High Conservation Values in Timimbang-Botitian Forest Reserves

Assessment Report and Management Recommendations

1ST REVISION

MARCH 2016

EXECUTIVE SUMMARY

High Conservation Value (HCV) assessment for Timimbang-Botitian Forest Reserves or known as Timimbang-Botitian Sustainable Forest Management (TBSFM) area was carried out in two stages. The assessment was carried out from the 17th–22nd of February 2014 and from the 7th–16th of May 2014. The main objective of this assessment is to enhance relevant information on the HCV elements within the TBSFM area. The assessment was carried out by a multidisciplinary team with experienced assessors from various fields. In the first revision of the HCV, all 6 HCV elements identified are still valid and were elaborated for TBSFM area. Appropriate management and monitoring actions have been recommended and discussed with the management team of TBSFM for further actions to be undertaken. The only amendment is that the demarcation of boundaries of all HCV elements is redundant since the entire project area is classify as Class I Protected Area, which is indicated as HCV 1.1.

One of the major recommendations is to enhance forest resource condition and tree diversity through various activities designed specifically for conservation purposes, especially on forest restoration and the silvicultural treatment on scheduled compartments of the FMP. Through the analysis of the many species recorded, nearly half of the species have yet to be assigned IUCN status and not much research work has been conducted on such species, especially within the flora group. Therefore, by looking at the current condition of the TBSFM area, it is essential for actions to be taken in setting the entire TBSFM area for conservation, consisting of various forest types with the aim to preserve species diversity and also taking into account species that are unique to certain forest types. It is recommended that further studies should be conducted to document the rich flora and fauna diversity within TBSFM area.

On a landscape level (HCV 2), TBSFM area forms part of the forest reserve complex that borders Bonggaya FR (eastern) and Ulu Tungud FR (western). HCV fauna assessment has shown that diverse fauna can be found within the TBSFM area and interviews with the villagers provided information on the frequent sightings of the wildlife that are present and constantly moving in and out of TBSFM area. Therefore, TBSFM does not only provide habitats for the fauna but also acts as a transient wildlife migratory path between the different forest reserves it borders.

From the social aspect, there is no major confict by the surrounding villages with the TBSFM area. Furthermore, the communities verify that no basic needs or cultural values are placed in the project area. Many of the villages are aware of the Forestry Rules and Law. Their understanding to protect forest reserve and its resources is also part of their role as stakeholder within the management unit of the area. There is much effort undertaken by the Sabah Forestry Department to manage and to ensure the goal set aside for TBSFM area is consistent with the social needs and development adjacent to it and to achieve maximum equilibrium on environment, social and economic aspects in general.

Table 1: The followings are the findings of HCV elements in TBSFM area and the management and monitoring recommendations for each HCV.

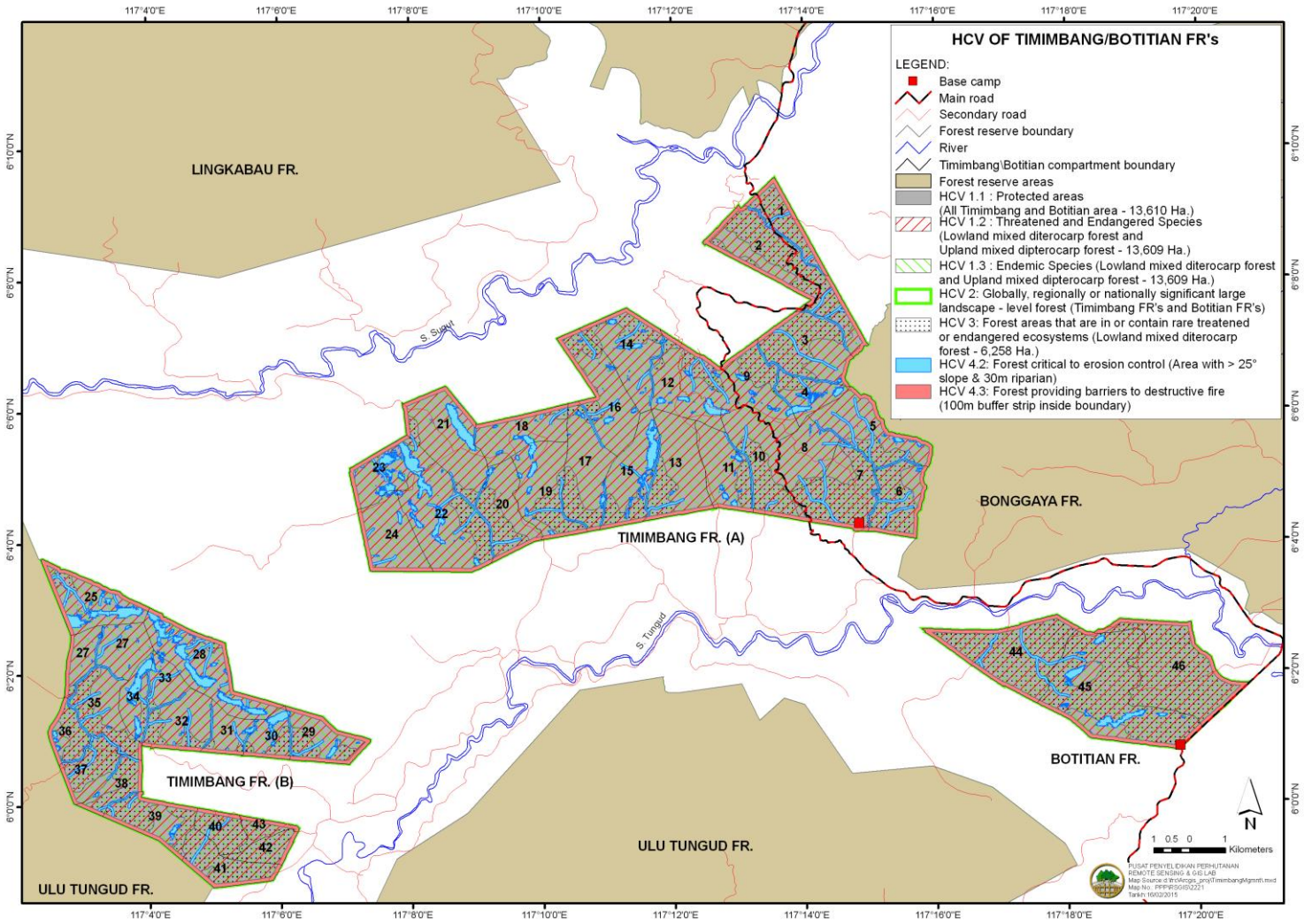
HCV	Findings	Management Prescription	Monitoring
1.1	Timimbang and Botitian Forest Reserves are Class I Protection Forest.	• Conduct periodic patrolling and surveillance in all designated HCV areas to curb illegal activities such as encroachment and poaching.	• Periodic monitoring and control should be carried out to prevent encroachment in the buffer zone. Any signs of encroachment should be reported and dealt with immediate actions. • Quarterly progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing reporting of monitoring results of known HCV attributes.
1.2	The presence of considerably high number of high conservation significant fauna and flora from both past research findings and the recent HCV assessment may concludes that this FMU unit is an important natural plant habitat or for wildlife nesting and foraging habitats.	• Conduct periodic patrolling and surveillance in all designated HCV areas to curb illegal activities, such as encroachment and poaching. • Establish a long term biodiversity monitoring system for critical forest ecosystem, flora and fauna. • The trees listed in the prohibited list, significant fruit trees or nesting sites for wildlife, annotated IUCN red list species found in TBSFM should be clearly marked on the ground and on the maps. • Migratory pathway of wildlife on logging roads, along streams or wildlife trails in the forest should be marked on the map and kept to ensure wildlife are able to use it for movement within and between forest reserves. • TBSFM Wildlife Management System to be enhanced through collaboration with wildlife experts such as HUTAN, WWF and other research institutes. • Field staff is required to attend training courses on plants and wildlife to further enhance their botanical and wildlife knowledge on species that are currently listed in the threatened, endemic and forestry prohibited lists to ensure they do not harvest or damage and also for monitoring purposes.	• Periodic monitoring and control should be carried out to prevent encroachment in the buffer zone. Any signs of encroachment should be reported and dealt with immediate actions. • Quarterly Progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing reporting of monitoring results of known HCV attributes. • Periodical monitoring by conducting re-enumeration of the trees in the permanent sample plots to be conducted once every three years to get an indication of changes in tree structure and species assemblages. • Periodical monitoring of endangered, endemic and migratory wildlife species will be practiced using Wildlife Management System adopted by the management team. Any changes in terms of population count or migratory pathways observed by either researchers or ground staffs, the management team must be alerted. Similarly, this monitoring prescription also applies to endangered and endemic plant.

		• Update current biodiversity conservation status to TBSFM team of the upgrade or downgrading of threat status locally and globally.	
1.3	The presence of considerably high number of endemic fauna and flora from both past research findings and the recent HCV assessment may conclude that this FMU unit is an important natural plant habitat or for wildlife nesting and foraging habitats.	• Conduct periodic patrolling and surveillance in all designated HCV areas to curb illegal activities, such as encroachment and poaching. • Establish a long term biodiversity monitoring system for critical forest ecosystem, flora and fauna. • Migratory pathway of wildlife on logging roads, along streams or wildlife trails in the forest should be marked on the map and kept to ensure wildlife are able to use it for movement within and between forest reserves. • TBSFM Wildlife Management System to be enhanced through collaboration with wildlife experts such as HUTAN, WWF and other research institutes. • Field staff is required to attend training courses on plants and wildlife to further enhance their botanical and wildlife knowledge on species that are currently listed in the threatened, endemic and forestry prohibited lists to ensure they do not harvest or damage and also for monitoring purposes. • Update current biodiversity conservation status to TBSFM team of the upgrade or downgrading of threat status locally and globally.	• Periodic monitoring and control should be carried out to prevent encroachment in the buffer zone. Any signs of encroachment should be reported and dealt with immediate actions. • Quarterly Progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing reporting of monitoring results of known HCV attributes. • Periodical monitoring by conducting re-enumeration of the trees in the permanent sample plots to be conducted once every three years to get an indication of changes in tree structure and species assemblages. • Periodical monitoring of endangered, endemic and migratory wildlife species will be practiced using Wildlife Management System adopted by the management team. Any changes in terms of population count or migratory pathways observed by either researchers or ground staff, the management team must be alerted. Similarly, this monitoring prescription also applies to endangered and endemic plant.
1.4		• No HCV area is indicated. • In the event that any salt licks and potential nesting sites are found within the TBSFM area in the future, demarcation of HCV boundaries on the ground and installing clear signage along existing road, foot trails and navigable rivers/streams indicating	• No HCV area is indicated. • In the event that any salt licks and potential nesting sites are found within the TBSFM area in the future, periodic monitoring as prescribed above will be conducted.

		critical values	
2	The entire TBSFM should be categorised as HCV 2 as potential for linking large forested areas between Bongaya and Ulu Tungud Forest Reserves is applicable.	• Conduct periodic patrolling and surveillance in all designated HCV areas to curb illegal activities such as encroachment and poaching. • Establish a long term biodiversity monitoring system for critical forest ecosystem, flora and fauna. • Migratory pathway of wildlife on logging roads, along streams or wildlife trails in the forest should be marked on the map and kept to ensure wildlife are able to use it for movement within and between forest reserves. • TBSFM Wildlife Management System to be enhanced through collaboration with wildlife experts such as HUTAN, WWF and other research institutes.	• Periodic monitoring and control should be carried out to prevent encroachment in the buffer zone. Any signs of encroachment should be reported and dealt with immediate actions. • Quarterly progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing reporting of monitoring results of known HCV attributes. • Periodical monitoring by conducting re-enumeration of the trees in the permanent sample plots to be conducted once every three years to get an indication of changes in tree structure and species assemblages. • Periodical monitoring of endangered, endemic and migratory wildlife species will be practiced using Wildlife Management System adopted by the management team. Any changes in terms of population count or migratory pathways observed by either researchers or ground staff, the management team must be alerted. Similarly, this monitoring prescription also applies to endangered and endemic plant. • Long term monitoring of TBSFM landscape using remote sensing technology and to be conducted once every three years to detect changes within the reserve and also vicinity areas. If threats are detected, precautionary approached will be taken and potential mitigation measures will be incorporated in the management plan.
3	The forests located below 200 m a.s.l. contain rare, endangered, threatened and also endemic species and appropriate to be categorised as HCV 3.	• Conduct periodic patrolling and surveillance in all designated HCV areas to curb illegal activities, such as encroachment and poaching. • Establish a long term biodiversity monitoring system for critical forest	• Periodic monitoring and control should be carried out to prevent encroachment in the buffer zone. Any signs of encroachment should be reported and dealt with immediate actions. • Quarterly progress reports in

		ecosystem, flora and fauna.	reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing reporting of monitoring results of known HCV attributes. • Periodical monitoring by conducting re-enumeration of the trees in the permanent sample plots to be conducted once every three years to get an indication of changes in tree structure and species assemblages.
4.1		• No HCV area is indicated.	• No HCV area is indicated.
4.2	All areas with slopes >25° and 30 m riparian buffer strips should be categorised as HCV 4.2 for their importance in erosion control.	• Conduct periodic patrolling and surveillance in all designated HCV areas to curb illegal activities, such as encroachment and poaching.	• Periodic monitoring and control should be carried out to prevent encroachment in the buffer zone. Any signs of encroachment should be reported and dealt with immediate action. • Quarterly progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing reporting of monitoring results of known HCV attributes.
4.3	Buffer strips of 100 m inside TBSFM boundaries that border local communities land and northern boundary that bordering oil palm estate are categorised as HCV 4.3.	• Conduct periodic patrolling and surveillance in all designated HCV areas to curb illegal activities, such as encroachment and poaching. • When the Forest Fire Management Plan is available it has to be implemented and updated periodically. • Forest restoration of indigenous tree species as part of the remedial action to increase forest structural diversity and mitigate any forest fire incidence spreading into the FMU core area, especially area dominated with lalang grassland and ferns.	• Periodic monitoring and control should be carried out to prevent encroachment in the buffer zone. Any signs of encroachment should be reported and dealt with immediate actions. • Quarterly progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing reporting of monitoring results of known HCV attributes. • Ensure that all fire prevention procedures (monitoring, fire drills, public awareness campaign and etc) to be practised on a regular basis (at least once a year) especially during the drought season.
5	No community basic need is indicated within TBSFM.	• No HCV area is indicated.	• No HCV area is indicated.
6	No cultural value is indicated within TBSFM.	• No HCV area is indicated.	• No HCV area is indicated.

Demarcation of HCV boundaries on the ground for all designated HCVs is not required since 100 % overlaps occurred among elements (Map 1).



Map 1. The composite map of all identified HCV elements in Timimbang-Botitian Sustainable Forest Management Project Area, Sabah.

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LIST OF ACRONYMS AND ABBREVIATIONS

AOI	Area of Interests
CITES	Convention on international Trade in Endangered Species
CFI	Continuous Forest Inventory
CR	Critically Endangered
dbh	Diameter at breast height
EN	Endangered
FCC	Fecal Coliform Count
FMP	Forest Management Plan
FMU	Forest Management Unit
FR	Forest Reserve
FSC	Forest Sterwardship Council
GFS	Global Forestry Services
GIS	Geographical Information System
HCV	High Conservation Value
HCVF	High Conservation Value Forest
HDF	Hill Dipterocarp Forest
IUCN	International Union for Conservation of Nature
Kg	Kampung (Village)
LMDF	Lowland Mixed Dipterocarp Forest
UMDF	Upland Mixed Dipterocarp Forest
LAC	Limit of Acceptable Change
MC	Main Canopy
MS	Middle Storey
MUS	Malayan Uniform System
NCS	National Conservation Strategy
NGO	Non Governmental Organisation
NTFP	Non Timber Forest Produce
PSP	Permanent Sample Plot
SAN	Sandakan Herbarium
SBS	Social Baseline Survey
SFM	Sustainable Forest Management
Sg	Sungai (River)
SOP	Standard Operation Procedure
SWD	Sabah Wildlife Department
TBSFM	Timimbang-Botitian Sustainable Forest Management
UMS	Universiti Malaysia Sabah
US	Under Storey
WCE	Wildlife Conservation Enactment

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1. INTRODUCTION

This report presents the findings of the High Conservation Value Forest (HCVF) assessment of the Timimbang-Botitian Sustainable Forest Management (TBSFM) area, Sabah, Malaysia. The assessment was conducted on the 17th–22nd of February 2014 and from the 7th–16th of May 2014, with a team comprising multiple disciplines ranging from botanists, ecologists, conservationists and socio-economists from the Sabah Forestry Department. The assessment aims to enhance relevant information on HCV elements for TBSFM area, ensuring the Department meets the international standards and principles of Sustainable Forest Management and obtaining the FSC certification. The HCVF assessment was carried out in accordance to the High Conservation Value Forest (HCVF) toolkit for Malaysia (2009). HCV assessment data are derived from secondary data from various research institutions, NGO (Non-Governmental Organizations) and others whom have previously worked within the TBSFM area.

1.1 Objectives

The objectives of the HCV assessment in TBSFM are as follows:

a. To determine which categories of HCV is present in the project area;
b. To delineate HCV areas where possible;
c. To recommend TBSFM management on the management prescriptions and monitoring plans for the identified HCV attributes that have been discussed and agreed by relevant stakeholders through consultative approaches.

1.2 Approach

One of the requirements in the implementation of Sustainable Forest Management principles is to protect such areas with great biodiversity importance. This is to ensure that aside from harvesting the forest, the management will safeguard and ensure that forest ecosystem values are not depleting or omitted from their management plans. In 1999, the Forest Stewardship Council (FSC) developed the High Conservation Values (HCVs) concept (Principle 9) as part of the FSC certification standard for a well-managed forest. Under FSC certification standard, there are a total of 4 requirements that govern the management of High Conservation Value Forests (HCVFs). The 4 requirements are as listed below:

Criterion 9.1

Assessment to determine the presence of the attributes consistent with High Conservation Value Forests will be completed, appropriate to scale and intensity of forest management.

Criterion 9.2

The consultative portion of the certification process must place emphasis on the identified conservation attributes, and options for the maintenance thereof.

Criterion 9.3

The management plan shall include and implement specific measures that ensure the maintenance and/or enhancement of the applicable conservation attributes consistent with the precautionary approach. These measures shall be specifically included in the publicly available management plan summary.

Criterion 9.4

Annual monitoring shall be conducted to assess the effectiveness of the measures employed to maintain or enhance the applicable conservation attributes.

Within those requirements, HCVF set up is basically designed to enhance the value of the forest. For TBSFM area, the HCVFs that are set up should be managed with inputs from various stakeholders, complete with the long-term plans in various programmes and activities through frequent monitoring. If there are changes of plan or proposal of new development plan during the revision of FMP, the values within the HCVF areas in terms of environmental, social and economics should be taken into consideration. Aside from that, the assigned HCVs have to be monitored regularly as its value might change over time.

The interpretation of HCVs categories basically follows the definition that was set in the Global HCVF Toolkit as adopted by the HCVF toolkit for Malaysia in 2009 (Table 1).

Table 1. HCVs categories and elements as described in the HCVF Toolkit for Malaysia (2009).

HCV	Element
1	Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values
1.1	Protected areas
1.2	Threatened and endangered species
1.3	Endemic species
1.4	Critical temporal use
2	Globally, regionally or nationally significant large landscape-level forests
3	Forest areas that are in or contain rare, threatened or endangered ecosystems
4	Forest areas that provide basic services of nature in critical situations
4.1	Forests critical to water catchments
4.2	Forests critical to erosion control
4.3	Forests providing barriers to destructive fire
5	Forest areas fundamental to meeting basic needs of local communities (e.g. subsistence, health)
6	Forest areas critical to local communities' traditional cultural identity

1.3 HCV Assessment Team

The assessment was carried out by a multidisciplinary team from Sabah Forestry Department with experience from various fields. The team specialized scope covered forest ecosystem and species ecology in tropical forests, the socio-economics of village communities and Geographic Information Systems (GIS) (Table 2).

Table 2. Assessment team and HCV Assessment Focus

Name	Fields of Expertise & Experience	HCV aspect
Reuben Nilus (Team Leader)	Forest Ecologist (21 years)	HCV 2, 3 & 4
Arthur Y.C. Chung	Entomologist and Wildlife Conservation (23 years)	HCV 1 & 2

John B. Sugau	Botanist (21 years)	HCV 1 & 3
Ricky A. Martin	Community Forestry (26 years)	HCV 4, 5 & 6
Julsun Sikui	Forester (11 years)	HCV 2, 3 & 4
Rayner Bili	Wildlife Ecology (8 years)	HCV 1 & 2
Mohmad Jumri Abdul Hamid	GIS (21 years)	GIS Mapping

1.4 Report Availability and Peer Review

This report is made available publicly and uploaded on to the Timimbang-Botition Sustainable Forest Management's website by the Sabah Forestry Department. Prominent experts in park management, plant and wildlife ecology in Sabah have been approached and requested to review this report.

2. THE FOREST MANAGEMENT UNIT

2.1 OVERVIEW

Both Timimbang Forest Reserve and Botitian Forest Reserve are legally designated as Class I Protection Forests, covering a total area of 11,465 hectares and 2,145 hectares respectively. These reserves are administered directly under the management and jurisdiction of the Beluran Forestry District of the Sabah Forestry Department.

2.2 FOREST MANAGEMENT SYSTEM

Based on the Management Policies and Development Goal stated in the Forest Management Plan (FMP) 2014, the TBSFM area is planned to be managed mainly for protection and conservation where timber extraction is prohibited. The primary long-term goal and management objective is to provide a non-destructive use of forest resources, focussing largely on the conservation and protection of diversity of flora and fauna found in this reserve.

2.3 PHYSICAL BACKGROUND

2.3.1 Landscape Setting

The Timimbang-Botitian Forest Reserves or Timimbang-Botitian Sustainable Forest Management (TBSFM) area is geographically located between latitude 05° 58’ 44.9”–06° 09’ 32.3” N and longitude 117° 02’ 19.6”–117° 21’ 14.9” E Sabah (Figure 1). It comprises a cluster of two forest reserves, namely Timimbang (Part A and B) and Botitian Forest Reserves.

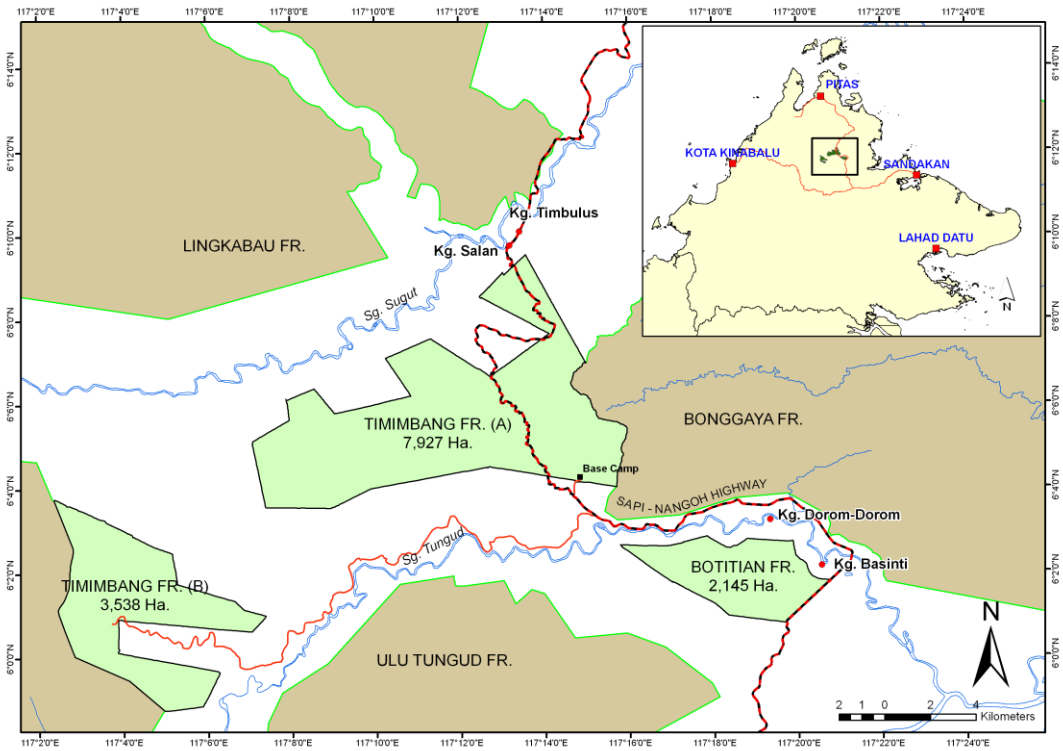


Figure1. The location map of the Timimbang-Botitian Sustainable Forest Management area in Sabah, Malaysia.

Geographically, Botitian is isolated from Timimbang (Part A and B). In term of landuse perspective, TBSFM area is mostly surrounded by the private and small holder oil palm plantations (Figure 2).

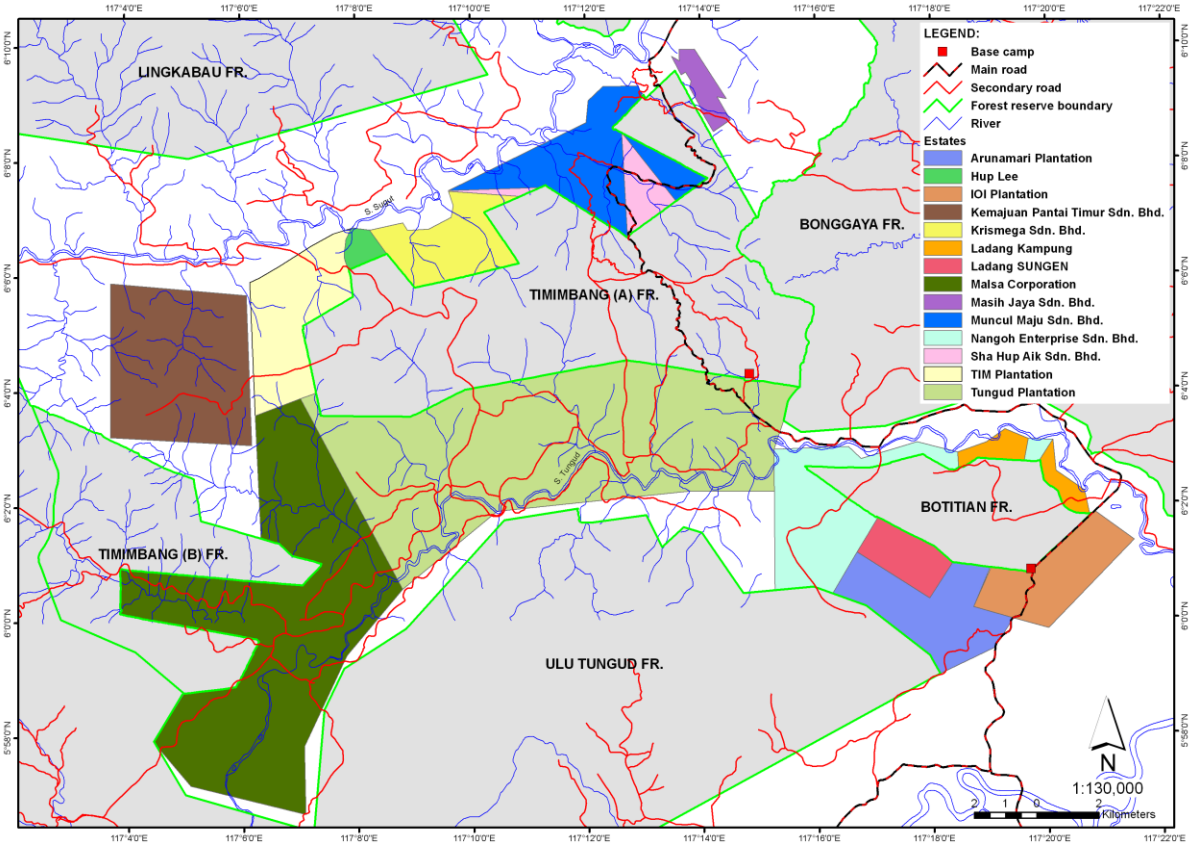


Figure 2. The surrounding landuse of Timimbang-Botitian SFM area.

