



Study of Priority

# Plants and Endangered Wildlife Species

In Betung Kerihun National Park







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March 2015

**ITTO PD 617/11 (F) Rev.3**

Promoting Biodiversity Conservation in Betung Kerihun National Park  
(BKNP) as a Transboundary Ecosystem between Indonesia and state of  
Sarawak, Malaysia (Phase III)

**Study of Priority Plants and Endangered Wildlife Species  
in Betung Kerihun National Park**

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# Foreword

Thank God we pray to the Almighty God for all his blessings and gift on the occasion that has been given, so that we can finalize the activity report on Endangered Wildlife Species Assessment in Betung Kerihun National Park (The study of priority plants and endangered wildlife species (TSL).

We would like to thank you all profusely, all those who cannot be mentioned one by one, for all the help, feedback, criticism or encouragement and prayer, which were given to us. May God Almighty repay all your goodnesses.

Assessment on Biodiversity in Betung Kerihun National Park is compiled to give information about priority endangered species based on the results of a survey of biological diversity In Embaloh Sub-Watershed, Betung

Kerihun National Park. The report is expected to be a guide, framework, and reference in the management of this type of endangered species TSL so as to materialize the management plan effectively and efficiently in accordance with their status and function.

Hopefully this report will be useful.

Jakarta, March 2015



Yani Septiani  
Project Coordinator of ITTO PD 617/11



# Introduction

The study of priority plants and endangered wildlife species (TSL) in the Betung Kerihun National Park (TNBK), especially in the sub-watershed Embaloh was a continuation of the survey in order to update the data and information of biodiversity, which is one of the activities in “*Promoting Biodiversity Conservation in Betung Kerihun National Park (BKNP) as The Trans-boundary Ecosystem between Indonesia and State of Sarawak Malaysia (Phase III) - PD 617/11 (F) Rev.3*”. With the implementation of the activities of this study, the priority of the endangered species (TSL) should be studied further and managed in accordance with the priorities of the TNBK management. Moreover, during the implementation of the study it could be learnt that the social problem was related to the conservation efforts that can be designed and carried out with initiatives that support development of local communities concerned in the context of the TNBK management.

On this occasion, we would like to thank all parties who have assisted since the preparation, the implementation of field activities until the completion of this report. We also recognize that this report is still not yet perfect so that criticism and constructive suggestions are highly welcomed for the implementation of future activities.

Hopefully this report may be useful, especially for the strengthening of the biological diversity management, especially of endangered species (TSL) in TNBK.

Jakarta, March 2015

Implementation team



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# CHAPTER 1

## **Introduction**



## 1.1 Background

The Betung Kerihun National Park (TNBK) is a conservation area which has a very high biodiversity. Biodiversity data and information becomes the baseline for effective management of the area. One of the important factors in the *Framework* of an effective area management is the existence of a thorough planning. Planning is in the form of an area management plan, including management of Fauna and Flora and wildlife species (TSL) as end products. But until now, biodiversity management plan, in particular the management of wildlife species type TSL has not been implemented as expected.

Implementation of biodiversity management plan has not yet been done due to several factors. First, biodiversity data and information are not adequate. Secondly, the assessment of the biological diversity has not yet been carried out. Thirdly, the process of the formulation of the work program with parties has not been done well. Therefore, it is necessary to setup rules and management of the causative factors.

Assessment of the biological diversity as part of the management plan should consider to achieve the objectives of the management of the area. This assessment can be the basis in the determination of the scale of priorities for management of biodiversity. The determination of priority scale is to address the constraints of the inputs (human resources, financing, and more) to achieve effective management of the area. Thus, prioritization of management of endangered wildlife species TSL in the TNBK area needs to be done in a comprehensive manner.

## 1.2 Purpose and Objectives

### 1.2.1 Purpose

The purpose of the implementation of the Endangered Wildlife Species Assessment in Betung Kerihun National Park is to provide

guidelines, framework, or reference in the management of the endangered wildlife species TSL so as to realize a management plan that is effective and efficient in compliance with its status and function.

### 1.2.2 Objectives

Implementation of the Endangered Wildlife Species Assessment in Betung Kerihun National Park aims to: (1) determine which TSL species are the priority wildlife species which are endangered and (2) collect data and information on the selected priority TSL species.

## 1.3 Target

1. based on the biodiversity type, the target of this activity is some of endangered wildlife species TSL as the results of the Survey of Biodiversity In Sub Watershed Embaloh in Betung Kerihun National Park.
2. based on its location, the target of this activity is the Sub Watershed Embaloh in the TNBK area which is located in Kapuas Hulu Regency, West Kalimantan province.
3. based on the level of its administrators, the target of this activity is the Technical Management Unit (UPT) Balai Besar of Betung Kerihun National Park (BBTNBK) under the Directorate General of Forest Protection and Nature Conservation

## 1.4 Scope

The scope of activities are as tools to achieve the intention, the desired goals and objectives, including (1) the formation of the working team, (2) the preparation of a work plan, (3) the collection of data and information, (4) processing and analysis of data, and (5) discussion and reporting

### **1.5 Output**

The output of this activity is to document the assessment of the endangered wildlife species TSL for consideration in the biodiversity management plan of the TNBK area.

### **1.6 Source of Funding**

The source of funding for the Endangered Wildlife Species Assessment in Betung Kerihun National Park was the ITTO project PD 617/11 Rev.4 (F) 2013-2017.



CHAPTER 2  
**Methodology**



## 2.1 Location and Time

Desk-study activities were carried out in the office of the Balai Besar of the Betung Kerihun National Park (BBTNBK), while the survey was conducted in the area surrounding the Sub Watershed Embaloh of TNBK. Implementation time up to the completion of the preparation of the report was 30 working days, calculated from November 22 to December 21, 2014.

## 2.2 Research Methods

The approach that was carried out in this activity was in the form of a qualitative approach with the support of a quantitative approach. The research method used was the evaluation<sup>1</sup> and survey<sup>2</sup> methods. The evaluation method was conducted to analyze the extent of the biodiversity management in the TNBK area, in particular regarding the endangered priority species according to the results of the survey of biodiversity in the Sub Watershed Embaloh in Betung Kerihun National Park. Method of the survey focused on identifying factors that affect the sustainability of the priority endangered species.

## 2.3 Framework

The framework in the implementation of this activity is divided into two stages. First, the determination of the priority species threatened with extinction. Second, the assessment of the priority species threatened with extinction which was selected. The framework in the implementation of these activities is shown in Figure 1.

<sup>1</sup> The evaluation method used to determine the quality of matters, programs, etc. that have happened, usually by comparing with a standard (Irawan 2007)

<sup>2</sup> The survey research method was conducted to obtain the facts from existing symptoms and search for actual information, both about social institutions, economics, or politics from a group or an area (Nazir 2009)

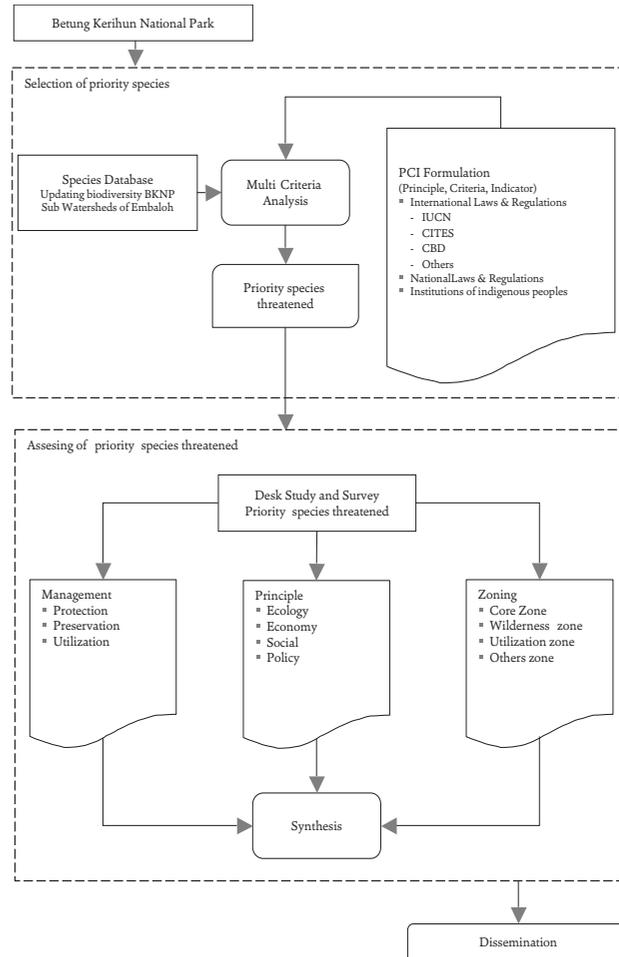


Figure 2. Framework of Implementation Activities

## 2.4 Species and Data Collection Techniques

The type of data required in this activity is qualitative and quantitative data. The information needed is related to the ecological, economic, and social aspects of the species the result of the Biodiversity Survey activities In the Sub Watershed Embaloh in Betung Kerihun National Park. The source of data on species types comes from government agencies,

educational institutions, non-governmental organizations, communities, as well as from the internet.

Data collection was carried out through review of documents<sup>3</sup>, distribution of questionnaire, and indepth<sup>4</sup> interviews. Review of documents was done by collecting recorded data that was already available from various sources which have been published. Distribution of the questionnaire was done to obtain the value of the level of interest in determination of priority species threatened with extinction. In-depth interviews were conducted to obtain data and additional information for the selected endangered species priorities. This interview was conducted on selected key informants by using the questionnaire techniques and direct interviews.

## 2.5 Data analysis

Data analysis in this activity was done qualitatively and quantitatively of the received data. The analysis was divided in 2 stages. Firstly, the selection of the priority species threatened with extinction. Second, assessment of priority species threatened with extinction that was chosen.

### 2.5.1 Selection of endangered priority species

Selection of endangered priority species was conducted to assist in the selection of species from all existing species data. The selection was carried out by using Multi Criteria Analysis (MCA). MCA was used as a decision-making tool in selecting species that will be assessed based on the priority. The steps to make this consisted of 4 stages, namely (1) drafting of the Principles, Criteria, Indicators (PCI), (2) weighting and scoring, (3) input and clearing of species data,

and (4) determination of endangered priority species.

#### 2.5.1.1 PREPARATION OF PRINCIPLES, CRITERIA, AND INDICATORS

PCI is structured to provide a framework that is consistent and easily understood in choosing species to be assessed. The principle in this activity is to determine the priority of endangered species as ingredient in the assessment. The criteria standards were prepared to be used to appraise the principle. The indicators were made to measure the status from the criteria by adding in gauges for the indicators. Preparation of the C & I was made through discussions between team members who supported the review of the document.

#### 2.5.1.2 WEIGHTING AND SCORING

Weighting and scoring was done through the assessment method by experts (expert judgment). Experts were selected from various parties who were considered to have the capacity to conduct an assessment of the criteria and indicators which were compiled. The selection of experts was based on the results of the discussions between members of the team. The weighting value was determined with a total value of all criteria of 100 %. The value of the indicators were sorted according to the level of influence on each criterion.

#### 2.5.1.3 CLEARING AND DATA ENTRY OF THE SPECIES

Clearing and data input is the process of sorting the species into PCI which has already been compiled and already had values (weights and scores). Species which have been entered into PCI came from the results of the survey of biodiversity activities In Sub Watershed Embaloh in Betung Kerihun National Park. The group of species which are only assessed taxonomically has been identified at the species level or sub species level that is part of the process of clearing the data. Data input was carried out by the

<sup>3</sup> Review of the documentation is a data collection technique through various documents (Irawan 2007).

<sup>4</sup> In-depth interview is a data collection technique through a conversation with a specific purpose (Maleong 2009).

team by sorting the species according to criteria and indicators (C&I) that had been prepared. Inclusion of these species into the C & I was based on the obtained data and information, either from the document management unit, results of discussions, or surfing of the internet.

**2.5.1.4 DETERMINATION OF ENDANGERED PRIORITY SPECIES**

Determination of priority endangered species to be assessed was sorted based on the values obtained from each of the criteria and indicators. Species that have the biggest values have the opportunity of becoming the species that will be considered. The value held by every species in question is rescaling and grading. Rescaling and grading/classification were done to reduce the options in determining a species that will be chosen to be assessed.

Rescaling was done to get the standard scores/the value which was the same between all the factors that will be used as well as extending the range of the grouping. The range of values used was between 10 and 100. The equation used is:

$$ScoreR_{out} = \left[ \frac{(ScoreE_{input} - ScoreE_{min}) *}{(ScoreR_{max} - ScoreR_{min})} \right] + ScoreR_{min}$$

Wherein:

- Score R<sub>out</sub> = Rescaling score result
- Score E<sub>input</sub> = Estimated score input
- Score E<sub>min</sub> = Minimum value of actual score
- Score E<sub>max</sub> = Maximum value of actual score
- Score R<sub>max</sub> = Highest score of rescaling
- Score R<sub>min</sub> = Lowest score of rescaling

The grading/classification were done to divide the scale of the priority species that will be assessed. The priority class was divided into 5 sub-classes with the same class intervals. The class with the highest value is the first priority to be considered and the lowest was the last priority (Table 1). Species listed in priority 1 are those TSL which will be assessed.

**Table 2.** Priority Clas

No	Class			Priority	Description
1	82.00	-	100.00	1	The threat of extinction is very high
2	64.00	-	82.00	2	The threat of extinction is high
3	46.00	-	64.00	3	The threat of extinction is modest
4	28.00	-	46.00	4	The threat of extinction is low
5	10.00	-	28.00	5	The threat of extinction is very low

**2.5.2 Assessment of endangered priority wildlife species**

Assessment of priority endangered species was done with a qualitative approach. Analysis used consisted of the descriptive analysis, the content analysis<sup>5</sup>, and the gap analysis. The limitation used in the assessment was the criteria and the indicators that were made in preparation of the PCI that was connected to (1) Management (protection, conservation, utilization), (2) Aspects (Ecology, Economy, Social, and the policy), and (3) Zoning. The results of the analysis were synthesized and presented in accordance with the objectives to be achieved in the implementation of these activities.

<sup>5</sup> Content analysis is a technical analysis of a variety of resources including printed and non-printed materials (Irawan 2007)





CHAPTER 3  
**Results and  
Discussions**



### 3.1 Selection of Priority Endangered Species

#### 3.1.1 Preparation of Principles, Criteria and Indicators

Preparation of PCI in the selection of priority endangered species threatened with extinction is

divided into five criteria with multiple indicators per criterion. The five criteria are as follow: (1) endemism (2) the status of the population, (3) the level of disturbance, (4) species management policies, and (5) institutional support. Table 2 shows the C & I prepared for selecting the priority endangered wildlife species.

