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CONSERVATION IN THE PRODUCTION AREAS: AN OPPORTUNITY TO CONSERVE WILD CAT SPECIES IN KAMPAR PENINSULAR, RIAU PROVINCE, INDONESIA

Donny Gunaryadi¹, Petrus Gunarso^{2*}, Ryan Avriandy¹, Irene Margareth Romaria Pinondang¹, Andi Arya Fajar Art Christ¹, Safrina Ayu Trisnawati¹, Nugraha Putra Maulana¹, Husnul Fikri¹, Ahmad Dani¹ and Muhammad Iqbal²

¹*Fauna Flora International-Indonesia Programme, Indonesia*

²*Riau Ecosystem Restoration, Indonesia*

*Corresponding author: petrus_gunarso@aprilasia.com

ABSTRACT

The Kampar Peninsula in Riau is a unique ecosystem and shown its unique distribution of biodiversity. Although the peninsula was categorized as production forests since the eighties, the degradation of the core of Kampar Peninsula considered as lowest in the region. To assess the richness of wildlife in Kampar Peninsula, Biodiversity assessments have been conducted by collaborating partner, Fauna & Flora International-Indonesia Programme using camera trap in the landscape. Biodiversity richness of this lightly degraded area is significant. Five species of wild cats of Sumatra were found in the landscape including the charismatic Sumatran Tiger and a rare species of the flat-headed cat. Several large mammals species such as, sunbear, sambar deer and bearded pig were found in the area as well as several unique and endemic species of birds, reptiles and amphibians. Based on this initial finding and the existence of top predator in the region, and its potential of recording new species, the biodiversity richness in the whole Kampar Peninsula appears to be potentially high and its conservation status most likely more significant than the neighbouring designated conservation areas.

Keywords: *Kampar Peninsula, peatland, tiger, flat-headed cat, camera trap, restoration.*

INTRODUCTION

The Kampar peninsula which part of the largest peatland forest for Riau, provided important ecosystem services such as the storage of carbon stocks which potentially ranged from 2.14 to 2.68 billion tonnes, preservation of water resources and flood reducer (Tropenbos International Indonesia Program, 2010). Since 1980es, the peninsula converted into logging concession then followed by massive industrial production forest. The role of industrial forest plantation in the peat dome of the peninsula discouraged past massive logging operation in the area. Although extensive canals have been developed for small scale illegal logging operation exist, the remoteness and intensive effort to stop illegal practices had shown positive results. Under the moratorium status, large track of peat dome in the peninsular is now designated as ecosystem restoration concession.

Riau ecosystem Restoration Riau (RER) is a not for profit programme formed by APRIL in 2013 with an area of about 150,000 hectare. RER has the purpose of restoration protection and conservation of peat swamp forest ecosystem in the area of Kampar Peninsula as a response to the program from the Ministry of Environment and Forestry-Republic of Indonesia to protect 2.6 million hectares of forest through ecosystem restoration forest concession system (IUPHHK-RE). Three of the four concessions under the supports of the RER had obtained a license of IUPHHK-RE which are PT. Gemilang Cipta Nusantara (20.265 ha), PT. Sinar Mutiara Nusantara (32.830 ha) and PT. The Best One Uni Timber (39.412 ha). RER's restoration, protection and conservation efforts is very important as RER concessions and HCV areas covered more than 30%, beyond legally required (Tropenbos International Indonesia Program, 2010).

A survey of fauna using a surveillance camera has many advantages especially in the tropical forests which might inaccessible terrain by observers. The survey uses a camera trap proved to find a cryptic species which might be hard to be found with other methods, besides the use of camera trap by pairing in the right scheme can provide information on ecological aspects of wildlife by examining their pattern of activity, detection of occupancy or even wildlife density in a landscape (O'Brien *et al.*, 2003).

METHODS

Biodiversity surveys using camera trap have been implemented during March-December 2015 in three APRIL concessions, PT. GCN, PT. SMN and PT. TBOT. This survey aims to figure out basic data and identifying

the biodiversity that exists in those three concessions. Camera trap (the Bushnell Trophy Cam type HD 2014) being deployed systematically in the grid cell sized 2 x 2 km, there is a grid cell of each camera which setup in single or paired. The survey targeted a 500 trapday/100 km². In each survey grid, one camera station was selected based on the possibility of getting pictures of wildlife, such as a location which has scent marks, scats and former footprint of predation or at least is a wildlife trails. In each station, the camera was mounted on a tree at the height of 40-50 cm with the distance of 4-6 m from the midpoint of animal active tracks where the animal is expected to pass through. The setting of camera trap was divided into two, a video mode with duration of 10 seconds on a single station and a photo mode on the pair stations with the 10 seconds time interval. The camera was activated 24 hours per day with the duration of at least 25 trapdays.