2.3.2 Soil

There are five major soil association within Timimbang-Botition FRs (Fig. 2). About 82% of the FMU is categorised as Crocker association; 9% as Lokan and 7% as Dalit association. The other soil associations, i.e. Labau and Kinabatangan are negligible in size. All of the soil associations are categorised as intermediate fertility in plant nutrient aspect (Acres *et al.*, 1975).

2.4 BIOLOGICAL RESOURCES

2.4.1 Forest Ecosystems (source: Nilus *et al.* 2014)

Originally, the forest formation of the reserve was mainly classified as lowland and upland mixed dipterocarp forests that established on Crocker, Lokan, Dalit and Labau soil associations, and negligible area covered by seasonal freshwater swamp forest on Kinabatangan association (Fig. 3). At present, various regenerative stages of mixed dipterocarp forest, secondary vegetations and planted forest are the main vegetation classes in the reserve. As stratified by the Forest Resource Management Division, based on 2007 Spot5 satellite image with 2.5 m resolution interpretation, the disturbed lowland and upland mixed dipterocarp forests cover about 17% and ~1% of the reserve, respectively.

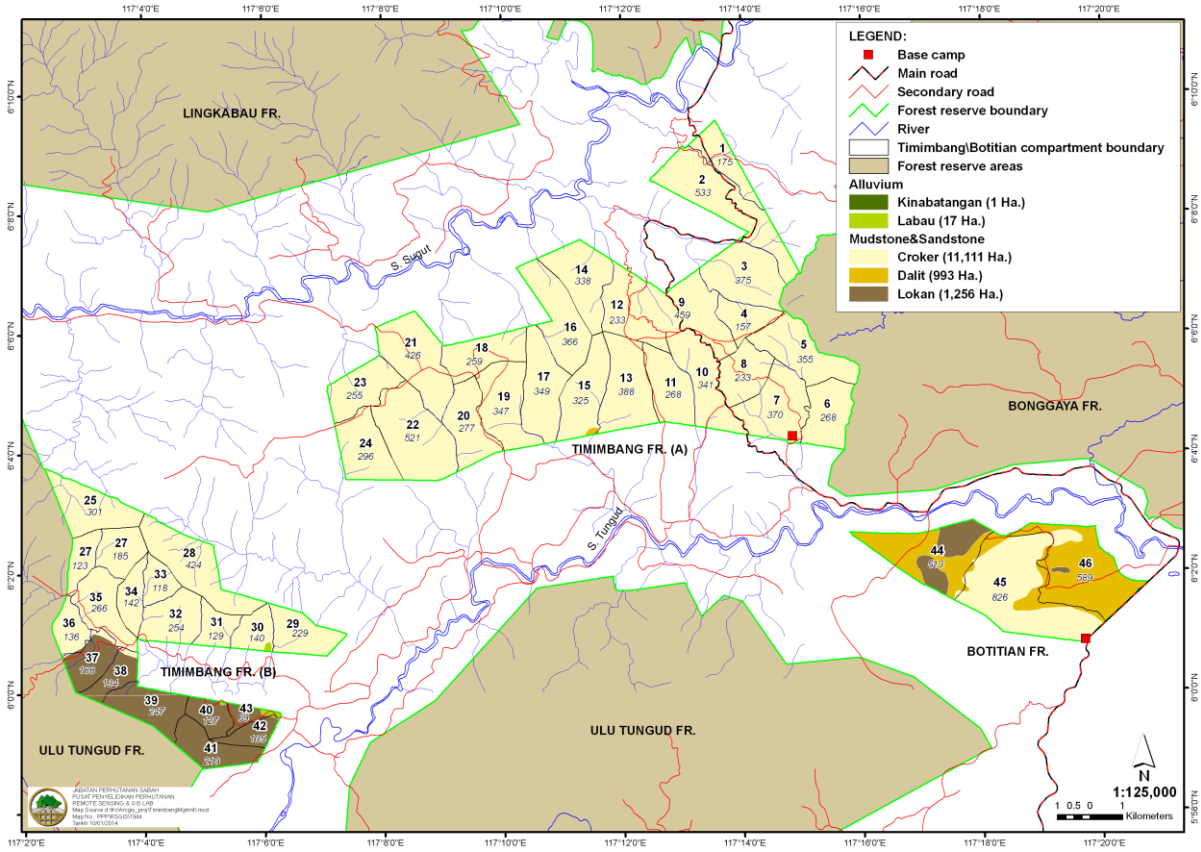


Figure 3. Soil association map of Timimbang-Botitian SFM area in Sabah, Malaysia.

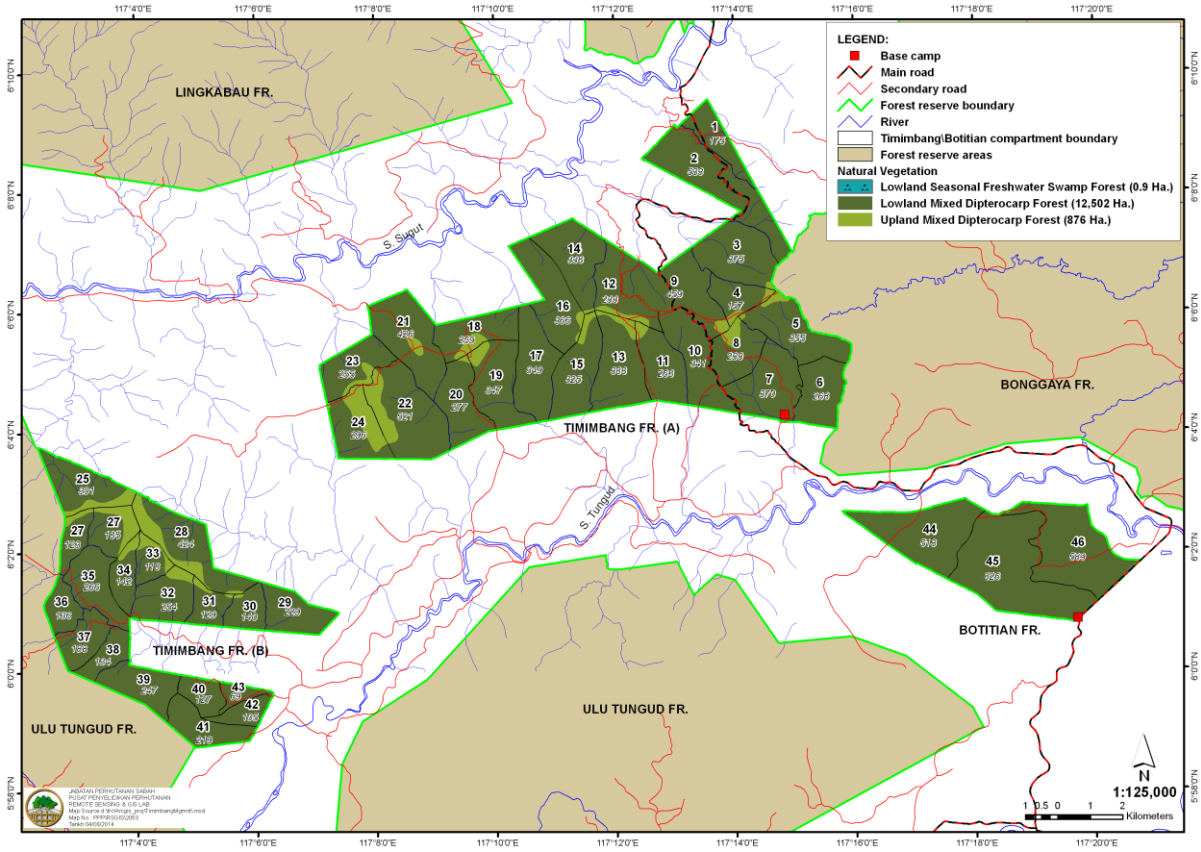


Figure 4: The original natural vegetation of Timimbang-Botitian SFM area, Sabah.

No record of forest fire incidence in the forest, thus forest disturbance are directly impacted by timber extraction and forest clearing. About 76% of the reserve is affected by severe logging disturbance and currently covered by mostly secondary species; and 2% previously encroached areas and currently undergo forest restoration activities (Fig. 5).

A total of 544 trees above 10 cm dbh were enumerated in all 11 permanent sample plots that were established during the HCV assessment. Of these total, 238 number of taxa and 110 number of genera derived from 45 known families were recorded. The Dipterocarpaceae is the most species-rich families and followed by the Euphorbiaceae (Figure 5).

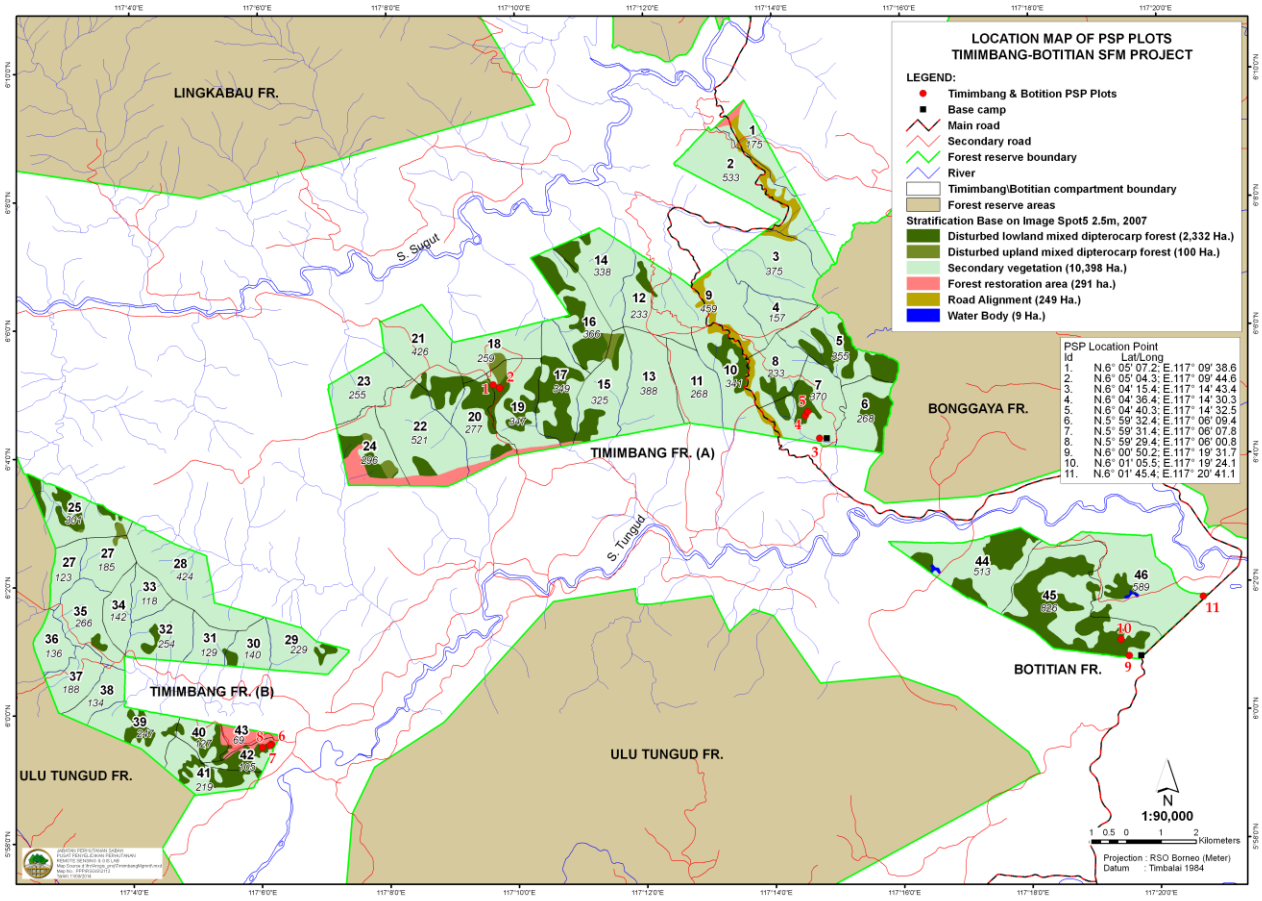


Figure 5. The current natural vegetation and the location of permanent sample plots in Timimbang-Botitian SFM area, Sabah.

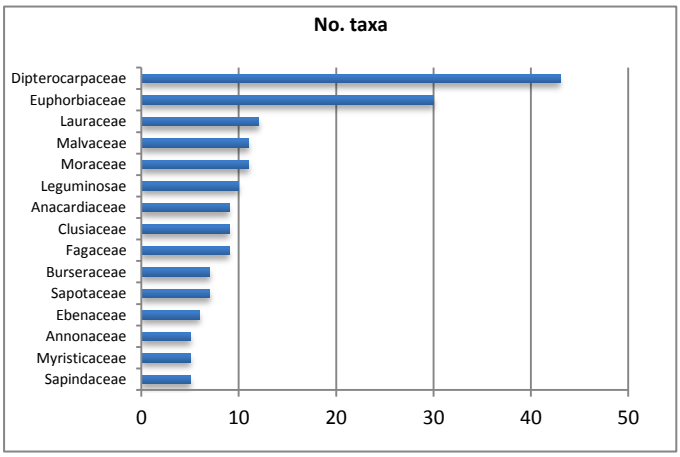


Figure 6. The 15 most species-rich families derived from pooled data of all the 11 plots for trees in Timimbang-Botitian SFM area.

i. Mixed Dipterocarp Forest

This forest is found on lowland below 500 m a.s.l. throughout the whole reserve (Fig. 4). However, only 17% of the reserve is classified under this forest formation. Even so most the lowland mixed dipterocarp forest (MDF) is largely disturbed and currently under various stage of regenerating condition. The dominant group of trees is the dipterocarps that represent 22–50% and 20–67% of the total density and basal area of the forest, respectively (see Appendix II). Other important groups of trees are represented by the tree families Euphorbiaceae, Anacardiaceae, Fagaceae, Clusiaceae, Lauraceae, Myrtaceae, Malvaceae, Ebenaceae and Flacourtiaceae. It is a large stature forest with the main canopy 30–40 m in height (Plate 1–3).

The main canopy consists of mature trees with diameter more than 40 cm and can attain height about 30–40 m tall. The main canopy is dominated by *Shorea macrophylla, Shorea macroptera, Shorea parvifolia, Shorea smithiana, Dryobalanops beccarii, Dipterocarpus acutangulus, Shorea pauciflora, Hopea beccariana, Hopea pentanervia, Dipterocarpus stellatus, Hopea semicuneata, Shorea acuminatissima, Shorea multiflora, Shorea ovalis, Dipterocarpus pachyphyllus, Shorea agami, Shorea hopeifolia, Shorea leprosula, Vatica* sp., *Dipterocarpus* cf. *caudiferus, Dipterocarpus kuntsleri, Shorea domatiosa, Shorea exelliptica* and *Shorea inappendiculata* from the tree family Dipterocarpaceae; *Gluta sabahana, Gluta wallichii, Mangifera* sp. and *Mangifera foetida* from the tree family Anacardiaceae; *Lithocarpus* sp., *Lithocarpus gracilis, Lithocarpus lucidus* and *Lithocarpus* sp1 from the tree family Fagaceae; *Canarium* cf. *euryphyllum* and *Santiria laevigatum* from the tree family Burseraceae; *Chaetocarpus castanocarpus* and *Endospermum diadenum* from the tree family Euphorbiaceae; *Alseodaphne insignis* and *Beilschmiedia* cf. *assamica* from the tree family Lauraceae; *Durio acutifolius, Durio lanceolata, Durio* sp. and *Scaphium macropodum* from the tree family Malvaceae; *Xylopia* sp. (Annonaceae); *Bhesa paniculata* (Celastraceae); *Kayea macrantha,* (Clusiaceae); *Dillenia excelsa* (Dilleniaceae); *Diospyros* sp., (Ebenaceae); *Crudia* sp. (Fabaceae); *Hydnocarpus woodii* (Flacourtiaceae); *Artocarpus odoratissimus* and *Artocarpus* sp. from the tree family Moraceae; *Syzygium* sp. (Myrtaceae); *Gonystylus malaccensis* (Thymelaeaceae); and *Gironniera subaequalis* (Ulmaceae) (Appendix II).

The middlestorey canopy layer of this forest is represented by most of the trees found in the main canopy layers, alongside medium sized trees with diameter between 20–40 cm. Common trees in this middlestorey canopy and other regenerating main canopy trees are *Dipterocarpus grandiflorus, Shorea argentifolia, Shorea beccariana, Parashorea malaanonan, Vatica oblongifolia, Dipterocarpus confertus, Shorea fallax, Shorea tenuiramulosa, Vatica dulitensis, Vatica odorata* subsp. *Mindanensis, Vatica umbonata, Dipterocarpus caudiferus, Dipterocarpus kerrii, Hopea nervosa, Shorea patoensis,*

Shorea sp. and *Vatica albiramis* from the tree family Dipterocarpaceae; *Mangifera decandra* (Anacardiaceae); *Xylopia ferruginea* and *Polyalthia hookeriana* from the tree family Annonaceae; *Dacryodes* sp. (Burseraceae); *Mesua elmeri* (Clusiaceae); *Diospyros* sp2 (Ebenaceae); *Pimeleodendron griffithianum* (Euphorbiaceae); *Castanopsis* sp. and *Lithocarpus conocarpus* from the tree family Fagaceae; *Hydnocarpus* sp. and *Hydnocarpus gracilis* from the tree family Flacourtiaceae; *Dehaasia brachybotrys, Cryptocarya* sp. and *Cynometra* sp. from the tree family Lauraceae; *Barringtonia lanceolata* (Lecythidaceae); *Ptenandra coerulescens* (Melastomataceae); *Aglaia* sp. (Meliaceae); *Horsfieldia brachiata* and *Myristica* sp. from the tree family Myristicaceae; *Syzygium corymbifera* (Myrtaceae); *Anacolosa frutescen* (Olacaceae); *Xanthophyllum heterophyllum* (Polygalaceae); *Colubrina beccariana* and *Colubrina* sp. from the tree family Rhamnaceae; *Madhuca* sp. (Sapotaceae) (Appendix II).

The understorey canopy layer of this forest is represented by most of the trees found in the main canopy land also middle storey layers, alongside treelet species with diameter less than 20 cm. Common trees in this understorey canopy and other regenerating main and middlestorey canopy trees are *Vatica umbonata, Dipterocarpus caudiferus, Dipterocarpus kerrii, Hopea nervosa, Shorea patoensis, Shorea* sp. and *Vatica albiramis* from the tree family Dipterocarpaceae; *Mallotus* sp., *Elateriospermum tapos, Macaranga conifera* and *Ptychopyxis arborea* from the tree family Euphorbiaceae; *Diospyros andamanica, Diospyros elliptifolia* and *Diospyros frutescens* from the tree family Ebenaceae; *Neesia* sp., *Pentace adenophora* and *Pentace borneensis* from the tree family Malvaceae; *Dehaasia* sp. and *Litsea* sp. from the tree family Lauraceae; *Mangifera rufocostata* (Anacardiaceae); *Lophopetalum beccarianum* (Celastraceae); *Mesua micrantha* (Clusiaceae); *Memecylon borneense* (Melastomataceae); *Syzygium caudatilimbum* (Myrtaceae) (Appendix II).

The upland mixed dipterocarp forests occur from 600–1,200 m a.s.l with an estimated area of less than 1 ha. Due to the remoteness of the forest area, the forest structure and composition is unattainable.

ii. Secondary Vegetation

The natural landscape of this reserve has been degenerated into secondary vegetation with various successional stages. The scale, intensity and age of the past logging operations and encroachments have resulted in residual forests of varying levels of forest quality (Plates 4 E & F). About 76% of the reserve is categorized as secondary growth vegetation that naturally very low quality in forest structure and diversity status. The recovery rate of such disturbed areas are largely compounded by the severity of soil degradation in relation to soil moisture and fertility. The rate will be slow in areas where the topsoil has been removed. Furthermore, the soils that had been compacted by the passage of heavy machineries or log stumping areas are often devoid of high vegetation structure and can be considered low in forest productivity. The common secondary trees found in this heavily disturbed area are *Macaranga pearsonii*, *Macaranga gigantea*, *Macaranga tanarius*, *Macaranga hypoleuca* and *Macaranga beccariana* from the family Euphorbiaceae; *Neolamarckia cadamba* and *Neonauclea gigantea* from the family Rubiaceae; *Alstonia angustiloba* (Apocynaceae); *Trema orientalis* (Ulmaceae); *Alphitonia excelsa* (Rhamnaceae); *Homalium foetidum* (Flacourtiaceae); *Artocarpus elasticus* (Moraceae); *Vitex pinnata* (Verbenaceae); *Litsea garciea* (Lauraceae); and *Bruinsmia styracoides* (Styracaceae). Some of these trees established in patches or are sparsely distributed across the low shrub and sedge vegetation layer. A number of secondary treelets, namely, *Fagraea cuspidata* (Loganiceae), *Ficus septica* (Moraceae), *Leea indica* (Leeaceae), *Melicope luna-ankenda* (Rutaceae), *Dillenia borneensis* (Dilleniaceae), *Callicarpa longifolia* (Verbenaceae), *Pternandra* sp. (Melastomataceae), *Homalanthus populneus* and *Glochidion* sp. from the family Euphorbiaceae, are categorized as common treelets that establish in the matrix of secondary vegetation. In much open

areas, vines or woody climbers, such as, *Croton cordata* (Euphorbiaceae), *Merremia* sp. (Convulvulaceae), *Smilax borneensis* (Melastomataceae), and *Uncaria* sp. (Rubiaceae), scramble on the ground or smother other secondary plants. In relatively openned nutrient poor site, the ground vegetation occupied by lalang grass (mainly *Imperata cylindrica*), ferns (mainly *Pteridium esculentum* and associated with *Dicranopteris linearis*) and shrubs (*Melastoma malabathricum*).

iii. Forest restoration area

The district forestry office has restored the encroached area in Timimbang B that was previously cultivated with oil palm. The area was enriched with various native species such as *Neolamarckia cadamba* (Rubiaceae), *Octomeles sumatrana* (Datiscaceae), *Aquilaria malaccensis* (Thymelaeaceae), and mixed dipterocarp species. However, the encroached area in Timimbang A that was culvitated with oil palm has been recently cleared but planting exercise has yet been carried out.

2.4.2 Flora

Through the HCV for flora assessment and past records, approximately 1182 taxa have been recorded from the TBSFM area (Table 3; Appendix III). These numbers include 2 lycophytes families, 11 ferns, 1 gymnosperm, 15 angiosperms (monocotyledon) and 88 angiosperm (dicotyledon). The most specious families identified in the TBSFM area are Dipterocarpaceae (100), Fabaceae (62), Rubiaceae (58), Orchidaceae (52), Euphorbiaceae (50), Lauraceae (42), Malvaceae (42), Moraceae (29), Meliaceae (27) and Myrtaceae (27) (Figure 7).

Table 3. Number plant taxa by plant groups identified from TBSFM area.

Plant group	No. of families	No. of taxa
Lycopyhtes	2	5
Ferns	11	26
Gymnosperm	1	5
Angiosperm:		
Monocotyledon	15	126
Dicotyledon	88	1020
Total	**117**	**1182**

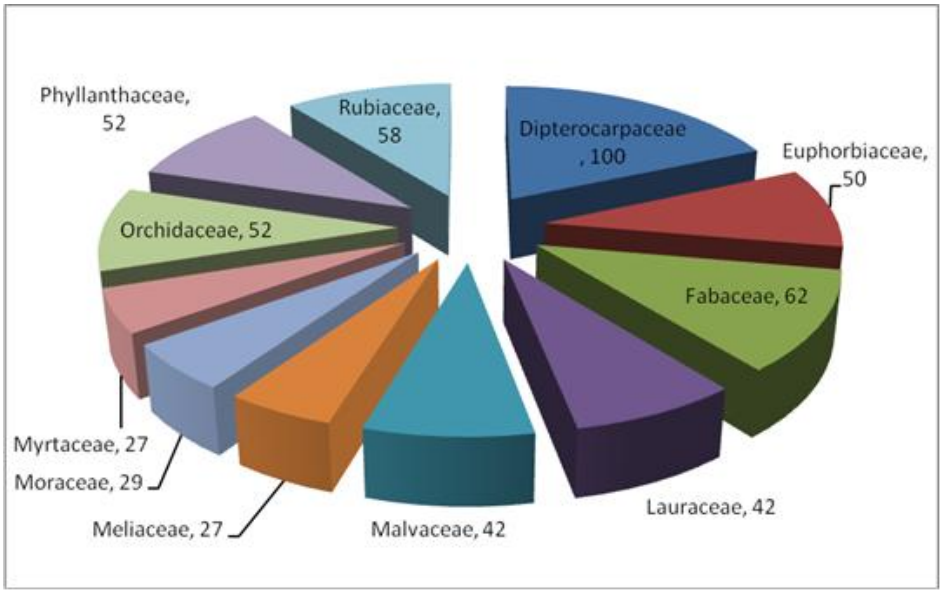


Figure 7. Ten most specious families in the Timimbang-Botitian SFM area, Sabah.

2.4.3 Wildlife

Based on secondary data obtained from the TBSFM management team from past survey and ongoing camera trap studies, a total record of 37 mammal species that derived from 17 families (Bili *et al.* 2014; Appendix V). Furthermore, total of 160 species from 38 families of birds were recorded for TBSFM area based on five observation sites in Timimbang (Part A), 3 sites for Timimbang (Part B) and 1 in Botitian F.R.

The result of the nocturnal insect survey in TBSFM area shows that the diversity was high, with estimated diversity indices such as Shannon Index (4.29), Simpson Index (443.56) and Fisher Alpha Index (452.54) (Chung *et al.* 2014). At least 31 butterfly species, 61 moth species, 22 macro-beetles species and 27 Odonata species were sampled during the survey (Appendix V). In general, at the time of the survey period in February, it was observed that was the beginning of the flowering period for most of the plants such as herbs, weeds and climbers which were seen flowering (e.g. *Mikania micrantha, Choroleana adorata, Melastomata malabathricum* and *Mimosa pudica*). These flowering plants attracted the butterflies. Among the interesting butterflies recorded from this survey are the birdwing butterflies, such as *Troides (Trogonoptera) brookiana* and *Troides miranda miranda*.

Due to the oustanding wildlife biodiversity value, the present TBSFM management has outlined wildlife management and monitoring programme within TBSFM area by engaging wildlife expert to provide guidance in enhancing the existing wildlife management system that is specially designed for this project area.

2.5 SOCIO-ECONOMIC SETTING

There are no villages located within the TBSFM area (Martin, 2014). However, 4 villages, namely Kg. Timbulus, Kg. Salan, Kg. Dorom-Dorom and Kg. Basinti Baru are located adjacent to TBSFM and along the Tungud and Sugut Rivers **(**Figure 1**)**. Kg. Timbulus, Kg. Salan, Kg. Dorom-Dorom and Kg. Basinti Baru are located 1.84 km, 0.80 km, 0.95 km and 0.50 km, respectively from the TBSFM boundary. Social baseline Survey (SBS) were carried out in the villages by management team and found that majority of the villages are inhabited by people of the Sungai and Dusun ethnic groups. Nevertheless other ethnic groups are present, mainly through mixed marriages. The survey also find that the communities have not rely any basic needs or place cultural value in TBSFM area.

In terms of village population, Kg Timbulus is the most populous among the 4 villages (Table 4). All of the villages are equipped with basic infrastructure (Table 5). The Sapi-Nangoh road is the main access to all the villages.

Table 4. The location of villages that are found adjacent to TBSFM and their population and household number.