**Table 2.** *Criteria and indicators for assessment of priority endangered species threatened with extinction*

No	Criteria	Indicator	Clarification	
1	Endemism	Endemic local	1.1	If the spread of species is limited to one of the areas/ regions with certain geographical restrictions
		Endemic regional	1.2	If the species is widespread on the island of Kalimantan/ Borneo
		Endemic National	1.3	If the species is only found in Indonesia
		Non Endemic	1.4	If the species is found not only in Indonesia
2	Population Status	Serious	2.1	If the species is experiencing a very high risk of extinction in the nature
		Critical	2.2	Species will face a very high risk of extinction in the nature in the near future
		Sensitive	2.3	Species reported to be facing a very high risk of extinction
		Almost threatened	2.4	The species that not yet fill the criterion of threatened but is expected to qualify for a threatened category in the near future
		Low risk	2.5	Species that have been evaluated but did not meet the criteria for being threatened
3	Level of disturbance	Species with commercial value	3.1	Species susceptible to disturbance because of having a quite high market demand
		Species to meet the needs of everyday's life	3.2	Species susceptible to disturbance because it is used by communities around the area of TNBK to meet the needs of everyday's life
		Species to meet the indigenous and religious needs, as well as part of the culture	3.3	Species that are used by people around the TNBK area for customary and religious purposes, as well as part of the culture
		Species that are considered being pest to community	3.4	Species experiencing disturbance because of being regarded as pest
		Species is not disturbed	3.5	Species which are not disturbed by the communities
4	Species management policy	Species management is not existing at all	4.1	Species which have not received enough attention from the management
		Species management is already existing but it is not optimal	4.2	Species that have received attention but management has not yet focused on it

No	Criteria	Indicator	Clarification	
		There is already a good and successful species management	4.3	Species which has received considerable attention and has been managed well
5	Institutional Support	Formal Informal rules	5.1	Already there are both informal and formal rules that support the conservation of species
		Formal rules	5.2	Already there are rules that formally support the conservation of the species; e.g. public policy
		Informal rules	5.3	Already there are rules which support informally species conservation; e.g. social norms
		There are no rules	5.4	There are no rules that support species conservation

### 3.1.2 Weighting and Scoring

Weighting and scoring of C & I was carried out by experts. The criterion of being endemic had the biggest weight (26%) and institutional support had the smallest value (14%). This shows that extinction threaten of a species was really affected by the level of the endemicy of the species. In addition, the criteria for

species management policy have an influence on the level of the threat. Management/good management of the species which is successful will certainly become the factor that would minimize the rate of species extinction and even that it will not be threatened again. Figure 2 and Table 3 show the weights and weighted indicator scores made by the experts.

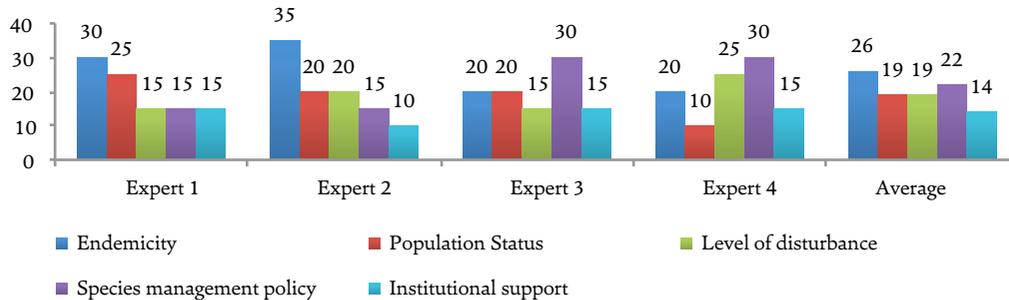


Figure 2. The percentage weight of each criterion

Table 3. Scoring indicators per criteria

Criteria 1		Criteria 2		Criteria 3		Criteria 4		Criteria 5	
Indicator	Score								
1.1	5	2.1	5	3.1	5	4.1	5	5.1	5
1.2	4	2.2	4	3.2	4	4.2	4	5.2	4
1.3	3	2.3	3	3.3	3	4.3	2	5.3	3
1.4	1	2.4	2	3.4	2			5.4	1
		2.5	1	3.5	1				

### 3.1.3 Cleaning and Data Entry of Species

Cleaning and species data input was carried out for the species groups that have been identified at the species level. Results of the updating of the survey data of threatened Biodiversity at Sub Watershed Embaloh in Betung Kerihun National Park, showed that there were as many as 462 species recorded which were divided into 7 groups. Table 4 shows, 339 types were identified to the species level of the total species surveyed (or 73.38%). Entering the species data into C & I was done, which has already been prepared and had values (weights and scores). Entering the species types into C & I was made based on data and information per species.

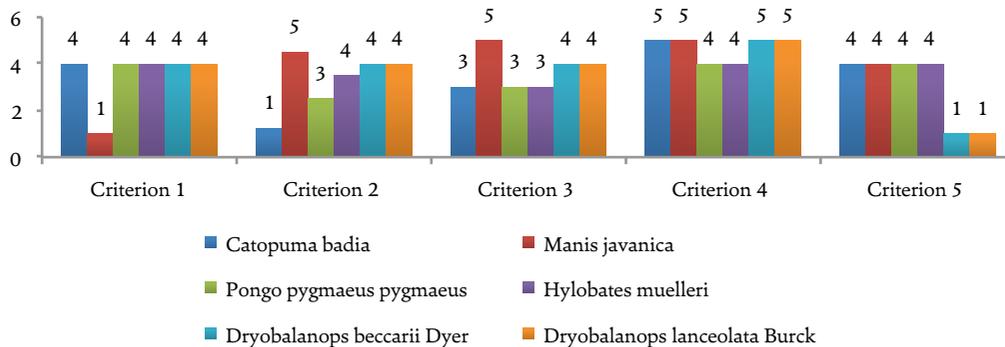
### 3.1.4 Determination of Endangered Priority Species

The species selection of the endangered priority species was carried out through a classification based on the priority scale. The species which was put into priority class 1 was the species that was to be assessed. The species that was entered into the priority 1 assessment consisted of 6 types. These species were: *Catopuma badia*, *Manis javanica*, *Pongo pygmaeus pygmaeus*, *Hylobates muelleri*, *Dryobalanops beccarii*, and *Dryobalanops lanceolata*. Figure 3 shows the assessment of the indicators for each criterion. The six species had a weighted

value over 82.00 and assessed of existing scores (Table 5). The six species which will be assessed fit into 3 big groups. These three groups consist of mammals, primates, and flora. Results of the determination of priorities in the assessment are included in the annexes.

**Table 4.** *The following species types were assessed*

No	Groups	Total Species		Percentage
		Updating Result	Identified	
1	Birds	52	52	100.00
2	Flora	225	127	56.44
3	Herpetofauna (reptiles and amphibians)	32	28	87.50
4	Fish	22	21	95.45
5	Insects	82	62	75.61
6	Mamalia & Primata	49	44	89.80
Total		462	339	73.38



**Figure 3.** *Results of the assessment of criteria and indicators for species priority 1*

**Table 5.** Results of the determination of priority species threatened with extinction

No	Scientific Name	Local Name	Group	Result
1	<i>Catopuma badia</i>	Kucing merah	Mamalia	100.00
2	<i>Manis javanica</i>	Trenggiling	Mamalia	91.21
3	<i>Pongo pygmaeus pygmaeus</i>	Orangutan	Primata	90.79
4	<i>Hylobates muelleri</i>	Kelempiau	Primata	90.79
5	<i>Dryobalanops beccarii</i>	Keladan	Flora	90.37
6	<i>Dryobalanops lanceolata</i>	Kelansau	Flora	90.37

C & I shows the mentioned six species the average species which constitute the regionally endemic ones except *Manis javanica*. *Manis javanica* is a species that goes into the critical status of the population. At the level of disturbance, the pangolin/anteater is the species that has the highest threat level because it is the species that has a very high commercial value. As regards criteria of the management of the species, all species types not yet have a good and successful management scheme. At the institutional level, the flora has no regulations in particular, and all kinds of animals already have formal rules to prevent the occurrence of extinction. Table 6 shows the criteria and indicators of 6 species of priority 1 for assessment.

**Table 6.** Criteria and indicators for species of priority 1

Species	Criteria/Indicator				
	Endemicity	Population Status	Level of Disturbance	Species Management	Institutional Support
<i>Pongo pygmaeus pygmaeus</i>	Endemic regional	Critical	Species to meet the needs of indigenous and religious peoples	Species management exists but not optimal	Formal Regulation
<i>Hylobates muelleri</i>	Endemic regional	Critical	Species to meet the needs of indigenous and religious peoples	Species management exists but not optimal	Formal Regulation
<i>Dryobalanops beccarii</i>	Endemic regional	Critical	Species for the fulfillment of the needs of everyday's life	Management of species does not exist at all	There is no formal regulation
<i>Dryobalanops lanceolata</i>	Endemic regional	Critical	Species for the fulfillment of the needs of everyday's life	Management of species does not exist at all	There is no formal regulation
<i>Catopuma badia</i>	Endemic regional	Critical	Species to meet the needs of indigenous and religious peoples	There is no species management	Formal Regulation
<i>Manis javanica</i>	Non Endemic	Critical	Species which have a commercial value	Management of species does not exist at all	Formal Regulation

## 3.2 Assessment of Endangered Priority Species

### 3.2.1 *Catopuma badia*

#### 3.2.1.1 TAXONOMY



Source: [www.httpcarnivoraforum.com/topic93290861.jpg](http://www.httpcarnivoraforum.com/topic93290861.jpg) Accessed on 27 December 2014

**Figure 4.** *Catopuma badia*

The species *Catopuma badia* has a skull morphology which distinguishes it from other types of *Pardofelis*. Sicuro and Oliveira (2011) in the IUCN (2014) states that the structure of the skull of *Pardofelis* slightly different from that of the Kucing merah (local name). In addition, *Pardofelis* have a flexible ankle joint and a long tail as a way of adaptation to arboreal life. These things are parts that are not owned by a Kucing merah. On these differences, the IUCN SSC Cat

Specialist Group includes the badia species and allocated it into the *Catopuma* family.

Taxonomy of the *Catopuma* species is as follows:

Kingdom : Animal  
 Phylum : Chordata  
 Class : Mammal  
 Order : Carnivora  
 Family : Felidae  
 Genus : *Catopuma*  
 Species : *Catopuma badia* (Synonym : *Felis badia* ; *Pardofelis badia*)

#### 3.2.1.2 ENDEMICITY

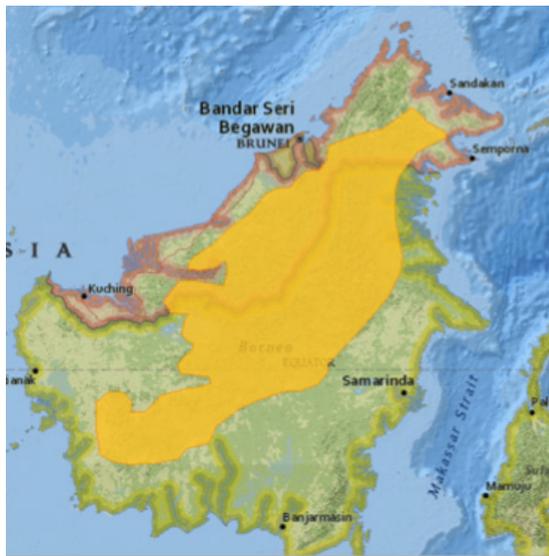
The *Kucing merah* (Red cat) is a species that is regionally endemic and it is an endemic cat of Borneo discovered by Wallace in 1855 and was named by Gray in 1874. This cat is one of the most rare species in the world (Meijaard 1997; Sunquist Sunquist 2002; Azlan and Sanderson, 2007). Records with regard to information about *Kucing merah* (Red cat) are very few. Since 1855 until 2005 there are only 24 recorded information of *Kucing merah* in Sarawak, Sabah, and Kalimantan (Azlan and Sanderson, 2007). This species was encountered in the primary forest, the primary dipterocarp forest, the secondary dipterocarp forest, and the mangrove forest. Moreover, in 2009, *Kucing merah* (Red cat) was recorded by Azlan et al. (2009) in Deramakot Forest Reserve, Malaysia. In TNBK it was first recorded<sup>6</sup> in connection with the updating of the biodiversity data. Results of the interview mentioned that the species *Kucing merah* (Red cat) was still being encountered in the upstream of the Sub -Watershed Embaloh which is part of the TNBK area.

#### 3.2.1.3 POPULATION STATUS

The status of the population of *Kucing merah* in the Sub Watershed Embaloh in TNBK area is

<sup>6</sup> Results of follow-up interview with the Dayak Tamambaloh and Dayak Iban around the Embaloh Sub-Watershed in TNBK which was conducted in December 2014 in connection with the updating of biodiversity data in the Sub-Watershed Embaloh in the TNBK area

not known. This is due to the lack of records of this type and within the exploration activities that have been done to date. The interview has indicated that the chance of the locals to encounter this species in the area is very little, while it still can be found in the TNBK area. At the international level, IUCN put the *Kucing merah* in the Endangered Status as C1. Ver 3.1, which means that the population size of *Kucing merah* is estimated at less than 2,500 adult individuals and would decline by 20 % within five years or within two generations (IUCN 2014). According to this, the management unit should make an effort to find out where to estimate the population of this *Kucing merah* species.



Source: <http://maps.iucnredlist.org/map.html?id=4037>. Accessed on 27 December 2014..

**Figure 5.** Distribution of *Catopuma badia*

### 3.2.1.4 LEVEL OF DISTURBANCE

The level of the disturbance was the factor that influenced the existence of the *Kucing merah*. Nowell and Jackson (1996) in Azlan and Sanderson (2007) mentioned that habitat damage and the hunting were always regarded

as threat to the species of the Felidae family. The *Kucing merah* species is likely to face the same threat in Borneo (Azlan and Sanderson, 2007). According to IUCN (2014), the threat to the *Kucing merah* species was due the loss of its natural habitat because of logging of the forest and the conversion of the forest for the development of oil palm plantations.

At the local level around Sub Watershed Embaloh, several communities from the Dayak Tamambaloh and Dayak Iban Ethnic Group stated that the species *Kucing merah* was rare to be encountered, but if the community met this species around the settlement it will be killed, because being regarded as a wild animal and threatening. The conditions mentioned by both the references and results of the interviews indicated that the *Kucing merah* species will have a fairly high level of disturbance as one of the threatening factors.

### 3.2.1.5 SPECIES MANAGEMENT

TNBK does not yet have a species management plan, including for the *Kucing merah* species. There is a lack of attention towards this species because of the *Kucing merah* species was not yet recorded in the TSL database of TNBK. Azlan & Sanderson (2007), gave seven recommendations for conservation of the *Kucing merah* species, namely: (1) *Kucing merah* must be included in CITES Appendix I, with a strict ban on the trade; (2) management priorities should include the establishment of many protected areas and even better where *Kucing merah* is found; (3) Breeding facilities must be improved in captivity for *Kucing merah*; (4) a survey at regional scale was needed to increase knowledge about the geographical distribution, the habitat preferences, and the threat to the *Kucing merah*; (5) mitigation towards the extraction of natural resources and the conversion of the habitat where *Kucing merah* can be encountered must be carried out; ( 6 ) Breeding of *Kucing merah* should be initiated immediately in cooperation

with international facilities, possibly it could start with captured *Kucing merah*; (7) Further research must be carried out about the existence of *Kucing merah* in Brunei.

The initial stage in the conservation of the *Kucing merah* can be based on available references. The beginning stage of conservation of the *Kucing merah* could refer to the conservation recommendations of *Kucing merah* by Azlan and Sanderson (2007), but this conservation recommendation must be adapted to the situation and the conditions of the TNBK. One of the recommendations that could be applied from the seven conservation recommendations of the *Kucing merah* which should be done immediately in TNBK, is a survey to know the geographical distribution, the habitat preferences, and the threat to the *Kucing merah*.

### 3.2.1.6 INSTITUTIONAL

Regulations on conservation efforts of *Kucing merah* species are listed in the formal rules. At the national and international level *Kucing merah* was one of the Cat species that was protected by PP 7/2009<sup>7</sup> and also included in the list of CITES Appendix II. At the level of the local communities around the Sub Watershed Embaloh they do not yet have good rules, neither written nor not written for the protection of the wild animals, especially the *Kucing merah*. Based on this situation, Azlan and Sanderson (2007) recommended that *Kucing merah* must be included in CITES Appendix I, with a strict ban on the trade. This recommendation is important to be paid attention to internationally, considering the shortage of information about this species and the threat towards it which will continue to increase.

