti by passed by vehicles average - average 271 units / hour. According to Litvaitis and Tash (2008), characteristic of many causal factors of wildlife hit by the vehicle, the vehicle speed, traffic volume, road width, an abundance of wildlife, vegetation roadside, and time. The characteristics of the location are reinforced by the findings of dead wildlife in protected areas in the three transport lines in West Sumatra.

**Table 1. The wildlife found in transportation lines in three protected areas in West Sumatra**

No.	Class Ordo	Family	Species	Ladang Padi	Lembah Anai	Rimbo anti	The number of dead
	Mammalian						
1.	Primate	Cercopithecidae	- <i>Macaca fascicularis</i> Raffles, 1821	-	1	-	1
	Scandentia	Tupaiidae	- <i>Tupaia javanica</i> Horsfield, 1822	1	-	-	1
	Reptile						
	Squamata	Elapidae	- <i>Naja sumatrana</i> Muller, 1890	-	1	-	1
4.		Colubridae	- <i>Coelognathus flavolineatus</i> Schlegel, 1837	1	1	-	2
5.			- <i>Dendrelaphis pictus</i> Wall, 1921	-	-	1	1
6.		Agamidae	- <i>Bronchocela cristatella</i> Kuhl, 1827	-	-	1	1



**Figure 1. The comparison of the number of species of wildlife that died in transport lines in three protected areas in West Sumatra**

**Table 2. Wildlife is observed on the roadside activities in three conservation areas of West Sumatra**

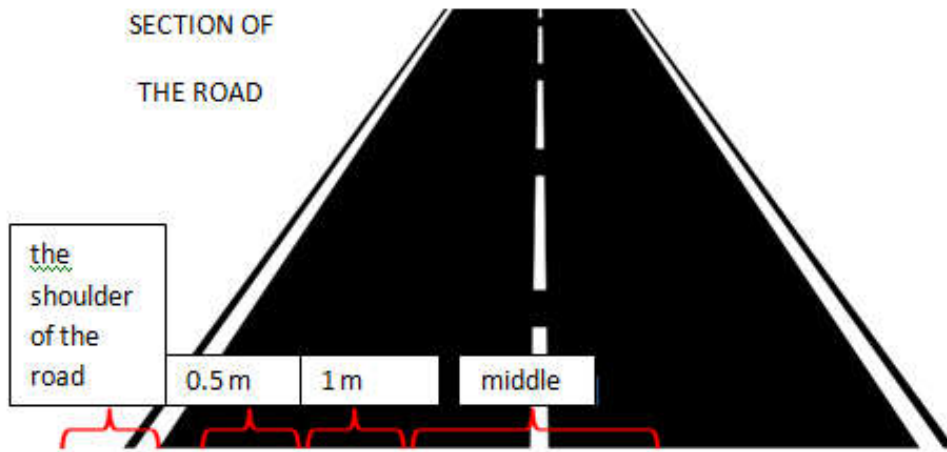
No.	Species	The proportion of individuals found			Location	Individual who died	Living individuals
		Ladang Padi	Lembah Anai	Rimbo Panti			
1.	Mammal						
	<i>Macaca fascicularis</i>	12	27	-	1	38	
2.	<i>Macaca nemestrina</i>	1	4	-	-	5	
3.	<i>Presbytis melalophos</i>	5	-	-	-	5	
4.	<i>Tupaia javanica</i>	1	-	-	1	-	
	Reptile						
5.	<i>Naja sumatrana</i>	1	-	-	1	-	
6.	<i>Coelognathus flavolineatus</i>	1	1	-	2	-	
7.	<i>Varanus salvator</i>	-	1	-	-	1	
8.	<i>Dendrelaphis pictus</i>	-	-	1	1	-	
9.	<i>Bronchocela cristatella</i>	-	-	1	1	-	

