Identification of terrestrial fauna biodiversity as an effort to reduce the wildlife conflict in Batang Angkola protected forest

B Sai¹*, Z Nasution¹ and H Wahyuningsih²

¹Faculty of Agriculture, Universitas Sumatera Utara, Medan, Indonesia.
²Faculty of Mathematic and Natural Science, Universitas Sumatera Utara, Medan, Indonesia.

E-mail: *bharatysai@gmail.com

Abstract. The case in the key biodiversity area of Sumatera named Batang Angkola indicate clearly that the trend of deforestation effected to the biodiversity lost within past few years. The objective of this research is to identify the remind wild animal in Batang Angkola Forest, as an effort to reduce the wildlife conflict, the result were significantly showed that protected forest Batang Angkola has some of the list of animals that also apart of IUCN, as tiger, pangoline, sunda pangolin and sun bear. There are 450 animals photos including 21 types of mammals, some animals that registered in the IUCN or International Union or Conservation Nature, as a part of the animals captures by the camera traps in Batang Angkola listed as endangered, endangered and critical endangered, threatened and vulnerable. The analysis provides an occurrence probability for respective species, which is a proxy for abundance, that is allowing population trends to be tracked and also a Relative Abundance Indices measure for respective capture species. The high number of endangered and critical species illustrated that the forest contribution to conserving the Sumatera key biodiversity area significantly needed. Many of the wildlife animals are highly sensitive to the forest fragmentation.

1. Introduction
Batang Angkola Ecosystem is a part of the greater Sumatra Corridor landscape, located in the west part of North Sumatera Province, and it spreads across the coastline of the South Tapanuli and district Mandailing Natal. The ecosystem of Angkola is Key Biodiversity Area, around 130,000 hectare of width area which is including the downstream of the two key rivers in Tapanuli, named Batang Gadis and Batang toru watershed. Nevertheless, the high rate of encroachment in Batang Angkola resulted the significant increase of deforestation, and forest degradation in district South Tapanuli occurs as well in the protected forest Batang Angkola. Protected Forest based to the District Spatial Regulation [1], and connected as a corridor of Batang Gadis National Park.

The Forest cover change in District South Tapanuli considered led by the deforestation, from 2000 to 2018 there has been a significant change from forest cover to non-forest cover which includes all types of forest cover, including dry land forest, forest swamps and forest plantations. From those periods of 18 years the deforestation occurs around 45,000 hectares, according to the study of special cultivation area of district South Tapanuli it is equal to approximately 10,405 of total area of district South Tapanuli [1]. The condition of the forest cover loss that has occurred in the last few years is not balanced to the economic growth, as well as the challenges for the sustainable development which has become the concern of the stakeholders, particularly South Tapanuli where it has the uniqueness, as a corridor of
the key biodiversity area, one of the plantation and agriculture production area is the main income of the community.

Batang Angkola is included in the conservation corridor of Lauser Aceh, a long Bukit Barisan Mount that connectivity covering an area of 4.7 million hectares, which is also a home for key Sumatera wildlife. Deforestation and biodiversity loss as well as the ecosystem degradation area the main threads identified in Batang Angkola Protected Forest, the primary reason of the deforestation is due to land clearing for agriculture expansion which could be clearly seen in many parts of the forest, mainly palm oil and other agriculture commodity.

As a protected forest under the Government of Indonesia Law [2]. Biodiversity data is not available for Batang Angkola Forest. Our initial interview to the communities reported that they encountered a range of species including, tiger, honey bear and hornbills in the forest where the tiger footprint found many years ago as well. They also reported that population of these species probably have reduced, since they rarely found them now in the wild area. This information also confirmed by Batang Gadis National Park by the information that provided by the community. Referred to the data of Batang Gadis National Park and CI in 2015 and 2016, where explained that Batang Gadis National Park as part of Batang Angkola Forest is a home of tiger, deer, tapir, honey bear, wild goat and other Sumatera endemic species. However, having specific and detail biodiversity data of Batang Angkola forest is necessary to inform stakeholders particularly the community in the sub village and village so round the importance of this forest. For the local community the forest is important to prevent the nature disaster as an erosion because 45% of Batang Angkola Forest is slope area. There is a sub village in this area that are located in the buffer zone of the forest named Binasari that have an experience of flash flood in 1991 [3], where 5 people death on this flood. Moreover, this forest is the only sources of water for the house hold activities and plantation of the community.

2. Materials and methods

2.1. Location and tools

Figure 1. Map of the research area, the green highlight color indicates the protected forest area.
The research was conducted in Protected Forest Batang Angkola, and the sub village Binasari, Pardomuan village, sub district South Angkola, district South Tapanuli. This area also known as the territory area of Forest Management Unit X, function as protected area [4]. The data observe through the process of the research, preceded by the information of the availability of the wildlife animals in their area, concerning that the sub village of Binasari is the buffer zone of the protected forest as well as the social economic surveys. The research on animals remind difficult to find directly in the natural habitat area because of the limitation to know their existence usually known through the traces left in the form of dirt, stretches, food scraps and footprints. This research also equipped with 12 camera traps where would be installed based on the distance between the cameras of about 1,5 km, GPS, Compass, Field maps and data entry sheets.