## 3.2.2 *Manis javanica*

### 3.2.2.1 TAXONOMY



Source: <http://www.arkive.org/sunda-pangolin/manis-javanica/image-G61802.html>. Accessed on 27 December 2014

**Figure 6.** *Manis javanica*

*Manis javanica* that exists in the TNBK is one of the 8 species types in the world. There are eight types of pangolin (anteaters), namely: *Manis javanica*, *Manis pentadactyla*, *Manis crassicaudata*, *Manis culionensis*, *Uromanis tetradactyla*, *Phataginus tricuspis*, *Smutsia temminckii*, and *Smutsia gigantean* (Challender et al. 2014). The following is the taxonomy of *Manis javanica*, (IUCN 2014) namely:

Kingdom : Animalia  
 Phylum : Chordata  
 Class : Mamalia  
 Ordo : Pholidota  
 Family : Manidae  
 Genus : Manis  
 Spesies : *Manis javanica*

<sup>7</sup> Indonesian Government Regulation No. 7 of 1999 on the Preservation of Fauna and Flora

### 3.2.2.2 ENDEMICITY



Source: <http://maps.iucnredlist.org/map.html?id=12763>. Accessed on 27 December 2014

**Figure 7.** Distribution of *Manis javanica*1

Pangolins are spread throughout the region and are not concentrated in one area. The anteater geographical distribution is quite wide this species is recorded in almost all regions of South-East Asia, southern China and Myanmar, including the lowlands of Laos. This species has been encountered in Thailand, southern and central Vietnam, Cambodia, Peninsular Malaysia, Sumatra, Java and the surrounding islands, Borneo (Malaysia, Indonesia, Brunei) (IUCN, 2014). The anteater lives in the primary and secondary forest, including the lowland dipterocarp forest, as well as the agricultural areas including the oil palm and rubber plantations. The anteater was recorded to be able to live from the lowland area until 1700 meter above sea level (IUCN 2014). At a local level, the information from several communities of the Dyaks Tamambaloh and Dayaks Iban around the Sub Watershed Embaloh TNBK suggests that the pangolins can be found around settlement

areas in the upstream of the Sub Watershed Embaloh that is situated in the TNBK area.

### 3.2.2.3 POPULATION STATUS

The population of *Manis javanica* in the TNBK area is not yet known. This is due to the absence of a special study of the species. When referring to the international references the population of pangolin shows a quite alarming condition. IUCN puts the anteaters in the Critically Endangered Status *A2d+3d+4d Ver 3.1*. This status means the conditions for anteater copulation internationally has been critical and approaching the extinction.

### 3.2.2.4 LEVEL OF DISTURBANCE

The level of disruption to *Manis javanica* leads to illegal trade, both locally and internationally. According to Chan (2001) in Semiadi et al. (2008), the Pangolin trade internationally is a global issue that has long been underway. The main problem of this trade is the magnitude of the demand for Pangolin from China. Initially the demand could be satisfied from countries around China, but after an increase in the demand, the demand for Pangolin could not be satisfied only from China and Malaysia. A note stating that the export of Pangolin from Java to China had begun as early as in 1925, but the growth of population and economy in South China pushed the demand for Pangolin to a higher level than ever before.

The pangolin hunt has recently reached a disturbing level of the population. One example is on the Riau Islands, after three years of hunt for Pangolin the population of Pangolin on Riau Islands dropped dramatically. Most of the hunting is done by local communities (Semiadi et al., 2008). In addition to the Riau Islands, in Sabah which is located on the same island as TNBK local communities also hunt Pangolin around their villages, but if it is not found in the vicinity of the village they also hunt in the forest (Tuuga, 2008).

At the local level in the Sub Watershed Embaloh the same disturbance occurs to the Pangolin. This species is an animal that is hunted by some communities as Dayak Tamambaloh and Dayak Iban. Besides communities surrounding Sub Watershed Embaloh, there are also hunters and traders of Pangolin coming from Putussibau and Malaysia. Lately, hunting of Pangolin in Sub Watershed Embaloh became rampant because the price of Pangolin skin reached Rp 2,400,000-Rp 2,800,000- per ounce. Pangolin hunting is done around settlements, but according to information<sup>8</sup> from the people, there are indications that the hunters have already started penetrating into the TNBK area. Based on information from communities, at about the end of November 2014 there were some people who brought snares to hunt Pangolin in the TNBK area.

### 3.2.2.5 SPECIES MANAGEMENT

Information on taxonomy and ecology of Pangolin in TNBK at the moment is still very minimal. The lack of research on ecology and taxonomy of the Pangolin is also occurs at the national level (Semiadi et al. 2008). Therefore research on ecology and taxonomy of the Pangolin is very important to be undertaken in Indonesia particularly in TNBK which is the natural habitat of the Pangolin. In addition to research, prevention against poaching of Pangolin is also very necessary to undertake. One of the prevention efforts is to do public awareness with communities about the conservation of the Pangolin.

Breeding of Pangolin can be one of the types of conservation activities which can be carried out abroad. Yang et al. (2007) in Sheperd (2008) cite the high threat to Pangolin occurring internationally through to local levels which raises the thought to encourage some people to breed species of Pangolin, although Pangolin is

known to be very difficult to live and breed in captivity. Vietnam has created a handbook for cultivation of Pangolin under the title “the Sunda Pangolin (*Manis javanica*) Husbandry Guideline” (Van Thai et al., 2014). With the existence of the cultivation handbook it is expected that it will be a reference for future cultivation of Pangolin, so as to raise the Pangolin population in nature that can be maintained.

### 3.2.2.6 INSTITUTIONAL

Pangolin is in a critical condition therefore the trafficking should be minimized with a strong law enforcement because this species has been protected based on PP 07/1999. According Semiadi et al. (2008) strong law enforcement should be carried out in the country in conjunction with an International commitment so that illegal pangolin trade can be controlled. Furthermore Semiadi et al. (2008), conveyed that law enforcement against illegally traded Pangolin should be reviewed for their effectiveness at least once every three year. Although considering addressing the problem of illegal Pangolin trade, the law enforcement needs adjustment to the conditions of the culture of the local community. This was done so that law enforcement can go hand in hand with the customary rules in an effective manner as well as with the understanding of the local community.

<sup>8</sup> Interviews with key informants in the area of the Sub Watershed Embaloh on 13-14 December 2014



**Figure 8.** Interviews with key informants of local communities

### 3.2.3 *Pongo pygmaeus pygmaeus*

#### 3.2.3.1 TAXONOMY

Orangutans are the only great apes that live in Asia, but are currently only found in Borneo and Sumatra (Groves, 1999 in Bernard, 2003). Furthermore, the Orangutans which is found in those two places are different species based on the classification made in 1999. For Sumatra it is *Pongo abelii*, while for Borneo it is *Pongo pygmaeus*.

Warren et al. (2001) in the IUCN (2014) mentioned, based on mitochondrial DNA analysis, that orangutans in Kalimantan are divided into three sub species namely *Pongo pygmaeus pygmaeus*, *Pongo pygmaeus wurmbii* and *Pongo pygmaeus morio*. Based on the description of the location distribution, the Orangutans that can be found in TNBK is the species of *Pongo pygmaeus pygmaeus* which is spread across Sarawak and Kalimantan in the Northwest. The following is the taxonomy of *Pongo pygmaeus pygmaeus* of (IUCN 2014):

Kingdom : Animalia  
 Filum : Chordata  
 Kelas : Mamalia  
 Ordo : Primata  
 Famili : Pongidae  
 Genus : Pongo  
 Spesies : *Pongo pygmaeus*  
 Sub Spesies : *Pongo pygmaeus pygmaeus*



Source: Rizky Gumelar/TNBK

**Figure 9.** *Pongo pygmaeus pygmaeus*

#### 3.2.3.2 ENDEMICITY

Orangutans are endemic to Borneo. Orangutans can be found in Sabah and Sarawak, Malaysia as well as in Kalimantan, Indonesia (IUCN, 2014). The habitat of Orangutan is quite varied, ranging from primary and secondary Dipterocarp forests, swamps, peat bogs, and even recorded on the forest hills up to an elevation of 1500 meters above sea level, however on a hilly forest habitat its density is lower compared to other habitats. (MacKinnon 1974; Rijksen 1978; Payne 1988; Payne and Andau 1989; Rijksen and Meijaard 1999; Bernard et al. 2003). For the sub species *Pongo pygmaeus pygmaeus* which is in the TNBK, it is spread from North West Kalimantan or North of the Kapuas River to Northeastern Sarawak. From the results of the

interviews<sup>9</sup>, the Orangutans in the TNBK area still can be easily found in the forests around the villages or in the inland river Embaloh.

### 3.2.3.3 POPULATION STATUS

IUCN puts the Borneo Orangutan sub species *Pongo pygmaeus pygmaeus* in the Endangered Status of A2cd+3cd+4cd ver 3.1, which means that the Orangutan population has decreased more than 50% during the last 60 years (IUCN 2014). At the TNBK level, the last entry about Orangutan Population in TNBK was in 2014. BBTNBK (2014) stated that the number of Orangutan in the TNBK is  $1.9 \pm 1.21$  or 2 individuals/km<sup>2</sup>.



Source: <http://maps.iucnredlist.org/map.html?id=1797>. Accessed on 27 December 2014

**Figure 10.** Distribution of *Pongo pygmaeus pygmaeus*

### 3.2.3.4 LEVEL OF DISTURBANCE

Disturbances to the presence of Orangutans and their habitats are caused by several factors. Disturbances such as the utilization of legal and illegal timber, forest fires, and forest conversion to agriculture and settlement are activities which

to date are the factors that interfere with the natural habitat of the Orangutan. (Wilson and Wilson 1975; EIA 1998; Rijksen and Meijaard 1999; Yeager 1999; Bernard 2003). In addition to the disruption of the habitat, hunting of Orangutans for their meat and for trade also contributing factors which interferes with the Orangutan population (IUCN 2014).

Nowadays, many communities around the Sub Watershed Embaloh have already stopped hunting orangutans. This is because they are already beginning to understand the value of the importance of Orangutan. Nevertheless, some people still think that killing the Orangutan is the good thing to do if the living conditions were hard pressed and/or not getting other game animals such as wild boar.

### 3.2.3.5 SPECIES MANAGEMENT

Government provide support in the management of Orangutan species through laws and regulations. These regulations<sup>10</sup> form the strategy and action plan for conservation of orangutans in Indonesia, National Conservation Strategic Direction and the Determination of 14 (fourteen) Endangered Species which are made into the Top Priority Species Population to increase by 3% in 2010-2014. This policy has consequences for BBTNBK to do more intensive conservation efforts for Orangutans. This is because TNBK is a working area unit of the Ministry of Forestry which is managing the natural habitat of the orangutan.

Until now, conservation efforts that have been made by BBTNBK to the Orangutans in TNBK were the identification of the suitability of the habitat of the Orangutan, inventory of the Orangutan populations, monitoring feeding of the Orangutan, Monitoring Orangutan, as well

<sup>9</sup> Interview with communities around Sub Watershed Embaloh on 13-14 December 2014

<sup>10</sup> Ministry of Forestry Regulation Number: P.53/Menhut-IV/2007 about Strategy and Action Plan for Orangutan Conservation Indonesia 2007-2017; Ministry of Forestry Regulation Number P.57/Menhut-II/2008 about National Conservation Strategic Directions; and Decision of DirGen PHKA Number: SK.132/IV-KKH/2011 about Determination of 14 (fourteen) Endangered Species which are made into Top Priority Species Population to increase by 3% in the year 2010-2014

as orangutan conservation campaign. These efforts are expected to help the success of the conservation of orangutans in TNBK, which incidentally is the policy of the Ministry of Forestry.

Although the Orangutan conservation efforts have been made by BBTNBK, but these efforts need to be periodically reviewed and developed in order for Orangutan conservation efforts in TNBK to become better and more effective. To establish the mechanisms for research and development of Orangutan conservation efforts in TNBK, it would require a local scale Orangutan conservation plan in TNBK, which until now does not exist.

### 3.2.3.6 INSTITUTIONAL

Support for the orangutan conservation efforts in Indonesia has been started since 1931, with the publication of the Wild Animals Protection Ordinance No. 233 of 1931. In the course of time, as an orangutan conservation effort PP 07/1999 was also published. Other regulations issued later included among others Regulations 57/2008 and Regulation by DirGen PHKA 132/2011. Meanwhile, the Ministerial Decree 467/1995<sup>11</sup> concerning the designation of the TNBK area, strengthening the protection of the orangutan and it mentions that orangutan was one of the considerations in the designation of the area as a national park area.

In addition to the rules of the Government regarding the conservation of Orangutans there are also CITES that lists Orangutans in Appendix I with strict trading rules (IUCN 2014). At the local level, there are no customary rules created by the communities around the TNBK in Sub Watershed Embaloh regarding hunting of wildlife species including Orangutans. However, the traditional institutions have given a verbal

appeal to the communities to maintain the sustainability of protected animals, especially Orangutans.

## 3.2.4 *Hylobates muelleri*

### 3.2.4.1 TAXONOMY

Almost the entire body of Gibbon or Kelempiau (*Hylobates muelleri*) is covered with colored hair ranging from brownish to grayish, except the head and belly which are black. At the front there is a ring-shaped light-colored fur.



**Figure 11.** *Hylobates muelleri*

Males are generally paler than females, with colored eyebrows which are also much lighter. Gibbon's body size ranges from 420-470 mm with an average weight of 5-7 kg (Fleagle 1988). Like the other apes, Gibbons have no tail and tail bone. There are three sub species namely *Hylobates muellerii muellerii*, *Hylobates muellerii abbotti*, and *Hylobates muellerii funereus* which have slightly different characteristics from one another. *Hylobates muellerii muellerii* is gray or darker brown, while the other two types are paler. The classification of Gibbon as follows:

Kingdom	: Animalia
Phylum	: Chordata
Class	: Mamalia
Ordo	: Primata

<sup>11</sup> Ministry of Forestry Regulation Number 467/Menhut-II/1995 of year 1995 regarding Changing Function and Nature Reserve Designation Bentuang Karimun of Tk. II Kapuas Hulu District, Tk 1 Region of West Kalimantan covering an area of ±800.000 (Eight Hundred Thousand) Hectare to be a National Park with the name of Taman Nasional Bentuang Karimun

Family : Hylobatidae  
 Genus : Hylobates  
 Species : *Hylobates muellerii*  
 Sub Species : *Hylobates muellerii muellerii*,  
*Hylobates muelleri abbotti*,  
*Hylobates muelleri funereus*

Gibbon is living a monogamous life and has a social system. In addition to the parent males and females in the group, there are one or two kids who have not been able to stay independently. The female group tends to be more dominant over the males. Parent male and female will be moved from the group when their child enters puberty age. To recognize the Gibbon one can hear the distinctive and piercing voice. These species have a windpipe situated under the chin to help improve the call. Calls are made by males and females, but are dominated by females. Generally Gibbon begins to sound from 05:00 until around 06:30 every morning. This call is important because it helps to keep the bonding pairs to breed and also help to build and maintain the territory.

#### 3.2.4.2 ENDEMICITY

Gibbon is endemic to the island of Borneo. The animals have a limited distribution in Central Kalimantan and some parts of Borneo (East Malaysia) and Brunei. There are three subspecies namely *Hylobates muelleri muelleri*, *Hylobates muelleri funereus* and *Hylobates muelleri abbotti*. *Hylobates muelleri muelleri* is spread south of the rivers Mahakam and Barito West. The sub species *Hylobates muelleri abbotti* is found in the northern part of the Kapuas River in West Kalimantan and in the northwards direction until the river Saribas in Sarawak. *Hylobates muelleri funereus* the last sub species is distributed in parts of Borneo Island, i.e. between the Saribas river (Sarawak) and Karangan river in East Kalimantan, in the northwards direction until Sarawak (Groves 2001).

Gibbon lives in primary and secondary forests or dipterocarp forests up to an altitude

of 1,500 meters above sea level (Leighton 1987). However, the population in Sabah is found up to an elevation of 1,700 meters above sea level (Yasuma and Andau 2000). The density of population in the lowlands is quite high and it declines in the highlands (Nijman V. 2001). Some of the natural habitat on the island of Borneo is the Betung Kerihun National Park, the National Park of Bukit Baka-Bukit Raya, the Kayan Mentarang National Park, Kutai National Park, Wain River Protection Forest and Tanjung Puting National Park in Indonesia. While in Malaysia in Lanjak Entimau Nature Reserves and Semengok Protected Forest.