Villages	GPS Location	No. of Villagers	No. of Households
Kg.Timbulus	N06°10’36.8”, E117°13’38.8”	232	39
Kg. Salan	N06°09’46.6”, E117°13’11.1”	137	17
Kg. Dorom-Dorom	N06°03’15.4”, E117°19’20.6”	219	35
Kg. Basinti Baru	N06°00’47.2”, E117°19’42.3”	105	12

Table 5. Basic infrastructure in the four villages adjacent to TBSFM area.

Village	School	Religious Building	Access Road	Telecomunication service
Kg. Timbulus	x	x	x	x
Kg. Salan	x	x	x	x
Kg.Dorom-Dorom	x	x	x	x
Kg. Basinti Baru	x	x	x	x

2.6 NATURAL RESOURCE IMPACTS WITHIN AND AROUND THE FMU

As mentioned earlier, forest degradation within the FMU is mainly due to direct disturbance impact by timber extraction and forest clearing. About 76% of the reserve is affected by severe logging disturbance and currently covered by mostly secondary species. Furthermore, Botitian FR is fragmented and surrounded with large private and small holder oil palm estates. Thus, Botitian FR is not connected to any large contiguous forest cover area. Due to unclear boundary demarcation on the ground in the past about 2% of the total area of Timimbang FR were encroached during the development of the oil palm estates (Fig. 5).

3. HCV ASSESSMENT METHODS

3.1 HCV PLANNING

The HCV assessment for TBSFM area is basically done in the following steps:

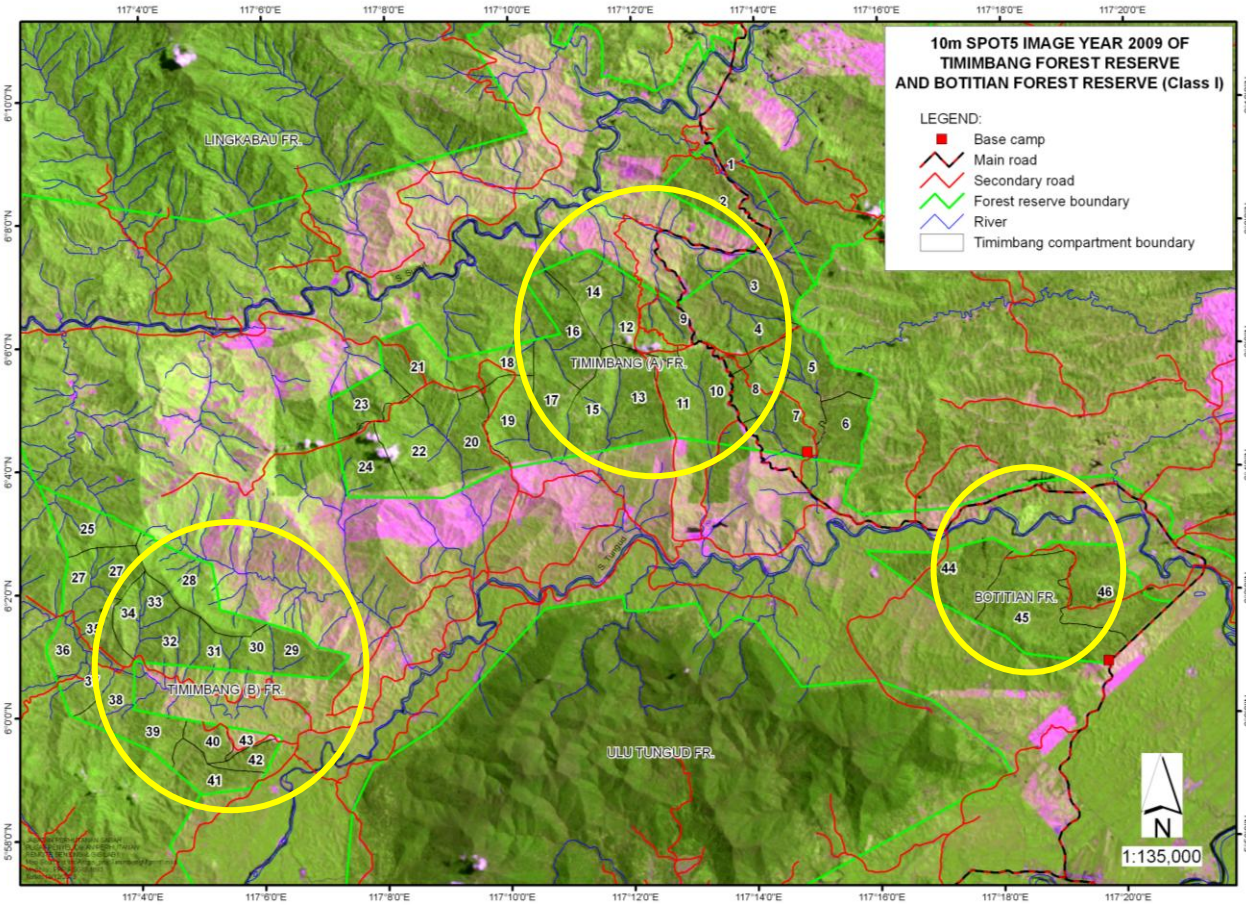
A. Identify potential HCVF (desktop "preliminary assessment")

The potential survey sites to be assessed for HCV1-4 were chosen based on satellite imageries, slope angles, stratifications, forest types and soil maps. Initial desktop research has taken into account recent research work and publications conducted by various institutions within TBSFM area. These research studies will be taken in as secondary data to provide a holistic view of this area. This, is to prevent bias output in terms of recommendations made and to minimize the potential of overlooking important facts that might not be accounted for during the HCV assessment.

The basic preliminary guide of determining targeted Areas of Interests (AOI) are as follows:

a. Logged-over areas/ forest condition and quality
b. Areas noted with high faunal diversity according (as reported by Ancrenaz et.al., 2007 & 2008)

Figure 8. Satellite imagery is used as a tool to identify Area of Interests (AOIs) for ground assessment to address HCV 1-4.



For HCV 5-6, all villages surrounding the forest reserve (Kg Timbulus, Kg Salan, Kg Dorom-Dorom and Kg Basinti) were identified and meetings with the local communities were arranged.

B. Identify specific HCVF components in the field & through consultation

An assessment and interviews were carried out in the field in 2 stages. The 1st assessment was conducted from the 17th to the 22nd of February 2014 and the 2nd assessment was done from 7th to the 16th of May 2014. Through the assessment, much information was gathered for each aspects of the HCV. Upon the completion of data analysis and interpretation, areas that are deemed to be of HCV will be recommended to the management team to be set aside as HCVF. The recommendation will be presented in an initial Draft Report. Stages of review of initial draft:

i. Internal discussion of report between the assessment team members and management of the department.
ii. Initial draft to be reviewed by relevant stakeholders either through distribution of report or meetings (with the different villages).
iii. Revised report based on feedback obtained from the relevant stakeholders and Sabah Forestry Department.

C. Zone HCVF areas, buffer zones and note compartments

HCVF areas should be delineated and properly mapped out by the management team after the consultation sessions. The management of the HCVF areas and the summary of HCV should also be incorporated into the Timimbang-Botitian FMP and website, for reference during the monitoring and management process.

D. Identify limits of acceptable change (LAC) for maintaining HCVF

Limitations or limits of acceptable change in the maintenance of the HCVF will be discussed and set up.

E. Plan precautionary management prescriptions for HCVF compartments

Management and monitoring suggestions are brought forward and to be put in place. Actions to be taken in carrying out all management practices prescribed.

F. Primary data collection and gathering

Preliminary desktop exercises were done and action plan framework were carried out on the ground as follows:

- Assessment on Plant Biodiversity which was conducted from the 17th to the 22th of February 2014.
- Wildlife assessment was carried out from the 7th to the 22nd of May, 2014.
- Social Baseline Survey (SBS) was conducted earlier (June-July, 2010).

*Currently, TBSFM personnel is conducting regular meeting with the surrounding villages to get feedback and provide assistance to the local community in any relevant aspects.

3.2 FAUNA COMPONENT

Fauna assessment covered the general wildlife survey and recce, day and night survey, camera trapping, direct interview and also insect survey. Methods of surveys are as follows:

A. General Wildlife Survey, Recce and Oppurtunistic Sighting:
All accessible roads within TBSFM area as indicated within the AOI have been utilised during the wildlife survey (Fig. 8). The method of direct and indirect sighting for example looking for animal footprints, calling, faeces and signs of feeding etc. All sighting of wildlife are asociated with environmental parameters, i.e. GPS coordinates and other essential details such as location, time of sighting and altitude (Appendix V).

B. Day and Night Survey:
Transects were established along the accessible roads within TBSFM area. A total of 3 transects were set up, with each transect length of approximately 9000 m. These were conducted from 6 a.m. to 10 a.m. (Day Survey) and from 7 p.m. to 10 p.m. (Night Survey) with a maximum driving speed of 20 to 30km/hr. All sightings of wildlife are associated with environmental parameters, i.e. GPS coordinates and other essential details, such as location, time of sighting and altitude (Appendix V).

C. Camera Trapping:
7 units of camera device were installed in various locations within the AOI at three locations in TBSFM area for 14 days. The locations were based on the criteria, such as wildlife trail, ridge, wallows and old logging roads.

D. Interview Session:
This session was carried through direct interviews with the Sabah Forestry Department staff working in TBSFM area. Information gathered and collected through this session is useful to get detailed information and to list down the overall species and current condition of the fauna presence in this area.

E. Insect Survey:
This survey was conducted based on 2 methods as follows;

   a. Light trap was used to sample nocturnal insects
   The trap consists of a vertical white sheet (2x2m) illuminated by a 250w mercury-lithium bulb was set up in an open area facing the forest reserve from 7 p.m. to 9 p.m. Each sampling site location was recorded, including temperature and humidity.

   b. Sweep nets and forceps were used to sample diurnal insects

      i. These methods were used to collect flying insects while other were sampled using fine forceps. Butterflies were put in triangle papers while specimens were put invials with 75% ethanol solution. Sampling was conducted along the road, open riverine/ stream areas within the forest and also along trails established by the Botany and Ecology teams of the Forest Research Centre.

ii. All specimens (butterflies, moths, beetles, dragonflies and damselflies) were dry-mounted and sorted to family and some to the genus and species level. The specimens sampled from this survey are deposited at the Forest Research Centre, Sepilok, Sabah. Dry-mounted specimens were identified based on the FRC Entomology Collection and various reference materials, e.g. Otsuka (1988 & 2001) for butterflies; Holloway (1983, 1985, 1986, 1988, 1989, 1993, 1996a, 1997, 1998a & b, 1999, 2001, 2003, 2005, 2008, 2009 & 2011) and Robinson et al. (1994) for moths; Fujita (2010), Makihara (1999) and Tung (1983) for beetles; Orr (2003) and Tang et al. (2010) for dragonflies and damselflies. Some other insects were identified based on Hill and Abang (2005). Insect experts, i.e. Dr Steven Bosuang, Dr C. Y. Choong and Dr Francis Seow Choen assisted in identification of beetles, dragonflies and stick insects respectively.

3.3 FLORA COMPONENT

Flora surveys were carried out by sampling plants found in circular plots and line transects.

A. Circular Plots:

Individual plots of 20 m radius were established within AOIs and plant species that have a dbh (diameter at breast height) of 10 cm and above within the plot were recorded and identified. In total, 11 plots were established in TBSFM area (Figure 5).

B. General Plant Collections:

General plant collections were conducted to estimate population species diversity. All vascular plants (flowering and non-flowering plants) observed in the eleven 0.1-ha circular plots as mentioned earlier were recorded. Non-vascular plant, such as mosses was excluded. Plant specimens were collected and deposited at the Sandakan Herbarium (SAN). A plant species list was drawn up along with GPS readings and its medicinal value.

C. Plant Identification:

Method of collection and preservation of plant specimens is as described by Bridson *et. al*., 1992. The common plants were identified down to the species level in the field by means of their distinctive characteristics. For those that were not easily identified, voucher specimens were collected for subsequent determination at SAN. Specimens were oven-dried 45–55° C for several days, sorted according to morphospecies and cross-referenced with specimens in the herbarium and flora references (Soepadmo *et al*., 1995, 1996, 2000, 2002, 2004, 2007, 2011; Stevens, P.F. 2001 onwards).

D. Flora Data

Flora data obtained from the HCV surveys were compiled along with secondary data obtained from various studies such as previous survey data from Botanical Research and Herbarium Management System (BRAHMS); Carbon study research plots; Compartment Forest Inventory (CFI) plots and biodiversity studies if there any. Conservation status of the plants were assigned based on IUCN Red List 2013, CITES, Wildlife Conservation Enactment 1997, Forest Enactment 1968 and Sabah Forestry Department Prohibited Lists (as of 2014).

3.4 SOCIAL COMPONENT

Social Baseline Studies (SBS)

The studies were conducted by Sabah Forestry Department officers headed by the Sustainable Forest Management (SFM) Division. The villages (kampung(s)) that were interviewed are as follows:

- Kampung Timbulus
- Kampung Salan
- Kampung Dorom-Dorom
- Kampung Basinti Baru

Several aspects were highlighted during the session, as listed below:

a. Community conservation values
b. Population and land ownership
c. Community livelihoods
d. Dependence upon the forest
e. Cultural aspects
f. Social Needs

These interviews were conducted through formal meetings with the villagers. Two types of Social Assessment Forms (Community Leader and Household Head Form) were used in the meeting, whereby an in-depth understanding of the respective communities in regards to their basic needs such as health, education, infrastructure/access, livelihood and conservation values were obtained. Interviews were also conducted to obtain additional information regarding the villagers' dependency on the surrounding forest and forest produce. The interviewees were separated into the following categories:

i. Village Leader (Village Head, JKKK Head, etc.),
ii. Men (31 to 55 years old),
iii. Women (31 to 55 years old),
iv. Teenagers / Young Adults (18 to 30 years old) and
v. Government & Private Sector Officers.

The social assessment tried to include as many people as possible within each community. The field data were compiled to define significant aspects within each communities associated with the TBSFM area. All field data and sites of interests located within the TBSFM area and outside its boundary were surveyed and verified on the ground. The data were analysed and compiled based on the HCV 4, 5, 6 elements. The HCVF Toolkit for Malaysia (1st Edition-October 2009) was used as a guideline to evaluate impacts of TBSFM activities upon the surrounding villages.

a. Social Assessment Forms (SBS/SIA/HCV5&6) for Community Leader
b. Social Assessment Forms (SBS/SIA/HCV5&6) for Household Head

4. HCV FINDINGS

4.1 HCV 1: BIODIVERSITY VALUES

According to the HCVF toolkit for Malaysia (2009), category HCV 1 is defined as: *"Forest area contains globally, regionally or nationally significant biodiversity values (e.g. endemism, endangered species, sites of critical temporal use)."*

4.1.1 HCV 1.1: Protected areas

As defined in the Toolkit: *"All forest areas that have been legally gazetted as Protected Areas under Malaysia legislation (either federal or state), are HCV 1.1., the Master List of Protected Areas in Malaysia, commissioned by the Ministry of Natural Resources and Environment, has listed all areas that fall under this category, and should therefore be the first point of reference. However, it is noted that in Sarawak there is no overlap between FMUs and TPAs"*

Findings

At present, both Timimbang and Botition Forest Reserves are Class I Protection Forest. Therefore, the management prescription and monitoring recommendation for TBSFM is mainly on protection and conservation activities that emphasize the protection and preservation of ecosystem functions and prohibits all forms of destructive activities.

Rationale for HCV boundary delineation

Due to the total protected area status, the management should consider that the entire TBSFM to be categorised as HCV 1.1 (Fig. 9).

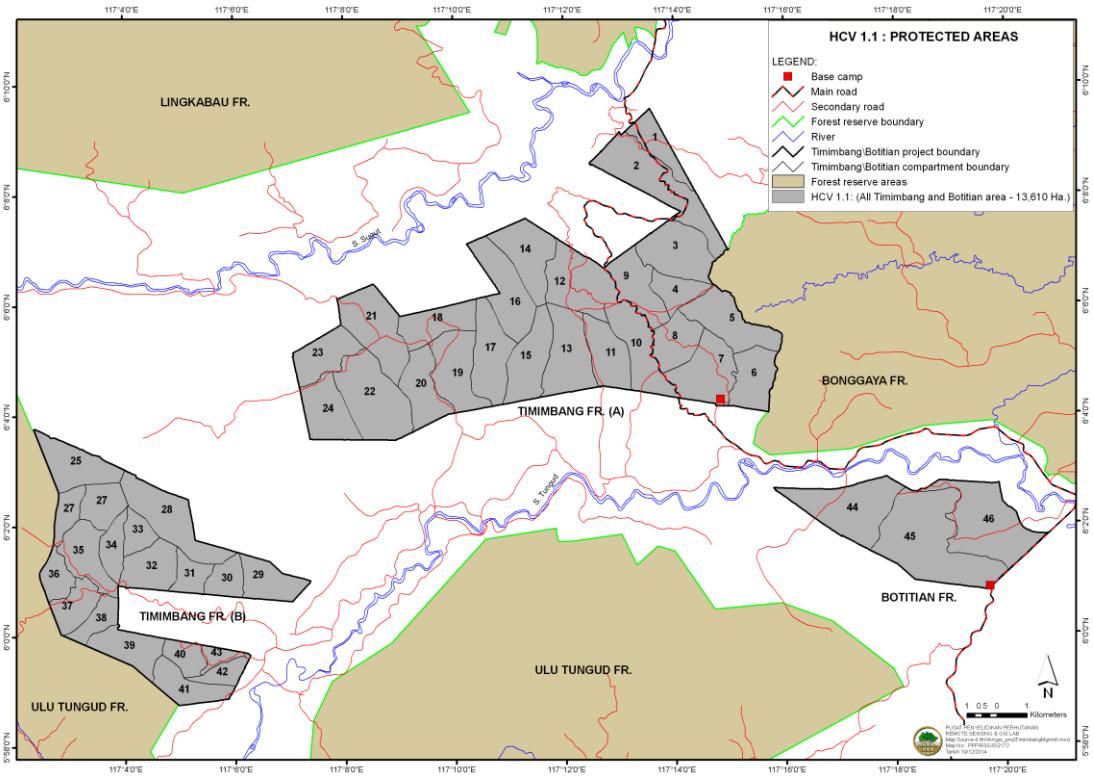


Figure 9. The whole TBSFM area should be desinated as HCV 1.1 due to the totally protected status of the reserves.

4.1.2 HCV 1.2: Threatened and Endangered Species

As mentioned in the Toolkit: *"Any species categorized as either Critically Endangered (CR), Endangered (EN) or Vulnerable (VU) on the IUCN Red List, Appendix I of CITES or listed as protected under Malaysian legislation (federal or state), is HCV 1.2. However, for practical reasons forest managers may want to limit field surveys of fauna to mammals (particularly large ones, over 20kg in weight), birds and herpetofauna, unless literature indicates that there are other species in the area which require specific attention. This does not mean that other taxa are unimportant, and wherever possible, if the expertise and survey protocols are available there should be covered too. It is also recommended to cross check the IUCN Red list with the Malaysian Red Data Book, once that is available. Where there may be difference between the Malaysian Red Data Book and the IUCN Red List, the Malaysian Red Data Book should always take precedence."*

A. Fauna

Findings

As listed in Appendix IV, of 37 mammals recorded in TBSFM, three species are categorised as Endangered under the IUCN criteria, namely the Asian Elephant, Borneon Gibbon & Orang Utan. Furthermore, 11 of the mammals are categorised as Vulnerable and one as Near Threatened under the IUCN criteria. Three of the mammals recorded in TBSFM area, such as the Orang Utan, Sun Bear and Clouded Leopard are listed under Schedule I that bearing the status as Totally Protected as stipulated in the Sabah Wildlife Conservation Enactment (1997); 23 species are listed under Schedule II (protected species-limited hunting with license) and 6 species are listed under Shcedule III (protected species-hunting with license). On international trading issue, five species of the listed mammals are listed under Appendix I and eleven spesies under Appendix II of the CITES list (Appendix IV).

Of the 160 species of birds recorded in TBSFM, three species, namely Blue Headed Pitta, Large Green Pigeon & Wallace's Hawk Eagle, are categorised as Vulnerable under the IUCN threat categories. In addition, about 25% (44 species) of the total birds in TBSFM are categorised as Near Threatened under the IUCN threat categories.

In general, the fauna surveys were conducted mainly on areas classified under lowland and upland mixed dipterocarp forest of various degrees of forest degradation. Given a short period of survey TBSFM area, the presence of considerably high number of high conservation status fauna from both past research findings by Ancrenaz (2008) and the recent HCV assessment may conclude that this FMU unit is an important for nesting and foraging habitats for these listed species. However, the presence of these high conservation value wildlife during the assessments may not be able to verify the stability of population. Therefore, the present widlife monitoring activities (camera trap, transects, oppurtunity sightings, etc.) should be continue and further enhance by collaborating with local or international wildlife experts. It is important to distinguish long-term population trend of increase or decrease of these species that may have been influenced by human disturbance or environmental factors, such as fluctuation of weather or unpredictable natural catastrophic event.

Rationale for HCV boundary delineation

Due to the fact above, the management should consider that all original natural lowland and upland mixed dipterocarp forests in TBSFM to be categorised as HCV 1.2 for its importance in providing potential nesting and foraging habitats (Fig.10).

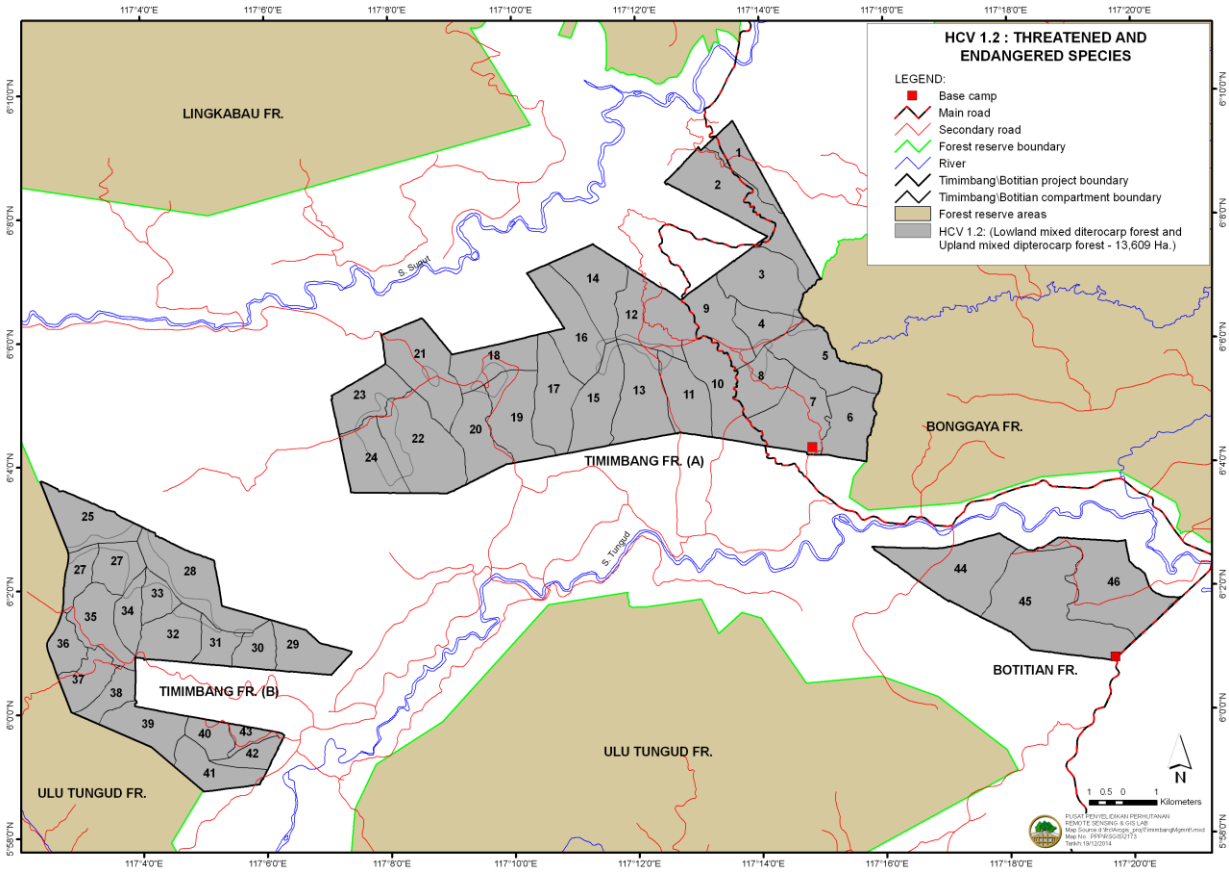


Figure 10. The original natural lowland and upland mixed dipterocarp forests in TBSFM area should be desinated as HCV 1.2 due to its important habitats for high conservation value flora and fauna.

B. Flora

Findings

There are 17 plant species that listed in the IUCN red list as Vulnerable (VU), 12 Endangered (EN) and 34 Critically Endangered (CR) identified from this area (Appendix II). By looking at the Sabah Wildlife Conservation Enactment 1997 (SWD, 1997), part VI (Protection of Plants) listed plants that may not be harvested without a license, it was identified that there were 62 plant taxa, which are 52 taxa of orchids, 7 taxa of gingers, 2 species of pitcher plants and Arenga *undulatifolia* that fall under Schedule 2, part II, Protected Plant Species. There are 3 taxa, namely *Tetrastigma diepenhorstii*, *T. dubium* and *T. lanceolarium* that fall under Schedule 1, part II, Totally Protected Plant Species and 118 plant taxa that fall under Schedule 2, part II, Protected Plant Species found to be present in the TBSFM area. Under Sabah Forest Rules 1969, the director of forest may for reasons of silviculture or for any other reason prohibit or restrict the cutting or removal of plant species in the forest reserve. There were 72 plant taxa in TBSFM area that fall under the prohibited species by the Director of Sabah Forestry Department. However, the presence of these high conservation value flora during the assessments may not be able to verify the stability of population. Therefore, the existing long-term monitoring activities by using permanent sample plots are useful to determine long-term population trends of increase or decrease that can be related to human disturbance or short term term flactuations caused by variations in weather or unpredictable natural catastrophic events.

Rationale for HCV boundary delineation

In relation to the flora diversity and a number outstanding conservation values, the assessment indicates that the whole area of lowland and upland mixed dipterocarp forest should be categorised as HCV 1.2 areas that are important habitats for threatened and endangered flora in TBSM (Fig. 10).

4.1.3 HCV 1.3: Endemism

This is define as: *" Any forest containing endemic species as identified by FRIM, MNS, SFC, Forestry Departments and published literature, particularly in high concentration or highly restricted distribution, can be considered HCV 1.3"*

A. FAUNA

Findings

A total of 4 mammals, 3 bird species and 7 insects that are endemic to Borneo were recorded in TBSFM (Appendix IV). For mammals, many of them are listed as endangered. Many of the endemic species recorded in the FMU are little known in term of their ecology and functionality in the ecosystems. Therefore, the present widlife monitoring activities (camera traps, transects, oppurtunity sightings, etc.) should be continued and further enhanced by collaborating with local or international wildlife experts. It is important to distinguish long-term population trend of increase or decrease of these species that may have been influenced by human disturbance or environmental factors, such as fluctuation of weather or unpredictable natural catastrophic event.

Rationale for HCV boundary delineation

In relation to the presence of numerous endemic fauna recorded in TMSFM, the assessment indicates that the whole area of lowland and upland mixed dipterocarp forest should be categorised as HCV 1.3 areas that are important habitats for endemic fauna (Fig. 11).

