WILDLIFE BASE LINE STUDY AT GOLD MINING CONCESSION AREA OF PT BATUTUA LAMPUNG ELOK IN WAY KANAN DISTRICT, LAMPUNG PROVINCE

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Collaboration Between

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With
PT BATUTUA LAMPUNG ELOK

2006

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INTRODUCTION

Background

PT. Batutua Lampung Elok (BLE) is a gold firm mining, which it have licensed area statement of exploration around 3 430 ha at four sub district such as Baradatu, Banjit, Blambangan Umpu and Kasui, Way Kanan District Province of Lampung. On exploration activities, BLE have concern to their environmental at the concession area. One of their activities is base line study. The subject of the study to collect information and data related to physical, biological, social and economic aspect of the property to anticipated negative issue on environmental impact, which it is caused by developing gold mining exploration activities. The BLE started with base line study of the project area and one part of this study is base line study on wildlife.

To developed positive impact on exploration gold mining not only make profit orientated on economical but also social aspect and ecological reason. From beginning state of planning for the exploration, BLE will comply with all regulations are used in Indonesia such as the biodiversity convention regarding to high biodiversity value of the exploration area.

Objective of the Study

The base line study of wildlife at the exploration area of BLE gold mining in Way Kanan District is to gain

1. To get information and data are related with species diversity of wildlife at the site area
2. Local distribution and abundances of wildlife
3. The status of wildlife at site study

STUDY AREA

The gold mining exploration area of PT. Batutua Lampung Elok (BLE) is located at northern part of Lampung Province at (4^0 40`39" - $4^0$ 42`05" latitude south and $104^0$29`56" - $104^0$31`03" longitude east). The topography of the project area is mostly flat and undulating. The slope was mostly less than 15 %.Very few at the property have hilly area such as Bukit Jambi.

At BLE exploration area is dissected by numerous small streams. Two big rivers (width > 25 m) flow at the project area such as Way Umpu and Way Sawa river and, several small rivers occur at the project area, joint with both river. The drainage pattern of the rivers was dendritic.

The climate at the project area is tropical with clear a distinct between dry season and wet season, less precipitation between June to September, where conditions are wet for about 8 months (>200 mm rainfall) and dry (<100 mm rainfall) for about 4 months of the year. According to Smith and Ferguson rainfall type classification at the project area was fall into B. The annual precipitation was around 2027 mm. The dryer's month in the project area was June to September. Annual average temperature was 28.4 ^{0}C and average humidity was around 89 %.

The soil at the project area is podzolic with color brown yellowish. Soil physically was deep solum. The soil chemists at project area were classified a fertile soil.

The exploration area was developed on current vegetation mostly plantation, such as rubber and piper, secondary growth, and garden. Re-greening area (Forest plantation) occur at bukit Jambi with Sonokeling (*Dalbergia latifolia*) tree. Tropical rain forest is rest forest only small portion at BLE area as riparian forest of Way Sawa and Way Umpu river..

MATERIALS AND METHODS

Location and Time

The study was conducted at PT Batutua Lampung Elok exploration area in Lampung. At least 6 days for get data and information related to wildlife diversity, from 1 – 6 June 2006. The observations were focused forested area at 3 430 ha wildlife habitat such riparian forest, secondary growth, rubber plantation, piper plantation, garden, and re-greening area.

Equipment and Materials

Tools were used in this survey: distribution of forest map of BLE area, compass, chronometer, binocular, and field guide to the birds of Sumatra, Kalimantan, Jawa and Bali also field guide to the mammals of Borneo.

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Methods

The wildlife inventory was carried out by transect method combination with IPA count for birds. Five transect were made close to rivers such as riparian forest at Bukit Jambi, Way Sawa, and Semijang, rubber plantation, coffee plantation, piper plantation and garden .and length of transect around 0.5 – 1 km. The inventory started every morning at 7.00 and lasted until 9.00 a.m. The counting of individual numbers was based on direct visual contact or the animal track. Besides direct observation to animal, interview with local people was done to know about wildlife occurring at project area.