Source: <http://maps.iucnredlist.org/map.html?id=10551>. Accessed on 27 December 2014

**Figure 12.** Distribution of *Hylobates muellerii*

In the Sub Watershed Embaloh, the Gibbons exist not only in the TNBK area, but also in the surrounding primary and secondary forests. Gibbon generally prefers relatively undisturbed forest because it has long arms to swing from tree to tree with a distance of up to 10 meters or more (Fleagle 1988). Therefore, Gibbons are increasingly difficult to find around the settlements which are located in the Sub Watershed Embaloh because the already growing expansion of the settlement areas, agricultural fields and community gardens, so the trees

which the Gibbons liked were also difficult to find.

### 3.2.4.3 POPULATION STATUS

On a global scale, the international conservation organization (IUCN) assigned the status Critical<sup>12</sup> for the Gibbons (Endangered A2cd ver 3.1). This species is considered endangered based on the reduction of an estimated population of more than 50% during the last 45 years (3 generations) resulting from the habitat reduction, illegal hunting, trade in wild animals and for human consumption (Ancrenaz *et al* 2008). The policy for the protection of the Gibbon species was also done by the Convention on International Trade in Endangered Species (CITES) which classified these species into the Appendix I, which means it should not be traded in any form on the international trade market.

At the management level, the population status is not certainly known in the TNBK area. However direct encounters or hearing of voices is often reported by officers of TNBK and local communities. In general, local communities do not think that Gibbon will be extinct in their territories. One of the fenomen is that the species still easily can be found in the surrounding forests.

However, given the highly endangered status globally, the manager's side must pay attention to the existence of this species in the TNBK area. Population survey efforts of species in the TNBK area must be carried out to get information over its status.

### 3.2.4.4 LEVEL OF DISTURBANCE

The disturbance of the existence of the Gibbon species consists of several factors. The main threat to the disturbance of the Gibbon's habitat is the deforestation as a result of the

change in the forest function by converting it into oil palm plantation and illegal logging (Mejiaard *et al* 2005). Another threat to the reduction in population is due to hunting and illegal trade (Nijman 2005).

Threat of disruption of habitat due to deforestation also occurs in the Sub Watershed Embaloh. In areas adjacent to settlements land clearing for agriculture and plantations belonging to the communities has also occurred. In the Sub Watershed Embaloh also there are private oil plantations, which are certainly in land clearings where forest has been cut down. The habitat reduction is causing increased difficulties of meeting Gibbons around the settlement.

The Gibbon population is also under threat, although the level is still being classified as low. The ethnic Dayaks living around the TNBK area still hunt it because of the habit that was born from their culture. The hunt for a Gibbon is done accidentally, rarely done just for pleasure and done if there is a disappointment when no other games can be found (pigs, chevrotain or mouse deer, deer and antelope) in the forest. Some people are still eating Gibbon meat because it is tastier as compared to other primates.

Some time ago when illegal logging activity was booming in the Sub Watershed Embaloh, many captured baby Gibbons to be a pet. Moreover trading also happened on a small scale because of the number of requests. However for present condition it can be said that this trading activity does not exists anymore. However the disturbance to catch the animal for keeping it as an illegal pet is still happening. This may be found in the Lanjak area, where some people keep Gibbons in their homes.

When habitat is currently disturbed, the alternative is to move to the protected forests and TNBK area. The existence of protected and conservation areas is considered as the defense fortress of the habitat of the wild animal species because it has a strong legal status. Natural habitat located in protected forest areas

<sup>12</sup> What is meant by Critical category is a species of very high risk of extinction in the nature and in the near future, and at risk of becoming critical. According to Nijman, still from 2003 to 2004 54 Gibbon species was traded on several markets in Kalimantan

and the relatively undisturbed TNBK tend to become pockets of wildlife habitat. The level of disturbance that happened to the Gibbon is also less likely to happen in the protected forest areas and TNBK.

#### 3.2.4.5 SPECIES MANAGEMENT

As in the case with Orangutan, Gibbon also played a role in spreading the seeds as well as having a wide area range and need healthy habitats with good species diversity structure. Gibbons are included in the group *frugivorous*, namely fruit eaters especially those that have high sugar content. This is where the Gibbon plays the role as seed spreader, have a range of approximately 800-1.000 meter and a territory of about 38 hectares. Besides it is eating leaves and insects (Leighton 1987; Rodman 1978). So, if Gibbon was made the focus of the management and the protection, then all the biological diversity available in the territory will also be protected.

Obviously if not managed properly, the status of protection or conservation areas is not a guarantee that there is no threat to the biodiversity in it. Moreover, if the biodiversity has economic value, or there is still dependency of the surrounding communities in their utilization. The perspective for the management of biological diversity is that how it could be useful for the undertaken preservation. If both of these things are already going well, protection efforts for species will happen by itself. One of the utilizations that could be carried out for Gibbon species is the one of natural tourist attractions.

Attention of the management of TNBK related to the management of Gibbon species is still lacking. New activities undertaken were to identify habitat of Gibbons at the end of 2014. To achieve the purpose of the protection, species conservation plan is required especially for this Gibbon species. Several aspects that must be paid attention to were from the aspects

of utilization, conservation and protection. The management also cannot rule out the role of local communities, so one of the main issues is to focus attention also to the social values, the culture and economics.

#### 3.2.4.6 INSTITUTIONAL

Seeing if from the status that was set by the IUCN, the Government pays attention to protection efforts of *Hylobates muellerii* by including it in PP 07/1999. In these regulations, it is stated that all Hylobatidae ethnic group of which one species is *Hylobates muellerii* is protected species in Indonesia.

Implementation of law enforcement in the field still has not been carried out. Information concerning the protected Gibbon species also not communicated so not many communities know about it. They are still freely carrying out hunting or keep it as an illegal pet because the lack of information about it. Moreover the traditional rules that is applied by the local community, does not prohibit the hunting of animals in the forest including Gibbon. Thus, law enforcement efforts will not go well if socialization has not been done. Wise effort is the approach that is followed by the customary laws prevailing in the local communities.

In view of the fact that this species is endemic to Borneo, its status is protected by the state and the level of threat is very high and therefore it must receive more attention. Gibbon needs to be proposed to be included as one of the Threatened Species which will become the Priority Species of the Directorate General of Nature Conservation. This policy will certainly be a concern at Unit (UPT) level, where Gibbon also becomes the focus of the management of the species in TNBK.

### 3.2.5 *Dryobalanops beccarii*

#### 3.2.5.1 TAXONOMY

*Dryobalanops Beccarii* generally have the characteristics of main diagnostic oval leaves rather narrow compared with *D. Aromatica* or ellipse, thinner, paler secondary leafstalks on the bottom surface of the leaf forming a striking edge. If leaves and wood squeezed slightly it smells like camphor. The morphology of large trees with a diameter at man's height reaches 190 cm, height of the trees reaching 57 meters, cylindrical bole, thick buttresses, which are steep reaches up-to 5 m, often branched and spread on the ground as large surface roots, sometimes concave. Big crown, wide, half round, grayish green, branching upwards. The stem surface is yellowish or pale yellow, big scales and rather long, irregular shape to rectangular, reaching 60 x 10 cm, stabilized and became lax. Bark notches of stem is straw yellow colored until pale yellow, the wood is very hard the surface is light brown to dark.



Source: [http://cdn1.arkive.org/media/28/28C40D19-F20B-42BD-BB53-F2CB19F60E94/Presentation\\_Large/Dryobalanops-beccarii-showing-habitat.jpg](http://cdn1.arkive.org/media/28/28C40D19-F20B-42BD-BB53-F2CB19F60E94/Presentation_Large/Dryobalanops-beccarii-showing-habitat.jpg)

**Figure 13.** *Dryobalanops beccarii*

The structure of the leaves is oval-shaped or egg round with sizes of 5-13 x 1-4.5 cm, the long sharp tip with peg-shaped or rounded base. The upper surface of the leaves becomes brownish yellowish or brown when drying up while the lower surface becomes yellowish. The system of secondary leafstalks is straight up to the edge of the leaf, connected with each other to form a very clear leafstalk on the inner edge, when conditions are dry one can see clearly the leaves are paler, whereas the tertiary leafstalks are invisible or barely visible clearly. Form of small flowers with white petals and the number of stamen is around 27-33. Fruit has five petals of the equally long wing size of 5, 5-6,5 x 0.8-2 cm, nut shaped fruit measuring 10-14 x 10-14 mm. *Dryobalanops beccarii* is growing abundantly on coastal sandy hilly soils and the inland, generally found thriving around hill slopes and mountains at an elevation below 700 meters above sea level. Distribution of *Dryobalanops Beccarii* is almost evenly spread on the island of Borneo, except the South and Southwest.

The *Dryobalanops Beccarii* species in Kalimantan have several local names or regional names like Kapur, Kapur Keladan, Kapur Merah, Kapur Paji, Kapur Rangi and Keladan. According to the taxonomy of *Dryobalanops Beccarii* (keladan) it belongs to:

Kingdom : Plante  
 Phylum : Tracheophyta  
 Class : Magnoliopsida  
 Ordo : Theales/Malvales  
 Family : Dipterocarpaceae  
 Genus : *Dryobalanops*  
 Spesies : *Dryobalanops beccarii*

#### 3.2.5.2 ENDEMICITY

Distribution of *Dryobalanops Beccarii* or keladan is endemic to the region. This is indicated by the wide spread distribution on the island of Kalimantan (Borneo). The distribution covers almost the whole island except the South

and Southwest, the distribution even extends to the State of Brunei Darussalam and Malaysia covering the area of Sabah and Sarawak. This condition indicates that the distribution of *Dryobalanops Beccarii* is very limited. 7 types of *Dryobalanops* (77,8%) was just growing and found in Kalimantan from a total of 9 species in Indonesia (Purwaningsih, 2004).

Kalimantan and Sumatra are the two large islands which have the spread of a quite prominent dipterocarp species group, both from the population and the number of species point of view. Most of the remaining primary forests in Kalimantan the vegetation there are still dominated by the dipterocarp so often that it is termed as Dipterocarp forest. Of the 10 genera found in Indonesia the most diverse genus is *Shorea* species, which is mostly grown in Kalimantan, some genus like *Dryobalanops*, *Dipterocarpus*, and *Parashorea* did not spread to the eastern part of Indonesia. The dipterocarp species generally are emergent trees whose growth is slow and the wood is used as building material, if these species were exploited continuously then eventually we will have a drastic reduction in the number of population and to recover the primary forest would take very long time (Purwaningsih, 2004). Of the area of the TNBK territory accordingly as much as 28.14 % has the topography which is hilly and sloping with an altitude of 500-700 m above sea level constituting the living habitat for *Dryobalanops beccarii*. These potentials must receive special attention especially in the management of *Dryobalanops Beccarii* species in order to save the species from extinction, considering this species is regionally endemic and has only very limited distribution area in Kalimantan, one of which is the area of TNBK.

The distribution of the *Dryobalanops Beccarii* species is widespread in 3 (three) Sub Watersheds, that is Sub Watershed Embaloh, Sub Watershed Sibau and Sub Watershed Bungan (TNBK 1999). This fact shows that the species is not evenly distributed throughout the TNBK. The

forest type that is often occupied by dipterocarp species is forestland, hills and river banks, while in the extreme conditions of forest types where the soil is nutrient-poor and has bad drainage that will affect the number of species that can grow in those conditions. In some extreme forest types such as peat forests, limestone hills, and heathlands forest only a few species could adapt to these conditions (Purwaningsih, 2004). Extreme forest conditions as one of the factors limiting the distribution of *Dryobalanops Beccarii* in Sub Watershed Kapuas and Sub Watershed Mendalam was not found, In addition to above conditions the altitude in inland of Watershed Kapuas averages more than 700 m above sea level with topography of lime hills, causing difficulty for growth and for development of the species *Dryobalanops beccarii*.

### 3.2.5.3 POPULATION STATUS

It is difficult to find Dipterocarpus species around the ethnic dayak communities of Iban and Tambaloh. To find it, people must look for it in the upstream Sub Watershed area of Embaloh. Ecologically *Dryobalanops Beccarii* species have some limiting factors for its growth and its spreading. Whitmore (1988) mentions the most decisive factors are soil, climate and altitude of the place. Regarding the soil and altitude of the place, generally *Dryobalanops Beccarii* grows on sandy soil at an elevation below 700 m above sea level. Regarding climatic factors, a rainfall of > 1.000 mm per year and/or dry season of less than 6 months, the Dipterocarpaceae family can thrive and grow in lowland rain forest. This condition is one of the causes of difficulties of Keladan species to grow around ethnic Dayak settlements with an average altitude below 200 meter above sea level.

The population status of *Dryobalanops Beccarii* species at vulnerability level and the extinction risk is very high. The IUCN data placed this species in the critical status (Endangered/EN) whereby the species will face a very high risk of

extinction in the near future with the extinction chance of >20% in less than 20 years. This condition will impact the existence of threats to the population of *Dryobalanops Beccarii* species in the TNBK area. This is because it is hard to find the species around the conservation area, while the need for this type of wood as a building material is quite high in the communities.

The *Dryobalanops Beccarii* species should get priority efforts in order to keep it from extinction in the nature. This is caused by the conditions for the spreading in the narrow habitat whereby the population declined, which resulted in the growing threat of extinction due to forest degradation. The TNBK area is one of the dispersal habitat for this species therefore it is necessary to apply a more optimal area management as a rescue effort for this species to save it from extinction.

#### 3.2.5.4 LEVEL OF DISTURBANCE

Wood needs of *Dryobalanops beccarii* as a building material is quite high as being included in the Annex to the Ministerial Decree 163/2003<sup>13</sup>, where *Dryobalanops beccarii* is entered into commercial timber group I. Utilization of this wood species by the communities around the TNBK area was limited to fulfill the requirements as building material such as board, floor to wooden houses, door frames and window frames. Utilization for commercial purposes (trading) generally in the market is still very rarely done by communities in the buffer zone such as by the ethnic dayak Iban and Tamambaloh. Although there is a demand for such an activity, the community still lacks interest for reasons of quite high operational costs. The factors that cause the community to be less interested is the location of this wood species which is far away in the upstream area which requires time, expenses and quite a bit of effort.

<sup>13</sup> Ministry of Forestry Decree Number 163/Kpts-II/2003 of 23 May 2003 regarding Classification Of Wood Types As Basis For Imposition Of A Forestry Levy

The population of *Dryobalanops Beccarii* is currently experiencing a very rapid degradation. This is due to the process of logging that occurring continuously at a large scale, so it affects the existence of this species. Several species of the present Dipterocarpaceae family or its population has already started to decline in the nature. Therefore, the high economic value of it needs serious attention to secure that it will be preserved.

*Dryobalanops Beccarii* is one of the Dipterocarpaceae wood groups that is traded on the international wood market, especially in South-East Asia (Apannah, 1998). The very high demand led to the exploitation of the Dipterocarpaceae wood group which continues to increase, that makes the population declines. Some species from this family has already reached the extinction status in the nature one of them is the species *Dryobalanops Beccarii*. The area of the distribution of the *Dryobalanops Beccarii* species was very limited and followed the exploitation which was very high so as one had to be worried that it would quickly reach the stage of extinction.

#### 3.2.5.5 SPECIES MANAGEMENT

The management of *Dryobalanops Beccarii* species in TNBK has not received enough attention. It can be proven by the absence of technical activities specifically carried out in the framework of good management of the Dipterocarp family group or specifically per species. In addition, a formal policy or rule has not yet put the *Dryobalanops Beccarii* species as a kind of priority species that needs species conservation efforts in accordance with Ministerial Decree 57/2008. It is possible that the management of this species in TNBK has not been considered important, compared with other species which are included in the IKU (Key Performance Indicators) of PHKA. At the community level, the management of the *Dryobalanops beccarii* species has not been given

a priority as a species that began to experience the start of extinction. The communities still consider that there are much *Dryobalanops Beccarii* species in the interior despite the fact that it was already getting hard to find this species around the villages.