**Table 3. The location of wildlife discovery site that died in three conservation areas in West Sumatra**

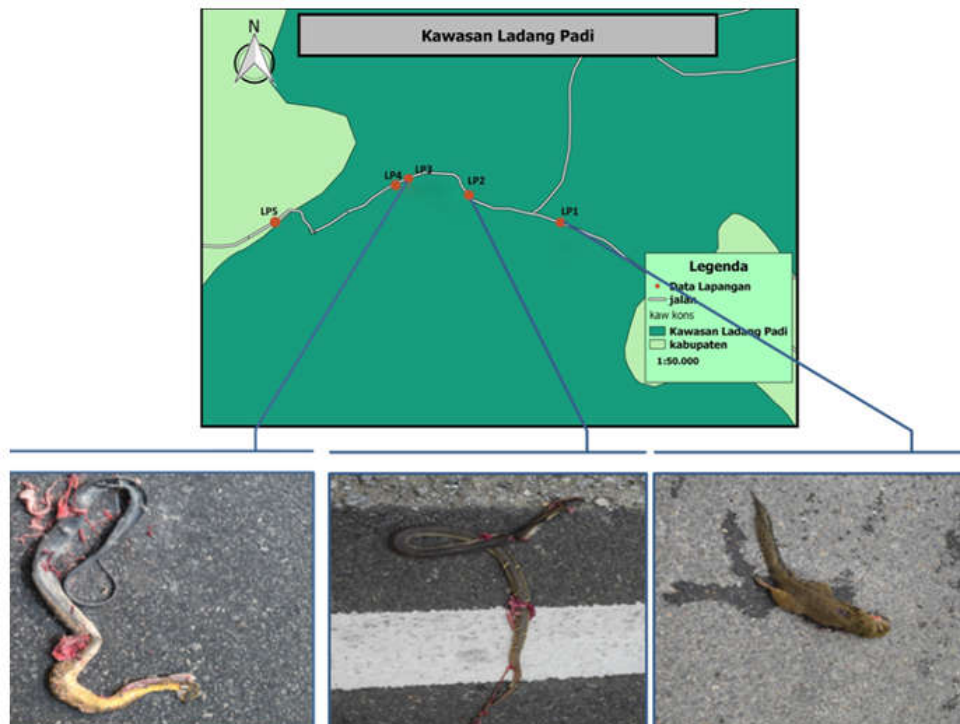
No.	Species	Topography	Canopy	Road conditions	The width of the road	Time found
1.	<i>Macaca fascicularis</i>	Flat	Rarely	Turn	<6 m	09.07
2.	<i>Tupaia javanica</i>	Flat	Rarely	Straight	<7 m	10.43
3.	<i>Naja sumatrana</i>	Flat	Rarely	Straight	<7 m	09.22
4.	<i>Coelognathus flavolineatus</i> (Ladang Padi)	Flat	Rarely	Turn	<7 m	10.20
5.	<i>Coelognathus flavolineatus</i> (Lembah Anai)	Valleys and cliffs	Rarely	Straight	<8 m	16.21
6.	<i>Dendrelaphis pictus</i>	Flat	Leafy	Straight	<6 m	16.56
7.	<i>Bronchocela cristatella</i>	Flat	Leafy	Straight	<6 m	09.52

**Table 4. The proportion of dead wild animals based on the position on the road**

No.	section of the road	Reptile	Mammal	Total
1.	middle	1	-	1
2.	the shoulder of the road	-	-	-
3.	0.5 m from the shoulder of the road	2	1	3
4.	1 m from the shoulder of the road	2	1	3
Total		5	2	7