Bird Census

Five transects of one kilometer each has been laid out along riparian in the project area, presenting distinct habitat types within the forested areas. At 200 m intervals along each transect, all bird calls or sightings within 100 m from the observer were recorded over 20 minute periods. This provided a quantitative measure of the relative abundance of species. Daily species lists have been prepared as an indication of the comprehensiveness of the inventory: fewer species will be added as the total list becomes more complete. Tape-recordings of bird calls have been made using.

Interviews

Semi-structured interviews with local guides/inhabitants provided information on the local use of wildlife.

Data analysis

Data from the bird censuses were used to calculate the following ecological measures:

Species Diversity Index

The Shannon index (Magurran 1988) describes bird species diversity along the different transects:

$$\mathbf{H = -\Sigma\ p_i\ ln\ p_i}$$

in which p_i is the number of individuals of species divided by the total number of individuals. Species diversity is influenced by its components Species Richness (number

of species in the sample) and Evenness (also called Equitability). The following formula will be used:

$$E = H/H_{max}$$

in which H_{max} = - log 1/n (n = number of species in the sample).
E is index of equitability.

RESULTS AND DISCUSSION

RESULTS

Species Richness

Base on direct and indirect observation also as well as interviews to diversity of wildlife/fauna in the project area, resulted that species richness at exploration area of PT BLE is medium. Wildlife species were found at observation area 16 species of mammals, 53 species birds and 5 species reptiles. Beside number of wildlife species were abundant, some protected species were identified.

Table 1. Wildlife Fauna species were recorded at exploration area of PT BLE

Wildlife Species	Found at Riparian Forest (n species)	Found at Rubber, Coffee and Piper Plantation (n species)	Foound at secondary vegetation (Herb & Shrubs) (n species)	Found at Home garden (n species)	Found at Plantation Forest or Re-greening Area (n species)
Mammals	16	5	7	2	12
Avifauna	40	28	32	22	34
Reptilian	5	2	3	2	5

Mammals

Among mammals species were found at the project area, seven species were categories as protected animals such as Western Tarsier (*Tarsius bancanus*), Pangolin (*Manis javanica*), Porcupine (*Hystrix brachyura*), Leopard Cat (*Felis bengalensis*), Rusa Deer (*Cervus unicolor*), Barking Deer (*Muntiacus muntjak*) dan Lesser Mouse Deer (*Tragulus napu*).

Tabel 2. Mammals species were found at exploration area of PT. BLE

Mammals Species	Local Name	Common Name	Found with Frequencies					Status	Document
			1	2	3	4	5		
Tupaidae									
1. *Tupaia tana*	Tupai tanah	Large Treeshrew	+	-	+	-	+	TD	Sr, sol, I, F
Cercopithecidae									
1. *Macaca fascicularis*	Monyet	Long tailed Macaque	+	-	-	-	+	TD	
2. *Presbytis melolophos*	Simpai	Banded langur	+	-	-	-	-	TD	
3. *Presbytis cristata*	Lutung	Silvered Leaf Monkey	?	-	-	-	-	TD	
Tarsiidae									
1. *Tarsius bancanus**	Beruk semunding	Western Tarsier	+	-	-	-	?	D	Sjr, sol, I, F
Manidae									
1. *Manis javanica**	Trenggiling	Pangolin	+	-	-	-	?	D	Sjr, sol, I, F
Sciuridae									
1 *Callosciurus notatus*	Bajing Kelapa	Plaintein Squirrrel	+	+	+	+	+	TD	Sr, sol, F
Muridae									
1. *Rattus tiomanicus*	Tikus Belukar	Malaysia Wood Rat	?	+	+	-	+	TD	Jr, sol, I, F
Hystricidae									
1. *Hystrix brachyura**	Landak	Porcupine	+	?	?	-	+	D	Jr, sol, I, F
Felidae									
1. *Felis bengalensis**	Macan akar	Leopard Cat	+	?	?	-	+	D	Jr, sol, C
Mustelidae									
1. *Lutra*	Wregul	Hairy Nosed Oter	+	-	-	-	-	TD	Sjr, sol, Fs
Viveridae									
1. *Paradoxurus hermaproditus*	Musang	Palm Civet	?	+	+	+	?	TD	Sjr, sol, C, F
Cervidae									
1. *Cervus unicolor**	Menjangan	Sambar Deer	?	-	-	-	+	D	Sjr, sol, H
2. *Muntiacus muntjak**	Kijang	Barking Deer	?	-	-	-	?	D	Sjr, sol, H
Tragulidae									
1. *Tragulus javanica**	Kancil	Lasser Mouse Deer	?	-	-	-	-	D	Sjr, sol, H
Suidae									
1. Sus barbatus	Babi hutan	Bearded Pig	+	-	?	-	+	TD	Jr, sol/kel, H