Management of species should be done considering that the TNBK area is known as mega-biodiversity for this type of flora. Management of species for this type of *Dryobalanops Beccarii* in the area must get priority. Factors that support this species to be a priority, namely the distribution is very limited (only on the island of Borneo) and the population status facing the risk of extinction. The risk of extinction is occurring as a result of dwindling natural habitat and lots of conversion of forest areas.

In order to improve the management efforts of the TNBK, it is necessary to collaborate by involving the local communities in the surrounding area. This is done as a form of co-management in keeping SDAHE from extinction. During this time, the management of the TNBK area by involving community participation is still very limited and less than optimal. This resulted in lack of community interest and it tended to be inconsistent with the management of the Sub Watershed in the TNBK area. To that end, the surrounding communities need to be involved either directly or indirectly in the management of TNBK, given the dependence of communities around the area of the forest is still relatively high.

### 3.2.5.6 INSTITUTIONAL

Formal institutions have not yet been put in place for *Dryobalanops beccarii* species as a kind of priority that needs to be done in species conservation efforts. This species is also not included in the legislation as other species which are listed in PP 07/1999. Informal institutions, like customary rules which exist in the indigenous communities residing around the

TNBK region, none of it yet was set in writing about the protection specifically towards the *Dryobalanops Beccarii* species. The traditional rules in the communities around the national park area only set in writing the utilization of *Dryobalanops Beccarii* wood species which could be only done for the everyday requirements and not for trading.

There are no rules supporting the conservation of the *Dryobalanops Beccarii* species either formal or informal. The conditions and the situation is potentially at high level of exploitation for free trading both nationally and internationally. Given the problems of the situation with regard to this exploitation, an institution, both formal and informal must be established to reduce the rate of extinction for the species of the Dipterocarpaceae family particularly the *Dryobalanops Beccarii* species. In the future, the *Dryobalanops Beccarii* species is expected to be one of the priority species in terms of conservation of plant species in Balai Besar TNBK.

## 3.2.6 *Dryobalanops lanceolata*

### 3.2.6.1 TAXONOMY

*Dryobalanops lanceolata* generally have the characteristics of main diagnostic lancet to oval (egg round) leaves rather narrow with only a scrolled edge at the base. The stem height can reach 69 m with diameter reaching 230 dbh. Stipules measure 12 mm, the alternative leaves are simple shaped, pinnately-veined, rather narrow and long, adjacent secondary veins. Flower size is 14 mm, white-yellow, placed in panicles. The fruit has a length of 15 mm, green-yellow-red, has five wings measuring 90 mm, wings are placed on top of the sepals so the fruit and flower can easily be dispersed by the wind.



Source: [http://www.sabah.gov.my/htan\\_caims/Class%20III/Kawang/kawang\\_pics.htm](http://www.sabah.gov.my/htan_caims/Class%20III/Kawang/kawang_pics.htm)

**Figure 14.** *Dryobalanops Lanceolata*

The morphology, a large tree with a diameter at breast height reaching 200-230 cm, rod-shaped winder buttressed that can reach a height of 4 m and stretch 3 m, concave, rarely branched. Big tree crown, stretchable, half round shaped green colored with a little branching upwards to the top. The surface of the bark is dark brown to blackish, sometimes faded to gray until it is slightly reddish purple, patterns are less pronounced than in the hillside species, with vertical apertures at a distance of 1. k. 15 cm patterns from 5 x 22,5 to 60 x 10 cm, oval, lenticel rather soft. Stem notches are very fragrant, bark is yellowish or brownish yellow, the structure of wood is soft to quite hard, color is pink brown or dark red brown.

The structure of the leaves had the shape of the lancet, oval or egg round sized leaves of about 7-20 cm x 1,8-5,4 cm, the tip of the long leaf is sharp with a wedge shaped or rounded

base. When drying the upper leaf surface is pale yellow, whereas the underside of the leaves is molasses, the secondary petiole system of the leaves is straight through to the edge of the leaf or straight, curved just near the edge of the leaf, forming a certain petiole edge which is invisible; rolled edges on the base, while the tertiary petiole is invisible.

*Dryobalanops Lanceolata* habitat is widespread on fertile soil, abundant on undulating volcanic soil and limestone rocks. *Dryobalanops Lanceolata* can grow upto an altitude of 700 m above sea level. The distribution of this species includes Malaysia (Sarawak and Sabah), Brunei Darussalam and Indonesia (Kalimantan).

*Dryobalanops Lanceolata* species in Kalimantan have some local names or names of areas, such as Buffalo (Kwijau), Jalam (Dusun), Kapur, Kapur Bukit(Brun.), Kapur Daram (Brun.), Kapur Paji (Iban), Kapur Paya, Ngeri (Bassap), Paji (Iban) and Sesuan (Murut). In Taxonomy *Dryobalanops lanceolata* classified into:

Kingdom : Plante  
 Phylum : Tracheophyta  
 Class : Magnoliopsida  
 Ordo : Theales/Malvales  
 Family : Dipterocarpaceae  
 Genus : *Dryobalanops*  
 Spesies : *Dryobalanops Lanceolata*

### 3.2.6.2 ENDEMICITY

*Dryobalanops Lanceolata* is a species of the family Dipterocarpaceae, which is unevenly distributed in Indonesia on each island. According to Ashton (1982), the distribution of Dipterocarp biodiversity to the east is getting smaller. Generally species diversity locally of each genus of Dipterocarp is uneven in fact there are several genus that are not found in eastern parts of Indonesia. Dipterocarpaceae in Indonesia reached 62% (238 species) of the number of species that occur in Malesia region (386 species). This indicates that Indonesia is a suitable place

for the growth of dipterocarp, mainly in the western part of Indonesia. Dipterocarpaceae have high endemicity value with as high as 128 species (53,78%) of 238 dipterocarp species existing in Indonesia, Kalimantan have high number of endemic species namely 103 species or about 80,47% (Purwaningsih, 2004).

Distribution of *Dryobalanops Lanceolata* or Kapur/Kelansau itself is regionally endemic. This endemicity was seen from the widespread distribution on the Island of Kalimantan (Borneo), like Kutai Barat, East Kalimantan as far as to South Sangkulirang, the distribution even reached the country of Bruneian Darussalam and the Malaysian states of Sabah and Sarawak territories. Of the Dipterocarpaceae family which is distributed in Indonesia, 9 Genus found in Kalimantan, namely *Dryobalanops*, *Hopea*, *Vatica*, *Cotylelobium*, *Parashorea*, *Anisoptera* and *Upuna*. In Indonesia the *Dryobalanops* genus alone only grew and spread across Sumatra, 2 species of non-endemic and in Kalimantan as many as 7 species, namely 5 endemic species in Kalimantan and 2 non-endemic species (Fajri 2008).

*Dryobalanops Lanceolata* or Kapur/Kelansau is spread into the TNBK area but only found in the Embaloh Watershed area (TNBK 1999). While outside the TNBK area it can be found in the locality of ethnic dayak Iban and Tamambaloh which are located in the buffer zone area and it grows on locations with clay soil, and even can be found growing in swampy areas. Geographical proximity to the national park enabled the spreading of *Dryobalanops lanceolata* species and it is still easily found around the population areas of the Sub Watershed Embaloh. The limited area of distribution of *Dryobalanops Lanceolata* species in the TNBK area requires conservation management of the area with emphasis on the protection and preservation of the species which have limited distribution. One of the activities for the preservation of plant species with limited dispersal is the breeding or

cultivation activities in order to improve the spread of the species to areas that have suitable habitat. Subiakto et al. (2007), stated that one of the species of the group Dipterocarpaceae which is growing rapidly includes *Dryobalanops lanceolata* Burck.

### 3.2.6.3 POPULATION STATUS

The IUCN data placed *Dryobalanops lanceolata* Burck species in the critical status (Endangered/EN). This status has a very high degree of vulnerability to extinction in the nature in the near future with a chance of extinction of > 20 % in less than 20 years. The economic activities outside the TNBK area at present time already begin to be rare, due to intense logging without being followed by replanting. Other factors, namely the narrowing living habitat because of the occupation of the forest area around TNBK by communities to convert into plantations or fields by the ethnic dayak Iban and Tamambaloh.

The decrease in the population is caused by several factors. First, this species has a very high commercial value (Ashton, 1982). Second, exploitation for trade. Third, deforestation and degradation for plantations, mining even settlements. Efforts to prevent and slow down the rate of extinction of the species or genetic conservation activities of the tree need to be done *in-situ* and *ex-situ*. This conservation activity plays an important role that should be pursued and enhanced specifically for *Dryobalanops lanceolata* which have very limited distribution. In addition, the necessary rules (public policy) are more pronounced for the management of species which are already rare, endangered, and endemic.

### 3.2.6.4 LEVEL OF DISTURBANCE

*Dryobalanops lanceolata* species has a high commercial value. This value is indicated by the timber trade<sup>14</sup> group and its physical<sup>15</sup> and

<sup>14</sup> Ministerial Decree 163/2003 which includes this species into commercial group I timber

<sup>15</sup> This species is included into the durable class I-II, whereas in a strong timber class II-I

mechanical<sup>16</sup> properties which are suitable for carpentry. Its commercial value has the potential for disruption. At the local level, the use of wood by most people around the TNBK area is limited only for their daily needs and not commercially traded. For the dayak Iban and Tamambaloh community who resides around the buffer zones of the TNBK area, the use of *Dryobalanops lanceolata* wood is not a favored one, compared with *Dryobalanops Beccarii* wood because the quality is not better, it is susceptible to water damage and easily decayed.

Several forest areas in Indonesia including Kalimantan have suffered of deforestation and degradation, so that the potential threat of extinction of *Dryobalanops lanceolata* can happen. This condition need a together thinking to carry out conservation efforts of the species, considering the *Dryobalanops lanceolata* species has only limited spreading in Kalimantan, and in the TNBK area it only grows in the Sub Watershed Embaloh.

### 3.2.6.5 SPECIES MANAGEMENT

The management of *Dryobalanops lanceolata* Burck species in TNBK has not yet been done. This can be proven by the absence of the very specific management activities needed for this species. The management by communities in the buffer zone areas also has not been done, although its existence is seldom encountered.

Management of *Dryobalanops lanceolata* Burck species in TNBK needs to be done and prioritized. One form of *Dryobalanops lanceolata* species of management are activities of preserving plant species in its habitat (*in-situ*) and outside of its habitat (*ex-situ*) such as cultivation of plants. Farming activities for a variety of purposes can be an alternative to increase the population of certain species, through human intervention and technology. In addition, there is a need for public awareness related to conservation of this Kelansau species.

<sup>16</sup> Low cracking power, moderate hardness

If possible, awards should be given as incentives to members of local communities/groups that have been carrying out conservation activities of the species and preserved traditional knowledge.

### 3.2.6.6 INSTITUTIONAL

Legislation and national planning documents that are specifically for the conservation of the plant species are still a few. Formal rules of existing species conservation are far more prepared for any type of fauna. In the direction of the National Conservation policies, the *Dryobalanops lanceolata* species is not included into the priority group that needs to be conserved.

Custom rules in public life of dayak Iban and Tamambaloh in Sub Watershed Embaloh, related to protection of plant species has not yet been done in writing. The existing restrictions are only to the extent of prohibiting timber harvesting for commercial needs or trading. Adat regulations of indigenous peoples for taking wood from another location saying that it must obtain permission from the traditional leader or Temenggung.

Recommendations, the *Dryobalanops lanceolata* Burck species may be included as part of a conservation policy of the species as well as supported by development of formal and informal institutions. However, such activities must be based on studies that must be made in advance.

## 3.3 Priority Species in Each Group

The results of Priority 1 species (6 species) assessment are divided into 3 groups. The three groups are, Group of Mammals, Primates, and Flora. To provide the information it is necessary to make an overview of the assessment results for each priority species groups. The figure was made for those species which have entered into the second highest priority.

### 3.3.1 Plants

Plant species that were assessed is the largest (127 species). All species in this group has been entered into five priority classes. Six species have the highest values for the second highest priorities (priority 1 and priority 2), i.e. *Dryobalanops beccarii*, *Dryobalanops lanceolata*, *Dipterocarpus semivestitus*, *Dipterocarpus grandiflorus*, *Shorea peltata*, and *Shorea leprosula*.

The six species types of threatened priority flora groups provide diverse information. On the side of endemism, there are 3 endemism groups namely endemic in Kalimantan, endemic and non-endemic nationwide. Two species are endemic to Kalimantan, namely *Dryobalanops beccarii* Dyer and *Dryobalanops lanceolata* Burck

(Kelansau). There are 4 species of flora that are categorized in this group as non-endemic, namely *Dipterocarpus semivestitus* Slooten (keruing padi), *Dipterocarpus grandiflorus* (Blanco) Blume (tekam), *Shorea peltata* Symington (meranti) and *Shorea leprosula* Miq. (meranti).

Population status of this flora group puts 3 species to the critical status (Endangered/EN), namely the species *Dryobalanops beccarii* Dyer (Keladan), *Dryobalanops lanceolata* Burck (Kelansau) and *Shorea leprosula* Miq (meranti). This group also puts 3 species to the Status *Critically Endangered* (critical), namely *Dipterocarpus semivestitus* Slooten (keruing padi), *Dipterocarpus grandiflorus* (Blanco) Blume (tekam) and *Shorea peltata* Symington (meranti).

**Table 7.** Priority species of plant groups

No	Scientific Name	Local Name	Family	Value	Priority
1	<i>Dryobalanops beccarii</i>	Keladan	Dipterocarpaceae	90.37	1
2	<i>Dryobalanops lanceolata</i>	kelansau	Dipterocarpaceae	90.37	1
3	<i>Dipterocarpus semivestitus</i>	Keruing Padi	Dipterocarpaceae	73.63	2
4	<i>Dipterocarpus grandiflorus</i>	Tekam	Dipterocarpaceae	73.63	2
5	<i>Shorea peltata</i>	Meranti	Dipterocarpaceae	73.63	2
6	<i>Shorea leprosula</i>	Meranti	Dipterocarpaceae	65.67	2

### 3.3.2 Mammals

Species in the mammals group are the main recommendations for the management unit in the management of the species as the result of the assessment. Two classes of the highest priority for this group consist of 6 species. These species are i.e. *Catopuma badia*, *Manis javanica*, *Trichys fasciculata*, *Tragululus javanicus*, *Lariscus bosei*, and *Cervus unicolor* (Table 8). These six species belong to priority classes 1 and 2.

**Table 8.** Priority species of mammal groups

No	Scientific Name	Local Name	Value	Priority
1	<i>Catopuma badia</i>	Kucing Merah	100.00	1
2	<i>Manis javanica</i>	Trenggiling	91.21	1
3	<i>Trichys fasciculata</i>	Landak Padi/Angkis Ekor Panjang	74.47	2
4	<i>Tragulus javanicus</i>	Pelanduk Kancil	73.21	2
5	<i>Lariscus hosei</i>	Bajing Tanah Bergaris Empat	68.19	2
6	<i>Cervus unicolor</i>	Rusa Sambar	67.35	2

### 3.3.3 Primates

At the assessment level for the group of primates, *Pongo pygmaeus pygmaeus* and *Hylobates muelleri* became the first priority in the selection of threatened species in TNBK. Both species have the same value, namely 90,79. The second priority is the *Presbytis rubicunda* with a value of 68,19. The three primate species are endemic to the island of Borneo, with regional distribution in Indonesia (Kalimantan), Malaysia (Sarawak) and Brunei Darussalam. Balai Besar TNBK already have the attention of the management regarding the species *Pongo pygmaeus pygmaeus* and *Hylobates muelleri*, though the implementation is still not optimal.