The camera trap data were organized and analysed using a program developed by Sanderson & Harris (2013). The analysis was conducted using total trapdays, the number of pictures and the number of independent pictures (O'Brien *et al.*, 2003). Diversity index was analysed using R version 3.2.3 program, with Biodiversity R package (Kindt, 2016) and script from Gardener (2014). The diversity index used was Shannon index (Krebs, 1999) which enables us to see the richness and composition of species in a community. Species richness was estimated using Richness estimator with a permutation of 1000 times and the results of Jackknife 1 (Tobler *et al.*, 2008).

RESULTS

Camera Trap Survey Effort

A nine (effective) months of camera trap installations accumulated 11.385 trapdays and 14.504 pictures of animals. The number of installation stations for each concession area was PT. GCN 50 stations of 50 stations, PT. SMN 74 stations of 80 stations, PT. TBOT 96 stations of 100 stations (Table 1). Approximately 20% of the installed camera traps suffered physical and electronical damage, such as taking pictures continuously causing the duration of the installation to become very short due to lack of memory card space which in turn made the camera incapable of recording pictures, malfunctioning sensors, and the quality of the resulting image not being representative for identification due to its color (blurred or damaged).

Table 1: Summary of camera trap deployment in three concessions.

Concession	Total picture		Duration			Total trap days	Total Station	Distance of camera trap deployment (Km)			
	Total	Independent	Start	End	Duration			Min	Mean	Max	Covered area (Km ²)
PT. GCN	1,662	415	3/26/15	6/22/2015	89	1,460	50	0.37	1.33	2.69	189
PT. SMN	4,140	1217	4/12/15	8/31/2015	142	5,948	74	0.70	1.37	2.16	301
PT. TBOT	8,252	1804	9/15/15	11/20/2015	67	3,977	96	0.46	1.48	2.32	354

The camera trap survey results show the existence of a predator species that occupy the peat forests in the RER. The five predator species of the Felidae family in this area are the marbled cat, the flat-headed cat, the leopard cat, the clouded leopard and the sumatran tiger (Figure 1.). Two of which were Sumatran tiger and flat-headed cat as the charismatic species, which categorized as critically endangered and a wetlands specialist.

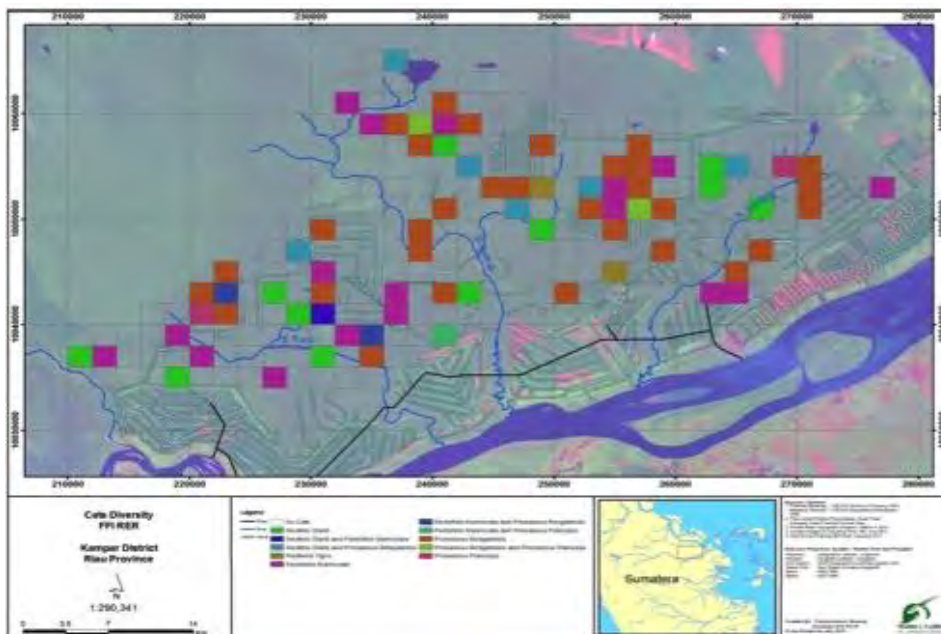


Figure 1: Spatial overlap map of Felidae

Animal Species Richness

As many as 37 species recorded by camera trap in PT. GCN, covering 21 mammals, 13 aves, and three reptiles. The PT. SMN concession acquired 47 species, consisting of 28 mammals, 18 aves, and one reptile, whereas in the area of PT. TBOT concession found 52 species of fauna comprising 30 mammals, 18 aves, and four species of reptiles (Figure 2). The whole number of species being caught by camera traps on RER as much as 75 species of 34 mammals, 35 aves and 6 reptiles. As many as 20% of that were protected wildlife species by either government regulations as well as the red list of IUCN