Legend :
1 = Found at riparian forest 2 = Found at Rubber, Coffee and Piper Plantation 3. Found at Secondary growth
4 = Found at home gardening 5 = Found at forest Plantation/re-greening area TD = not protected D = protected
+ = Found at sample plot ++ = Found at sample plot with abundances - = not found at sample plot
? = Present at sample plot, but not found during observation Jr = rare Sol = Solitary I = Insectivores
F = Frugivores Kel = group Sjr = vary rare C = Carnivores H = Herbivores, Fs = Fishivores

Avifauna

From observation activities, resulted that wildlife which present abundance(53 species) at exploration area of PT BLE is bird. Most of observation places (some habitat tipe), bird was relatively easy to find. Nine species of birds were found at the project area, was categories as protected animals such as Crested Serpent Eagle (*Spilornis cheela*), Blue Eared Kingfisher (*Alcedo meninting*), Collared Kingfisher (*Halcyon chloris*), White Throated Kingfisher (*Halcyon smyrnensis*), Pied Faintailed (*Rhipidura javanica*), Olive Backed Sunbird (*Nectarinia jugularis*), Brawn Throated Sunbird (*Anthreptes malacensis*),

Rubby Cheked Sunbird (*Anthreptes singalensis*) dan Little Spiderhunter (*Arachnothera longirostra*)

Table 3. Birds species were found at exploration area of PT. BLE

Birds Species	Local Name	Common Name	Found With Frequencies					Status	Docum
			1	2	3	4	5		
Accipitridae									
1. *Spilornis cheela**	Elang Ular	Crested serpent eagle	+	-	-	-	+	D	Jr, sol, C
Phasianidae									
1. *Coturnix chinensis*	Puyuh	Blue breasted quail	-	+	+	-	?	TD	Jr, sol/ke
2. *Gallus gallus*	Ayam Hutan	Red Jungle fowl	+	-	-	-	+	TD	Jr, sol/ke
Rallidae									
1. *Amaurornis phoenicurus*	Kareo	White breasted waterhern	+	-	-	-	-	TD	Jr, sol, I
Columbidae									
1. *Streptopelia chinensis*	Balam	Spotted Dove	+	+	+	+	+	TD	Sr, sol/pa
2. *Geopelia striata*	Perkutut	Peaceful Dove	-	+	-	-	-	TD	Sjr, sol, S
3. *Treron vernans*	Punai gading	Pink neck green pigeon	+	+	+	-	+	TD	Jr, sol/ke
Cuculidae									
1. *Cacomantis merulinus*	Wik-wik	Plaintive cuckoo	+	+	+	+	+	TD	Sr, sol, I
2. *Centropus bengalensis*	Bubut alang	Lesser coucal	+	+	+	-	+	TD	Sr, sol, I
3. *Centropus chinensis*	Bubut	Greater coucal	+	-	-	-	+	TD	Jr, sol, I
4. *Phaenicophaeus curvirostris*	Kadalan selaya	Chestnut breasted malkoha	+	-	-	-	-	TD	SJr, sol,
Caprimulgidae									
1. *Caprimulgus affinis*	Cabak	Nightjar	-	+	+	?	-	TD	Sjr, sol, I
Apodidae									
1. *Collocalia maxima*	Walet	Black nest swift	+	-	+	-	+	TD	Jr, sol, I
2. *Collocalia esculenta*	Walet Sapi	Glossy swiftlets	+	+	+	+	+	TD	Sr, sol, I
3. Apus affinis	Kapinis	Little swift	-	-	-	-	+	TD	Jr, sol, I
Alcedinidae									
1. *Alcedo meninting**	Bintik	Blue eared kingfisher	?	-	-	+	-	D	Jr, sol/pa
2. *Halcyon chloris**	Cekakak sungai	Collared kingfisher	+	+	+	+	+	D	Sr, sol, I,
3. *Halcyon smyrnesis**	Cekakak belukar	White throated kingfisher	+	-	+	-	-	D	Jr, sol/ke
Capitonidae									
1. *Megalaima australis*	Takur tenggeret	Blue eared Barbet	+	-	-	-	?	TD	Sjr, sol, F
2. *Megalaima haemacephala*	Ungkut-ungkut	Coppersmith Barbet	?	+	-	-	-	TD	Sjr, sol, F
Picidae									
1. Picoides molucensis	Pelatuk kecil	Sunda woodpecker	-	+	+	+	?	TD	Sr, sol, F
2. Celeus brachyurus	Pelatuk Kijang	Rofous woodpecker	?	+	+	-	+	TD	jr, sol, F
Campephagidae									
1. *Hemipus hirundinaceus*	Jinjing pentulak	Black wing flycatcher shrike	+	?	+	+	?	TD	Jr, sol, I
Hirundinidae									
1. *Hirundo tahitica*	Layang-layang	Pacific swallow	+	+	+	+	+	TD	Jr, sol, I
Pycnonotidae									
1. *Pycnonotus goiavier*	Cerucuk	Yellow vented bulbul	?	+	+	+	+	TD	Sr, sol, I,
2. *Pycnonotus aurigaster*	Kutilang	Scooty headed bulbul	+	+	+	+	+	TD	Sr, sol, I,
3. *Pycnonotus melanicterus*	Kutilang emas	Black creasted bulul	+	-	-	-	+	TD	Jr, sol, I,