**Table 9.** Priority species of primate groups

No	Scientific Name	Local Name	Value	Priority
1	<i>Pongo pygmaeus pygmaeus</i>	Orangutan Kalimantan	90.79	1
2	<i>Hylobates muelleri</i>	Kelempiau	90.79	1
3	<i>Presbytis rubicunda</i>	Kelasi / Lutung Merah	68.19	2

### 3.3.4 Birds

Bird group consists of 52 species which were assessed. 4 species have the highest priority order, i.e. *Rhinoplax vigil* (*Buceros vigil*), *Buceros rhinoceros*, *Chloropsis cyanopogon* (Table 10). Three of these birds belong to 2 Families i.e. Bucerotidae (*Rhinoplax vigil*, *Buceros rhinoceros*), and Chloropsidae (*Chloropsis cyanopogon*).

In the bird's group, the level of the disturbance was one of the important criteria to pay further attention to because the excessive hunting that could change the wildlife condition (Meijard et al. 2006). Of the three species above, *Rhinoplax vigil* and *Chloropsis cyanopogon* need to be attended to seriously, because these two species are experiencing disruption because their fairly high market demand.

**Table 10.** Priority species of bird groups

No	Scientific Name	Common Name	Family	Value	Priority
1	<i>Rhinoplax vigil</i>	Rangkong gading	Bucerotidae	67.35	2
2	<i>Buceros rhinoceros</i>	Rangkong badak	Bucerotidae	51.44	3
3	<i>Chloropsis cyanopogon</i>	Cica-daun besar	Chloropsidae	49.77	3

### 3.3.5 Herpetofauna

Herpetofauna species group became part of the assessment. The priority species of this group are *Limnonectes ibanorum*, *Limnonectes leporinus*, *Rhacophorus gauni*, and *Ansonia spinulifer*. These four species belong to priorities 2 and 3 (Table 11).

**Table 11.** Priority species of Herpetofauna group

No	Scientific Name	Local Name	Priority	Value
1	<i>Limnonectes ibanorum</i>	Katak sungai belakang kesat	2	74.47
2	<i>Limnonectes leporinus</i>	Katak sungai besar	2	66.51
3	<i>Rhacophorus gauni</i>	Katak pokok bermuncung pendek	3	50.60
4	<i>Ansonia spinulifer</i>	Kodok puru kurus berduri	3	50.60

All four species are endemic to the island of Borneo which also can be found in Indonesia (Kalimantan), Malaysia (Sarawak) and Brunei Darussalam. Among the four species just one species has IUCN status at low risk (*Learn Concern/LC*), namely *Limnonectes leporinus*, while the others are close to extinction (*Near Threatened/NT*). But interestingly though the international status of the population was said to be low, this species already experiencing some level of disruption despite its relatively low intensity. Surrounding communities utilize the *Limnonectes leporinus* species as one of the ingredients in food, although not a requirement for their wedding-day (sekar-hari). More intensive attention could be given to the *Limnonectes ibanorum* species which has the highest population status value and level of disruption. This species apart from the status of its population nearing the extinction (*Near Threatened/NT*), is also often used by the communities as one of the ingredients of the food in everyday's life. Surely the certainty about the number of the population in the TNBK area

is needed to be a reference in the management of the species.

### 3.3.6 Fish

Assessment of priority species places 9 species of fish as threatened with extinction in the TNBK area. 5 fish species into priority 2 and 3 species into priority 3 (Table 12). The ninth priority threatened species of the fish group gives about the same information. The difference of information is only regarding endemism, 2 species of fish included into locally endemic, that is the species of *Rasbora volzii* (ikan seluang) and *Barbonymus collingwoodii* (ikan kepiat). As many as four fish species are placed as endemic to Kalimantan, namely *Hampala bimaculata* (ikan langkung), *Paracrossochilus acerus* (ikan kemujok), *Gyrinocheilus pustulosus* (ikan bingkus) and *Lobocheilus bo* (ikan kulong). Species which are included as nationally endemic are, i.e. *Lobocheilus hispidus* (ikan kulong nga'), *Botia/Syncrossus hymenophysa* (ikan pansik/engkadik) and *Macrognathus aculeatus* (ikan tilan).

**Table 12.** Priority species of fish group

No	Scientific Name	Family	Value	Priority
1	<i>Rasbora volzii</i>	Cyprinidae	77,40	Prioritas 2
2	<i>Barbonymus collingwoodii</i>	Cyprinidae	77,40	Prioritas 2
3	<i>Hampala bimaculata</i>	Cyprinidae	66,51	Prioritas 2
4	<i>Paracrossochilus acerus</i>	Cyprinidae	66,51	Prioritas 2
5	<i>Gyrinocheilus pustulosus</i>	Gyrinocheilidae	66,51	Prioritas 2
6	<i>Lobocheilus bo</i>	Cyprinidae	66,51	Prioritas 2
7	<i>Lobocheilus hispidus</i>	Cyprinidae	55,63	Prioritas 3
8	<i>Botia/Syncrossus hymenophysa</i>	Cobitidae	55,63	Prioritas 3
9	<i>Macrognathus aculeatus</i>	Mastacembelidae	55,63	Prioritas 3

Other information from the nine species has similar level. The status of the population group of the fish has a low risk level, while at the level of disturbance this species has to meet the needs of everyday's life of the people around the area. On the side of the management of the fish species at the UPT level (Unit Management Level) it has not yet been done, it has been seen that there hasn't been activities of technical nature to find out clearly what information was needed of the species in the area. On the institutional side, either formal or informal rules govern the management of the species at field level.

The endangered fish priority species group places 1 species, which has a quite fast extinction rate, namely the species *Rasbora volzii* (ikan seluang). In endemicity, this species is classified as locally endemic species whereby this species is only found in the region. The level of disruption on this species is rather high one can see the existence of this species is threatened because this species is widely hunted by the communities surrounding the forest area for their everyday's needs, the phenomenon now has already led to trading level because this fish species is in great demand on the market.

### 3.3.7 Insects

Selection of priority species threatened with extinction in the insect groups shows that there are two species of insects that fall into priority 2 and 3. The two species of these insects are *Phobaeticus chani* and *Trogonoptera brookiana*. Two of these insects fall into 2 Families, namely Phasmatidae (*Phobaeticus chani*), and Pappilionidae (*Trogonoptera brookiana*).

**Table 13.** Priority species of insect groups

No	Scientific Name	Common Name	Family	Value	Priority
1	<i>Phobaeticus chani</i>	Serangga tongkat	Phasmatidae	67.35	2
2	<i>Trogonoptera brookiana</i>	Kupu-kupu Raja Broke	Pappilionidae	51.44	3

In the group of insects, the level of endemism can be the criteria that affect *Phobaeticus chani* to become the highest priority species in the group of insects. Although *Trogonoptera brookiana* is entered in the second priority group of insects, but this species is the mascot of the Betung Kerihun National Park and it is also protected by regulation PP 7/1999.



## CHAPTER 4

# **Recommendations for the Management of the Endangered Priority Species**



In an effort of managing the endangered priority species at TNBK as the result of the assessment it is required to make a comprehensive follow-up plan. Four species of fauna were assessed, including the species protected by government - through legislation and preservation efforts, particularly with regard to the management of their habitats. Criteria for the determination of protected species is contained in PP 07/1999 Article 5 paragraph (1), a population that is small, sharply declining in nature regarding the number of individuals, and has a limited distribution (endemic). Although not included in the current legislation regulations, 2 flora species based on the assessment also filled the criteria to be protected, especially locally in the TNBK area. Therefore, conservation efforts of the six species could be carried out through the management of the TSL as well as its habitat.

The management of TSL species and their habitats through management activities (*in situ*) and management outside of their habitats (*ex situ*) to increase and restore the population. As a conservation area, it is certainly more appreciated the *in situ* management of TNBK area. Legal regulations<sup>17</sup> mentioned *in situ* management will be done through (1) identification, (2) inventory, (3) monitoring, (4) development of habitat and population, (5) species rescue, and (6) investigation, research and development.

Species conservation, as part of management efforts, actions to be taken must be in the management of these endangered priority species. Species conservation can be done with two different goals. First, control the small-sized population that has a low growth rate. Second, control the population that is experiencing a decline. This species conservation was carried out with several aims, that to increase the density of the population, obtain optimal age

composition and structure, increased growth rate, and maintain the genetic diversity.

The management of species at site level (UPT) in principle can be done as long as its prerequisite could be fulfilled. Unit management<sup>18</sup> mentions that there are four prerequisites that must be met. First, regulatory changes and adjustments in the management of species in conservation and protected areas. Second, transfer gradually the policy regulations on species management. Third, UPT must be business oriented. Finally, UPT must be very powerful in law enforcement, especially regarding illegal hunting of plants and wild animals. However, to achieve the ideal conditions there are constraints.

Obstacles faced at management unit level in achieving species management at field level consist of several factors. First, human resources (HR) are still not adequate in terms of quality and quantity. Second, it does not yet have follow up plans for the results of technical activities of related species. Third, structural changes at each level to determine the policy directions and the priority scale. Fourth, public investment (government budget) that is often changed. Fifth, management policy of species is very dependent on the policy from the Headquarters. To that end, the necessary strategies are needed for efforts to manage and resolve these barriers.

According to the problems encountered, the management of the species, especially the endangered priority species, at the UPT level can be done through several stages. First, capacity building of human resources (HR) related to management of species to achieve a uniform knowledge and understanding. Second, increase search for and information of data as well as data collection, including the benefits of TSL in TNBK. Third, drafting a species management plan for at least 10 years, so as to be available as reference for the structural officials at each level. Fourth, optimize existing resources and

<sup>17</sup> Legislation governing the regulation of the management of TSL among others are PP 07/1999, PP 28/2011

<sup>18</sup> Results of a written interview with Head of Balai Besar TNBK on 19 December 2014

other resource opportunities as input in support of the objectives of the management of the species. In addition, species conservation efforts in the TNBK area need to involve the surrounding local communities because the success of the efforts to save endangered species will be largely determined by communities' participation. They will help fully if they know that there are enormous benefits from the existence of the species that are relevant to the life of humankind. Therefore, the preparation of the species conservation plan with community-based participation needs to be done.

To anticipate these things a clear plan of action is required for the purpose of the management of endangered priority species to effectively implement it. Actions that must be carried out in the action plan include:

1. Ecological Aspect:

- a. The compilation of the conservation plan of the endangered priority species per species, including community-based species conservation plan.

2. Social and Economic Aspects:

- a. Public awareness related to community conservation of the species that was linked with the protection, conservation, and its utilization;
- b. Creation of alternative livelihoods in order to improve the economy of the communities surrounding the area.

3. Policy and Institutional Aspects:

- a. Preparation of legislation;
- b. Proposing priority species to become the species of the priority in the Directorate General PHKA;
- c. Collective action in the management of the area with parties (communities surrounding the area, local government, Non-Government Organizations/NGOs, law enforcement agencies, academia);
- d. Increased capacity building of organization and HRD;

Increase the capacity of communities in the conservation of the endangered priority species.



CHAPTER 5

# Conclusions and Recommendations



## 5.1 Conclusions

Based on the results of the study, the priority species threatened with extinction in TNBK totaling six species. The species which were selected on the priority 1 scale were *Catopuma badia* (Kucing Merah), *Manis javanica* (Trenggiling), *Pongo pygmaeus pygmaeus* (Orangutan), *Hylobates muelleri* (Kelempiau), *Dryobalanops beccarii* (Keladan), and *Dryobalanops lanceolata* (Kelansau).

The six endangered priority species mentioned provide almost the same information. On the endemism side, these species include regionally endemic ones except *Manis javanica*. Besides the Orangutan, the population of all species in the Sub Watershed Embaloh in the TNBK area is not yet known. At the level of disruption, *Manis javanica* has the biggest threat compared to the other species. Species management not yet functioning well because a species management plan as the guide does not yet exist. On the institutional side, the existing legislation has not been adequate enough to hinder the rate of extinction.

Overall, the selected species belong to three groups, namely the group of mammals, primates, and flora. In addition, according to the results of the study, from the group of birds, *Buceros vigil* (Enggang gading) is a species that has the highest threatened value. *Limnonectes*

*ibanorum* (Katak sungai punggung kesat) is the species that is a top priority in the Herpetofauna group. In the insects group, *Phobaeticus chani* (Walang tongkat/sembah) and *Trogonoptera brookiana* (Kupu-kupu raja Brook) is the species that became the priority.

## 5.2 Recommendations

The management of endangered priority species requires alterations and improvements of various factors. Follow-up the recommendations which identified the expected driving factors for changes and improvements in the management of the species which are effective in supporting the effectiveness of the management of the area. In addition, an assessment of all the species in the TNBK area needs to be done to get a comprehensive data and information.

The results of this study are expected to become a model for overall biodiversity assessment of TNBK. To get a result which is more optimal, future assessment activities need improvement and development of methods for the determination of further criteria and indicators.

For the priority species, as the results of the overall assessment both the 6 species or for each group a population survey needs to be done as the basis to conduct further the management of the concerned species.



# Appendices



**Appendix 1.** Form Kuisisioner Penentuan Bobot dan skor

<b>QUESTIONNAIRE - WEIGHTNG AND SCORING FOR CRITERIA AND INDICATORS FOR DETERMINING THREATENED SPECIES IN TNBK</b>  <i>Assessment on Biodiversity in Betung Kerihun National Park</i>	Respondent:	
	Office:	
	Completion Date:	
	Enumerator:	
<b>To Mr/Ms Respondent,</b>  <p>The Betung Kerihun National Park (TNBK) is a conservation area which has a very high biodiversity. The biological diversity information and data become the baseline for the effective management of the area. Framework in the effective management of the area is one of the planning activities. Planning here is done in the form of management of the area including the management of Plants and Wildlife (TSL) and their descendants. However the situation is that the biodiversity management plan/TSL has not yet been implemented.</p> <p>The biodiversity management plan has not yet been implemented due to several factors. First, biodiversity data and information are not adequate. Second, the assessment of biodiversity has not yet been made. Third, the process of the formulation of a work plan with parties has not been well done. Based on the situation structuring of the factors for the biodiversity management plan has not yet been implemented it needs to be done.</p> <p>The assessment of the biological diversity as part of the arrangement of the management plan is one of the points to be considered to achieve the aim of the area management. This assessment could become the basis in the determination of the scale of the priority in the management of biodiversity. The determination of the priority scale to overcome the constraints of the inputs (human resources, financing, and others) to achieve an effective management of the area. One of the considerations in the management of biodiversity, the management of endangered priority species TSL still is a rational phenomenon. For this, <i>Assessment on Biodiversity in Betung Kerihun National Park</i> must be done.</p> <p>In the process <i>Assessment on Biodiversity in Betung Kerihun National Park</i> a quantitative measurement is needed of some Criteria indicators which has been done, therefore, we are requesting the willingness of Mr/Ms to participate by giving weights and scores on criteria and indicators that have been prepared.</p>  <p>Thank you for your willingness</p>		

## Guide for Weighting and Scoring for Criteria and Indicators

### Weighting For Criteria

In the process of *Assessment on Biodiversity in Betung Kerihun National Park* 5 criteria was specified that may affect the threat of the species TSL namely Endemicity, Population Status, Level of Disturbance, Species Management Policy and Institutional Support. Scoring for each criterion must be done whereby the total score must be equal to 100. Example:

Criteria		Weight
Endemicity	:	a
Population Status	:	b
Level of Disturbance	:	c
Species Management	:	d
Institutional Support	:	e
<b>Total Weight</b>	:	<b>(a+b+c+d+e = 100)</b>

### Scoring for Indicators

For each criterion, indicators were created to describe the criteria that have been established and each criterion has a number of different indicators. Each indicator was based on the criterion given the scores 1-5 with the following explanations:

Score	Description
1	The indicator does not affect the threatening
2	The indicator is un-influential against threatening
3	The indicator is influential enough against threatening
4	The indicator is influential against threatening
5	The indicator is very influential against threatening

It should be noted that the indicators for each of the criteria has been created in sequence, the mean score on the top of the indicator may not be smaller than its score indicator beneath.