2.2. Methodology
The Methodology used through the installation of camera traps in order to identify animal species and using a field guide book for mammals [5], by continuing to calculate the relative animals or the Relative Abundance Index – RAI, where the animal abundance index counted based on acquisition or photographed results. The effort to take the sampling by analyzing using the Relative Abundance Indices (RAI) measure for respective species capture by the camera. The RAI represent the number of independent figures for respective species per short period of the trap. By following the definition of the independent image as [6]:

1. The sequential photographs of different individuals of the same or different species
2. The sequential photographs of individuals of the same species taken over 0.5 hours
3. Non-consecutive photographs of individuals od the same species

RAI is determined by using encounter rated which provide a baseline ordinal scale of abundance [7]. By the calculation methodology:

\[
\text{RAI} = \frac{SF}{TD} \times 100
\]

(1)

\[
A = \pi r^2
\]

(2)

Where:

RAI = equal to Relative Abundance Index
SF = the number of photos of the species
TD = the total trap days

The Camera trap could also be used to estimate the size of the animal population, determined the habitat requirements of a species or groups or cluster of animals, even we could also analyze the cause of increase or decrease of the population of certain animals species, including monitoring population inspected through a certain period of the time and habitat management plans. The photographs that recorded by camera traps were identified to determine the species of animals by using the mammal field guidebook. Until now, the approach developed in every wildlife research is using camera traps, concerning that it is very useful to obtain the basic data about animals in certain area, determining the important area of the animals cluster, including to identify the right area for implementing the conservation activities.

3. Results and discussion
The total of the camera trap captured there are 450 animals fotos including 21 types of mammals, some animals that registered in the IUCN or International Union for Conservation of Nature, as known that IUCN criteria use the terms of Observed, Estimated, Projected, Inferred and Suspected to refer to the nature of the evidence, including aspects of data quality, for specific criteria [7] we could see clearly from the list below, that apart of the animals captured by the camera trap in Batang Angkola Forest are listed in IUCN by the status as below.
Table 1. the list of animal in Batang Angkola at the status of IUCN.

| No | Name                  | Latin Name                        | Status IUCN    |
|----|-----------------------|-----------------------------------|----------------|
| 1  | Sumatran tiger        | Panthera tigris Sumatrae          | Critically endangered |
| 2  | Sumatran Clouded Leopard | Neofelis diardii                | Endangered     |
| 3  | Asial Golden Cat      | Catopuma Temminckii              | Near threatened |
| 4  | Tapir                 | Tapirus Indicus                  | Endangered     |
| 5  | Sam bardeer           | Rusa Unicolor                    | Vulnerable     |
| 6  | Wild Boar             | Sus Scrofa                       | Least Concern  |
| 7  | Lessern ouse deer     | Tragulus Kanchil                 | Least Concern  |
| 8  | Muntjak               | Mustiasus Muntjak                | Least concern  |
| 9  | Sumatran Serow        | Capriconis Sumatraensis          | Vulnerable     |
| 10 | Sun bear              | Heralctos Malayanus              | Vulnerable     |
| 11 | Malay civet cat       | Artictis binturong               | Vulnerable     |
| 12 | Bended Palm Civet     | Hemigalus derbyianus             | Near threatened|
| 13 | Yellow throated martes | Martes flavijula                | Least concern  |
| 14 | Sunda Pangolin        | Manis javanica                   | Critically Endangered |
| 15 | Piq tailed macaque    | Macaca nemestrina                | Vulnerable     |
| 16 | Malayan porcupine     | Hystrix bracyura                 | Least Concern  |
| 17 | Long tailed porcupine | Trishcys fasciculate             | Least Concern  |
| 18 | Peregrine falcon      | Falco peregrinus                 | Least Concern  |
| 19 | Gretargus             | Argusianus argus                 | Near Threatened|
| 20 | Crested fireback      | Lopura ignita                    | Near Threatened|
| 21 | Domestic dog          | Canis fam ilaris                 |                |

The list shows that the wild animals detected in the research location are common species that live in Sumatera, based on the global conservation status in the IUCN the conclusion as below,

- There are two types of species by the status of critically endangered, named Pangolin or Manis Javanica and Pantera Tigris or Sumatra Tiger.
- There are three of species by the status of endangered species, named Tapir or Tapirus Indicus, the Sumatera Clouded Tiger and the Sumatera Black Lutung.
- There are five types of animals by the status of vulnerable, named Sambar or Unicolor Rusa, the Sumatera Black goat, the Beruk and Sun Bear
- There are three types of Sumatra endemic species, named Sumatra Tiger, The Forest Goat or Capriconis Sumatraensis and the Sumatran Lutung.
- Five types of Sumateran Wild Cats (Sumatra Tigers, Sumatran Clouded Leopard, Asian Golden Cat, Stone Cats and Forest Cats)

4. Conclusions

The conclusion based on the result of the camera trap above, that there are 450 animals fotos including 21 types of mammals, some animals that registered in the IUCN or International Union for Conservation of Nature, a part of the animals captured by the camera trap in Batang Angkola Forest are listed in IUCN as, critically endangered, endangered, vulnerable and endemic species, those explained that the biodiversity in Batang Angkola Forest remind significant to be protected, the sub village in the buffer zone, and some of the plantation area so round the protected forest described the high potential of animal conflict, since some of the wild animal as tiger and tapir remind exist in this key biodiversity area of Sumatera, despite the thread of deforestation remind increased.
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