4. *Pycnonotus bruneus*	Merbah	Red eye bulbul	+	-	+	-	-	TD	Jr, sol, I,
Aegithinidae									
1. *Aegithina tiphia*	Cipo	Common Iora	+	+	+	+	+	TD	Sr, sol, I
Dicruridae									
1. *Dicrurus paradiceus*	Srigunting surga	Great tailed racket drongo	+	-	-	-	-	TD	SJr, sol,
Turdidae									
1. *Copsychus saularis*	Kucica	Megpie robin	-	+	+	+	-	TD	jr, sol, I
2. *Copsychus malabaricus*	Murai Batu	White rumped shamma	+	-	-	-	-	TD	Sjr, sol, I
Timaliidae									
1. *Trichastoma malacense*	Pelanduk pendek	Short tailed babbler	+	-	-	-	-	TD	Sjr, sol, I
2. *Stachyris erythroptera*	Tepus merbah	Chesnut winged babbler	?	-	+	-	+	TD	Sjr, sol, I
3. *Macronous gularis*	Ciung air coreng	Strip tit babbler	+	+	+	-	+	TD	Sr, sol, I
Corviidae									
1. Corvus enca	Gagak	Lesser crow	+	-	-	-	-	TD	Jr, sol, O
Sylviidae									
1. *Gerygone sulfurea*	Remetuk	Golden bellied gerygone	+	+	-	-	+	TD	Jr, sol, I
2. *Prinia flaviventris*	Prenjak semak	Yellow bellied prinia	-	+	+	-	-	TD	Jr, sol, I
3. *Prinia familiaris*	Prenjak ciblek	Bar wing prinia	-	+	+	+	+	TD	Sr, sol/ke
4. *Orthotomus atrogularis*	Cinenen belukar	Dark necked tailorbird	-	-	+	-	+	TD	Sr, sol, I
5. *Orthotomus ruficeps*	Cinenen	Ashy tailorbird	+	+	+	+	+	TD	Sr, sol/pa
Muscicapidae									
1. *Rhipidura javanica**	Kipasan belang	Pied faintailed	-	-	+	+	-	D	Jr, sol, I
Laniidae									
1. *Lanius schach*	Bentet	Long tailed shrike	-	+	+	-	+	TD	Jr, sol, I
Sturnidae									
1. *Aplonis panayensis*	Perling	Asian glossy starling	+	+	-	-	?	TD	Sjr, sol, I
Dicaeidae									
1. *Dicaeum trigonostigma*	Cabai bunga api	Orange bellied flowerpecker	-	+	+	+	-	TD	jr, sol, I
2. *Dicaeum agile*	Cabai gesit	Thick billed flowerpecker	+	-	-	-	-	TD	Sjr, sol, I
Nectariniidae									
1. *Nectarinia jugularis**	Madu Kuning	Olive backed sunbird	+	+	+	+	+	D	Sr, sol, N
2. *Anthreptes malacensis**	Madu kelapa	Brown throated sunbird	+	+	+	+	+	D	Sr, sol, N
3. *Anthreptes singalensis**	Madu Hutan	Ruby checked sunbird	+	-	-	-	+	D	Jr, sol, N
4. *Arachnothera longirostra**	Pijantung	Little spider hunter	+	-	+	-	+	D	Jr, sol, N
Ploceidae									
1. *Lonchura punctulata*	Peking	Scaly brested munia	-	+	-	+	+	TD	Sr, sol, I
2. *Lonchura leucogastroides*	Bondol jawa	Javan munia	-	+	+	+	-	TD	Sr, sol, I
3. *Passer montanus*	Br gereja	Erasia tree sparrow	-	-	-	+	-	TD	Sr, sol, I