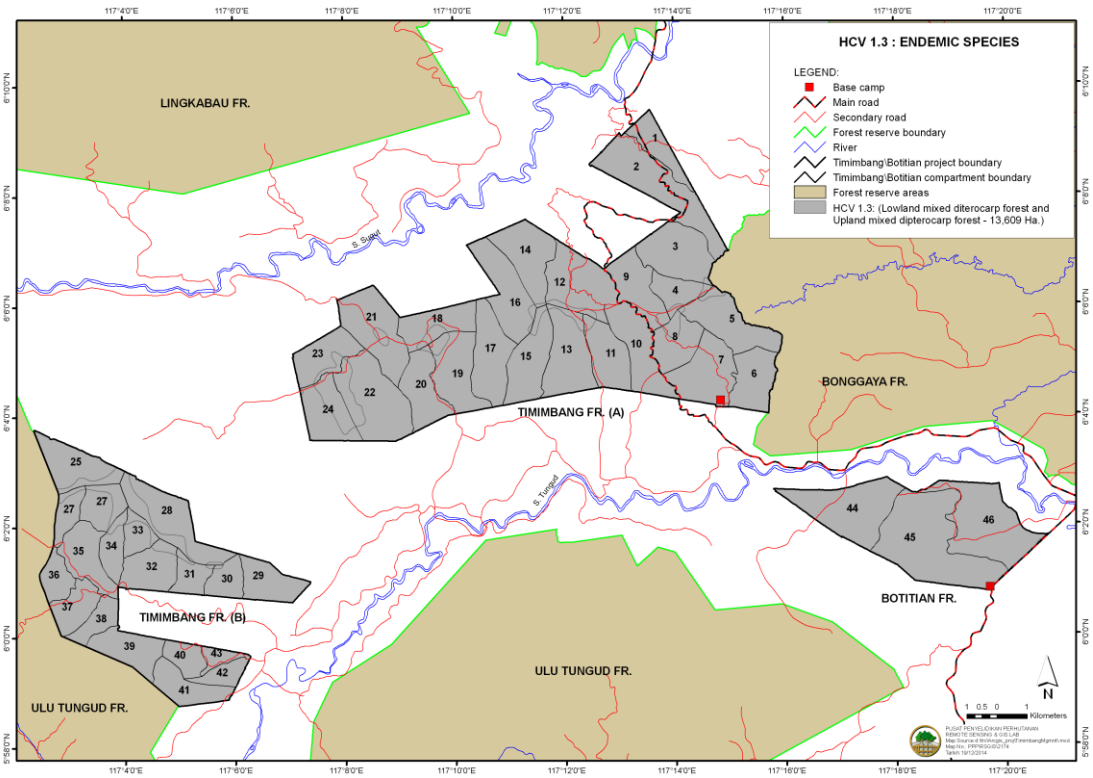


Figure 11. The original natural lowland and upland mixed dipterocarp forests TBSFM area should be desinated as HCV 1.3 due to its important habitats for high conservation value endemic flora and fauna.

B. FLORA

Findings

Based on the primary data obtained from HCV and the secondary data compiled from previous studies, there is a total of 234 species that were recognized as endemics to Borneo, representing about 43% of tree species known from TBSFM area. A total of 29 species are endemic to Sabah. Trees recognized as Bornean endemics were highly represented by the Dipterocarpaceae with 25 tree species, represented by 5 genera namely *Dipterocarpus* (3 species), *Dryobalanops* (2 species), *Parashorea* (1 species), *Shorea* (14 species), and *Vatica* (5 species).

Under Schedule 1 of the Sabah Forest Rules 1969, about 11 endemic species from 4 families ranging from commercially valuable *Dipterocarpacae* (3- Shorea spp) and fruit trees from the *Malvaceae* (4- *Durio spp*), *Moraceae* (3- *Artocarpus* spp) and *Sapindaceae* (1- Nephelium sp) recorded for TBSFM area. However, there is no record of Sabah endemic found in this area which is classified under Sabah Forest Rules.

Endemic species, such as climbers and herbaceous plants are considered at low risk to loss within the management unit, due to the sivilculture systems employed. Since the late 1950s, Sabah has adopted the Modified Malayan Unified System, a prerequisite requirement of the system is the prescription of pre-harvesting and post-harvesting treatment of climbers, via a blanket treatment or a total removal of climbers. In natural forest management area, climber cutting is a preharvesting treatment that usually conducted between 6 to 12 months prior to harvesting. This measure is employed to reduce incidental damage that might result from harvesting operations to neigbouring trees that were intertwined by

climbers. This treatment is expected to provide additional benefits which include in increasing light quality for the desirable crop trees and consequently improving thier growth, enhancing natural regeneration of the site, and as well as to reduce climber regeneration in the site though not necessarily eliminating them. Even though a "blanket" treatment is applied to climbers, the focus of the prescribed treatment is the removal of high density climbing bamboo, such as *Dinochloa scabrida* and *D. trichogona* (Poaceae), that proliferate in abundance in areas that once severely disturbed by past logging activities. Furthermore, the management is also taking steps to avoid removal of climbers for example *Uncaria* spp (Rubiaceae) and *Willughbia* spp (Apocynaceae) that are important food source for wildlife, especially for primates. Therefore, silvicultural activities in TBSFM is mainly for stand improvement and reduced weedy climbers impact on natural regeneration. However, the presence of these endemic flora during the assessments may not be able to verify the stability of population. Therefore, the existing long-term monitoring activities by using permanent sample plots are useful to determine long-term population trends of increase or decrease that can be related to human disturbance or short term term flactuations caused by variations in weather or unpredictable natural catastrophic events.

Rationale for HCV boundary delineation

In relation to the presence of endemic flora, the assessment indicates that the whole area of lowland and upland mixed dipterocarp forest are categorised as HCV 1.3 areas that are important habitats for endemic flora in TBSM (Figure 11).

4.1.4 HCV 1.4: Critical Temporal Use

This is defined as: *"Any forest area which is important to wildlife for feeding, nesting, roosting, and migration or contains saltlicks is HCV 1.4. Limestone hills, although important as habitat, are captured under HCV 3 Ecosystems."*

Findings

There is no sign of saltlicks and any specific forest area that is found to be important to wildlife. One of the potential effects of this could be the geographical location and topography of these cluster of forests which are surrounded by the private oil palm plantations. However, most of the area of interest could be potentially used by certain group of wildlife as a transit to the adjacent area of oil palm plantations which were observed have more source of food supply (Figure 12). By looking at the potential connectivity between forest reserves, there could be a potential nesting sites and migratory route found in the area as listed below:

i. Eastern part of Timimbang Part A that is sharing border with Bonggaya FR;
ii. Western part of Timimbang Part B that is sharing border with Ulu Tungud FR;
iii. Northwestern and southern part of Botitian FR that are nearest to adjacent reserves, namely Timimbang Part A and Ulu Tungud, respectively.

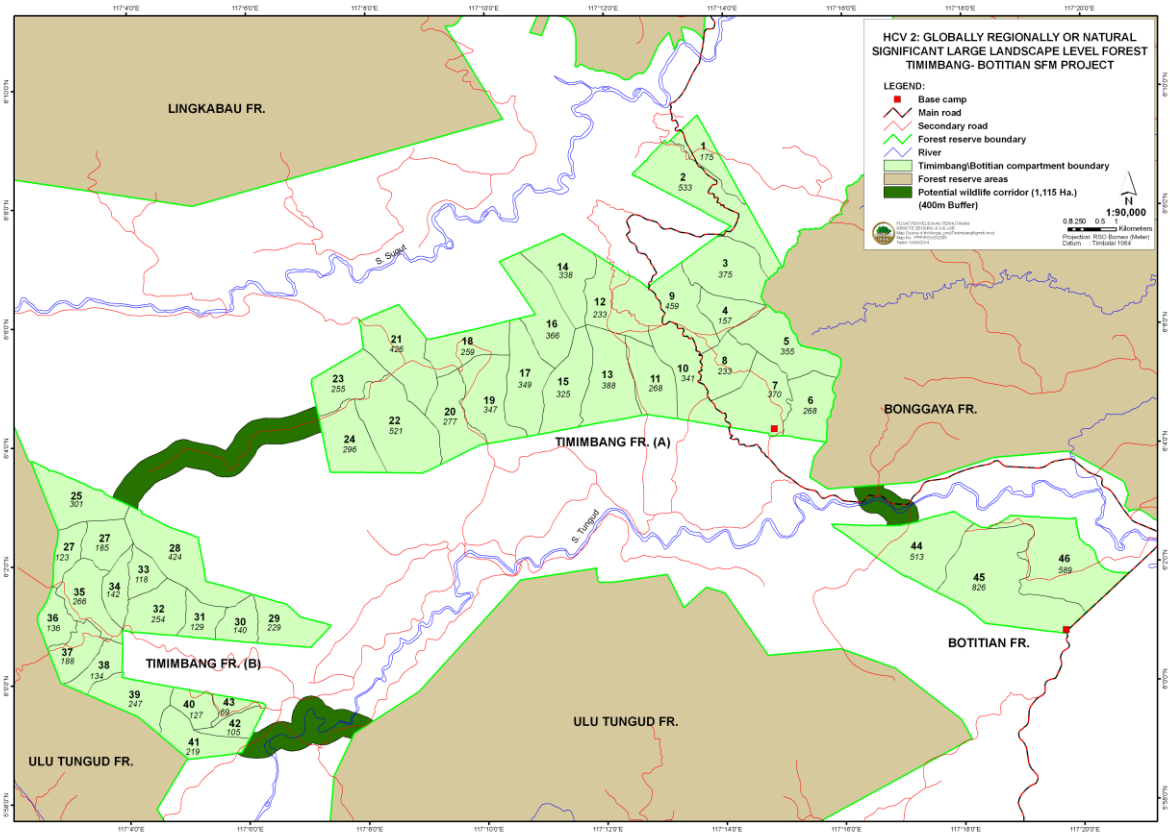


Figure 12. Potential connectivity and wildlife corridor (dark green shades) between forest reserve units in TBSFM, Sabah.

In the recent bird assessment, the Black capped Kingfisher, Indian Cuckoo and the Common Sandpiper were recorded and recognised as winter visitor species. According to the IUCN Red List, though all three species are listed as least concern, but there is an indication of population decrease. Therefore, TBSFM area could be playing an essential part in providing nesting site for these winter migratory visitors. However, potential nesting site of these species in the project area are still unknown

Rationale for HCV boundary delineation

At present, due to lack of information, there is no area that can be categorised as HCV 1.4 in TBSFM area. Wildlife monitoring should be carried out to identify ciritical temporal use in order to protect important conservation target species, especially the three winter visitor birds.

4.2 HCV 2: Landscape Level Forest

This is defined as "Forest area contains or is part of a globally, regionally or nationally significant large landscape level forest where significant populations of most if not all naturally occuring wildlife species exist in natural patterns of distribution and abundance.

Any forest area that forms or is part of a linkage between larger forest complexes, and can thus provide connectivity between fragments or act as a wildlife corridor for the movement of animals

from one complex to another, is considered HCV 2. This HCVF can serve as a buffer zone to protected areas. Its identification and management should be tailored towards the needs of umbrella species i.e. sensitive, wide ranging wildlife that are particularly susceptible to forest fragmentation and human population pressures."

Findings

On landscape level, TBSFM area is part of a larger forest reserve complex within the eastern part of Sabah, bordering other Class II Commercial reserve, namely Bonggaya FR and Ulu Tungud FR on the eastern part of Timimbang Part A and on the western part of Timimbang Part B, respectively. TBSFM area consists of 3 clusters of forest reserves that have no direct linkages and isolated by rivers, roads, villages and oil palm estates, especially Botitian FR. With the management that focuses on the protection and conservation of biodiversity, TBSFM area would inevitably become a critical link from the aspects of plant species dispersal and wildlife foraging and migratory pathways between the different forest complexes among TBSFM area. By creating connectivity among clusters of the reserves, it will provide more habitats and path movements for wildlife in the landscape level around these areas (Figure 13). Considering the potential and prospect of wildlife diversity and its importance at the landscape level, recommendations will be provided on the management and monitoring level. However, creating connectivitiy on adjacent alienated land to TBSFM area will be a big challenge to the Department as it involves other private lands.

Rationale for HCV boundary delineation

The entire TBSFM should be categorised as HCV 2 as potential for linking large forested areas between Bongaya and Ulu Tungud Forest Reserves is applicable (Figure 13).

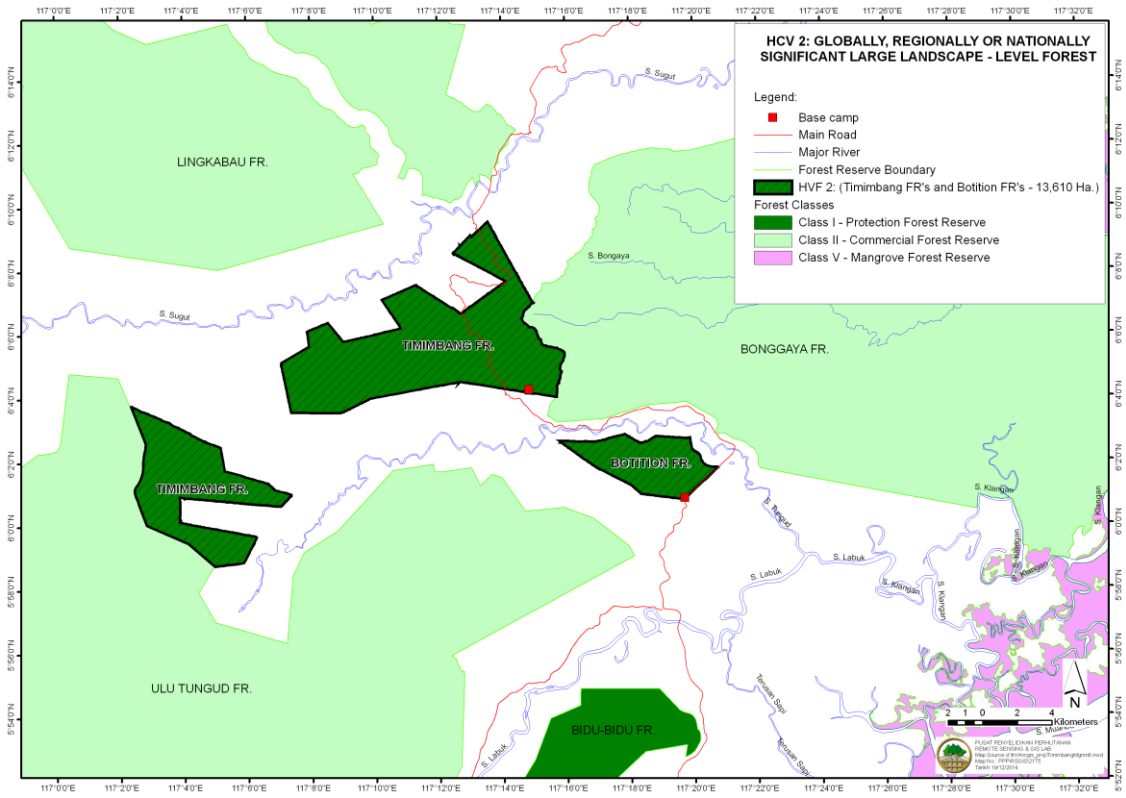


Figure 13. Map showing TBSFM categorised as HCV 2.

4.3 HCV 3: Ecosystem

This has been defined as: *"Forest areas that is in or contains rare, threatened or endangered ecosystem. Any forest area that contains an ecosystem/habitat type identified as a priority for protection by National Conservation Strategy (NCS), PERHILITAN Ecosystem Assessment report, Forestry Departments, FRIM or SFC, and/or is confirmed as such by current expert opinion, is HCV 3. Some ecosystems are naturally rare, but some others are becoming increasingly threatened by pressure from human activities. Due to rapid changes, existing data may be outdated and some particularly threatened ecosystems may already need to be considered Priority 1. A good example of this would be Lowland Dipterocarp Forests, Peat Swamps Forests and Limestone Habitats. Always refer to current expert opinion for confirmation."*

Findings

About 6,257 ha of TBSFM is estimated to be below 200 m a.s.l. and covered with forest of various quality including lowland of mixed dipterocarp forest and secondary forest on previously lowland mixed dipterocarp forest. The area previously covered with lowland seasonal freshwater swamp forest has been encroached and planted with oil palm. The management team has addressed this issue by removing all the oil palms and restore the area by planting indigenous tree species.

Rationale for HCV boundary delineation

The forests located below 200 m a.s.l contain rare, endangered, threatened and also endemic species and appropriate to be categorised as HCV 3 **(**Figure 14).

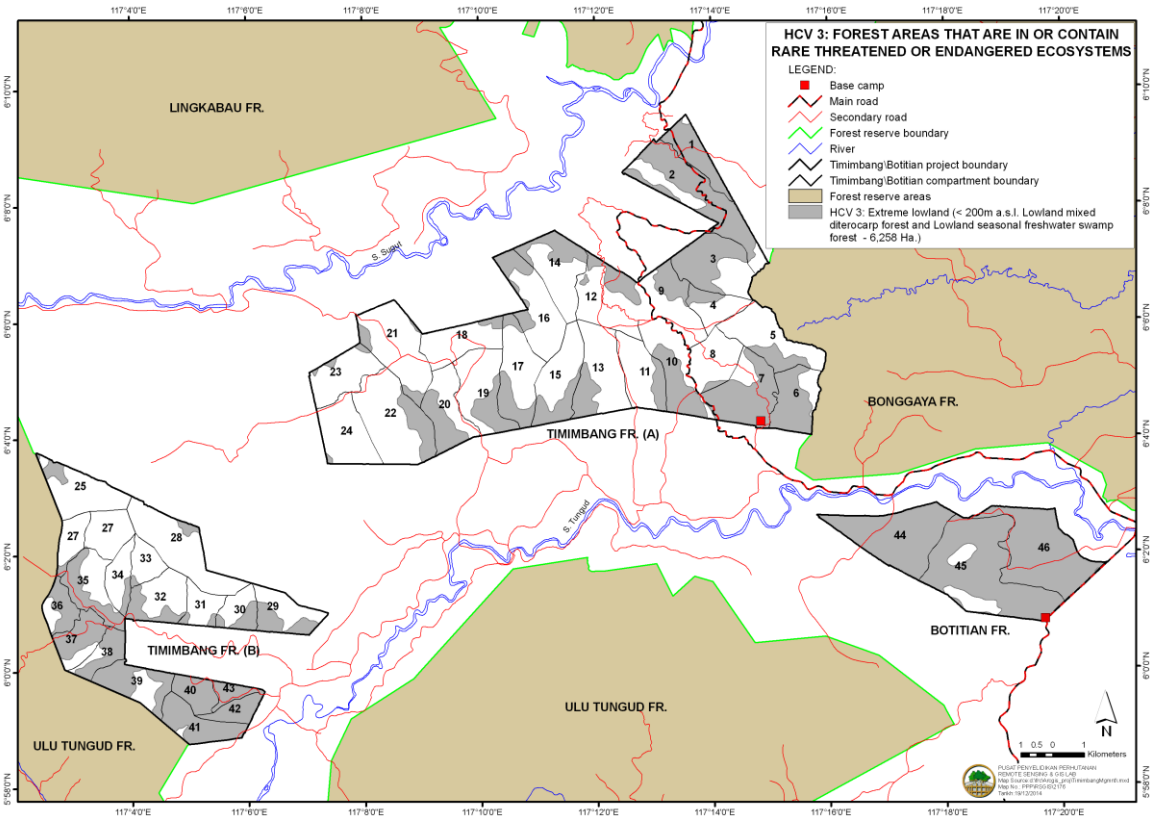


Figure 14. The location of extreme lowland forest that are categorised as HCV 3 in TBSFM area, Sabah.

4.4 HCV 4: Services of Nature

These are "*Forest area provides basic services of nature in crictical situations*."

4.4.1 HCV 4.1: Watershed Protection

Under this HCV, it includes: *"Dam catchment areas and any forest area legally gazette as a Protection Forest for water catchment under the National Forestry Act 1984, water protection area under the Sabah Water Resources Enactment 1998 or Class I Protection Forest Reserve under the Sabah Forest Enactment 1968."*

Findings

The entire area of Timimbang-Botitian FRs is Class I Protection Reserve and current management activities is purely tuned for conservation for flora and fauna purposes. However, no gazetted catchment under the Sabah Water Resource Enactment 1998 is found in TBSFM area. In terms of elevation, TBSFM area has elevation ranging 5 to 1000 m. A number of short streams originated from TBSFM area are tributaries to adjacent 2 major rivers, namely Sungai Sugut and Sungai Tungud. Indirectly, TBSFM area is providing natural ecosystem services to these rivers by constantly supply natural filtered water into these rivers. These two major rivers are still used by the communities residing downstream of the rivers for fishing and transportation.

Rationale for HCV boundary delineation

No forest area in TBSFM can be categorised as HCV 4.1.

4.4.2 HCV 4.2: Erosion Control

This includes: *"Forest areas that have been legally facetted for soil protection or conservation under federal and state laws e.g. the National Forestry Act 1984 (Peninsular Malaysia), forest areas, situated on slopes over 25 degrees (Sabah), areas classified as Terrain Class 4 in First Schedule: Forest Management Plan, Forest Timber License, and riparian areas covered under the DID (Department of Irrigation and Drainage) guidelines."*

Findings

Based on digital elevation model, about 33% and 12% of the total TBSFM area is with 15–25° and >25° of slopes, respectively ***(APPENDIX 2: Map 1).*** Generally, the management team of TBSFM has taken into consideration that there are no development activities to be carried out on slope over 25 degrees. However, since there are areas require species enhancement and restorations, the prescribed activity for this area have to be done with appropriate measure and guidelines.

Rationale for HCV boundary delineation

All areas with slopes >25° and 30 m riparian buffer strips should be categorised as HCV 4.2 for their importance in erosion control (Figure 15).

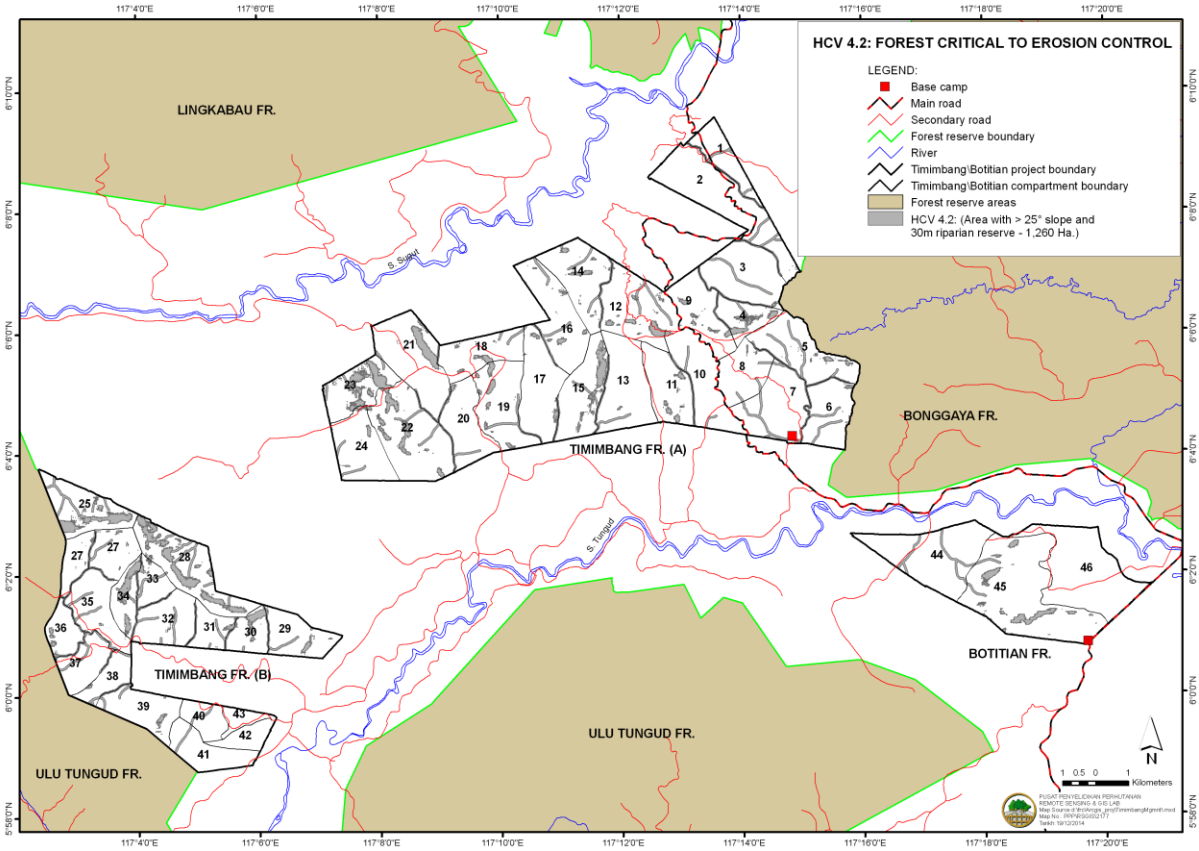


Figure 15. The location of areas with slopes >25° and 30 m riparian buffer strips are categorised as HCV 4 in TBSFM area, Sabah.

4.4.3 HCV 4.3: Barriers to Destructive Fire

This is defined as: *"Any specific areas that can act as barriers to provide protection of forests, especially forests with high conservation values, from fire, in areas that are generally fire prone and where the consequences are potentially severe, can be considered HCV 4.3."*

Findings

Most of TBSFM boundaries are commonly shared with oil palm estates, local communities and other stateland, such as Sapi–Nangoh highway that traverses across Timimbang Part A. The forest vegetation at the immediate border of the forest adjacent to non-forest cover areas may experience drastic edge effects that includes microclimatic changes in light, temperature, wind and the incidence of fire. Overtime, alteration of species assemblages could occur at the edge of the reserve and only species that tolerated to prolong dessication process and strong wind such as sedges, lalang grass and a few secondary tree species.

The management has established 3 outposts which potentially will be used for the prevention and control of forest fires during drought season. These are the Botitian Checking Station, Compartment 42 outpost and Timimbang A Central Office. A Forest Fire Management Plan is yet to be finalized by the Sustainable Forest Management (SFM) Division. This plan will be used as TBSFM management tools for fire prevention and control. Aside from that, areas that are located adjacent to oil palm plantations should be considered and monitored on a regular basis.

Rationale for HCV boundary delineation

Due to the fragmented and elongated shape of the FMU, a 100 m band of moderate to high forest structure inside TBSFM boundaries that border local communities land and oil palm estate are categorised as HCV 4.3 (Fig. 16).

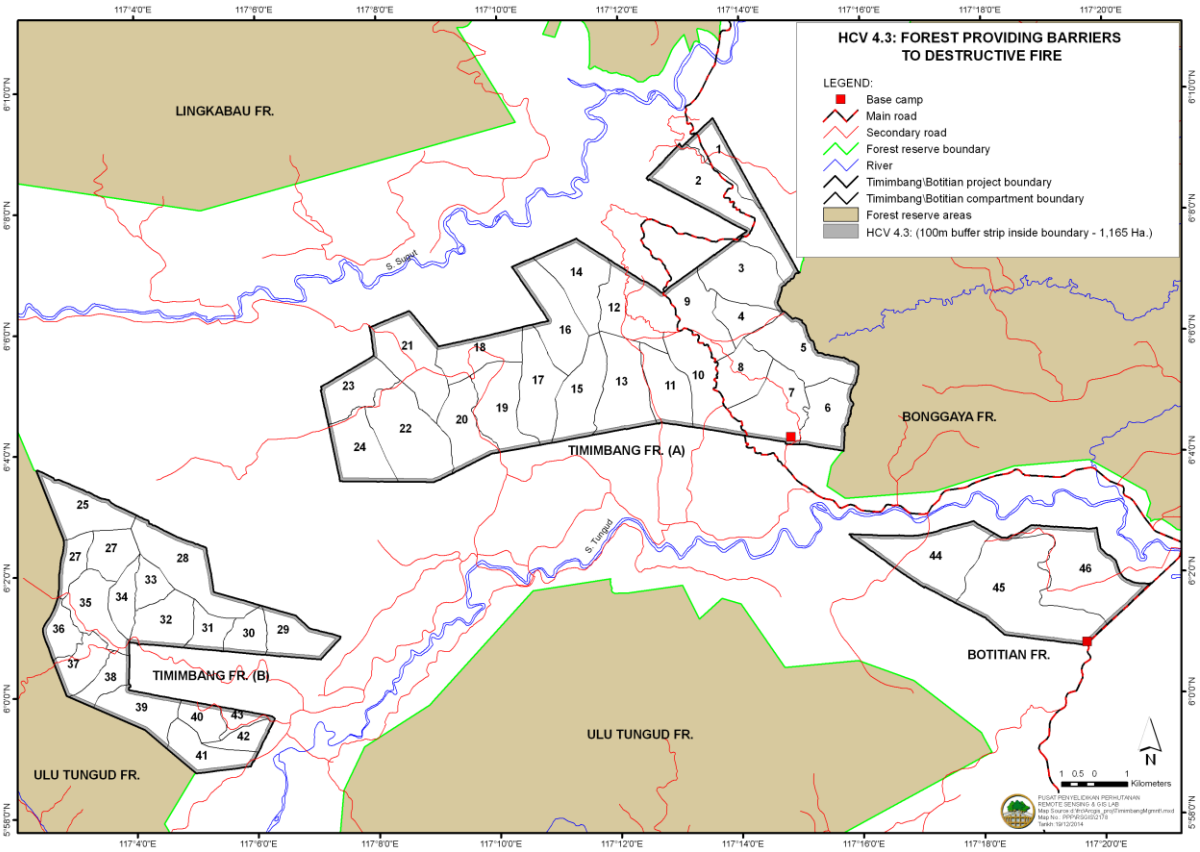


Figure 16. The location of HCV 4.3, a 100 m band of moderate to high forest structure inside TBSFM boundary providing barriers from fire from adjacent areas.