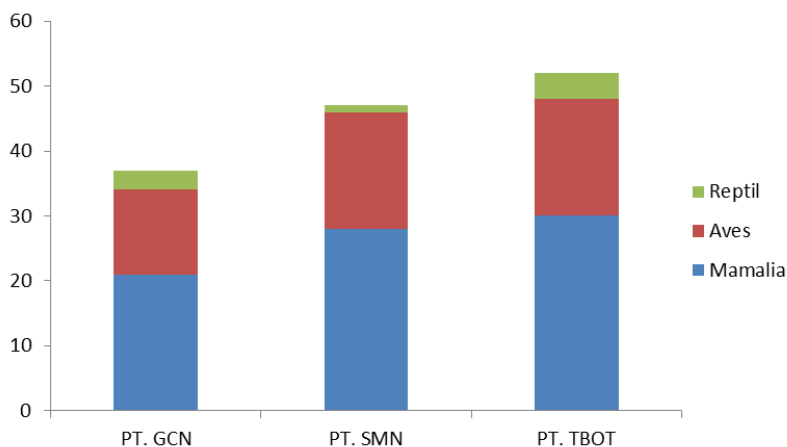


Figure 2: Species richness in three concessions.

DISCUSSION

The discovery of the flat-headed cat in the region confirmed the study conducted by Wilting *et al* (2010) that the Kampar peninsula is one of the largest habitats on Sumatra for flat-headed cat. This implies an important role for maintaining the sustainability of the landscape for flat-headed cat in Sumatra. Indonesia has nine species of wildcats, seven of which are in Sumatra (Nowell & Jackson, 1996). Golden cats (*Catopuma temminckii*) and fishing cats (*Prionailurus viverrinus*) were not found in this survey. This is due to the Golden cats being commonly found in mountains (900-2500 > mdpl) (Griffiths, 1996; W Pusparini *et al.*, 2014). As for the fishing cat, there has not been a valid confirmation about its existence in Sumatra to this day (Duckworth & Shepherd, 2009; Sanderson, 2009).

The discovery of flat-headed cats in this area have already been predicted by previous studies (Wilting *et al.*, 2010), which states that Riau has the widest wingspan habitat for flat-headed cats in Sumatra, and since flat-headed cat are wetland specialists. This species, therefore, can be considered as a flagship for wetland habitats, particularly in peat swamp forests of the Kampar peninsula. Moreover, the existence of large predators have an impact on the health of an ecosystem in that area (Miller *et al.*, 2001). The tiger is one of the top predators found in the RER, a tiger will prey on smaller animals or those equivalent to its size, so do other predators (Karanth & Nichols, 2002). The tigers' ability to prey on a variety of species of different sizes can guarantee their survival in nature. Declining populations of animals they prey on can reduce the abundance of tigers in a location (Karanth & Nichols, 2002). A total of 10 prey animals were recorded in the RER. Bearded pigs are a large size prey animal in the RER, while medium-sized prey consists of monkeys and long-tailed macaques, small-sized prey animals include the mouse-deer, squirrels, forest mice, squirrels, mouse-type mices, and black partridges.

Table 2 provides a comparison of photographic rate between wildcats in the Sumatra region, and it shows that RER possesses the most number of wildcat species in comparison to other similar areas of study. One of the reasons for this was most likely due to the camera trap efforts having longer duration and wider coverage. It should be noted that the camera traps installed in this study were designed to maximize the chances of capturing tiger images, so other smaller mammals, in this case the marbled cats, leopard cats and flat-headed cats were less likely caught on these camera traps. If further studies were conducted where the camera trap installation designs are maximized for capturing smaller cats, then the photographic rate of smaller cats in this area would most likely increase.

Table 2: Photographic rates comparison among landscape in Sumatra.

Area	RER ^a	Kerumutan ^b	Semenanjung kampar southwest ^b	Bukit Barisan NP ^c	Gunung Leuser NP ^d
Total trap days	11.385	1.868	1.132	34.166	3.452
<i>Neofelis diardii</i>	0.16	0.05	0.71	0.15	0.41
<i>Panthera tigris</i>	0.02	0.70	-	0.16	N/A
<i>Pardofelis marmorata</i>	0.21	0.21	-	0.1	0.23
<i>Prionailurus bengalensis</i>	0.57	0.05	0.71	0.08	0.2
<i>Prionailurus planiceps</i>	0.04	-	-	-	-

^a This Study, peat.

^b (Sunarto *et al.*, 2015), peat.

^c (McCarthy *et al.*, 2015), mineral.

^d (Wulan Pusparini *et al.*, 2014), mineral.

CONCLUSION

- Camera traps installed in concession areas were able to detect a number of important cryptic species which cannot be obtained using other methods. Those cryptic species are five wildcats and pangolin from the mammalian taxonomy.
- RER in Kampar peninsula indicate a higher number of mammal species diversity compared to other lowlands in Sumatra, especially species of wetland specialists.
- Flat headed cats as wetland habitat specialist can be promoted as a flagship species for the protection of the Kampar peninsula peat swamp, especially in the concession areas.

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