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O = omonivores N = Honey suchker Sf = Seed feeder Sr = Frequently

Reptilia

There are not many reptiles species can be found in at the exploration area of PT BLE. The reptiles were found at the project area listed at Table 4. The commonest reptiles species were found is Common Skink *(Mabouya multifasciata)*.. This species was distributed at many type of habitat. Among reptiles species were found at the project area, they are not as protected species.

Table 4. Reptiles species can be found at exploration area of PT. BLE

Reptiles Species	Local Name	Common Name	Found With Frequencies					Status	Document
			1	2	3	4	5		
Scincidae 1. *Mabouya multifasciata*	kadal	Common skink	+	+	+	+	+	TD	Sr, sol, I
Geckonidae 1. *Gecko gekco*	Tokek hutan	Gekko	+	-	-	-	?	TD	Jr, sol, I
Agamidae 1. *Bronchochaella jubatus*	bunglon		+	?	?	+	?	TD	Jr, sol, I
Varanidae 1. *Varanus salvator*	biawak	Monitor	+	-	?	-	?	TD	Jr, sol, C
Phytonidae 1. Phyton reticulatus	Ular sanca	phyton	?	-	-	-	+	TD	Sjr, sol, C

Legend :
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+ = Found at sample plot ++ = Found at sample plot with abundances - = not found at sample plot
? = Present at sample plot, but not found during observation Jr = rare C = Carnivores Sol = Solitary I = Insectivores
Sr = Freqeuntly Jr = rare

Habitat Type

Species of wildlife were found at project area distributed at several habitat types such as riparian forest, secondary growth, forest plantation and re-greening area, rubber, coffee and piper plantation also home garden. It seems present relationship between species of wildlife with vegetation types (habitat type).

Many species of vegetation grown at riparian forest such terap (*Artocarpus elastica*), pulai (*Alstonia sp*), and Ara (*Ficus* spp). This forest present at left and right of Way Umpu and Way Sawa river with wide around 100 – 200 m. The riparian forest has 2-3 storeys. Wildlife species used this forest were 16 species of mammals, 40 birds species and 5 species of reptiles.
Forest plantation at Bukit Jambi was dominated by sonokeling (*Dalbergia latifolia*) with height of trees around 8 – 12 m. Besides this forest, secondary growth present at

exploration area of PT BLE with dominated vegetation of mahang (*Macaranga spp*) and shrubs like senduduk (*Melastoma malabatricum*) and putihan (*Eupathorium odoratum*). Wildlife species can be found at that habitat type around 34 species of birds, 12 mammals species and 4 species of reptiles. At the project area also present rubber, coffee, and piper plantation also paddy field, and home garden..

Rubber plantation at the project area is young with age less than 12 years. Simple storey was formed only one stratum and ground cover with grasses and shrubs. The piper plantation was shaded with lamtoro (*Leucena glauca*), but for coffee plantation is dadap (*Erythrina fusca*). For this habitat type was used by 5 species of mammals, 28 bird species and 2 species reptiles.

Home garden also became wildlife habitat type which closed with human activities. The vegetation was planted at the habitat type such as nangka (*Artocarpus heterophylla*), petai (*Parkia speciosa*) and kelapa (*Cocos nucifera*) also the others.