**Figure 2. The path**



**Figure 3. Location map of wild animal and their dead body at Ladang Padi**

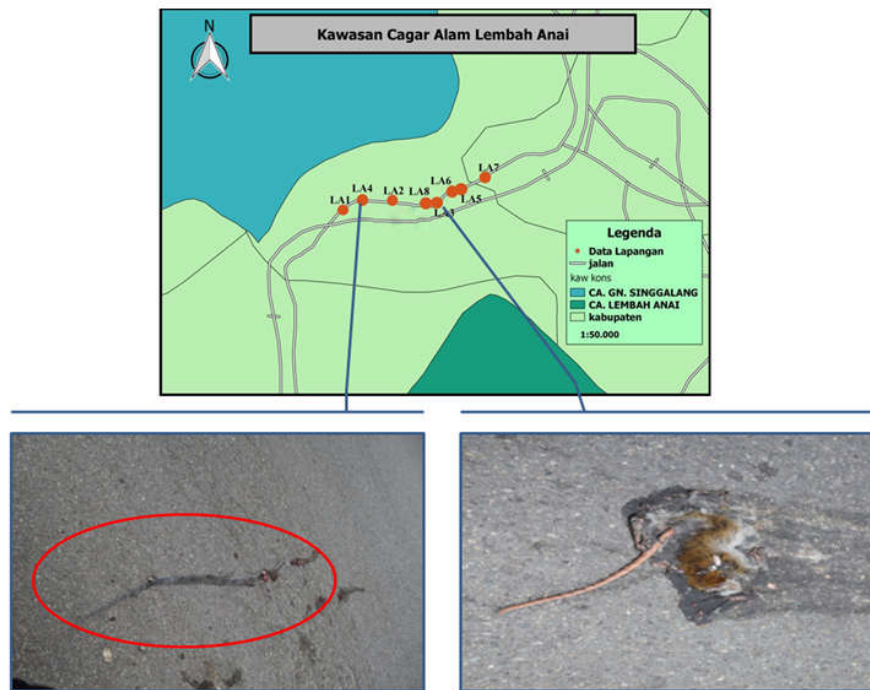


Figure 4. Location map of wild animal and their dead body at Lembah Anai

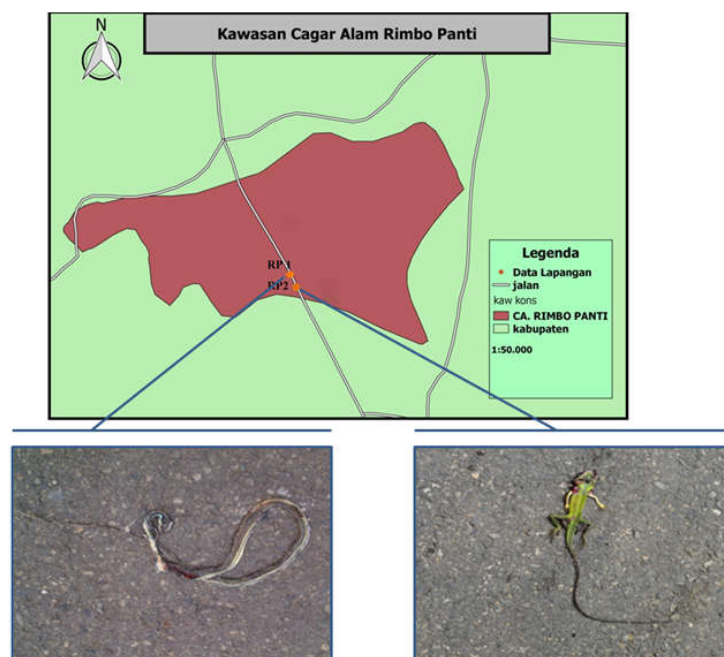


Figure 5. Location map of wild animal and their dead body at Rimbo Panti

Based on Table 3 it can be inferred that the topography was most responsible on wildlife accidents. The flat topography, straight roads and wide roads led to the vehicle speed that can be accelerated to the maximum. The characteristics pose a hazard to wildlife to do the crossing in the street, this is due to the separation of the tree by the existence of the road. The canopy that normally exploited by arboreal animals to move from one tree to another can no longer move through the canopy, so the wildlife to make the transition in a way streets despite the risks involved in a collision with a vehicle. At the location of the wildlife found dead, there on some road position, namely, middle of the road, road shoulders, 0.5 m from the road shoulder, and 1 m from the road shoulder (Kambourova-Ivanova *et al.*, 2012). The position of the wildlife in this study can be shown in a table based on the position of death in the street. In Table 4 are shown in that section of 0.5 m and 1 m from the road shoulder most accidents wildlife,

allegedly in this section is the most commonly traveled by the vehicle. Section 0.5 m and 1 m from the road shoulder allegedly the most vulnerable point of the accident, animals crossing the road will cross to the side of the road and on the part of the vehicle crashed into the wildlife.

### Conclusion

The results of observation found as many as six species of wildlife that is *Macaca fascicularis*, *Tupaia montana*, *Naja sumatrana*, *Coelognathus flavolineatus*, *Bronchocelea cristatella* and *Dendrelaphis pictus*. The causing of the presence of wildlife visiting the area of the highway is a human food, garbage pile, and a heat source.

The topography of the flat, straight roads and wide roads lead to the vehicle speed can be accelerated to the maximal, these characteristics pose a hazard to wildlife to perform the activity.

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