4.5 HCV 5: Basic Needs of Local Communities

This is defined as the *"Forest area is fundamental to meeting basic needs of local communities. A forest area may be considered HCV 5 if it contains or is adjacent to settlements which depend on produce from that forest for basic subsistence or health needs. Examples include hunting grounds or areas from which minor forest products such as bamboo, rattan and medicinal plants are collected, and which are regularly visited by community members for this purpose. The community may be living either in or adjacent to the forest. However, identification and management of this HCV must always involve participation of the communities themselves.*

Findings
As mentioned earlier, there is no community used area in TBSFM.

Rationale for HCV boundary delineation
There is no community used area and HCV 5 is not applicable in TBSFM area.

4.6 HCV 6: Cultural Identity of Local Communities

This is defined as: *"Forest area is critical to local communities' traditional cultural identity.*

A forest is considered HCVF 6 if it has been important for a local (particularly indigenous) community's cultural, ecological, or religious activities. The community may be living either in or adjacent to the forest. Examples of such sites within a forest include burial grounds or sacred areas, which cannot be replaced with alternative and/or would cause drastic cultural change within the community. Identification and management of this HCV must always involve participation of the communities themselves.

Findings
From the assessment carried out, there is no sign of cultural or burial sites of the villages found within TBSFM area. Generally, all these graveyards and sacred sites are identified far away from the TBSFM boundary. All the burial grounds or graveyards mentioned by the villagers were verified on ground.

Rationale for HCV boundary delineation
There is no important cultural site and HCV 6 is not applicable in TBSFM area.

5. MANAGEMENT, MONITORING AND RESEARCH

5.1 Management prescription

The HCV management prescription emphasizes the maintenance and even enhancement consistent with the precautionary approach to minimize the risk of irreversible loss of the identified critical environmental and social values. The management regime consists of management restrictions and/or requirements during implementation of harvesting, silvicultural, restoration, community engagement, nature recreation and biodiversity monitoring activities. The main options for management are as follows:

5.1.1 Protection of critical values

- All designated HCV areas are managed under natural forest management and no timber extraction and conversion of forest is permitted.
- Demarcation of HCV boundaries on the ground for all designated HCVs is not required since 100 % overlaps occurred among elements (Figure 21). Informative signage boards should be established in many strategic areas that are frequently communed by members of the public.
- Conduct periodic patrolling and surveillance in all designated HCV areas to curb illegal activities such as encroachment and poaching.
- Establish a long term biodiversity monitoring system for critical forest ecosystem, flora and fauna (HCV 1.2, 1.3, 2 and 3).
- Migratory pathway of wildlife on logging roads, along streams or wildlife trails in the forest should be marked on the map and kept to ensure wildlife are able to use it for movement within and between forest reserves (HCV 1.2, 1.3 & 2).
- When the Forest Fire Management Plan is available, it has to be implemented and updated periodically (HCV 4.3).
- TBSFM management team are to constantly conduct meeting with the village representatives to mitigate any potential issues pertaining to the management of TBSFM and made aware of the designated HCV elements in the FMU, though no HCV 5 and 6 areas are indicated.
- Collaboration amongst department, private land owners and individual surrounding the proposed wildlife crossing is crucial in setting up connectivity that will allow movement of wildlife between clusters, especially the fragmented forest of Botitian FR.

5.1.2 Modifications or constraints on operations

- Any threats to the HCVs, especially related to HCV 1.2 & 1.3, that may be posed by operations or other activities in the forest will need to be identified and documented. Furthermore, the operation constraints in managing HCV areas and also addressing potential threats to the HCVs should also be examined.
- The decision to adopt any particular operation must be made based on the precautionary approach whereby sufficient data and analyses should be carried out to maintain critical values.

5.1.3 Enhancement efficiency and effectiveness

- Field staff is required to attend training courses on plants and wildlife to further enhance their botanical and wildlife knowledge on species that are currently listed in the threatened,

endemic and forestry prohibited lists to ensure they do not harvest or damage and also for monitoring purposes (HCV 1.2 & HCV 1.3).

- Update current biodiversity conservation status to TBSFM team of the upgrade or downgrading of threat status locally and globally (HCV 1.2 & HCV 1.3).

5.1.4 Restoration

- Forest restoration of indigenous tree species as part of the remedial action to increase forest structural diversity and mitigate any forest fire incidence spreading into the FMU core area, especially area dominated with lalang grassland and ferns (HCV 4.3).

5.2 Monitoring

- Periodic monitoring and control should be carried out to prevent encroachment in the buffer zone. Any signs of encroachment should be reported and dealt with immediate action (All HCVs).
- Quarterly progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing reporting of monitoring results of known HCV attributes.
- Periodical monitoring by conducting re-enumeration of the trees in the permanent sample plots to be conducted once every three years to get an indication of changes in tree structure and species assemblages (HCV 1.2, 1.3, 2 & 3).
- Periodical monitoring of endangered, endemic and migratory wildlife species will be practised using Wildlife Management System adopted by the management team. Any changes in terms of population count or migratory pathways observed by either researchers or ground staff, the management team must be alerted. Similarly, this monitoring prescription also applies to endangered and endemic plants (HCV 1.2, 1.3 & 2).
- Long term monitoring of TBSFM landscape using remote sensing technology and to be conducted once every three years to detect changes within the reserve and also vicinity areas. If threats are detected, precautionary approach will be taken and potential mitigation measures will be incorporated in the management plan (HCV 2).
- Ensure that all fire prevention procedures (monitoring, fire drills, public awareness campaign, etc) to be practised on a regular basis (at least once a year) especially during the drought season (HCV 4.3).

5.3 Research and development

- TBSFM Wildlife Management System to be enhanced through collaboration with wildlife experts, such as HUTAN, WWF and other research institutes.

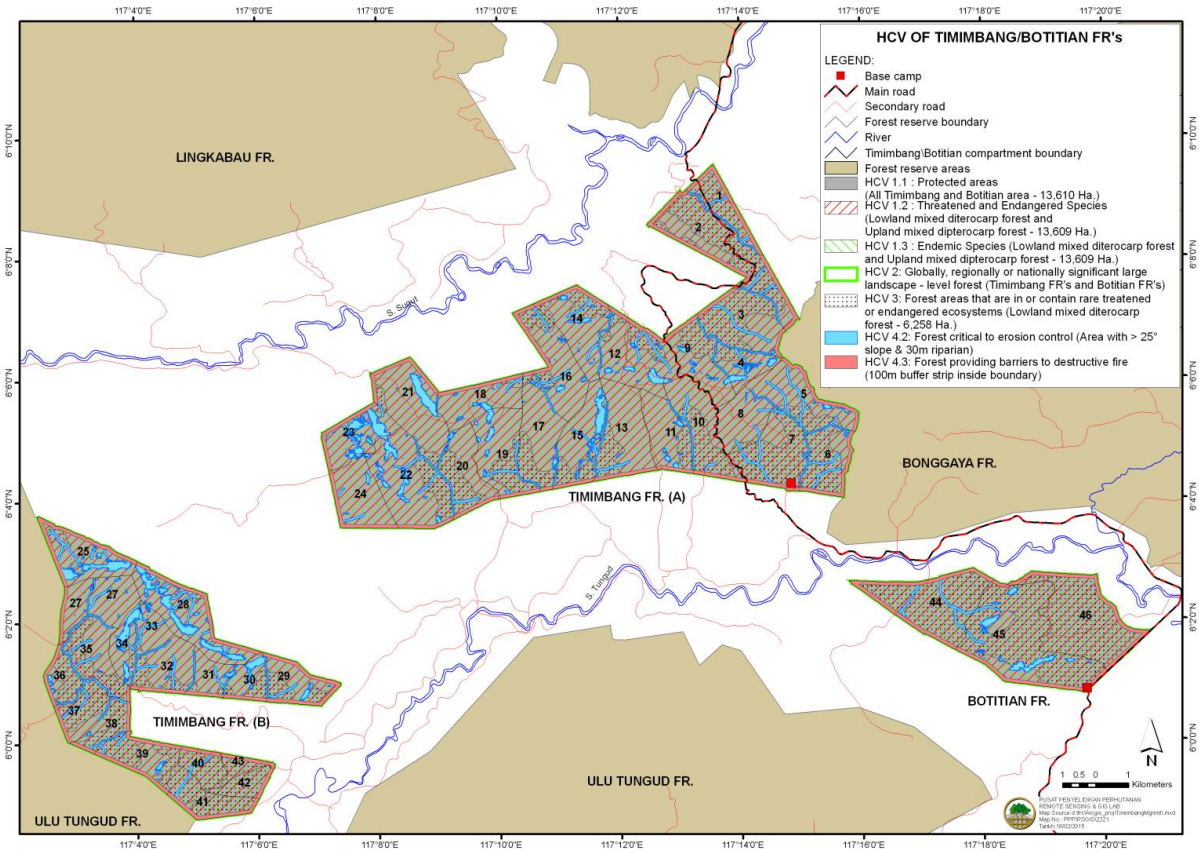


Figure 17. The composite map of all identified HCV areas in Timimbang-Botitian Sustainable Forest Mangement, Sabah.

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Appendix I: Permanent Sample Plots

Table 1. Plot numbers and their corresponding geographical position points for the forest assessment and rapid plant diversity monitoring in Timimbang-Botitian Sustainable Forest Management, Area.

Plot No.	Location (FR)	Vegetation Formation	Geographical Position	Elevation (m)
1	Timimbang A	Disturbed Lowland Mixed Dipterocarp Forest	6° 05' 07.2" N; 117 ° 09' 38.6" E	441
2	Timimbang A	Disturbed Lowland Mixed Dipterocarp Forest	6° 05' 04.3" N; 117 ° 09' 44.6" E	466
3	Timimbang A	Disturbed Lowland Mixed Dipterocarp Forest	6° 04' 15.4" N; 117 ° 14' 43.4" E	65
4	Timimbang A	Disturbed Lowland Mixed Dipterocarp Forest	6° 04' 36.4" N; 117 ° 14' 30.3" E	128
5	Timimbang A	Disturbed Lowland Mixed Dipterocarp Forest	6° 04' 40.3" N; 117 ° 14' 32.5" E	143
6	Timimbang B	Disturbed Lowland Mixed Dipterocarp Forest	5° 59' 32.4" N; 117 ° 06' 09.4" E	84
7	Timimbang B	Disturbed Lowland Mixed Dipterocarp Forest	5° 59' 31.4" N; 117 ° 06' 07.8" E	91
8	Timimbang B	Disturbed Lowland Mixed Dipterocarp Forest	5° 59' 29.5" N; 117 ° 06' 00.8" E	93
9	Botition	Disturbed Lowland Mixed Dipterocarp Forest	6° 00' 50.2" N; 117 ° 19' 31.7" E	93
10	Botition	Disturbed Lowland Mixed Dipterocarp Forest	6° 01' 05.5" N; 117 ° 19' 24.1" E	117
11	Botition	Disturbed Lowland Mixed Dipterocarp Forest	6° 01' 45.4" N; 117 ° 20' 41.4" E	60

Appendix II: Common tree species on various canopy layers

Common tree species on various canopy layers in disturbed mixed dipterocarp forest in Timimbang-Botitian Sustainable Forest Management Area. (Notes: Main canopy layer (MC); middlestorey canopy layer (MS); and understorey canopy layer (US)).

Family	Species	MC	MS	US
Dipterocarpaceae	*Shorea macroptera*	✓	✓	✓
	Dryobalanops beccarii	✓	✓	✓
	Shorea smithiana	✓	✓	✓
	Shorea parvifolia	✓	✓	✓
	Dipterocarpus acutangulus	✓	✓	✓
	Shorea pauciflora	✓	✓	✓
	Hopea beccariana	✓	✓	✓
	Dipterocarpus grandiflorus		✓	✓
	Shorea argentifolia		✓	✓
	Shorea beccariana		✓	✓
	Hopea pentanervia	✓	✓	✓
	Hopea semicuneata	✓	✓	✓
	Shorea multiflora	✓	✓	✓
	Shorea ovalis	✓	✓	✓
	Dipterocarpus pachyphyllus	✓	✓	
	Shorea leprosula	✓	✓	
	Shorea semicuneata	✓	✓	
	Vatica sp.	✓	✓	
	Parashorea malaanonan		✓	✓
	Vatica oblongifolia		✓	✓
	Dipterocarpus confertus		✓	
	Shorea fallax		✓	
	Shorea tenuiramulosa		✓	
	Vatica dulitensis		✓	
	Vatica odorata subsp. Mindanensis		✓	
	Dipterocarpus stellatus	✓		✓
	Shorea acuminatissima	✓		✓
	Shorea agami	✓		✓
	Shorea hopeifolia	✓		✓
	Dipterocarpus cf. caudiferus	✓		
	Dipterocarpus kuntsleri	✓		
	Shorea domatiosa	✓		
	Shorea exelliptica	✓		
	Shorea inappendiculata	✓		
	Shorea macrophylla	✓		
	Vatica umbonata			✓
	Dipterocarpus caudiferus			✓
	Dipterocarpus kerrii			✓
	Hopea nervosa			✓
	Shorea patoensis			✓
	Shorea sp.			✓
	Vatica albiramis			✓
Euphorbiaceae	*Mallotus* sp.			✓
	Chaetocarpus castanocarpus	✓	✓	
	Endospermum diadenum	✓	✓	
	Elateriospermum tapos		✓	✓
	Macaranga conifera		✓	✓
	Aporusa elmeri			✓
	Aporusa nigrescen			✓
	Blumeodendron kurzii			✓
	Cleistanthus baramicus			✓

	Cleistanthus ellipticus			✓
	Glochidion rubrum			✓
	Macaranga cf. *beccariana*			✓
	Macaranga pearsonii			✓
	Macaranga sp.			✓
	Mallotus korthalsii			✓
	Mallotus leucodermis			✓
	Mallotus peltatus			✓
	Mallotus penangensis			✓
	Moultonianthus leembruggianus			✓
	Pimeleodendron griffithianum		✓	
	Ptychopyxis arborea			✓
Anacardiaceae	*Gluta sabahana*	✓	✓	✓
	Gluta wallichii	✓	✓	✓
	Mangifera sp.	✓	✓	✓
	Buchanania sessilifolia			✓
	Mangifera foetida	✓		
	Mangifera decandra		✓	
	Mangifera rufocostata			✓
Fagaceae	*Lithocarpus* sp.	✓	✓	
	Lithocarpus gracilis	✓	✓	
	Lithocarpus lucidus	✓		
	Lithocarpus sp1	✓		
	Castanopsis sp.		✓	
	Lithocarpus conocarpus		✓	
Clusiaceae	*Mesua elmeri*		✓	✓
	Kayea macrantha	✓		
	Mesua micrantha			✓
Lauraceae	*Dehaasia brachybotrys*		✓	✓
	Alseodaphne insignis	✓		
	Beilschmiedia cf. *assamica*	✓		
	Cryptocarya sp.		✓	
	Dehaasia sp.			✓
	Litsea sp.			✓
Myrtaceae	*Syzygium* sp.	✓		✓
	Syzygium caudatilimbum			✓
	Syzygium corymbifera		✓	
Malvaceae	*Durio acutifolius*	✓		
	Durio lanceolata	✓		
	Durio sp.	✓		
	Scaphium macropodum	✓		
	Neesia sp.			✓
	Pentace adenophora			✓
	Pentace borneensis			✓
Ebenaceae	*Diospyros* sp2		✓	✓
	Diospyros sp.	✓		
	Diospyros andamanica			✓
	Diospyros elliptifolia			✓
	Diospyros frutescens			✓
Flacourtiaceae	*Hydnocarpus woodii*	✓	✓	
	Hydnocarpus sp.		✓	✓
	Hydnocarpus gracilis		✓	
Annonaceae	*Xylopia* sp.	✓		✓
	Xylopia ferruginea		✓	✓
	Polyalthia hookeriana		✓	
Leguminosae	*Crudia* sp.	✓	✓	
	Cynometra sp.		✓	
Burseraceae	*Canarium* cf. *euryphyllum*	✓		

	Santiria laevigatum	✓		
	Dacryodes sp.		✓	
Myristicaceae	*Horsfieldia brachiata*		✓	
	Myristica sp.		✓	
Polygalaceae	*Xanthophyllum heterophyllum*		✓	✓
Rhamnaceae	*Colubrina beccariana*		✓	
	Colubrina sp.		✓	
Ulmaceae	*Gironniera subaequalis*	✓		✓
Melastomataceae	*Memecylon borneense*			✓
	Ptenandra coerulescens		✓	
Celastraceae	*Bhesa paniculata*	✓		
	Lophopetalum beccarianum			✓
Moraceae	*Artocarpus odoratissimus*	✓		
	Artocarpus sp.	✓		
Dilleniaceae	*Dillenia excelsa*	✓		
Thymelaeaceae	*Gonystylus malaccensis*	✓		
Lecythidaceae	*Barringtonia lanceolata*		✓	
Meliaceae	*Aglaia* sp.		✓	
Olacaceae	*Anacolosa frutescen*		✓	
Sapotaceae	*Madhuca* sp.		✓	

APPENDIX III: LIST OF VASCULAR PLANT SPECIES

List of vascular plant species recorded from Timimbang-Botitian Sustainable Forest Management. Arranged by plant group and family in aphabetical order.

Family	Species	H	IUCN Red List
Lycophytes			
Lycopodiaceae	*Lycopodiella cernua*	l	NE
Selaginellaceae	*Selaginela argentea*	l	NE
Selaginellaceae	*Selaginella boschai*	l	NE
Selaginellaceae	*Selaginella caulescens*	l	NE
Selaginellaceae	*Selaginella delicatula*	l	NE
Ferns			
Aspleniaceae	*Asplenium phyllitidis*	f	NE
Blechnaceae	*Blechnum finlaysonianum*	f	NE
Blechnaceae	*Blechnum orientale*	f	NE
Blechnaceae	*Stenochlaena palustris*	f	NE
Cyatheaceae	*Cyathea tripinnata*	f	NE
Cyatheaceae	*Cyathea contaminans*	f	NE
Gleicheniaceae	*Dicranopteris curranii*	f	NE
Lindsaeaceae	*Lindsaea cultrata*	f	NE
Lindsaeaceae	*Lindsaea obtusa*	f	NE
Lindsaeaceae	*Lindsaea parallelogramm*	f	NE
Lygodiaceae	*Lygodium circinnatum*	f	NE
Lygodiaceae	*Lygodium microphyllum*	f	LC
Polypodiaceae	*Belvisia* cf. *mucronata*	f	
Pteridaceae	*Antrophyum callifolium*	f	NE
Pteridaceae	*Pityrogramma calomelanos*	f	NE
Pteridaceae	*Pteris longipes*	f	NE
Pteridaceae	*Syngramma alismifolia*	f	NE
Pteridaceae	*Taenitis blechnoides*	f	NE
Pteridaceae	*Vittaria elongata*	f	NE
Tectariaceae	*Pleocnemia irregularis*	f	NE
Tectariaceae	*Tectaria barberi*	f	NE
Tectariaceae	*Tectaria singaporeana*	f	NE
Thelypteridaceae	*Christella siamensis*	f	NE
Thelypteridaceae	*Cyclosorus aridus*	f	NE
Thelypteridaceae	*Cyclosorus heterocarpus*	f	NE
Thelypteridaceae	*Cyclosorus megaphyllus*	f	NE

Gymnosperm			
Gnetaceae	*Gnetum cuspidatum*	c	LC
Gnetaceae	*Gnetum gnemonoides*	c	LC
Gnetaceae	*Gnetum latifolium*	c	LC
Gnetaceae	*Gnetum leptostachyum*	c	LC
Gnetaceae	***Gnetum leptostachyum* var. *abbreviatum*** Markgr.	c	NE
Angiosperm (Monoctyledon)			
Araceae	*Aglaonema simplex*	h	NE
Araceae	*Alocasia denudata*	h	NE
Araceae	*Alocasia longiloba*	h	NE
Araceae	***Alocasia princeps*** W.Bull	h	NE
Araceae	***Amorphophallus pendulus*** Bogner & Mayo	h	NE
Araceae	*Amydrium medium*	h	NE
Araceae	*Homalomena humilis*	h	NE
Araceae	*Pothos* sp.	h	NA
Araceae	*Scindapsus borneensis*	h	NE
Araceae	***Scindapsus crassipes*** Engl.	h	NE
Araceae	*Scindapsus* sp	h	
Arecaceae	***Areca minuta*** Scheff.	pt	NE
Arecaceae	*Arenga undulatifolia**	pt	NE
Arecaceae	***Borassodendron borneensis*** J.Dransf.	pt	NE
Arecaceae	*Calamus flabellatus*	c	NE
Arecaceae	***Calamus hepburnii*** J. Dransf.	c	NE
Arecaceae	***Calamus pilosellus*** Becc.	c	NE
Arecaceae	***Calamus pogonacanthus*** Becc.	c	LC
Arecaceae	*Calamus* sp.	c	
Arecaceae	*Ceratolobus subangulatus*	c	NE
Arecaceae	*Daemonorops longipes*	c	NE
Arecaceae	*Korthalsia echinometra*	c	NE
Arecaceae	***Korthalsia furtadoana*** J.Dransf.	c	NE
Arecaceae	*Korthalsia rigida*	c	NE
Arecaceae	*Licuala intemedia*	pt	NE
Arecaceae	***Licuala valida*** Becc.	pt	NE
Arecaceae	Oncosperma tigillarium	pt	NE
Arecaceae	***Pholidocarpus maiadum*** Becc.	pt	LC
Asparagaceae	*Cordyline stricta*	s	NE
Asparagaceae	*Dracaena angustifolia*	s	NE

Asparagaceae	*Dracaena aurantiaca*	s	NE
Burmanniaceae	*Burmannia* sp.	sp	
Commelinaceae	*Amischotolype glabrata*	h	NE
Commelinaceae	*Floscopa* cf. *scandens*	h	
Costaceae	*Costus globosus*	h	NE
Costaceae	*Costus specious*	h	NE
Cyperaeae	*Carex petecticalis*	sd	NE
Cyperaeae	*Cyperus diffusus*	sd	LC
Cyperaeae	*Cyperus luzulae*	sd	NE
Cyperaeae	*Fimbristylis dichotoma*	sd	LC
Cyperaeae	*Hypolytrum compactum*	sd	NE
Cyperaeae	*Mapania cuspidata*	sd	NE
Cyperaeae	***Mapania graminea*** Uittien	sd	NE
Cyperaeae	*Mapania petiolata*	sd	NE
Cyperaeae	*Mapania wallichii*	sd	NE
Cyperaeae	***Paramapania radians*** (C.B. Clarke) Uittien	sd	NE
Cyperaeae	*Scleria levis*	sd	NE
Flagelariaceae	*Flagellaria indica*	c	NE
Hypoxidaceae	*Curculigo latifolia*	h	NE
Marantaceae	*Phaecelophrynium maximum*	s	NE
Marantaceae	*Phrynium capitatum*	s	NE
Orchidaceae	*Acriopsis liliifolia**	h	NE
Orchidaceae	*Agrostophyllum bicuspidatum**	h	NE
Orchidaceae	*Apostasia nuda**	h	NE
Orchidaceae	*Appendicula* cf. *torta**	h	
Orchidaceae	*Appendicula* sp.*	h	
Orchidaceae	***Arachnis breviscapa*** (J.J.Sm.) J.J.Sm.*	h	NE
Orchidaceae	*Bulbophyllum auratum**	h	NE
Orchidaceae	*Bulbophyllum flavescens**	h	NE
Orchidaceae	*Bulbophyllum limbatum**	h	NE
Orchidaceae	***Bulbophyllum praetervisum*** J.J.Verm.*	h	NE
Orchidaceae	*Bulbophyllum purpurascens**	h	NE
Orchidaceae	*Bulbophyllum* sp1*	h	
Orchidaceae	*Bulbophyllum* sp2*	h	
Orchidaceae	*Bulbophyllum* sp3*	h	
Orchidaceae	*Bulbophyllum* sp4*	h	
Orchidaceae	*Bulbophyllum vaginatum**	h	NE
Orchidaceae	*Calanthe pulchra**	h	NE
Orchidaceae	***Chrysoglossum reticulatum*** Carr*	h	NE
Orchidaceae	*Cleisostoma suaveolens**	h	NE
Orchidaceae	*Coelogyne foerstermanii**	h	LC
Orchidaceae	*Coelogyne incrassata* var.*valida**	h	NE
Orchidaceae	*Coelogyne pulverula**	h	NE

Orchidaceae	*Coelogyne* sp.*	h	
Orchidaceae	*Coelogyne swaniana**	h	NE
Orchidaceae	*Crepidium* sp.*	h	
Orchidaceae	*Cymbidium finlaysoniana**	h	NE
Orchidaceae	*Dendrobium aloifolium**	h	LC
Orchidaceae	*Dendrobium bifarium**	h	NE
Orchidaceae	*Dendrobium lohanense**	h	NE
Orchidaceae	***Dendrobium pinifolia*** Ridl.*	h	NE
Orchidaceae	*Dendrobium salacense**	h	NE
Orchidaceae	*Dendrobium sanguinolentum**	h	NE
Orchidaceae	*Dendrobium* sp.*	h	
Orchidaceae	*Epigeneium* sp.*	h	
Orchidaceae	*Flickingeria fimbriata**	h	NE
Orchidaceae	*Flickingeria xantholeuca**	h	NE
Orchidaceae	*Mycaranthes pannea**	h	NE
Orchidaceae	*Oxystophyllum concinnum**	h	NE
Orchidaceae	*Oxystophyllum grande**	h	NE
Orchidaceae	*Oxystophyllum* sp.*	h	
Orchidaceae	*Pinalia cepifolia**	h	NE
Orchidaceae	*Pinalia sacifera**	h	NE
Orchidaceae	*Pinalia* sp.*	h	
Orchidaceae	*Podochilus lucescens**	h	NE
Orchidaceae	*Podochilus microchilus**	h	NE
Orchidaceae	*Robiguetia spatulata**	h	NE
Orchidaceae	***Sarcoglaphys masiusii*** Miadin, A.L.Lamb & Emoi*	h	NE
Orchidaceae	*Thecostele alata**	h	NE
Orchidaceae	*Thelasis micrantha**	h	NE
Orchidaceae	*Thrixspermum centipede**	h	NE
Orchidaceae	*Trichotosia velutina**	h	NE
Orchidaceae	*Trichotosia vestita**	h	NE
Pandanaceae	*Freycinetia gitingiana*	s	NE
Pandanaceae	*Freycinetia meijeri*	s	NE
Pandanaceae	***Pandanus borneensis*** Warb. in H.G.A.Engler (ed.)	s	NE
Pandanaceae	***Pandanus brevistylis*** Martelli	s	NE
Pandanaceae	***Pandanus discostigma*** Martelli	s	NE
Pandanaceae	***Pandanus fusinus*** Martelli	s	NE
Pandanaceae	***Pandanus pugnax*** B.C. Stone	s	NE
Pandanaceae	***Pandanus rusticus*** B.C. Stone	s	NE
Poaceae	***Dinochloa sublaevigata*** S. Dransf.	g	NE
Poaceae	***Dinochloa trichogona*** S. Dransf.	g	NE
Poaceae	*Panicum* sp.	g	
Smilacaceae	***Smilax borneensis*** A. DC.	c	NE