### Example for Scoring

Criteria	Indicator	Score
Endemicity	A	a
	B	< a
	C	< b
	D	< c
Population Status	A	a
	B	< a
	C	< b
	D	< c
	E	< d
Level of Disturbance	A	a
	B	< a
	C	< b
	D	< c
	E	< d
Management Policy	A	a
	B	< a
	C	< b
Institutional Support	A	a
	B	< a
	C	< b
	D	< c

Table Scoring

No	Criteria	Weight
1	Endemicity	
2	Population Status	
3	Level of Disturbance	
4	Species Management Policy	
5	Institutional Support	

Table Scoring Indicator

No	Criteria	Indicator	Score
1	Endemicity	Endemic local	
		Endemic regional	
		Endemic National	
		Non Endemic	
2	Population Status	Serious	
		Critical	
		Susceptible	
		Almost threatened	
		Low Risk	
3	Level of Disturbance	Species which has commercial value	
		Species to meet the needs of everyday's life	
		Species to meet the needs of custom and religion, as well as part of the culture	
		Species that is considered a pest to the community	
		Species which do not experience disturbance	
4	Species Management Policy	Species management does not exists at all	
		Species management exists but it's not yet optimal	
		Species management which is good and successful already in place	
5	Institutional Support	Formal-Informal Regulations	
		Formal Regulations	
		Informal Regulations	
		There are no regulations	

Appendix 2. Priority Scale Assessment of Endangered Species

No	Species	Group	Indicator Value															Total <sup>1)</sup>	Rescalling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5								
1	<i>Catopuma badia</i>	Mammal	1.2	4	2.2	1,3	3.3	3	4.1	5	5.2	4	4.03	100.00	Priority 1					
2	<i>Manis javanica</i>	Mammal	1.4	1	2.1	4,5	3.1	5	4.1	5	5.2	4	3.82	91.21	Priority 1					
3	<i>Pongo pygmaeus pygmaeus</i>	Primate	1.2	4	2.2	2,5	3.3	3	4.2	4	5.2	4	3.81	90.79	Priority 1					
4	<i>Hylobates muelleri</i>	Primate	1.2	4	2.2	3,5	3.3	3	4.2	4	5.2	4	3.81	90.79	Priority 1					
5	<i>Dryobalanops beccarii</i> Dyer	Flora	1.2	4	2.2	4	3.2	4	4.1	5	5.4	1	3.80	90.37	Priority 1					
6	<i>Dryobalanops lanceolata</i> Burret	Flora	1.2	4	2.2	4	3.2	4	4.1	5	5.4	1	3.80	90.37	Priority 1					
7	<i>Rasbora volzii</i>	Fish	1.1	5	2.5	1	3.2	4	4.1	5	5.4	1	3.49	77.40	Priority 2					
8	<i>Barbonymus collingwoodii</i>	Fish	1.1	5	2.5	1	3.2	4	4.1	5	5.4	1	3.49	77.40	Priority 2					
9	<i>Trichys fasciculata</i>	Mammal	1.2	4	2.5	1	3.1	5	4.1	5	5.4	1	3.42	74.47	Priority 2					
10	<i>Limnonectes ibanorum</i>	Herpetofauna	1.2	4	2.4	2	3.2	4	4.1	5	5.4	1	3.42	74.47	Priority 2					
11	<i>Shorea peltata</i> Symington	Flora	1.4	1	2.1	5	3.1	5	4.1	5	5.4	1	3.40	73.63	Priority 2					
12	<i>Dipterocarpus grandiflorus</i> (Blanco) Blume	Flora	1.4	1	2.1	5	3.1	5	4.1	5	5.4	1	3.40	73.63	Priority 2					
13	<i>Dipterocarpus semivestitus</i> Slooten	Flora	1.4	1	2.1	5	3.1	5	4.1	5	5.4	1	3.40	73.63	Priority 2					
14	<i>Traugulus javanicus</i>	Mammal	1.3	3	2.5	1	3.2	4	4.1	5	5.2	4	3.39	73.21	Priority 2					
15	<i>Presbytis rubicunda</i>	Primate	1.2	4	2.5	1	3.4	2	4.1	5	5.2	4	3.27	68.19	Priority 2					
16	<i>Lariscas hosei</i>	Mammal	1.2	4	2.4	3,3	3.5	1	4.1	5	5.2	4	3.27	68.19	Priority 2					
17	<i>Cervus unicolor</i>	Mammal	1.4	1	2.3	3	3.2	4	4.1	5	5.2	4	3.25	67.35	Priority 2					
18	<i>Buceros vigil</i>	Bird	1.4	1	2.4	2	3.1	5	4.1	5	5.2	4	3.25	67.35	Priority 2					
19	<i>Gyrinocheilus pustulosus</i>	Fish	1.2	4	2.5	1	3.2	4	4.1	5	5.4	1	3.23	66.51	Priority 2					
20	<i>Lobocheilus bo</i>	Fish	1.2	4	2.5	1	3.2	4	4.1	5	5.4	1	3.23	66.51	Priority 2					
21	<i>Hampala bimaculata</i>	Fish	1.2	4	2.5	1	3.2	4	4.1	5	5.4	1	3.23	66.51	Priority 2					
22	<i>Paracrossobilus acerus</i>	Fish	1.2	4	2.5	1	3.2	4	4.1	5	5.4	1	3.23	66.51	Priority 2					
23	<i>Limnonectes leporinus</i>	Herpetofauna	1.2	4	2.5	1	3.2	4	4.1	5	5.4	1	3.23	66.51	Priority 2					
24	<i>Shorea leprosula</i> Miq.	Flora	1.4	1	2.2	4	3.1	5	4.1	5	5.4	1	3.21	65.67	Priority 2					
25	<i>Hystrix brachyura</i>	Mammal	1.4	1	2.5	1	3.1	5	4.1	5	5.2	4	3.06	59.40	Priority 3					

No	Species	Group	Indicator Value													Total <sup>1)</sup>	Rescalling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5						
26	<i>Rheithrosciurus macrotis</i>	Mammal	1.2	4	2.3	1	3.5	1	4.1	5	5.4	1	3.04	58.56	Priority 3			
27	<i>Botia/ Syncrossus hymenophylla</i>	Fish	1.3	3	2.5	1	3.2	4	4.1	5	5.4	1	2.97	55.63	Priority 3			
28	<i>Lobocheilus bispidus</i>	Fish	1.3	3	2.5	1	3.2	4	4.1	5	5.4	1	2.97	55.63	Priority 3			
29	<i>Macrogathus aculeatus</i>	Fish	1.3	3	2.5	1	3.2	4	4.1	5	5.4	1	2.97	55.63	Priority 3			
30	<i>Buceros rhinoceros</i>	Bird	1.4	1	2.4	2	3.3	3	4.1	5	5.2	4	2.87	51.44	Priority 3			
31	<i>Muntiacus muntjac</i>	Mammal	1.4	1	2.5	1	3.2	4	4.1	5	5.2	4	2.87	51.44	Priority 3			
32	<i>Tragulus napu</i>	Mammal	1.4	1	2.5	1	3.2	4	4.1	5	5.2	4	2.87	51.44	Priority 3			
33	<i>Helarctos malayanus</i>	Mammal	1.4	1	2.3	1	3.4	2	4.1	5	5.2	4	2.87	51.44	Priority 3			
34	<i>Neofelis nebulosa</i>	Mammal	1.4	1	2.3	4,8	3.4	2	4.1	5	5.2	4	2.87	51.44	Priority 3			
35	<i>Rhacophorus gauri</i>	Herpetofauna	1.2	4	2.4	2	3.5	1	4.1	5	5.4	1	2.85	50.60	Priority 3			
36	<i>Ansonia spinulifer</i>	Herpetofauna	1.2	4	2.4	2	3.5	1	4.1	5	5.4	1	2.85	50.60	Priority 3			
37	<i>Sus barbatus</i>	Mammal	1.4	1	2.3	3	3.2	4	4.1	5	5.4	1	2.83	49.77	Priority 3			
38	<i>Macaca nemestrina</i>	Primate	1.4	1	2.3	2	3.2	4	4.1	5	5.4	1	2.83	49.77	Priority 3			
39	<i>Chloropsis cyanopogon</i>	Bird	1.4	1	2.4	2	3.1	5	4.1	5	5.4	1	2.83	49.77	Priority 3			
40	<i>Horsfieldia atjehensis</i>	Flora	1.3	3	2.3	3	3.5	1	4.1	5	5.4	1	2.78	47.67	Priority 3			
41	<i>Elaeocarpus brigittae</i>	Flora	1.3	3	2.3	3	3.5	1	4.1	5	5.4	1	2.78	47.67	Priority 3			
42	<i>Tarsius bancanus</i>	Mammal	1.4	1	2.3	4,5	3.5	1	4.1	5	5.2	4	2.68	43.49	Priority 4			
43	<i>Nycticebus coucang</i>	Mammal	1.4	1	2.3	3,5	3.5	1	4.1	5	5.2	4	2.68	43.49	Priority 4			
44	<i>Syzygium multibracteolatum</i> (Merrill) Merrill & Perry	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4			
45	<i>Shorea ochracea</i>	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4			
46	<i>Ansonia longidigita</i>	Herpetofauna	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4			
47	<i>Aplolpetura boa</i>	Herpetofauna	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4			
48	<i>Staurois guttatus</i>	Herpetofauna	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4			
49	<i>Ziziphus bawilandii</i> Ridl.	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4			
50	<i>Lepturophis bornensis</i>	Herpetofauna	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4			
51	<i>Aporosa granularis</i> Airy Shaw	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4			
52	<i>Schefflera petiolosa</i> Harms	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4			

No	Species	Group	Indicator Value											Total <sup>1)</sup>	Rescalling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5				
53	<i>Diospyros ferruginescens</i> Bakh.	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
54	<i>Spatholobus ferrugineus</i>	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
55	<i>Elaeocarpus cordifolius</i>	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
56	<i>Lasianthus borneensis</i> Merr.	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
57	<i>Macaranga beccariana</i> Merr.	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
58	<i>Syzygium velutinum</i> A.P.Davis	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
59	<i>Macaranga umbrosa</i> S.J.Davies	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
60	<i>Callosciurus batuensis</i>	Mammal	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
61	<i>Vatica oblongifolia</i> Hook.f.	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
62	<i>Alseodaphne borneensis</i> Gamble	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
63	<i>Garcinia nitida</i> Pierre	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
64	<i>Durio graveolens</i> Bcc	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
65	<i>Exiliscirus exilis</i>	Mammal	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
66	<i>Calophyllum banyegitii</i> P.F.Stevens	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
67	<i>Cyrtodactylus malayanus</i>	Herpetofauna	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
68	<i>Spatholobus oblongifolius</i> Merr.	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
69	<i>Garcinia beccarii</i> Pierre	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
70	<i>Staurois latopalrnatus</i>	Herpetofauna	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
71	<i>Tropidophorus beccari</i>	Herpetofauna	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
72	<i>Syzygium bavidandii</i> (Merrill) Merrill & Perry	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
73	<i>Garcinia borneensis</i> Pierre	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
74	<i>Syzygium tawabense</i> (Korth.) Merr. & Perry	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
75	<i>Paravania parviflora</i> Bremek.	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
76	<i>Leptobrachella mjobergi</i>	Herpetofauna	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
77	<i>Amphispesma flavifrons</i>	Herpetofauna	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	

No	Species	Group	Indicator Value											Total <sup>1)</sup>	Rescalling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5				
78	<i>Pternandra crassicaelyx</i> Maxwell.	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
79	<i>Vatica micrantha</i> Slooten	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
80	<i>Phobaeticus chani</i>	Insect	1.2	4	2.5	5	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
81	<i>Aeromys thomasi</i>	Mammal	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
82	<i>Ardisia pyrsocoma</i> B.C.Stone	Flora	1.2	4	2.5	1	3.5	1	4.1	5	5.4	1	2.66	42.65	Priority 4	
83	<i>Paradoxurus bernabroditus</i>	Mammal	1.4	1	2.5	1	3.1	5	4.1	5	5.4	1	2.64	41.81	Priority 4	
84	<i>Copsychus malabaricus</i>	Bird	1.4	1	2.5	1	3.1	5	4.1	5	5.4	1	2.64	41.81	Priority 4	
85	<i>Tor tambroides</i>	Fish	1.4	1	2.5	1	3.1	5	4.1	5	5.4	1	2.64	41.81	Priority 4	
86	<i>Pteropus vampyrus</i>	Mammal	1.4	1	2.4	3,5	3.2	4	4.1	5	5.4	1	2.64	41.81	Priority 4	
87	<i>Puntius binotatus</i>	Fish	1.4	1	2.5	1	3.1	5	4.1	5	5.4	1	2.64	41.81	Priority 4	
88	<i>Tor tambra</i>	Fish	1.4	1	2.5	1	3.1	5	4.1	5	5.4	1	2.64	41.81	Priority 4	
89	<i>Aceros comattus</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.2	4	2.49	35.53	Priority 4	
90	<i>Argusianus argus</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.2	4	2.49	35.53	Priority 4	
91	<i>Ichthyophaga ichtbyaetus</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.2	4	2.49	35.53	Priority 4	
92	<i>Alcedo peninsulæ</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.2	4	2.49	35.53	Priority 4	
93	<i>Actenoides concretus</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.2	4	2.49	35.53	Priority 4	
94	<i>Anthraceros malayanus</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.2	4	2.49	35.53	Priority 4	
95	<i>Ambinga melanogaster</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.2	4	2.49	35.53	Priority 4	
96	<i>Prionodon linsang</i>	Mammal	1.4	1	2.5	1	3.4	2	4.1	5	5.2	4	2.49	35.53	Priority 4	
97	<i>Labiobarbus fasciatus</i>	Fish	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
98	<i>Macroglossus minimus</i>	Mammal	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
99	<i>Limnonectes kublii</i>	Herpetofauna	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
100	<i>Rourea mimosoides</i> (Vabl.) Planch.	Flora	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
101	<i>Fibraurea tinctoria</i>	Flora	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
102	<i>Luciosoma setigerum</i>	Fish	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
103	<i>Anematactichthys armatus</i>	Fish	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
104	<i>Osteochilus microcephalus</i>	Fish	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	

No	Species	Group	Indicator Value											Total <sup>1)</sup>	Rescalling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5				
105	<i>Macaca fascicularis</i>	Primate	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
106	<i>Sus scrofa</i>	Mammal	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
107	<i>Cayratia mollissima</i> (Planch.) Gagnep.	Flora	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
108	<i>Osteochilus waandersii</i>	Fish	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
109	<i>Eurycoma longifolia</i> Jack	Flora	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
110	<i>Oxygaster anomalura</i>	Fish	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
111	<i>Tylonycteris robustula</i>	Mammal	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
112	<i>Lutrogale perspicillata</i>	Mammal	1.4	1	2.3	3	3.4	2	4.1	5	5.4	1	2.45	33.86	Priority 4	
113	<i>Scotophilus kuhlii</i>	Mammal	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
114	<i>Licuala spinosa</i> Wurm	Flora	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
115	<i>Adiantum damosa</i> Jack	Flora	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
116	<i>Labiobarbus leptocentrus</i>	Fish	1.4	1	2.5	1	3.2	4	4.1	5	5.4	1	2.45	33.86	Priority 4	
117	<i>Syzgium nigricans</i> (King) Merr. & L.M. Perry	Flora	1.3	3	2.5	1	3.5	1	4.1	5	5.4	1	2.40	31.77	Priority 4	
118	<i>Shorea ovalis</i> Blume	Flora	1.3	3	2.5	1	3.5	1	4.1	5	5.4	1	2.40	31.77	Priority 4	
119	<i>Microcos sumatrana</i> (Baker,f.) Burret	Flora	1.3	3	2.5	1	3.5	1	4.1	5	5.4	1	2.40	31.77	Priority 4	
120	<i>Ingerophrynus divergens</i>	Herpetofauna	1.3	3	2.5	1	3.5	1	4.1	5	5.4	1	2.40	31.77	Priority 4	
121	<i>Calophyllum lanigerum</i> Miq.	Flora	1.3	3	2.5	1	3.5	1	4.1	5	5.4	1	2.40	31.77	Priority 4	
122	<i>Litsea rubiginosa</i> (Blume) Boerl	Flora	1.3	3	2.5	1	3.5	1	4.1	5	5.4	1	2.40	31.77	Priority 4	
123	<i>Anthreptes simplex</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
124	<i>Arachnothera flavigaster</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
125	<i>Koompassia malaccensis</i> Benth.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
126	<i>Hypogramma hypogrammicum</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
127	<i>Petaurista elegans</i>	Mammal	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
128	<i>Arachnothera longirostra</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
129	<i>Aleedo meninting</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
130	<i>Haliastur indus</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	