The Abundances and Local Distribution of Wildlife at The Project Area

Base on frequencies of wildlife can be found at the project area and the abundances individual number can be observed, so this phenomena expressed local distribution and abundances of wildlife species at exploration area of PT BLE. From mammals species, plantain squirrel (*Callosciurus notatus*) is dominat species. This fauna spread out all over habitat type at the property.

Table 5. The abundance and Local Distribution for several species of Wildlife at exploration area of PT BLE

Wildlife Species	Abundances	Frequencies be found at Habitat Type
Mammals		
1. *Callosciurus notatus*	Abundant	Present 75 % at habitat type of property
Birds		
1. *Streptopelia chinensis*	Abundant	Present 100 % at habitat type of property
2. *Collocalia esculenta*	Abundant	Present 100 % at habitat type of property
3 *Halcyon chloris*	Abundant	Present 100 % at habitat type of property
4. *Pycnonotus aurigaster*	Abundant	Present 100 % at habitat type of property
5. *Anthreptes malacensis*	Abundant	Present 100 % at habitat type of property
Reptiles		
1. *Mabouya multifasciata*	Abundant	Present 75 % at habitat type of property

Five species of bird such as spotted dove (*Streptopelia chinensis*), glossy swiflet (*Collocalia asculenta*), collared kingfisher (*Halcyon chloris*), Scotty headed bulbul (*Pycnonotus aurigaster*), and brawn throated sunbird (*Anthreptes malacensis*) are dominant species. Meanwhile for reptile's species, common skink (*Mabouya multifasciata*) was wide distributed at the project area.

Species Birds Diversity

Because bids are wildlife which abundant and spread out all over the project area, so ecological review of this fauna mainly the diversity will be consider. Diversity index of avifauna at the sample area is varied, the highest was at habitat type of riparian forest and the lowest was at home garden habitat type (table 6).

Diversity index have good relationship with equitability index, if the diversity is height, the equitability index became height or reserve. Some factors influenced to the diversity like habitat condition: such as availability of food, cover, shelter, and nesting site to support live being of birds.

Tabel. 6 Diversity and Equitability index of bids species at several habitat type At exploration area of PT BLE

Habitat Type	Diversity Index (H)	Equitability Index (E)
1. Riparian Forest	2.245	0.886
2. Rubber, Coffee, Piper Plantation	1.676	0.624
3. Secondary Growth	1.783	0.749
4. Home Garden	1.478	0.567
5.Forest Plantation & Re-greening	1.955	0.745

DISCUSSION

Wildlife diversity at exploration area of PT BLE is medium, because area for natural forest vegetation is small. The forest which still present at project area riparian forest, with vegetation diversity less diverse. Secondary growths also occur at property, but poor in vegetation diversity and condition isolated and fragmented. Besides, those natural vegetation, plantation forest present as re-greening area at Bukit Jambi with monoculture system planted by sonokeling (*Dalbergia latifolia*). Almost the reason less supported for diversity of wildlife. With less diverse on natural vegetation caused less to support habitat component such food, cover, shelter and nesting area for wildlife.

Most of wildlife which present abundant at the property is avifauna, but the others was low. Even though, at the project area have many protected species, it present around 40 % of mammals and 8.7 % of birds species. This phenomenon give indication if the mining

project will be developing at the area should be considered to the species and it used as one of criteria success on management of mining environmental.

Several species of wildlife has dominated at exploration area of PT BLE like plantain squirrel (*Callosciurus notatus*), spotted dover (*Streptopelia chinensis*), glossy swiflet (*Collocalia esculenta*), collared kingfiher (*Halcyon chloris*), Scotty headed bulbul (*Pycnonotus aurigaster*) and common skink (*Mabouya multifasciata*). Those species got suitable habitat for their live.

CONCLUSIONS & RECOMMENDATIONS

1. The wildlife/fauna has been found at the project area 16 species of mammals, 53 birds species and 5 species of reptiles. The diversity of wildlife was categorized medium, but for bird species richness significant high.

2. Among the wildlife have been identified 7 of mammals species, 9 birds species as protected species in Indonesia.

3. Riparian forest area should be lifted as natural vegetation at project area.

4. If the mining project will be developing at the area should be considered to the protected species of wildlife.

APPENDIX

Appendix 1. Selected Species Birds List

In the following account birds species are listed that have a globally threatened status: vulnerable and near-threatened (BirdLife International 2001).