Smilacaceae	***Smilax gigantea*** Merr.	c	NE
Smilacaceae	*Smilax laevis*	c	NE
Smilacaceae	*Smilax leucophylla*	c	NE
Smilacaceae	*Smilax myosotoflora*	c	NE
Zingiberaceae	*Alpinia* cf. *aquatica**	h	
Zingiberaceae	***Amomum coriaceum*** R.M. Sm.*	h	NE
Zingiberaceae	*Elettariopsis* sp.*	h	
Zingiberaceae	*Etlingera* sp.*	h	
Zingiberaceae	*Globba pendula**	h	LC
Zingiberaceae	*Plagiostachys albiflora**	h	NE
Zingiberaceae	***Plagiostachys strobilifera*** (Baker) Ridl.*	h	NE
Angiosperm (Dicotyledon)			
Acanthaceae	*Hypoester* sp.	s	NA
Achariaceae	***Hydnocarpus anomalus*** (Merr) Sleum.	t	NE
Achariaceae	***Hydnocarpus borneensis*** Sleum.	t	NE
Achariaceae	***Hydnocarpus calophylla*** (Ridl.) Sleum.	t	NE
Achariaceae	*Hydnocarpus gracilis*	t	NE
Achariaceae	*Hydnocarpus polypetalus*	t	NE
Achariaceae	*Hydnocarpus* sp.	t	NA
Achariaceae	*Hydnocarpus subfalcatus*	t	NE
Achariaceae	*Hydnocarpus sumatranus*	t	NE
Achariaceae	*Hydnocarpus woodii*	t	NE
Achariaceae	***Ryparosa acuminata*** Merr.	t	NE
Achariaceae	***Ryparosa hirsuta*** J.J. Sm	t	NE
Achariaceae	*Ryparosa kunstleri*	t	NE
Achariaceae	*Trichadenia philippinensis*	t	NE
Actinidiaceae	***Saurauia borneensis*** Merr.	t	NE
Actinidiaceae	***Saurauia ferox*** Korth.	t	NE
Alangiaceae	*Alangium* sp.	t	NA
Anacardiaceae	*Buchanania arborescens*	t	NE
Anacardiaceae	*Buchanania sessifolia*	t	NE
Anacardiaceae	*Campnosperma auriculatum*	t	NE
Anacardiaceae	*Dracontomelon costatum****	t	NE
Anacardiaceae	***Gluta oba*** (Merr.) Ding Hou	t	NE
Anacardiaceae	***Gluta rugulosa*** Ding Hou	t	NE
Anacardiaceae	***Gluta sabahana*** Ding Hou	t	NE
Anacardiaceae	*Gluta* sp.	t	NA
Anacardiaceae	*Gluta swintonia*	t	NE
Anacardiaceae	*Gluta wallichii*	t	NE
Anacardiaceae	*Koodersiodendron pinnatum*	t	NE
Anacardiaceae	*Mangifera decandra****	t	NE

Anacardiaceae	*Mangifera foetida****	t	LC
Anacardiaceae	*Mangifera magnifica****	t	LC
Anacardiaceae	*Mangifera pajang****	t	VU A1c
Anacardiaceae	*Mangifera parvifolia****	t	LC
Anacardiaceae	*Mangifera rufocostata****	t	VU A1c
Anacardiaceae	*Mangifera* sp.***	t	NA
Anacardiaceae	*Mangifera swintonioides****	t	NE
Anacardiaceae	*Melanochyla angustifolia*	t	NE
Anacardiaceae	*Melanochyla auriculata*	t	NE
Anacardiaceae	***Melanochyla beccariana*** Oliv.	t	NE
Anacardiaceae	***Melanochyla bullata*** Ding Hou	t	NE
Anacardiaceae	*Parishia insignis*	t	NE
Anacardiaceae	***Semecarpus bornensis*** Merr.	t	NE
Anacardiaceae	*Semecarpus bunburyanus*	t	NE
Anacardiaceae	*Semecarpus trengganuensis*	t	NE
Anisophylleaceae	*Anisophyllea corneri*	t	LC
Anisophylleaceae	*Anisophyllea disticha*	t	LC
Anisophylleaceae	*Anisophyllea* sp.	t	NA
Anisophylleaceae	*Combretocarpus rotundatus*	t	VU A1cd
Annonaceae	*Alphonsea javanica*	t	NE
Annonaceae	***Artabotrys roseus*** Boerl.	c	NE
Annonaceae	*Artabotrys* sp.	c	NA
Annonaceae	*Artabotrys suaveolen*	c	NE
Annonaceae	*Cananga odorata*	t	NE
Annonaceae	*Cyathocalyx corinatus*		
Annonaceae	*Cyathostemma excelsum*	c	NE
Annonaceae	*Cyathostemma hookeri*	c	NE
Annonaceae	*Desmos chinensis*	c	NE
Annonaceae	***Drepananthus magnificus*** (Diels) Survesw. & R.M.K.Saunders	t	NE
Annonaceae	*Enicosanthum* cf *erianthoides*	t	NE
Annonaceae	*Enicosanthum erianthum*	t	NE
Annonaceae	*Enicosanthum grandifolium*	t	NE
Annonaceae	*Enicosanthum* sp.	t	NA
Annonaceae	***Friesodielsia grandifolia*** (Merr.) Turner	c	NE
Annonaceae	***Goniothalamus borneensis*** Mat-Salleh	t	NE
Annonaceae	***Goniothalamus dolichocarpus*** Merr.	t	NE
Annonaceae	*Goniothalamus gigantifolius*	t	NE
Annonaceae	*Meiogyne virgata*	t	NE
Annonaceae	*Mezzettia leptopoda*	t	NE
Annonaceae	*Neo-uvaria acuminatissima*	t	NE
Annonaceae	Orophea sp	t	NA
Annonaceae	*Phaeanthus splendens*	t	NE

Annonaceae	***Polyalthia borneensis*** Merr.	t	NE
Annonaceae	*Polyalthia cauliflora*	t	NE
Annonaceae	*Polyalthia* cf. *lateriflora*	t	NE
Annonaceae	***Polyalthia congesta*** (Ridl.) Sinclair	t	NE
Annonaceae	*Polyalthia hookeriana*	t	LC
Annonaceae	***Polyalthia igniflora*** D.M.Johnson	t	NE
Annonaceae	*Polyalthia insignis*	t	NE
Annonaceae	*Polyalthia microtus* Miq	t	NE
Annonaceae	*Polyalthia rumphii*	t	NE
Annonaceae	*Polyalthia* sp.	t	NA
Annonaceae	*Polyalthia sumatrana*	t	NE
Annonaceae	*Popowia pisocarpa*	t	NE
Annonaceae	*Sageraea eliptica*	t	NE
Annonaceae	*Sageraea lanceolata*	t	NE
Annonaceae	***Sageraea sarawakensis*** van Heusden	t	NE
Annonaceae	*Uvaria littoralis*	c	NE
Annonaceae	*Uvaria lurida*	c	NE
Annonaceae	*Xylopia elliptica*	t	LC
Annonaceae	*Xylopia ferruginea*	t	NE
Annonaceae	*Xylopia* sp.	t	NA
Apocynaceae	*Alstonia angustiloba*	t	LC
Apocynaceae	*Alstonia* cf. *iwagensis*	t	NA
Apocynaceae	*Alstonia macrophylla*	t	LC
Apocynaceae	*Alstonia scholaris*	t	LC
Apocynaceae	*Alstonia* sp.	t	NA
Apocynaceae	*Alstonia spatulata*	t	LC
Apocynaceae	*Alyxia reinwardtii*	c	NE
Apocynaceae	*Alyxia* sp.	c	
Apocynaceae	*Baharuia gracilis*	c	NE
Apocynaceae	*Dischidia dolichantha*	ep	NE
Apocynaceae	*Dyera costulata*	t	LC
Apocynaceae	***Kopsia pauciflora* var. *mitrephora*** (Sleesen) D.J. Middleton	t	NE
Apocynaceae	*Parsonsia curvisepala*	c	NE
Apocynaceae	*Rauwolfia verticillata*	t	NE
Apocynaceae	*Tabernaemontana macrocarpa*	t	NE
Apocynaceae	*Tabernaemontana pauciflora*	t	NE
Apocynaceae	*Urceola* sp.	c	NA
Apocynaceae	*Willughbeia coriacea*	c	NE
Apocynaceae	***Willughbeia lanceolata*** (Markgr.) Mabb.	c	NE
Aquifoliaceae	*Ilex* cf. *cymosa*	t	NA
Aquifoliaceae	*Ilex cissoidea*	t	NE
Aquifoliaceae	*Ilex cymosa*	t	NE

Aquifoliaceae	Ilex sp.	t	NA
Araliaceae	*Schefflera beccariana*	sc	NE
Araliaceae	***Schefflera bipalmatifolia*** Merr.	sc	NE
Aristolochiaceae	*Thottea* cf. *grandiflora*	s	
Aristolochiaceae	***Thottea triserialis*** Ding Hou	s	NE
Asteraceae	*Blumea balsamifera*	s	NE
Asteraceae	*Vernonia arborea*	t	NE
Begoniaceae	*Begonia* cf. *gomantongensis*	h	
Burseraceae	*Canarium asperum*	t	LC
Burseraceae	*Canarium* cf. *caudatum*	t	
Burseraceae	*Canarium* cf. *euryphyllum*	t	
Burseraceae	*Canarium* cf. *euryphyllum*	t	
Burseraceae	*Canarium* cf. *kostermansii*	t	
Burseraceae	*Canarium decumanum*	t	NE
Burseraceae	*Canarium denticulatum*	t	NE
Burseraceae	*Canarium hirsutum*	t	NE
Burseraceae	***Canarium kinabaluensis*** Leenh.	t	NE
Burseraceae	***Canarium kostermansii*** Leenh.	t	NE
Burseraceae	***Canarium latistipulatum*** Ridl.	t	NE
Burseraceae	*Canarium odontophyllum*	t	NE
Burseraceae	*Canarium* sp.	t	
Burseraceae	*Dacryodes costata****	t	LC
Burseraceae	*Dacryodes laxa****	t	LC
Burseraceae	*Dacryodes rostrata****	t	LC
Burseraceae	*Dacryodes rostrata* var. *cuspidata****	t	NE
Burseraceae	*Dacryodes rubiginosa****	t	NE
Burseraceae	*Dacryodes rugosa****	t	NE
Burseraceae	*Dacryodes rugosa* var. *virgata****	t	NE
Burseraceae	*Dacryodes* sp.***	t	
Burseraceae	*Santiria laevigatum****	t	LC
Burseraceae	*Santiria tomentosa****	t	LC
Burseraceae	*Triomma malaccensis****	t	NE
Calophyllaceae	*Calophyllum blancoi*	t	NE
Calophyllaceae	*Calophyllum gracilipes*	t	NE
Calophyllaceae	*Calophyllum nodosum*	t	NE
Calophyllaceae	*Calophyllum obliquinervium*	t	NE
Calophyllaceae	***Calophyllum pyriforme*** P.F. Stevens	t	NE
Calophyllaceae	*Calophyllum* sp.	t	
Calophyllaceae	***Kayea borneensis*** P.F. Stevens	t	NE
Calophyllaceae	*Kayea elmeri* subsp. *elmeri*	t	NE
Calophyllaceae	***Kayea macrantha*** Baill.	t	NE
Calophyllaceae	***Kayea oblongifolia*** Ridl.	t	NE
Calophyllaceae	***Kayea scalarinervosa*** P.F.Stevens	t	NE

Calophyllaceae	*Mammea calciphila*	t	NE
Calophyllaceae	*Mesua elmeri*	t	
Calophyllaceae	*Mesua macrantha*	t	NE
Calophyllaceae	*Mesua* sp.	t	
Cannabaceae	*Celtis philippinensis*	t	NE
Cannabaceae	*Gironniera nervosa*	t	NE
Cannabaceae	*Gironniera parvifolia*	t	NE
Cannabaceae	*Gironniera subaequalis*	t	NE
Capparaceae	***Capparis buwaldae*** Jacobs	t	NE
Celastraceae	*Bhesa paniculata*	t	LC
Celastraceae	*Cassine* cf. *viburnifolia*	t	
Celastraceae	*Kokoona ochracea*	t	NE
Celastraceae	***Kokoona sabahana*** Kochummen	t	VU D2
Celastraceae	*Loeseneriella pauciflora*	t	NE
Celastraceae	*Loeseneriella* sp.	t	
Celastraceae	*Lophopetalum beccarianum*	t	NE
Celastraceae	*Lophopetalum floribundum*	t	NE
Celastraceae	*Lophopetalum javanicum*	t	LC
Celastraceae	*Lophopetalum* sp.	t	NA
Celastraceae	***Salacia leucoclada*** Ridl.	c	NE
Chrysobalanaceae	*Atuna* cf. *cordata*	t	
Chrysobalanaceae	*Atuna nannodes*	t	NE
Chrysobalanaceae	*Atuna racemosa*	t	NE
Chrysobalanaceae	*Atuna* sp.	t	
Chrysobalanaceae	*Licania splendens*	t	LC
Chrysobalanaceae	*Parinari oblongifolia*	t	NE
Chrysobalanaceae	*Parinari* sp.	t	
Clusiaceae	*Garcinia andersonii*	t	NE
Clusiaceae	***Garcinia beccarii*** Pierre	t	NE
Clusiaceae	***Garcinia caudiculata*** Ridl.	t	NE
Clusiaceae	*Garcinia* cf. *multinervia*	t	
Clusiaceae	*Garcinia cuspidata*	t	NE
Clusiaceae	*Garcinia diospyrifolia*	t	NE
Clusiaceae	*Garcinia dulcis*	t	NE
Clusiaceae	*Garcinia forbesii*	t	NE
Clusiaceae	*Garcinia gaudichaudii*	t	NE
Clusiaceae	*Garcinia mangostana*	t	NE
Clusiaceae	*Garcinia parvifolia*	t	NE
Clusiaceae	*Garcinia* sp.	t	
Clusiaceae	*Garcinia tetragonus*	t	NE
Clusiaceae	*Garcinia trianii*	t	NE
Combretaceae	*Combretum nigrescens*	c	NE
Combretaceae	*Terminalia copelandii*	t	NE

Combretaceae	*Terminalia foetidissima*	t	NE
Combretaceae	*Terminalia* sp.	t	
Connaraceae	*Agelaea borneensis*	c	NE
Connaraceae	*Agelaea macrophylla*	c	NE
Connaraceae	*Agelaea trinervis*	c	NE
Connaraceae	*Connarus odoratus*	c	NE
Connaraceae	*Ellipanthus beccarii*	s	NE
Connaraceae	*Rourea mimosoides*	c	NE
Convolvulaceae	*Erycibe borneensis*	t	NE
Convolvulaceae	***Erycibe borneensis* var. *borneensis*** (Merr.) Hoogl.	c	NE
Convolvulaceae	*Erycibe* cf. *grandifolia*	c	
Convolvulaceae	***Erycibe impressa*** Hoogl.	c	NE
Convolvulaceae	***Erycibe praecipua* subsp. *borneensis*** Hoogl.	c	NE
Convolvulaceae	*Erycibe* sp.	c	
Convolvulaceae	*Erycibe tomentosa* var. *tomentosa*	c	NE
Cornaceae	*Alangium javanicum*	t	LC
Cornaceae	*Alangium javanicum* var. *javanicum*	t	NE
Cornaceae	*Alangium javanicum* var. *tutela*	t	NE
Cornaceae	*Alangium* sp.	t	
Crypteroniaceae	*Crypteronia griffithii*	t	NE
Ctenolophaceae	*Ctenolophon parvifolius*	t	NE
Datiscaceae	*Octomeles sumatrana*	t	LC
Dilleniaceae	***Dillenia borneensis*** Hoogl.	t	NE
Dilleniaceae	*Dillenia excelsa*	t	NE
Dilleniaceae	*Dillenia reticulata*	t	NE
Dilleniaceae	*Dillenia* sp.	t	
Dilleniaceae	*Dillenia suffruticosa*	t	NE
Dilleniaceae	*Tetracera akara*	c	NE
Dilleniaceae	*Tetracera fagifolia*	c	NE
Dilleniaceae	*Tetracera macrophylla*	c	NE
Dipterocarpaceae	*Dipterocarpus acutangulus*	t	NE
Dipterocarpaceae	*Dipterocarpus caudiferus*	t	NE
Dipterocarpaceae	*Dipterocarpus* cf. *caudiferus*	t	
Dipterocarpaceae	***Dipterocarpus confertus*** Slooten	t	NE
Dipterocarpaceae	*Dipterocarpus conformis* subsp. *borneensis*	t	NE
Dipterocarpaceae	***Dipterocarpus geniculatus* subsp. *grandis*** P.S. Ashton	t	NE
Dipterocarpaceae	*Dipterocarpus globosus*	t	CR A1cd+2cd, B1+2c
Dipterocarpaceae	*Dipterocarpus grandiflorus*	t	CR
Dipterocarpaceae	*Dipterocarpus hasseltii*	t	CR
Dipterocarpaceae	*Dipterocarpus humeratus*	t	NE

Dipterocarpaceae	*Dipterocarpus kerrii*	t	CR
Dipterocarpaceae	*Dipterocarpus kunstleri*	t	CR
Dipterocarpaceae	***Dipterocarpus pachyphyllus*** Meijer	t	NE
Dipterocarpaceae	*Dipterocarpus* sp.	t	
Dipterocarpaceae	*Dipterocarpus stellatus*	t	NE
Dipterocarpaceae	***Dipterocarpus stellatus* subsp. *parvus*** P.S. Ashton	t	NE
Dipterocarpaceae	*Dipterocarpus tempehes*	t	CR
Dipterocarpaceae	*Dipterocarpus validus*	t	CR
Dipterocarpaceae	*Dipterocarpus verrucosus*	t	NE
Dipterocarpaceae	*Dryobalanops beccarii*	t	EN
Dipterocarpaceae	***Dryobalanops keithii*** Symington	t	CR
Dipterocarpaceae	***Dryobalanops lanceolata*** Burck	t	EN
Dipterocarpaceae	*Hopea aequalis*	t	CR A1c, B1+2c, C1
Dipterocarpaceae	*Hopea beccariana*	t	CR
Dipterocarpaceae	*Hopea bracteata*	t	NE
Dipterocarpaceae	*Hopea cernua*	t	NE
Dipterocarpaceae	*Hopea dryobalanoides*	t	NE
Dipterocarpaceae	*Hopea ferruginea*	t	CR A1c+2c
Dipterocarpaceae	*Hopea nervosa*	t	CR
Dipterocarpaceae	*Hopea nutans*	t	CR A1cd+2cd, B1+2c
Dipterocarpaceae	*Hopea pentanervia*	t	CR A1cd+2cd, B1+2c
Dipterocarpaceae	*Hopea sangal*	t	CR A1cd, B1+2c, C1, D
Dipterocarpaceae	*Hopea semicuneata*	t	CR
Dipterocarpaceae	*Hopea* sp.	t	
Dipterocarpaceae	*Hopea wyath-smithii*	t	CR
Dipterocarpaceae	*Parashorea malaanonan*	t	CR
Dipterocarpaceae	***Parashorea parvifolia*** Wyatt-Sm ex P.S.Ashton	t	NE
Dipterocarpaceae	*Parashorea smythiesii*	t	NE
Dipterocarpaceae	*Parashorea tomentella*	t	NE
Dipterocarpaceae	***Shorea acuminatissima*** Symington	t	CR
Dipterocarpaceae	***Shorea agamii*** P.S.Ashton	t	EN
Dipterocarpaceae	*Shorea almon*	t	CR
Dipterocarpaceae	***Shorea amplexicaulis*** P.S. Ashton***	t	NE
Dipterocarpaceae	*Shorea angustifolia*	t	NE
Dipterocarpaceae	***Shorea argentifolia*** Symington	t	EN
Dipterocarpaceae	*Shorea atrinervosa*	t	NE
Dipterocarpaceae	***Shorea beccariana*** Burck	t	NE
Dipterocarpaceae	*Shorea bracteolata*	t	EN
Dipterocarpaceae	*Shorea curtisii*	t	LC

Dipterocarpaceae	*Shorea domatiosa*	t	EN A1cd, C2a
Dipterocarpaceae	*Shorea exelliptica*	t	NE
Dipterocarpaceae	*Shorea faguetiana*	t	EN A1cd
Dipterocarpaceae	*Shorea faguetioides*	t	NE
Dipterocarpaceae	***Shorea falciferoides* subsp. *glaucesens*** (Meijer) P.S.Ashton	t	EN
Dipterocarpaceae	*Shorea fallax*	t	NE
Dipterocarpaceae	***Shorea ferruginea*** Dyer ex Brandis	t	NE
Dipterocarpaceae	*Shorea foxworthyii*	t	CR A1cd
Dipterocarpaceae	*Shorea gibbosa*	t	CR A1cd
Dipterocarpaceae	*Shorea havilandii*	t	NE
Dipterocarpaceae	*Shorea hopeifolia*	t	CR
Dipterocarpaceae	*Shorea hypoleuca*	t	CR A1cd
Dipterocarpaceae	*Shorea inappendiculata*	t	CR
Dipterocarpaceae	*Shorea johorensis*	t	CR
Dipterocarpaceae	*Shorea kunstleri*	t	CR A1cd
Dipterocarpaceae	*Shorea laevis*	t	LC
Dipterocarpaceae	*Shorea leprosula*	t	EN
Dipterocarpaceae	*Shorea macrophylla****	t	VU A1cd
Dipterocarpaceae	***Shorea macroptera*** P.S.Ashton	t	NE
Dipterocarpaceae	***Shorea mecistopteryx*** Ridl.***	t	NE
Dipterocarpaceae	*Shorea multiflora*	t	LC
Dipterocarpaceae	*Shorea obscura*	t	EN
Dipterocarpaceae	*Shorea ovalis*	t	NE
Dipterocarpaceae	*Shorea ovata*	t	EN A1cd
Dipterocarpaceae	*Shorea parvifolia*	t	NE
Dipterocarpaceae	***Shorea parvistipulata*** F.Heim	t	NE
Dipterocarpaceae	***Shorea patoiensis*** P.S.Ashton	t	NE
Dipterocarpaceae	*Shorea pauciflora*	t	EN
Dipterocarpaceae	***Shorea pilosa*** P.S.Ashton***	t	NE
Dipterocarpaceae	*Shorea pinanga*	t	NE
Dipterocarpaceae	*Shorea scabrida*	t	NE
Dipterocarpaceae	*Shorea scrobiculata*	t	NE
Dipterocarpaceae	*Shorea seminis*	t	CR
Dipterocarpaceae	***Shorea smithiana*** Symington	t	CR
Dipterocarpaceae	*Shorea* sp.	t	
Dipterocarpaceae	***Shorea superba*** Symington	t	CR
Dipterocarpaceae	***Shorea symingtonii*** Wood	t	CR
Dipterocarpaceae	*Shorea tenuiramulosa*	t	CR C2a, D
Dipterocarpaceae	*Shorea xanthophylla*	t	CR A1cd
Dipterocarpaceae	***Vatica albiramis*** Slooten	t	NE
Dipterocarpaceae	***Vatica dulitensis*** Symington	t	NE
Dipterocarpaceae	***Vatica micrantha*** Slooten	t	NE

Dipterocarpaceae	***Vatica oblongifolia*** Hook. *f.*	t	NE
Dipterocarpaceae	*Vatica oblongifolia* subsp. *multinervia*	t	NE
Dipterocarpaceae	*Vatica oblongifolia* subsp. *oblongifolia*	t	NE
Dipterocarpaceae	*Vatica odorata*	t	NE
Dipterocarpaceae	*Vatica odorata* subsp. *mindanensis*	t	NE
Dipterocarpaceae	*Vatica rassak*	t	LC
Dipterocarpaceae	***Vatica sarawakensis*** F. Heim	t	CR
Dipterocarpaceae	*Vatica* sp.	t	
Dipterocarpaceae	*Vatica umbonata*	t	LC
Ebenaceae	*Diospyros andamanica*	t	NE
Ebenaceae	*Diospyros areolata*	t	LC
Ebenaceae	*Diospyros borneensis*	t	NE
Ebenaceae	*Diospyros cauliflora*	t	NE
Ebenaceae	*Diospyros curranii*	t	NE
Ebenaceae	*Diospyros daemona*	t	VU D2
Ebenaceae	***Diospyros discocalyx*** Merr.	t	NE
Ebenaceae	*Diospyros durionoides*	t	NE
Ebenaceae	*Diospyros elliptifolia*	t	NE
Ebenaceae	***Diospyros euphlebia*** Merr.	t	NE
Ebenaceae	***Diospyros ferox*** Bakh.	t	NE
Ebenaceae	*Diospyros foxworthyi*	t	LC
Ebenaceae	*Diospyros frutescens*	t	NE
Ebenaceae	*Diospyros kurzii*	t	NE
Ebenaceae	*Diospyros macrophylla*	t	NE
Ebenaceae	*Diospyros pendula*	t	NE
Ebenaceae	*Diospyros* sp.	t	
Ebenaceae	*Diospyros* sp2.	t	
Ebenaceae	***Diospyros squamaefolia*** Kosterm.	t	NE
Ebenaceae	*Diospyros sumatrana*	t	NE
Elaeocarpaceae	*Elaeoarpus stipularis*	t	NE
Elaeocarpaceae	***Elaeocarpus clementis* var. *borneensis*** (Ridl.) Coode	t	NE
Elaeocarpaceae	*Elaeocarpus clementis* var. *canipes*	t	NE
Elaeocarpaceae	***Elaeocarpus clementis* var. *clementis*** Merr.	t	NE
Elaeocarpaceae	*Elaeocarpus griffithii*	t	NE
Elaeocarpaceae	***Elaeocarpus jugahanus*** Coode	t	NE
Elaeocarpaceae	*Elaeocarpus pedunculatsus*	t	NE
Elaeocarpaceae	*Elaeocarpus* sp.	t	
Escalloniaceae	*Polyosma* cf. *mutabilis*	t	
Euphorbiaceae	*Agrostistachys longifolia*	t	NE
Euphorbiaceae	*Blumeodendron concolor*	t	NE
Euphorbiaceae	*Blumeodendron kurzii*	t	NE
Euphorbiaceae	*Blumeodendron tokbrai*	t	NE