No	Species	Group	Indicator Value											Total <sup>1)</sup>	Rescalling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5				
131	<i>Shorea pinanga</i> Scheff	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
132	<i>Koompassia excelsa</i> (Becc.) Taub.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
133	<i>Lariscus insignis</i>	Mammal	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
134	<i>Trogonoptera brookiana</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
135	<i>Arachnothera robusta</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
136	<i>Anthreptes singalensis</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
137	<i>Pelargopsis capensis</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.2	4	2.30	27.58	Priority 5	
138	<i>Hemigalus derbyanus</i>	Mammal	1.4	1	2.3	3,8	3.5	1	4.1	5	5.4	1	2.26	25.91	Priority 5	
139	<i>Shorea macrophylla</i> (de Vriese) P.S.Ashton	Flora	1.4	1	2.3	3	3.5	1	4.1	5	5.4	1	2.26	25.91	Priority 5	
140	<i>Hesperoptenus tomesi</i>	Mammal	1.4	1	2.3	3	3.5	1	4.1	5	5.4	1	2.26	25.91	Priority 5	
141	<i>Aglaiia cumingiana</i> Turez	Flora	1.4	1	2.3	3	3.5	1	4.1	5	5.4	1	2.26	25.91	Priority 5	
142	<i>Goniobalanus carycinus</i>	Flora	1.4	1	2.3	3	3.5	1	4.1	5	5.4	1	2.26	25.91	Priority 5	
143	<i>Petinomys vordermanni</i>	Mammal	1.4	1	2.3	3	3.5	1	4.1	5	5.4	1	2.26	25.91	Priority 5	
144	<i>Gonystylus bancanus</i>	Flora	1.4	1	2.3	3	3.5	1	4.1	5	5.4	1	2.26	25.91	Priority 5	
145	<i>Notobelys platynota</i>	Herpetofauna	1.4	1	2.3	3	3.5	1	4.1	5	5.4	1	2.26	25.91	Priority 5	
146	<i>Maxomys rajab</i>	Mammal	1.4	1	2.3	3	3.5	1	4.1	5	5.4	1	2.26	25.91	Priority 5	
147	<i>Phaenicochaetus diardi</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
148	<i>Stachyris maculata</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
149	<i>Cuculus vagans</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
150	<i>Sundacivus hippurus</i>	Mammal	1.4	1	2.4	4,8	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
151	<i>Harpactes duvauceli</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
152	<i>Meiglyptes tukki</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
153	<i>Herpestes bosei</i>	Mammal	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
154	<i>Paguma larvata</i>	Mammal	1.4	1	2.5	1	3.4	2	4.1	5	5.4	1	2.07	17.95	Priority 5	
155	<i>Ptilinopus thoracicus</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
156	<i>Nyctaxalus pictus</i>	Herpetofauna	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
157	<i>Cymbirhynchus macrorhynchus</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	

No	Species	Group	Indicator Value											Total <sup>1)</sup>	Rescalling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5				
158	<i>Rhinomyias umbratilis</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
159	<i>Pycnonotus cyaniventris</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
160	<i>Eurylaimus ochromalus</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
161	<i>Pycnonotus eutilotus</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
162	<i>Arctogalidia trivirgata</i>	Mammal	1.4	1	2.5	1	3.4	2	4.1	5	5.4	1	2.07	17.95	Priority 5	
163	<i>Pycnonotus melanoleucus</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
164	<i>Rattufa affinis</i>	Mammal	1.4	1	2.4	2.5	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
165	<i>Enicurus ruficapillus</i>	Bird	1.4	1	2.4	2	3.5	1	4.1	5	5.4	1	2.07	17.95	Priority 5	
166	<i>Aporosa benthamiana</i> Hook.f.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
167	<i>Cyrtodactylus consobrinus</i>	Herpetofauna	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
168	<i>Treron olax</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
169	<i>Koruthaialos rubecula</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
170	<i>Rohana parisatis</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
171	<i>Kurixalus appendiculatus</i>	Herpetofauna	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
172	<i>Ixias marianne</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
173	<i>Argyrogramma signata</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
174	<i>Fagraea ceilanica</i> Thunb.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
175	<i>Calliphora vicina</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
176	<i>Ragadia makuta</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
177	<i>Anisophyllea disticha</i> (Jack) Baill.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
178	<i>Hylarana picturata</i>	Herpetofauna	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
179	<i>Artocarpus odoratissimus</i> Blanco.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
180	<i>Anax guttatus</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
181	<i>Callosciurus prevostii</i>	Mammal	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
182	<i>Dysdercus cingulatus</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
183	<i>Lasianthus griffithii</i> Wight	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
184	<i>Uvaria lamponga</i> Scheff.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	

No	Species	Group	Indicator Value											Total <sup>1)</sup>	Rescalling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5				
185	<i>Lepisanthes amoena</i> (Hassk.) Leenh	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
186	<i>Proutista moesta</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
187	<i>Aglaonema brevispatham</i> (Engl.) Engl.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
188	<i>Pycnonotus erythrophthalmos</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
189	<i>Calophyllum dtoscurii</i> P.F.Stevens	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
190	<i>Desmos cf. cochinchinensis</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
191	<i>Calophyllum ferrugineum</i> Ridl.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
192	<i>Dicrurus paradisus</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
193	<i>Garcinia parvifolia</i> (Miq.) Miq.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
194	<i>Shorea parvifolia</i> Dyer	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
195	<i>Calophyllum rigidum</i> cf. Miq	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
196	<i>Actitis hypoleucos</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
197	<i>Calophyllum venulosum</i> Zoll.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
198	<i>Syrphus ribesii</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
199	<i>Libocarpus sundaicus</i> (Blume) Rehd.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
200	<i>Syzygium palawanense</i> (C.B.Rob.) Merr. & Perry.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
201	<i>Georupis vernalis</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
202	<i>Echinopla lineata</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
203	<i>Camponotus gigas</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
204	<i>Tryporyza intercalas</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
205	<i>Catocrypsops strabo</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
206	<i>Proneris philonome</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
207	<i>Lophopetalum multinervium</i> Ridl.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	

No	Species	Group	Indicator Value											Total <sup>1)</sup>	Rescalling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5				
208	<i>Blattella asabinai</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
209	<i>Catopsilia pomona</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
210	<i>Pernandra rostrata (Cogn.) Nayar</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
211	<i>Aglaiouema brevispathum Benth.</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
212	<i>Pycnonotus atriceps</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
213	<i>Celeriblattina major</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
214	<i>Hermetia illucens</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
215	<i>Centropus sinensis</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
216	<i>Fagraea fragrans Roxb.</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
217	<i>Macaranga bancana (Miq.) Mull.Arg.</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
218	<i>Faunis gracilis</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
219	<i>Cephalomappa malloricarpa J.J.Sm</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
220	<i>Santiria laevigata Bl.</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
221	<i>Macaranga pruinosa Mull.Arg</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
222	<i>Dinopium javanense</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
223	<i>Abaetulla prasina</i>	Herpetofauna	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
224	<i>Diospyros sumatrana Miq.</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
225	<i>Chilades parthasius</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
226	<i>Ardisia elliptica Thunb.</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
227	<i>Chirodomys muroides</i>	Mammal	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
228	<i>Spilostethus hospes</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
229	<i>Macrotermes gilvus</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
230	<i>Stemonurus secundiflorus Blume</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
231	<i>Malaysia (Peninsular Malaysia)</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
232	<i>Alophoixus bres</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	

No	Species	Group	Indicator Value											Total <sup>1)</sup>	Rescaling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5				
233	<i>Girardinia nervosa</i> Planch.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
234	<i>Syzygium chrismannii</i> Merrill & Perry	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
235	<i>Manthis religiosa</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
236	<i>Durio griffithii</i> (Mast.) Bakh	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
237	<i>Girardinia subaequalis</i> Planch	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
238	<i>Syzygium scortechinii</i> (King) P.Chantaranonthai & J.Parnell	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
239	<i>Megophrys nasuta</i>	Herpetofauna	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
240	<i>Dysphaea dimidiata</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
241	<i>Gluta wallichii</i> (Hook.f.) Ding Hou.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
242	<i>Krema glaucescens</i> Jack	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
243	<i>Melanochyla angustifolia</i> Hook.f.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
244	<i>Fordia splendidissima</i> (Blume ex Miq.) Buijssen	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
245	<i>Melastoma malabathricum</i> L.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
246	<i>Endospermum diadenum</i> (Miq.)	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
247	<i>Microcos fibrocarpa</i> (Mast.) Burret	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
248	<i>Antidesma leucopodium</i> Miq.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
249	<i>Ardisia copelandii</i> Mez	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
250	<i>Priorchilus percussus</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
251	<i>Monotere/ Tetraodon leiurus</i>	Fish	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
252	<i>Priorchilus xanthopygius</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
253	<i>Mordella aculeata</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
254	<i>Prodasineura ininterrupta</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
255	<i>Chrysomya bezziana</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
256	<i>Cyornis banyumas</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	

No	Species	Group	Indicator Value															Total <sup>1)</sup>	Rescalling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5								
257	<i>Musca domestica</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
258	<i>Cyornis superbus</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
259	<i>Myristicivora blumei</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
260	<i>Apis cerana</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
261	<i>Mythimna convecta</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
262	<i>Heliocoprps dominus</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
263	<i>Nacaduba bermus</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
264	<i>Hemiprocne comata</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
265	<i>Nannosciurus melanotis</i>	Mammal	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
266	<i>Pycnonotus plumosus</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
267	<i>Chrysosoma leucopogon</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
268	<i>Dendrobium grande</i> Hook.f.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
269	<i>Nephetium uncinatum</i> Radlk. ex Leenb	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
270	<i>Rhabdophis chrysargos</i>	Herpetofauna	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
271	<i>Gonocephalus grandis</i>	Herpetofauna	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
272	<i>Dialium kunstleri</i> Prain.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
273	<i>Clidemia hirta</i> (L.) D.Don.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
274	<i>Riptortus linearis</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
275	<i>Eurema simulatrix</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
276	<i>Dicranopteris linearis</i> (Burm. f.) Underw.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
277	<i>Ochanostachys amentacea</i> Mast.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
278	<i>Sanitria rubiginosa</i> Bl.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
279	<i>Odorrana hosii</i>	Herpetofauna	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
280	<i>Scopula perlata</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
281	<i>Onychargia atrocyana</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
282	<i>Hopea dryobalanoides</i> Miq.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					
283	<i>Orthotomus atrogrularis</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5					

No	Species	Group	Indicator Value											Total <sup>1)</sup>	Rescaling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5				
284	<i>Shorea macroptera</i> Dyer	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
285	<i>Valanga nigricornis</i>	Insect	1.4	1	2.5	2,8	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
286	<i>Hylarana raniceps</i>	Herpetofauna	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
287	<i>Eria parviflora</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
288	<i>Blattella germanica</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
289	<i>Ypthima philomela</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
290	<i>Smilax blumei</i> DC.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
291	<i>Eurema hecabe</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
292	<i>Dipterocarpus oblongifolius</i> Blume	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
293	<i>Graphium antiphates</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
294	<i>Actinodaphne borneensis</i> Meisn.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
295	<i>Papilio demoleus</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
296	<i>Aporosa lunata</i> (Miq.) Kurz	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
297	<i>Colotis fausta</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
298	<i>Sundams infraluteus</i>	Mammal	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
299	<i>Copiterus irroratus</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
300	<i>Surniculus lugubris</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
301	<i>Payena acuminata</i> (Blume) Pierre	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
302	<i>Dryobalanops oblongifolia</i> Dyer	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
303	<i>Pedostibes hostii</i>	Herpetofauna	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
304	<i>Syzygium cbloranthum</i> (Dubie) Merrill & Perry	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
305	<i>Graphium doson</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
306	<i>Syzygium cleistocalyx</i> P.S.Ashton	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
307	<i>Pentace triptera</i> Mast	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	

No	Species	Group	Indicator Value											Total <sup>1)</sup>	Rescalling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5				
308	<i>Syzygium jambos</i> (Linn.) Ashton	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
309	<i>Gryllotalpa orientalis</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
310	<i>Knema conferta</i> (King) Warb.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
311	<i>Petaurista petaurista</i>	Mammal	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
312	<i>Syzygium racemosum</i> (Blume) A.DC.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
313	<i>Aulacophora foveicollis</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
314	<i>Durio zibethinus</i> Murray	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
315	<i>Ardisia elliptica</i> Reinw. ex Blume	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
316	<i>Tanaecia palguna</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
317	<i>Phlaeoba fumosa</i>	Insect	1.4	1	2.5	4	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
318	<i>Terpsiphone paradisi</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
319	<i>Baccaurea polyneura</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
320	<i>Echinorex gymmurus</i>	Mammal	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
321	<i>Phrynoideis aspera</i>	Herpetofauna	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
322	<i>Knema pulchra</i> (Miq.) Warb.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
323	<i>Polistes tenebricosus</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
324	<i>Elateriospermum tapos</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
325	<i>Polyalthia cauliflora</i> Hook.f. & Thomson	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
326	<i>Elymnias panthera</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
327	<i>Polyalthia sumatrana</i> (Miq.) Kurz	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
328	<i>Tupaia tana</i>	Mammal	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
329	<i>Crioa aroa</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
330	<i>Urophyllum arboreum</i> (Reinw. ex Blume) Korth.	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
331	<i>Potanthus omaha</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	
332	<i>Acantopsis dialuzona</i>	Fish	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5	

No	Species	Group	Indicator Value										Total <sup>1)</sup>	Rescalling	Priority
			K1	SK1	K2	SK2	K3	SK3	K4	SK4	K5	SK5			
333	<i>Haptoncus luteolus</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5
334	<i>Coelogyne foerstermannii</i>	Flora	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5
335	<i>Xanthopimpla gampsura</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5
336	<i>Collocalia esculenta</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5
337	<i>Eucorysses grandis</i>	Insect	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5
338	<i>Oxya chinensis</i>	Insect	1.4	1	2.5	5	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5
339	<i>Collocalia fuciphaga</i>	Bird	1.4	1	2.5	1	3.5	1	4.1	5	5.4	1	1.88	10.00	Priority 5

Explanation:

K1, K2, ..., K5 = Indicators per criteria

SK1, ..., SK5 = Indicator Value per Criteria

Total<sup>1)</sup> = The total value of the weight value and the value of the indicator

Rescalling = Unification of scale value between 10 to 100

Priority 1, ..., 5 = Priority assessment grading results





Study of Priority

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**ITTO PD 617/11 (F) Rev.4**

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(BKNP) as a Transboundary Ecosystem between Indonesia and state of  
Sarawak, Malaysia (Phase III)