Crested Serpent Eagle *Spilornis cheela*
Global status - Vulnerable (BirdLife International 2001). Field notes - Single birds fly above the plantation forest on Bukit Jambi. June, 2, 2006

Red Jungle Fowl *Gallus gallus*
Global status - Near-threatened (BirdLife International 2001). Field notes – Rare, Party of 2-4 birds searching food at piper plantation near Semijang riparian forest. June 4, 2006

Peaceful Dove *Geopelia striata*
Global status - Near-threatened (BirdLife International 2001), Field notes – Not uncommon. Single birds searching food at rubber the plantation June, 4, 2006

Graeter Coucal *Centropus sinensis*
Field notes – Not uncommon; Single birds searching food at secondary growth Bukit Jambi June, 4, 2006

Collared Kingfisher *Halcyon chloris*
Global status - Near-threatened (BirdLife International 2001). Field notes – Widespread in small numbers at project area

White Throated Kingfisher *Halcyon smyrnensis*
Global status - Near-threatened (BirdLife International 2001). Field notes - Widespread Rare, pare birds at fish pound closed to riparian Way Umpu River. June, 3, 2006

Blue Eared Barbet *Megalaima australis*
Global status - Near-threatened (BirdLife International 2001). Field notes – Rare, twice single bird calling at riparian forest near Way Umpu and Bukit Jambi . June 5, 2006

Coppersmith Barbet *Megalaima haemacephala*
Global status - Near-threatened (BirdLife International 2001). Field notes – Rare, single bird calling at randu trees near home garden . June 3, 2006

Sunda Woodpecker *Picoides molucensis*
Global status - Near-threatened (BirdLife International 2001). Field notes – Not Uncommon, several times observed the bird searching food at petai and sengon trees at home garden.

Rofous Woodpecker *Celeus brachyurus*
Global status - Near-threatened (BirdLife International 2001). Field notes – Rare, calling at petai trees, secondary growth and riparian forest also at Bukit Jambi forest

Scooty Headed Bulbul *Pycnonotus aurigaster*
Global status - Near-threatened (BirdLife International 2001), wide spread, dominant species bird can be found at every habitat type in exploration area of PT BLE.

Black Created Bulbul *Pycnonotus melanicterus.*
Global status - Near-threatened (BirdLife International 2001). Field notes – Not uncommon be found at riparian forest also at Bukit Jambi forest. June 2, 2006 and June 6, 2006

Great Tailed Racket Drongo *Dicrurus paradiceus*
Global status - Near-threatened (BirdLife International 2001). Field notes – Rare, pair bird at Riparian forest of Way Sawa. June 4, 2006

White-rumped Shama *Copyschus malabaricus*
Global status - Near-threatened (BirdLife International 2001). Field notes – Rare, single bird singing at Riparian forest of Way Sawa. June 4, 2006..

Magpie Robin *Copsychus saularis*
Global status - Near-threatened (BirdLife International 2001). Field notes - Rare, twice be found at secondary growth closed to home garden and at rubber plantation Bukit Jambi. June, 5, 2006.

Lesser Crow *Corvus enca*
Global status - Near-threatened (BirdLife International 2001). Field notes – Rare, pair bird fly over kampung. June 3, 2006

Short-tailed Babbler *Trichastoma malaccense*
Global status - Near-threatened (BirdLife International 2001). Field notes - Locally not uncommon. Singe at riparian forest Way Umpu. June 3, 2006

Chestnut-rumped Babbler *Stachyris erythroptera*
Global status - Near-threatened (BirdLife International 2001). Field notes – Rare, heard at secondary growth closed forest plantation Bukit Jambi and riparian Way Umpu June, 3 & 5, 2006

Pied Fantail *Rhipidura javanica*.
Global status - Near-threatened (BirdLife International 2001). Field notes – Rare, single bird was found at home garden. June 3, 2006

Thick-billed Flowerpecker *Dicaeum agile*.
Global status - Near-threatened (BirdLife International 2001). Field notes – Rare, single bird searching kersen fruit at home garden. June 5, 2006
Ruby checked Sunbird *Anthreptes singalensis*

Global status - Near-threatened (BirdLife International 2001). Field notes – Rare, single bird was found at riparian forest. June 2, 2006

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