Euphorbiaceae	*Botryophora geniculata*	t	NE
Euphorbiaceae	*Cassine* cf. *viburnifolia*	t	
Euphorbiaceae	*Croton griffithii*	t	NE
Euphorbiaceae	*Croton oblongus*	t	NE
Euphorbiaceae	*Croton* sp.	t	
Euphorbiaceae	*Dimorphocalyx luzoniensis*	t	NE
Euphorbiaceae	*Dimorphocalyx muricatus*	t	NE
Euphorbiaceae	*Elateriospermum tapos*	t	NE
Euphorbiaceae	*Endospermum diadenum*	t	NE
Euphorbiaceae	*Fahrenheitia pendula*	t	NE
Euphorbiaceae	*Koilodepas longifolium*	t	NE
Euphorbiaceae	***Macaranga brevipetiolata*** Airy Shaw	t	NE
Euphorbiaceae	*Macaranga* cf *glandibracteolata*	t	
Euphorbiaceae	*Macaranga* cf. *beccariana*	t	
Euphorbiaceae	*Macaranga conifera*	t	NE
Euphorbiaceae	*Macaranga gigantea*	t	NE
Euphorbiaceae	*Macaranga hypoleuca*	t	NE
Euphorbiaceae	***Macaranga pearsonii*** Merr.	t	NE
Euphorbiaceae	***Macaranga rarispina*** Whitmore	t	NE
Euphorbiaceae	*Macaranga* sp.	t	
Euphorbiaceae	*Macaranga tanarius*	t	NE
Euphorbiaceae	***Mallotus caudatus*** Merr.	t	NE
Euphorbiaceae	*Mallotus griffithianus*	t	NE
Euphorbiaceae	*Mallotus korthalsii*	t	NE
Euphorbiaceae	*Mallotus laevigatus*	t	NE
Euphorbiaceae	*Mallotus leptophyllus*	t	NE
Euphorbiaceae	*Mallotus leucodermis*	t	NE
Euphorbiaceae	*Mallotus macrostachyus*	t	NE
Euphorbiaceae	*Mallotus miquelianus*	t	NE
Euphorbiaceae	*Mallotus molissimus*	t	NE
Euphorbiaceae	*Mallotus muticus*	t	NE
Euphorbiaceae	*Mallotus oblongifolius*	t	NE
Euphorbiaceae	*Mallotus peltatus*	t	NE
Euphorbiaceae	*Mallotus penangensis*	t	NE
Euphorbiaceae	*Mallotus* sp.	t	
Euphorbiaceae	*Mallotus stipularis*	t	NE
Euphorbiaceae	*Mallotus subpeltatus*	t	NE
Euphorbiaceae	*Mallotus wrayi*	t	NE
Euphorbiaceae	*Moultonianthus leembruggianus*	t	NE
Euphorbiaceae	***Neoscortechinia angustifolia (***Airy Shaw) Welzen	t	NE
Euphorbiaceae	*Neoscortechinia forbesii*	t	NE
Euphorbiaceae	*Omphalea bracteata*	c	NE

Euphorbiaceae	*Pimeleodendron griffithianum*	t	NE
Euphorbiaceae	***Ptychopyxis arborea*** (Merr.) Airy Shaw	t	NE
Euphorbiaceae	*Trigonopleura malayana*	t	NE
Euphorbiaceae	*Trigonostemon merrillii*	t	NE
Fabaceae	*Adenanthera kostermansii*	t	NE
Fabaceae	*Albizia* sp.	t	
Fabaceae	*Albizia splendens*	t	NE
Fabaceae	*Archidendron borneense*	t	NE
Fabaceae	*Archidendron clypearia*	c	NE
Fabaceae	*Archidendron ellipticum*	t	LC
Fabaceae	*Archidendron jiringa*	t	NE
Fabaceae	*Archidendron* sp.	t	
Fabaceae	***Archidendron triplinervium*** (Kosterm.) Nielsen	t	NE
Fabaceae	***Bauhinia diptera*** Miq.	c	NE
Fabaceae	*Bauhinia excelsa* var. *excelsa*	c	NE
Fabaceae	*Bauhinia excelsa* var. *megalantha*	c	NE
Fabaceae	***Bauhinia kockiana* var. *angustifolia*** K & S.S. Larsen	c	NE
Fabaceae	***Bauhinia kockiana* var. *beccarii***	c	NE
Fabaceae	*Bauhinia kockiana* var. *kockiana*	c	NE
Fabaceae	*Bauhinia* sp.	c	
Fabaceae	***Bauhinia sylvani*** (de Wit) Cusset	c	NE
Fabaceae	*Caesalpinia latisiliqua*	c	NE
Fabaceae	***Callerya nieuwenhuisii*** (J.J. Sm) Schot	c	NE
Fabaceae	***Crudia reticulata*** Merr.	t	NE
Fabaceae	*Crudia* sp.	t	
Fabaceae	***Crudia tenuipes*** Merr.	t	NE
Fabaceae	*Cynometra inaequifolia*	t	VU A1d
Fabaceae	*Cynometra* sp.	t	
Fabaceae	*Dalbergia discolor*	c	NE
Fabaceae	*Dalbergia junghuhnii*	c	NE
Fabaceae	*Dalbergia parviflora*	c	LC
Fabaceae	*Dalbergia pseudo-sissoo*	c	NE
Fabaceae	*Dalbergia rimosa*	c	NE
Fabaceae	*Dalbergia rostrata*	c	NE
Fabaceae	*Derris elegans*	c	NE
Fabaceae	*Derris heptaphylla*	c	NE
Fabaceae	*Derris thyrsiflora*	c	NE
Fabaceae	*Dialium indum*	t	NE
Fabaceae	*Dialium* sp.	t	
Fabaceae	*Entada* sp.	c	
Fabaceae	*Fordia brachybotrys*	t	NE
Fabaceae	*Fordia coriacea*	t	NE

Fabaceae	*Fordia filipes*	t	NE
Fabaceae	*Fordia* sp.	t	
Fabaceae	*Fordia splendidissima*	t	NE
Fabaceae	*Intsia palembanica****	t	NE
Fabaceae	*Koompassia* cf. *malaccensis****	t	NE
Fabaceae	*Koompassia excelsa****	t	LR/cd
Fabaceae	*Koompassia malaccensis****	t	LR/cd
Fabaceae	*Kunstleria* cf. *geesinkii*	c	
Fabaceae	*Paraserianthes falcataria*	t	NE
Fabaceae	*Parkia* cf. *speciosa*	t	
Fabaceae	*Parkia singularis*	t	NE
Fabaceae	***Peltophorum racemosum*** Merr.	t	NE
Fabaceae	*Saraca declinata*	t	NE
Fabaceae	*Sindora beccariana*	t	DD
Fabaceae	*Sindora irpicina*	t	NE
Fabaceae	*Sindora* sp.	t	
Fabaceae	*Spatholobus* cf *strigillifera*	c	
Fabaceae	*Spatholobus ferrugineus*	c	NE
Fabaceae	*Spatholobus gyrocarpus*	c	LC
Fabaceae	*Spatholobus latibractea*	c	NE
Fabaceae	*Spatholobus macropterus*	c	NE
Fabaceae	*Spatholobus maingayi*	c	NE
Fabaceae	***Spatholobus viridis*** Wiriad & Ridd.	c	NE
Fabaceae	***Sympetalandra borneensis*** Stapf***	t	NE
Fagaceae	***Castanopsis endertii*** Hatus. ex Soepadmo	t	NE
Fagaceae	***Castanopsis hypophoenicea*** (Seemen) Soepadmo	t	NE
Fagaceae	*Castanopsis motleyana*	t	NE
Fagaceae	***Castanopsis oligoneura*** Soepadmo	t	NE
Fagaceae	*Castanopsis* sp.	t	
Fagaceae	*Lithocarpus cantleyanus*	t	NE
Fagaceae	*Lithocarpus caudatifolius*	t	NE
Fagaceae	*Lithocarpus clementianus*	t	NE
Fagaceae	*Lithocarpus conocarpus*	t	NE
Fagaceae	*Lithocarpus echinifer*	t	NE
Fagaceae	*Lithocarpus gracilis*	t	NE
Fagaceae	***Lithocarpus hallieri*** (Seemen) A. Camus	t	NE
Fagaceae	***Lithocarpus keningauensis*** Julia & Soepadmo	t	NE
Fagaceae	*Lithocarpus leptogyne*	t	NE
Fagaceae	*Lithocarpus lucidus*	t	NE
Fagaceae	*Lithocarpus nieuwenhuisii*	t	NE
Fagaceae	***Lithocarpus pulcher*** (King) Markgr.	t	NE
Fagaceae	*Lithocarpus* sp.	t	

Fagaceae	*Lithocarpus* sp1	t	
Fagaceae	*Lithocarpus* sp2	t	
Fagaceae	*Quercus argentata*	t	NE
Fagaceae	*Trigonobalanus verticillata*	t	NE
Gentianaceae	*Fagraea cuspidata*	t	NE
Gentianaceae	*Fagraea fragrans*	t	NE
Gentianaceae	*Fagraea spicata*	t	NE
Gentianaceae	*Fagraea volubilis*	t	NE
Gesneriaceae	*Cyrtandra* sp.	s	
Hypericaceae	*Cratoxylon* sp.	s	
Icacinaceae	*Iodes* cf. *irrhosa*	t	
Icacinaceae	***Phytocrene anomala*** Merr.	c	NE
Icacinaceae	***Phytocrene racemosa*** Sleum.	c	NE
Irvingiaceae	*Irvingia malayana*	t	LC
Ixonanthaceae	*Ixonanthes reticulata*	t	NE
Lamiaceae	*Callicarpa pentandra*	t	NE
Lamiaceae	*Gmelina uniflora*	t	NE
Lamiaceae	*Petraeovitex* sp.	t	
Lamiaceae	*Premna corymbosa*	t	NE
Lamiaceae	***Sphenodesma stellata*** Merr.	c	NE
Lamiaceae	*Teijsmanniodendron holophyllum*	t	NE
Lamiaceae	***Teijsmanniodendron sarawakanus (***H. Pearson) Kosterm.	t	NE
Lamiaceae	*Teijsmanniodendron simplicifolium*	t	NE
Lamiaceae	*Teijsmanniodendron* sp.	t	
Lamiaceae	*Timonius* sp.	t	
Lamiaceae	*Vitex pinnata*	t	NE
Lamiaceae	*Vitex vestita*	sc	NE
Lauraceae	***Actinodaphne borneensis*** Meisn.	t	NE
Lauraceae	*Actinodaphne glabra*	t	NE
Lauraceae	*Actinodaphne glomerata*	t	NE
Lauraceae	*Actinodaphne* sp.	t	
Lauraceae	*Alseodaphne bancana*	t	NE
Lauraceae	*Alseodaphne diversifolia*	t	NE
Lauraceae	*Alseodaphne insignis*	t	NE
Lauraceae	*Beilschmiedia* cf. *assamica*	t	
Lauraceae	*Beilschmiedia* cf. *cuadrae*	t	NE
Lauraceae	*Beilschmiedia maingayi*	t	NE
Lauraceae	***Beilschmiedia micrantha*** Merr.	t	NE
Lauraceae	*Beilschmiedia* sp.	t	
Lauraceae	*Beilschmiedia tawaensis*	t	NE
Lauraceae	*Cryptocarya ferrea*	t	NE
Lauraceae	*Cryptocarya griffithiana*	t	NE

Lauraceae	*Cryptocarya* sp.	t	
Lauraceae	***Dehaasia brachybotrys*** Kosterm.	t	NE
Lauraceae	*Dehaasia caesia*	t	NE
Lauraceae	*Dehaasia corynantha*	t	NE
Lauraceae	*Dehaasia ferrea* var. *ferrea*	t	NE
Lauraceae	*Dehaasia incrassata*	t	NE
Lauraceae	*Dehaasia* sp.	t	
Lauraceae	*Lindera lucida*	t	NE
Lauraceae	*Litsea accedens*	t	NE
Lauraceae	***Litsea cauliflora*** Stapf	t	NE
Lauraceae	*Litsea* cf. *elliptica*	t	
Lauraceae	*Litsea cordata*	t	NE
Lauraceae	*Litsea cubeba*	t	NE
Lauraceae	*Litsea cylindrocarpa*	t	NE
Lauraceae	*Litsea fulva*	t	NE
Lauraceae	*Litsea garciae*	t	NE
Lauraceae	*Litsea lancifolia* var. *prominens*	t	NE
Lauraceae	*Litsea mappacea*	t	NE
Lauraceae	*Litsea ochracea var oblanceolata*	t	NE
Lauraceae	*Litsea odorifera*	t	NE
Lauraceae	*Litsea sessiliflora*	t	NE
Lauraceae	***Litsea sessilis*** Boerl.	t	NE
Lauraceae	*Litsea* sp.	t	
Lauraceae	*Litsea umbellata*	t	NE
Lauraceae	*Neolitsea* sp.	t	
Lauraceae	*Nothaphoebe obovata*	t	NE
Lauraceae	*Phoebe elliptica*	t	NE
Lecythidaceae	***Barringtonia lanceolata*** (Ridl.) Payens	t	NE
Lecythidaceae	*Barringtonia macrostachya*	t	NE
Lecythidaceae	*Barringtonia sarcostachys*	t	NE
Lecythidaceae	*Barringtonia* sp.	t	
Lecythidaceae	*Planchonia grandis*	t	NE
Lecythidaceae	*Planchonia valida*	t	NE
Linaceae	*Indorouchera griffithiana*	c	NE
Loganiaceae	*Norrisia major*	t	NE
Loganiaceae	***Strychnos borneensis*** Leenh.	c	NE
Loganiaceae	*Strychnos cuspidata*	c	NE
Loganiaceae	*Strychnos ignatii*	c	NE
Loganiaceae	*Strychnos minor*	c	NE
Loganiaceae	*Strychnos villosa*	c	NE
Loranthaceae	*Macrosolen acunae*	ep	NE
Magnoliaceae	*Elmerillia mollis*	t	NE
Magnoliaceae	*Magnolia candollii*	t	NE

Magnoliaceae	*Magnolia candollii* var. *beccarii*	t	NE
Magnoliaceae	*Magnolia candollii* var. *singapurensis*	t	NE
Magnoliaceae	*Magnolia gigantifolia*	t	DD
Magnoliaceae	*Magnolia* sp.	t	
Magnoliaceae	*Michelia montana*	t	NE
Malvaceae	*Commersonia* sp.	t	
Malvaceae	***Durio acutifolius*** (Mast.) Kosterm.***	t	VU A1c
Malvaceae	***Durio grandiflorus*** (Mast.) Kosterm.***	t	VU A1c
Malvaceae	*Durio graveolens****	t	NE
Malvaceae	*Durio grifithii****	t	NE
Malvaceae	***Durio kutejensis*** (Hassk.) Becc.***	t	VU A1c
Malvaceae	***Durio lanceolatus*** Mast.***	t	NE
Malvaceae	*Durio* sp.***	t	
Malvaceae	*Durio testudinarum****	t	VU A1c
Malvaceae	***Grewia cinnamomifolia*** (Burret) Stapf ex P.S.Ashton	t	NE
Malvaceae	***Grewia gracilis*** (Stapf ex Ridl.) P.S.Ashton	t	NE
Malvaceae	*Heritiera elata*	t	NE
Malvaceae	*Heritiera javanica*	t	NE
Malvaceae	*Heritiera littolaris*	t	LC
Malvaceae	*Heritiera simplicifolia*	t	NE
Malvaceae	*Heritiera* sp.	t	
Malvaceae	*Microcos antidesmifolia* var. *hirsuta*	t	NE
Malvaceae	***Microcos crassifolia*** Burret	t	NE
Malvaceae	***Microcos henrici* subsp. *acuta*** R.C.K. Chung	t	NE
Malvaceae	*Microcos hirsuta*	t	NE
Malvaceae	*Microcos latistipulata* var. *latistipulata*	t	NE
Malvaceae	***Microcos membranifolia*** R.C.K. Chung	t	NE
Malvaceae	***Microcos ossea*** Burret	t	NE
Malvaceae	*Microcos* sp.	t	
Malvaceae	***Microcos subepetala*** Stapf ex Ridl.	t	NE
Malvaceae	***Microcos triflora* var. *longipetiolata*** (Merr.) R.C.K.Chung	t	NE
Malvaceae	*Neesia* sp.	t	
Malvaceae	*Neesia strigosa*	t	NE
Malvaceae	*Neesia synandra*	t	NE
Malvaceae	*Pentace adenophora*	t	NE
Malvaceae	***Pentace borneensis*** Pierre	t	NE
Malvaceae	***Pentace laxiflora*** Merr.	t	NE
Malvaceae	*Pterospermum* sp.	t	
Malvaceae	*Scaphium affine*	t	NE
Malvaceae	***Scaphium longipetiolatum*** (Kosterm.) Kosterm.	t	NE

Malvaceae	*Scaphium macropodum*	t	LC
Malvaceae	*Scaphium* sp.	t	
Malvaceae	*Sterculia cordata*	t	NE
Malvaceae	*Sterculia rubiginosa*	t	NE
Malvaceae	*Sterculia rubiginosa* var. *rubiginosa*	t	NE
Malvaceae	*Sterculia* sp.	t	
Malvaceae	***Sterculia stipulata*** Korth.	t	NE
Melastomataceae	*Clidemia hirta*	s	NE
Melastomataceae	*Diplectria beccariana*		NE
Melastomataceae	*Kibessia azurea*	t	NE
Melastomataceae	*Kibessia verruculosa*	t	NE
Melastomataceae	***Memecylon argenteum*** Bremer	t	NE
Melastomataceae	***Memecylon beccarianum*** Cogn.	t	NE
Melastomataceae	***Memecylon borneensis*** Merr.	t	NE
Melastomataceae	*Memecylon costatum*	t	NE
Melastomataceae	*Memecylon excelsum*	t	NE
Melastomataceae	*Memecylon floribundum*	t	NE
Melastomataceae	*Memecylon laevigatum*	t	NE
Melastomataceae	*Memecylon* sp.	t	
Melastomataceae	*Pternandra coerulescens*	t	NE
Meliaceae	*Aglaia argentea*	t	LC
Meliaceae	*Aglaia beccarii*	t	NE
Meliaceae	*Aglaia crassinervia*	t	NT
Meliaceae	***Aglaia densisquama*** Pannell	t	VU D2
Meliaceae	*Aglaia elliptica* subsp. *elliptica*	t	LC
Meliaceae	*Aglaia foveolata*	t	NT
Meliaceae	*Aglaia leptantha* subsp. *leptantha*	t	NE
Meliaceae	*Aglaia leucophylla*	t	NT
Meliaceae	*Aglaia luzoniensis*	t	NT
Meliaceae	*Aglaia meliosmoides*	t	NE
Meliaceae	*Aglaia odoratissima*	t	LC
Meliaceae	*Aglaia oligophylla*	t	NT
Meliaceae	*Aglaia* sp.	t	
Meliaceae	*Aglaia squamulosa*	t	NT
Meliaceae	*Aglaia tomentosa* subsp. *tomentosa*	t	NE
Meliaceae	*Aphanamixis polystachya*	t	LC
Meliaceae	*Canarium* cf. *caudatum*	t	
Meliaceae	*Chisocheton beccarianus*	t	NE
Meliaceae	*Chisocheton erythrocarpus*	t	NE
Meliaceae	*Chisocheton patens*	t	NE
Meliaceae	*Chisocheton petandrus*	t	NE
Meliaceae	*Chisocheton* sp.	t	
Meliaceae	*Dysoxylum arborescens*	t	NE

Meliaceae	*Dysoxylum parasiticum*	t	NE
Meliaceae	*Dysoxylum* sp.	t	
Meliaceae	*Sandoricum koetjape*	t	NE
Meliaceae	*Walsura pinnata*	t	NE
Menispermaceae	*Coscinium fenestratum*	c	NE
Menispermaceae	*Cyclea elegans*	c	NE
Menispermaceae	*Fibraurea chloroleuca*	c	NE
Menispermaceae	*Fibraurea tinctoria*	c	NE
Menispermaceae	***Parabaena megalocarpa*** Merr.	c	NE
Menispermaceae	*Parabaena* sp.	c	
Menispermaceae	*Pericampylus glaucus*	c	NE
Menispermaceae	*Tinomiscium* sp.	c	
Menispermaceae	*Tinospora* sp.	c	
Monimiaceae	*Kibara obtusa*	t	NE
Moraceae	*Antiaris toxicaria*	t	NE
Moraceae	*Antiaris toxicaria* var. *toxicaria****	t	NE
Moraceae	*Artocarpus anisophyllus****	t	NE
Moraceae	*Artocarpus dadah****	t	NE
Moraceae	*Artocarpus elasticus****	t	NE
Moraceae	***Artocarpus excelsus*** Jarrett***	t	NE
Moraceae	*Artocarpus glaucus****	t	NE
Moraceae	*Artocarpus kemando****	t	NE
Moraceae	*Artocarpus longifolius****	t	NE
Moraceae	*Artocarpus nitidus****	t	NE
Moraceae	***Artocarpus odoratissimus*** Blanco***	t	NE
Moraceae	*Artocarpus peltatus****	t	NE
Moraceae	*Artocarpus rigidus****	t	NE
Moraceae	*Artocarpus* sp.***	t	
Moraceae	***Artocarpus tamaran*** Becc.***	t	NE
Moraceae	*Ficus aurantiaca* var. *parvifolia*	t	NE
Moraceae	*Ficus aurata*	t	NE
Moraceae	*Ficus beccarii* var. *beccarii*	t	NE
Moraceae	*Ficus* cf. *stolonifera*	t	NE
Moraceae	*Ficus depressa*	c	NE
Moraceae	***Ficus midotis*** Corner	t	NE
Moraceae	*Ficus obscura* Bl	t	NE
Moraceae	*Ficus septica*	t	NE
Moraceae	*Ficus* sp		
Moraceae	*Ficus* sp (A)		
Moraceae	*Ficus* sp (B)		
Moraceae	*Ficus uncinata*	t	NE
Moraceae	*Ficus variegata*	t	NE
Moraceae	*Paratocarpus* sp.***	t	

Myristicaceae	*Gymnacranthera farquhariana* var. *farquhariana*	t	NE
Myristicaceae	*Gymnacranthera* sp.	t	
Myristicaceae	*Horsfieldia brachiata*	t	NE
Myristicaceae	***Horsfieldia fragillima*** Airy Shaw	t	VU A1c
Myristicaceae	*Horsfieldia grandis*	t	LC
Myristicaceae	*Horsfieldia polyspherula*	t	NE
Myristicaceae	*Knema* cf. *memmbranifolia*	t	
Myristicaceae	*Knema* cf. *pedicellata*	t	
Myristicaceae	*Knema cinerea*	t	NE
Myristicaceae	*Knema cinerea* var. *sumatrana*	t	NE
Myristicaceae	*Knema curtisii* var. *curtisii*	t	NE
Myristicaceae	***Knema elmeri*** Merr.	t	LC
Myristicaceae	*Knema furfuracea*	t	LC
Myristicaceae	***Knema galeata*** J. Sinclair	t	NE
Myristicaceae	*Knema glauca*	t	NE
Myristicaceae	***Knema hirtella* var. *pilocarpa*** W.J. de Wilde	t	NE
Myristicaceae	*Knema latericia*	t	NE
Myristicaceae	*Knema latifolia*	t	LC
Myristicaceae	*Knema laurina*	t	NE
Myristicaceae	*Knema* sp.	t	
Myristicaceae	*Myristica cinnamomea*	t	LC
Myristicaceae	*Myristica* sp.	t	
Myrtaceae	***Cleistocalyx barringtonioides*** (Ridl.) Merr. & L.M.Perry	t	NE
Myrtaceae	*Decaspermum fruticosum*	t	NE
Myrtaceae	*Eugenia malaccensis*	t	NE
Myrtaceae	*Syzygium amphanomyrtoides*	t	NE
Myrtaceae	*Syzygium campanulatum*	t	NE
Myrtaceae	*Syzygium castaneum*	t	NE
Myrtaceae	*Syzygium caudatilimbum*	t	NE
Myrtaceae	***Syzygium cephalophorum*** (Ridl.) Merr. & L.M.Perry	t	NE
Myrtaceae	*Syzygium cerasiformis*	t	NE
Myrtaceae	*Syzygium* cf. *fastigiatum*	t	
Myrtaceae	***Syzygium christmannii*** Merr. & L.M.Perry	t	NE
Myrtaceae	*Syzygium chrysantha*	t	NE
Myrtaceae	*Syzygium confertum*	t	NE
Myrtaceae	*Syzygium corymbifera*	t	NE
Myrtaceae	***Syzygium creaghii*** (Ridl.) Merr. & L.M.Perry	t	NE
Myrtaceae	*Syzygium curtisii*	t	NE
Myrtaceae	***Syzygium elliptilimbum*** (Merr.) Merr. & L.M.Perry	t	NE

Myrtaceae	***Syzygium elopurae*** (Ridl.) Merr. & L.M.Perry	t	NE
Myrtaceae	***Syzygium glanduligenum*** (Ridl.) Merr. & L.M.Perry	t	NE
Myrtaceae	*Syzygium grande*	t	NE
Myrtaceae	*Syzygium griffithii*	t	NE
Myrtaceae	***Syzygium kiauense*** (Merr.) Merr. & L.M.Perry	t	NE
Myrtaceae	*Syzygium kunstleri*	t	NE
Myrtaceae	*Syzygium lineatum*	t	NE
Myrtaceae	*Syzygium* sp.	t	
Myrtaceae	*Tristaniopsis merguensis*	t	NE
Nepenthaceae	*Nepenthes ampullaria**	s	LC
Nepenthaceae	*Nepenthes mirabilis**	s	
Ochnaceae	*Gomphia serrata*	s	LC
Ochnaceae	*Neckia serrata*	t	NE
Olacaceae	*Anacolosa frutescens*	t	NE
Olacaceae	*Ochanostachys amentacea*	t	DD
Olacaceae	*Scorodocarpus borneensis*	t	NE
Olacaceae	*Strombosia maingayi*	t	NE
Olacaceae	*Strombosia* sp.	t	
Oleaceae	*Chionanthus curvicarpus*	t	NE
Oleaceae	***Chionanthus pluriflorus*** (Knobl.) Kiew	t	NE
Oleaceae	*Chionanthus* sp.	t	
Oleaceae	*Chionanthus spicatus*	t	NE
Oxalidaceae	*Sarcotheca diversifolia*	t	NE
Pentaphylacaceae	*Adinandra acuminata*	t	NE
Pentaphylacaceae	*Adinandra* cf. *excelsa*	t	
Pentaphylacaceae	*Adinandra dumosa*	t	NE
Pentaphylacaceae	*Eurya* sp.	t	
Pentaphylacaceae	***Ternstroemia magnifica*** Stapf ex Ridl.	t	NE
Peraceae	*Chaetocarpus castanocarpus*	t	NE
Phyllanthaceae	*Antidesma banguensis*	t	NE
Phyllanthaceae	*Antidesma* cf. *punticulatum*	t	
Phyllanthaceae	*Antidesma* cf. *tomentosum*	t	
Phyllanthaceae	*Antidesma hosei*	t	NE
Phyllanthaceae	*Antidesma leucopodum*	t	NE
Phyllanthaceae	***Antidesma polystylum*** Airy Shaw	t	NE
Phyllanthaceae	*Antidesma stipulare*	t	NE
Phyllanthaceae	*Antidesma tomentosum* var. *tomentosum*	t	NE
Phyllanthaceae	*Aporosa acuminatissima*	t	NE
Phyllanthaceae	*Aporosa aurea*	t	NE
Phyllanthaceae	***Aporosa caloneura*** (Airy Shaw) Schot	t	NE
Phyllanthaceae	*Aporosa* cf. *dioica*	t	

Phyllanthaceae	*Aporosa chalarocarpa*	t	
Phyllanthaceae	***Aporosa elmeri*** Merr.	t	NE
Phyllanthaceae	*Aporosa expansa*	t	NE
Phyllanthaceae	*Aporosa frutescens*	t	NE
Phyllanthaceae	***Aporosa grandistipulata*** Merr.	t	NE
Phyllanthaceae	***Aporosa lagenocarpa*** Airy Shaw	t	NE
Phyllanthaceae	*Aporosa nigrescen*	t	NE
Phyllanthaceae	***Aporosa nitida*** Merr.	t	NE
Phyllanthaceae	*Aporosa pinangensis*	t	NE
Phyllanthaceae	*Aporosa subcaudata*	t	NE
Phyllanthaceae	*Baccaurea bracteata***	t	NE
Phyllanthaceae	*Baccaurea kunstleri***	t	NE
Phyllanthaceae	*Baccaurea lanceolata***	t	NE
Phyllanthaceae	*Baccaurea latifolia***	t	Lower Risk/Conservation Independent
Phyllanthaceae	*Baccaurea macrocarpa***	t	NE
Phyllanthaceae	*Baccaurea membranacea***	t	NE
Phyllanthaceae	*Baccaurea minor***	t	NE
Phyllanthaceae	*Baccaurea odoratissima***	t	VU B1+2c
Phyllanthaceae	*Baccaurea parviflora***	t	NE
Phyllanthaceae	*Baccaurea pubera***	t	NE
Phyllanthaceae	*Baccaurea racemosa***	t	NE
Phyllanthaceae	*Baccaurea* sp.***	t	
Phyllanthaceae	*Baccaurea tetrandra***	t	NE
Phyllanthaceae	*Bridelia glauca*	t	NE
Phyllanthaceae	*Bridelia penangiana*	t	NE
Phyllanthaceae	***Cleistanthus baramicus*** Jabl.	t	NE
Phyllanthaceae	***Cleistanthus beccarianus*** Jabl.	t	NE
Phyllanthaceae	*Cleistanthus* cf. *celebicus*	t	
Phyllanthaceae	*Cleistanthus ellipticus*	t	NE
Phyllanthaceae	*Cleistanthus megacarpus*	t	NE
Phyllanthaceae	***Cleistanthus paxii*** Jabl.	t	NE
Phyllanthaceae	*Cleistanthus* sp.	t	
Phyllanthaceae	*Glochidion borneense*	t	NE
Phyllanthaceae	***Glochidion calospermum*** Airy Shaw	t	NE
Phyllanthaceae	*Glochidion* cf. *lanceifolium*	t	
Phyllanthaceae	*Glochidion* cf. *lutescens*	t	
Phyllanthaceae	*Glochidion* cf. *sericeum*	t	
Phyllanthaceae	*Glochidion macrostigma*	t	NE
Phyllanthaceae	*Glochidion rubrum*	t	NE
Phyllanthaceae	*Glochidion* sp.	t	
Piperaceae	*Piper arborescens*	c	NE
Piperaceae	*Piper betle*	c	NE

Piperaceae	***Piper vestitum*** C. DC.	c	NE
Polygalaceae	*Epirixanthes* sp.	t	
Polygalaceae	*Xanthophyllum adenotus*	t	NE
Polygalaceae	*Xanthophyllum ellipticum*	t	NE
Polygalaceae	*Xanthophyllum flavescens*	t	NE
Polygalaceae	***Xanthophyllum heterophyllum*** Meijden	t	NE
Polygalaceae	*Xanthophyllum impressum*	t	NE
Polygalaceae	***Xanthophyllum neglectum*** Meijden	t	NE
Polygalaceae	*Xanthophyllum obscurum*	t	NE
Polygalaceae	***Xanthophyllum pachycarpon*** W.J.de Wilde & Duyfjes	t	NE
Polygalaceae	***Xanthophyllum pedicellatum*** Meijden	t	NE
Polygalaceae	*Xanthophyllum rufum*	t	NE
Polygalaceae	*Xanthophyllum* sp.	t	
Polygalaceae	*Xanthophyllum stipitatum*	t	NE
Polygalaceae	***Xanthophyllum velutinum*** Chod	t	NE
Primulaceae	***Ardisia creaghii*** Ridl.	t	NE
Primulaceae	*Ardisia elliptica*	t	NE
Primulaceae	*Ardisia forbesii*	t	NE
Primulaceae	***Ardisia lucida*** Merr.	t	NE
Primulaceae	***Ardisia oocarpa*** Stapf	t	NE
Primulaceae	*Ardisia oxyphylla*	t	NE
Primulaceae	***Ardisia premnifolia*** C.M. Hu	t	NE
Primulaceae	*Ardisia pyramidalis*	t	NE
Primulaceae	*Ardisia ridleyi*	t	NE
Primulaceae	*Ardisia sanguiolenta*	t	NE
Primulaceae	*Ardisia vestita*	t	NE
Primulaceae	***Embelia effusa*** Mez.	c	NE
Primulaceae	*Maesa macrotlyrs*	c	NE
Proteaceae	*Helicia petiolaris*	t	NE
Proteaceae	*Heliciopsis artocarpoides*	t	NE
Putranjivaceae	***Drypetes caesia*** Airy Shaw	t	NE
Putranjivaceae	*Drypetes kikir*	t	NE
Putranjivaceae	*Drypetes longifolia*	t	NE
Putranjivaceae	*Drypetes microphylla*	t	NE
Putranjivaceae	*Drypetes* sp.	t	
Rhamanaceae	*Celtis* sp.	t	
Rhamnaceae	*Alphitonia excelsa*	t	NE
Rhamnaceae	*Colubrina beccariana*	t	NE
Rhamnaceae	*Colubrina* sp.	t	
Rhamnaceae	*Gironniera nervosa*	t	NE
Rhamnaceae	*Ventilago dichotoma*	c	NE
Rhamnaceae	*Ziziphus angustifolius*	c	NE

Rhamnaceae	*Ziziphus calophylla*	c	NE
Rhamnaceae	*Ziziphus horsfieldii*	c	NE
Rhizophoraceae	*Carallia brachiata*	t	NE
Rhizophoraceae	*Carallia* sp.	t	
Rhizophoraceae	*Gynotroches axillaris*	t	NE
Rhizophoraceae	*Pellacalyx axillaris*	t	NE
Rhizophoraceae	*Pellacalyx* sp.	t	
Rosaceae	*Prunus javanica*	t	LC
Rosaceae	*Prunus* sp.	t	
Rosaceae	*Rubus angulosus*	c	NE
Rubiaceae	*Canthium confertum*	t	NE
Rubiaceae	*Canthium* sp.	t	
Rubiaceae	*Diplospora* sp.	t	
Rubiaceae	*Gynochthodes* sp.	t	
Rubiaceae	*Hedyotis congesta*	s	NE
Rubiaceae	*Ixora blumei*	t	NE
Rubiaceae	***Ixora brevicaudata*** Bremek.	t	NE
Rubiaceae	***Ixora caudata*** Br.	t	NE
Rubiaceae	*Ixora elliptica*	t	NE
Rubiaceae	***Ixora flagrans*** Brem	t	NE
Rubiaceae	***Ixora fulgida*** Ridl.	t	NE
Rubiaceae	***Ixora polycephala*** Bremek.	t	NE
Rubiaceae	*Ixora ridley*	t	NE
Rubiaceae	***Lasianthus borneensis*** Merr.	t	NE
Rubiaceae	*Lasianthus inaequalis*	t	NE
Rubiaceae	***Lasianthus polycarpus*** Miq.	t	NE
Rubiaceae	*Metadina trichotoma*	t	NE
Rubiaceae	*Nauclea* sp.	t	
Rubiaceae	*Nauclea subdita*	t	NE
Rubiaceae	*Neolamarckia cadamba*	t	NE
Rubiaceae	*Neonauclea bernardoi*	t	NE
Rubiaceae	*Neonauclea calycina*	t	NE
Rubiaceae	***Neonauclea excelsioides*** Ridsdale	t	NE
Rubiaceae	***Neonauclea longipedunculata*** Merr.	t	NE
Rubiaceae	*Oxyceras bispinosa*	t	NE
Rubiaceae	*Paederia foetida*	c	NE
Rubiaceae	*Pleiocarpidia* cf. *sandakanica*	t	
Rubiaceae	*Pleiocarpidia pillosa*	t	
Rubiaceae	*Pleiocarpidia sandakanica*	t	NE
Rubiaceae	***Porterandia beamanii*** Zahid	t	NE
Rubiaceae	*Porterandia chanii*	t	NE
Rubiaceae	***Praravinia borneensis*** (Merr.) Bremek.	t	NE
Rubiaceae	***Praravinia creaghii*** (Ridl) Brem.	t	NE

Rubiaceae	*Praravinia* sp.	t	
Rubiaceae	***Prismatomeris beccariana*** (Baill. ex K.Schum.) J.T.Johanss.	t	NE
Rubiaceae	***Psychotria agamae***	t	NE
Rubiaceae	*Psychotria aurantiaca*	t	NE
Rubiaceae	***Psychotria elmeri*** Merr.	t	NE
Rubiaceae	*Psychotria gracilis*	t	NE
Rubiaceae	***Psychotria gyrulosa*** Stapf	t	NE
Rubiaceae	*Psychotria* sp.	t	
Rubiaceae	***Renellia borneensis*** Baill.	t	NE
Rubiaceae	*Rothmannia pseudotermifolia*	t	NE
Rubiaceae	*Tarenna cumingiana*	t	NE
Rubiaceae	*Timonius palawanensis*	t	NE
Rubiaceae	*Timonius* sp.	t	
Rubiaceae	***Timonius villamilli*** Merr.	t	NE
Rubiaceae	*Uncaria borneensis*	c	NE
Rubiaceae	*Uncaria callophyllum*	c	NE
Rubiaceae	*Uncaria glabrata*	c	NE
Rubiaceae	*Uncaria longiflora*	c	NE
Rubiaceae	*Urophyllum* cf. *streptopodium*	t	
Rubiaceae	***Urophyllum congestiflorum*** Ridl.	t	NE
Rubiaceae	*Urophyllum corymbosum*	t	NE
Rubiaceae	*Urophyllum glabrum*	t	NE
Rubiaceae	*Urophyllum hirsutum*	t	NE
Rubiaceae	*Urophyllum* sp.	t	
Rubiaceae	*Wendlandia dasythyrsa*	t	NE
Rutaceae	***Luvunga motleyi*** Oliver	c	NE
Rutaceae	*Luvunga sarmentosa*	c	NE
Rutaceae	*Luvunga* sp.	c	
Rutaceae	*Maclurodendron porteri*	t	NE
Rutaceae	*Melicope latifolia*	t	NE
Rutaceae	*Melicope luna-akenda*	t	NE
Sabiaceae	*Meliosma sumatrana*	t	NE
Salicaceae	*Casearia* cf. *rugulosa*	t	
Salicaceae	*Casearia grewioides* var. *gelonioides*	t	NE
Salicaceae	*Casearia* sp.	t	
Salicaceae	*Flacourtia rukam*	t	NE
Salicaceae	*Homalium foetidum*	t	LC
Sapindaceae	*Dimocarpus longan****	t	NT
Sapindaceae	*Dimocarpus* sp.	t	
Sapindaceae	*Guioa pleuropteris*	t	NE
Sapindaceae	*Harpullia cupanioides*	t	NE
Sapindaceae	*Lepisanthes senegalensis*	t	NE

Sapindaceae	*Lepisanthes* sp.	t	
Sapindaceae	*Lepisanthes tetraphylla*	t	NE
Sapindaceae	*Mischocarpus pentapetalus*	t	NE
Sapindaceae	*Mischocarpus sundaicus*	t	NE
Sapindaceae	*Nephelium cuspidatum****	t	NE
Sapindaceae	***Nephelium daedaleum*** Radlk***	t	NE
Sapindaceae	*Nephelium lappaceum****	t	NE
Sapindaceae	*Nephelium lappaceum* var. *lappaceum****	t	NE
Sapindaceae	*Nephelium mutabile****	t	NE
Sapindaceae	*Nephelium ramboutan-ake****	t	NE
Sapindaceae	*Nephelium* sp.***	t	
Sapindaceae	*Nephelium uncinatum****	t	NE
Sapindaceae	*Paranephelium xestophyllum****	t	NE
Sapindaceae	*Pometia pinnata*	t	NE
Sapindaceae	*Xerospermum* sp.	t	
Sapotaceae	***Diploknema sebifera*** Pierre	t	NE
Sapotaceae	*Ganua kingiana*	t	NE
Sapotaceae	*Ganua sarawakensis*	t	NE
Sapotaceae	*Madhuca burckiana*	t	NE
Sapotaceae	*Madhuca* cf. *elmeri*	t	
Sapotaceae	*Madhuca dubardii*	t	NE
Sapotaceae	***Madhuca glabrescens*** H.J. Lam	t	NE
Sapotaceae	*Madhuca kingiana*	t	NE
Sapotaceae	*Madhuca korthalsii*	t	NE
Sapotaceae	*Madhuca kuchingensis*	t	NE
Sapotaceae	*Madhuca malaccensis*	t	NE
Sapotaceae	*Madhuca pallida*	t	NE
Sapotaceae	***Madhuca sepilokensis*** P.Royen	t	NE
Sapotaceae	*Madhuca* sp.	t	
Sapotaceae	***Palaquium beccarianum*** (Pierre) P.Royen	t	NE
Sapotaceae	*Palaquium calophyllum*	t	NE
Sapotaceae	*Palaquium dasyphyllum*	t	NE
Sapotaceae	*Palaquium gutta*	t	NE
Sapotaceae	*Palaquium leiocarpum*	t	NE
Sapotaceae	*Palaquium rostratum*	t	NE
Sapotaceae	*Palaquium* sp.	t	
Sapotaceae	*Payena accuminata*	t	NE
Sapotaceae	*Planchonella maingayi*	t	NE
Schisandraceae	***Kadsura borneensis*** A.C. Sm.	t	NE
Simaroubaceae	*Allantospermum* sp.	t	
Simaroubaceae	*Eurycoma longifolia*	t	NE
Sonneratiaceae	*Duabanga moluccana*	t	NE
Stemonuraceae	***Stemonurus grandifolius*** Becc.	t	NE

Stemonuraceae	*Stemonurus malaccensis*	t	NE
Stemonuraceae	*Stemonurus scorpioides*	t	NE
Symplocaceae	*Symplocos celastrifolia*	t	NE
Symplocaceae	*Symplocos crassipes*	t	NE
Symplocaceae	*Symplocos fasciculata*	t	NE
Symplocaceae	*Symplocos tricoccata*	t	NE
Theaceae	*Gordonia borneensis*	t	NE
Theaceae	***Pyrenaria serrata* var. *masocarpa*** (Korth.) H. Keng	t	NE
Thymelaeaceae	*Aquilaria malaccensis*	t	VU A1cd
Thymelaeaceae	*Enkleia malaccensis*	c	NE
Thymelaeaceae	*Gonystylus affinis*	t	NE
Thymelaeaceae	*Gonystylus bancanus*	t	VU A1cd
Thymelaeaceae	***Gonystylus borneensis*** (Tiegh.) Gilg.	t	NE
Thymelaeaceae	***Gonystylus consanguineus*** Airy Shaw	t	VU A1cd+2cd
Thymelaeaceae	*Gonystylus forbesii*	t	NE
Thymelaeaceae	*Gonystylus* sp.	t	
Thymelaeaceae	*Linostoma pauciflora*	t	NE
Thymelaeaceae	*Phaleria capitata*	t	NE
Trigoniaceae	*Trigoniastrum hypoleucum*	t	NE
Urticaceae	*Dendrocnide elliptica*	t	NE
Urticaceae	*Dendrocnide* sp.	t	
Urticaceae	*Dendrocnide stimulans*	t	NE
Vitaceae	*Ampelocissus cinnamonea*	c	NE
Vitaceae	*Ampelocissus imperialis*	c	NE
Vitaceae	*Ampelocissus* sp.	c	
Vitaceae	*Cissus rostrata*	c	NE
Vitaceae	***Tetrastigma diepenhorstii*** (Miq.) Latiff.**	c	NE
Vitaceae	*Tetrastigma dubium***	c	NE
Vitaceae	*Tetrastigma lanceolarium***	c	NE

Notes:

Italic bold=endemic to Borneo; Underlined italic bold=endemic to Sabah;

H= growth form and habit; l=lycophytes; f=fern; t=tree; h=herb; s=shrub; sd=sedge; g=grass; c=climber, ep=epiphyte; pt=palm tree.

NE= Not evaluated; LC=Least concern; VU=Vulnerable; DD=Data deficient; EN=Endangered; CR=Critically endangered

*Protected species under SWD

**Totally Protected species under SWD

***Prohibited species under Forest Rules 1969

APPENDIX 5C

List of Endemic species

Species	Family	Plot and Compartment
Actinodaphne borneensis Meisn.	Lauraceae	6
Aglaia densisquama Pannell	Meliaceae	10
Alocasia princeps W.Bull	Araceae	6,8,10
Amomum coriaceum R.M. Sm.	Zingiberaceae	1
Amorphophallus pendulus Bogner & Mayo	Araceae	Bot21
Antidesma polystylum Airy Shaw	Phyllanthaceae	1,4
Aporosa caloneura (Airy Shaw) Schot	Phyllanthaceae	2,3,11
Aporosa elmeri Merr.	Phyllanthaceae	4,8,10
Aporosa grandistipulata Merr.	Phyllanthaceae	TC22
Aporosa lagenocarpa Airy Shaw	Phyllanthaceae	1,2,6,8
Aporosa nitida Merr.	Phyllanthaceae	TC5,20,32,49
Arachnis breviscapa (J.J.Sm.) J.J.Sm.	Orchidaceae	8
Archidendron triplinervium (Kosterm.) Nielsen	Fabaceae	T20,Bot21
Ardisia creaghii Ridl.	Primulaceae	6,10
Ardisia lucida Merr.	Primulaceae	8
Ardisia oocarpa Stapf	Primulaceae	2
Ardisia premnifolia C.M. Hu	Primulaceae	T18
Areca minuta Scheff.	Arecaceae	3,5
Artabotrys roseus Boerl.	Annonaceae	11
Artocarpus excelsus Jarrett	Moraceae	3,11
Artocarpus odoratissimus Blanco	Moraceae	1, Bot21
Artocarpus tamaran Becc.	Moraceae	8
Barringtonia lanceolata (Ridl.) Payens	Lecythidaceae	2,4,10
Bauhinia diptera Miq.	Fabaceae	T19,Bot21
Bauhinia kockiana* var. *angustifolia K & S.S. Larsen	Fabaceae	10
Bauhinia kockiana* var. *beccarii	Fabaceae	8
Bauhinia sylvani (de Wit) Cusset	Fabaceae	T19
Beilschmiedia micrantha Merr.	Lauraceae	TC4,5
Borassodendron borneensis J.Dransf.	Arecaceae	T20, 10
Bulbophyllum praetervisum J.J.Verm.	Orchidaceae	
Calamus hepburnii J. Dransf.	Arecaceae	
Calamus pilosellus Becc.	Arecaceae	2,3,5
Calamus pogonacanthus Becc.	Arecaceae	2
Callerya nieuwenhuisii (J.J. Sm) Schot	Fabaceae	10
Calophyllum pyriforme P.F. Stevens	Calophyllaceae	5
Canarium kinabaluensis Leenh.	Burseraceae	Bot21
Canarium kostermansii Leenh.	Burseraceae	7,11
Canarium latistipulatum Ridl.	Burseraceae	1,2,3,6,7,9,11

Capparis buwaldae Jacobs	Capparaceae	3,9
Castanopsis endertii Hatus. ex Soepadmo	Fagaceae	11
Castanopsis hypophoenicea (Seemen) Soepadmo	Fagaceae	T18
Castanopsis oligoneura Soepadmo	Fagaceae	4
Chionanthus pluriflorus (Knobl.) Kiew	Oleaceae	1
Chrysoglossum reticulatum Carr	Orchidaceae	1,2
Cleistanthus baramicus Jabl.	Phyllanthaceae	7
Cleistanthus beccarianus Jabl.	Phyllanthaceae	8
Cleistanthus paxii Jabl.	Phyllanthaceae	2,4,6,7
Cleistocalyx barringtonioides (Ridl.) Merr. & L.M.Perry	Myrtaceae	3
Crudia reticulata Merr.	Fabaceae	4,6,8
Crudia tenuipes Merr.	Fabaceae	1,6,8
Dehaasia brachybotrys Kosterm.	Lauraceae	2
Dendrobium pinifolia Ridl.	Orchidaceae	
Dillenia borneensis Hoogl.	Dilleniaceae	6
Dinochloa sublaevigata S. Dransf.	Poaceae	2
Dinochloa trichogona S. Dransf.	Poaceae	1,8
Diospyros discocalyx Merr.	Ebenaceae	TC22,23,49,51
Diospyros euphlebia Merr.	Ebenaceae	2,4,7,9
Diospyros ferox Bakh.	Ebenaceae	1,10,11
Diospyros squamaefolia Kosterm.	Ebenaceae	6,8
Diploknema sebifera Pierre	Sapotaceae	past record
Dipterocarpus confertus Slooten	Dipterocarpaceae	TAC 19 & 20; BC 46
Dipterocarpus geniculatus **subsp.** ***grandis*** P.S. Ashton	Dipterocarpaceae	TC22
Dipterocarpus pachyphyllus Meijer	Dipterocarpaceae	7; TBC42,43; BC46
Dipterocarpus stellatus **subsp.** ***parvus*** P.S. Ashton	Dipterocarpaceae	4,5,6,8,9,10
Drepananthus magnificus (Diels) Survesw. & R.M.K.Saunders	Annonaceae	10
Dryobalanops keithii Symington	Dipterocarpaceae	8; TAC7; TBC42,43
Dryobalanops lanceolata Burck	Dipterocarpaceae	5,10; TAC19,20; BC46
Drypetes caesia Airy Shaw	Putranjivaceae	3,6,7,8
Durio acutifolius (Mast.) Kosterm.	Malvaceae	1,5,8
Durio grandiflorus (Mast.) Kosterm.	Malvaceae	4,7
Durio kutejensis (Hassk.) Becc.	Malvaceae	past record
Durio lanceolatus Mast.	Malvaceae	10
Elaeocarpus clementis **var.** ***borneensis*** (Ridl.) Coode	Elaeocarpaceae	1,2,6,10
Elaeocarpus clementis **var.** ***clementis*** Merr.	Elaeocarpaceae	4
Elaeocarpus jugahanus Coode	Elaeocarpaceae	6
Embelia effusa Mez.	Primulaceae	T20
Erycibe borneensis **var.** ***borneensis*** (Merr.) Hoogl.	Convolvulaceae	SAN 156317
Erycibe impressa Hoogl.	Convolvulaceae	6,11

Erycibe praecipua* subsp. *borneensis Hoogl.	Convolvulaceae	9
Ficus midotis Corner	Moraceae	8
Friesodielsia grandifolia (Merr.) Turner	Annonaceae	Bot21
Garcinia beccarii Pierre	Clusiaceae	T20
Garcinia caudiculata Ridl.	Clusiaceae	T20
Glochidion calospermum Airy Shaw	Phyllanthaceae	5,6,11
Gluta oba (Merr.) Ding Hou	Anacardiaceae	TC4,5,15,16,20,23,49,51
Gluta rugulosa Ding Hou	Anacardiaceae	3,6,7
Gluta sabahana Ding Hou	Anacardiaceae	1,5,6,9
Gnetum leptostachyum* var. *abbreviatum Markgr.	Gnetaceae	6,7
Goniothalamus borneensis Mat-Salleh	Annonaceae	8
Goniothalamus dolichocarpus Merr.	Annonaceae	7, Bot21
Gonystylus borneensis (Tiegh.) Gilg.	Thymelaeaceae	1
Gonystylus consanguineus Airy Shaw	Thymelaeaceae	2,4
Grewia cinnamomifolia (Burret) Stapf ex P.S.Ashton	Malvaceae	5,8,11
Grewia gracilis (Stapf ex Ridl.) P.S.Ashton	Malvaceae	11
Horsfieldia fragillima Airy Shaw	Myristicaceae	4
Hydnocarpus anomalus (Merr) Sleum.	Achariaceae	3
Hydnocarpus borneensis Sleum.	Achariaceae	TC16,17,20,22,51
Hydnocarpus calophylla (Ridl.) Sleum.	Achariaceae	T20
Ixora brevicaudata Bremek.	Rubiaceae	2
Ixora caudata Br.	Rubiaceae	4
Ixora flagrans Brem	Rubiaceae	2,3,6
Ixora fulgida Ridl.	Rubiaceae	9
Ixora polycephala Bremek.	Rubiaceae	2,7
Kadsura borneensis A.C. Sm.	Schisandraceae	8
Kayea borneensis P.F. Stevens	Calophyllaceae	10
Kayea macrantha Baill.	Calophyllaceae	3,4,6,9
Kayea oblongifolia Ridl.	Calophyllaceae	5,6,7,9,10
Kayea scalarinervosa P.F.Stevens	Calophyllaceae	11
Knema elmeri Merr.	Myristicaceae	2,5
Knema galeata J. Sinclair	Myristicaceae	9
Knema hirtella* var. *pilocarpa W.J. de Wilde	Myristicaceae	T18
Kokoona sabahana Kochummen	Celastraceae	7
Kopsia pauciflora* var. *mitrephora (Sleesen) D.J. Middleton	Apocynaceae	11
Korthalsia furtadoana J.Dransf.	Arecaceae	1,2
Lasianthus borneensis Merr.	Rubiaceae	2,6,8,9,11
Lasianthus polycarpus Miq.	Rubiaceae	T20
Licuala valida Becc.	Arecaceae	6,7
Lithocarpus hallieri (Seemen) A. Camus	Fagaceae	SAN 156259
Lithocarpus keningauensis Julia & Soepadmo	Fagaceae	1

Lithocarpus pulcher (King) Markgr.	Fagaceae	1
Litsea cauliflora Stapf	Lauraceae	8
Litsea sessilis Boerl.	Lauraceae	6,8
Luvunga motleyi Oliver	Rutaceae	2,8
Macaranga brevipetiolata Airy Shaw	Euphorbiaceae	4,6
Macaranga pearsonii Merr.	Euphorbiaceae	6
Macaranga rarispina Whitmore	Euphorbiaceae	7
Madhuca glabrescens H.J. Lam	Sapotaceae	7
Madhuca sepilokensis P.Royen	Sapotaceae	6
Mallotus caudatus Merr.	Euphorbiaceae	1
Mapania graminea Uittien	Cyperaeae	2,6,7,10,11
Melanochyla beccariana Oliv.	Anacardiaceae	Bot21
Melanochyla bullata Ding Hou	Anacardiaceae	1,5
Memecylon argenteum Bremer	Melastomataceae	1,4,11
Memecylon beccarianum Cogn.	Melastomataceae	6,11
Memecylon borneensis Merr.	Melastomataceae	T20
Microcos crassifolia Burret	Malvaceae	past record
Microcos henrici* subsp. *acuta R.C.K. Chung	Malvaceae	3
Microcos membranifolia R.C.K. Chung	Malvaceae	3
Microcos ossea Burret	Malvaceae	6,11
Microcos subepetala Stapf ex Ridl.	Malvaceae	1
Microcos triflora* var. *longipetiolata (Merr.) R.C.K.Chung	Malvaceae	3,7
Neonauclea excelsioides Ridsdale	Rubiaceae	3,9
Neonauclea longipedunculata Merr.	Rubiaceae	SAN 156344
Neoscortechinia angustifolia (Airy Shaw) Welzen	Euphorbiaceae	4
Nephelium daedaleum Radlk	Sapindaceae	6
Palaquium beccarianum (Pierre) P.Royen	Sapotaceae	Bot21
Pandanus borneensis Warb. in H.G.A.Engler (ed.)	Pandanaceae	7,11
Pandanus brevistylis Martelli	Pandanaceae	8
Pandanus discostigma Martelli	Pandanaceae	SAN 156286
Pandanus fusinus Martelli	Pandanaceae	SAN 156292
Pandanus pugnax B.C. Stone	Pandanaceae	8
Pandanus rusticus B.C. Stone	Pandanaceae	5,8
Parabaena megalocarpa Merr.	Menispermaceae	8
Paramapania radians (C.B. Clarke) Uittien	Cyperaeae	T20
Parashorea parvifolia Wyatt-Sm ex P.S.Ashton	Dipterocarpaceae	past record
Peltophorum racemosum Merr.	Fabaceae	TC5,16,17,20,23,32,37; L4
Pentace borneensis Pierre	Malvaceae	3
Pentace laxiflora Merr.	Malvaceae	Bot21
Pholidocarpus maiadum Becc.	Arecaceae	11
Phytocrene anomala Merr.	Icacinaceae	7,11
Phytocrene racemosa Sleum.	Icacinaceae	6

Piper vestitum C. DC.	Piperaceae	SAN 156322
Plagiostachys strobilifera (Baker) Ridl.	Zingiberaceae	1
Polyalthia borneensis Merr.	Annonaceae	Bot21
Polyalthia congesta (Ridl.) Sinclair	Annonaceae	10
Polyalthia igniflora D.M.Johnson	Annonaceae	4,5,6,7,8,9,11
Porterandia beamanii Zahid	Rubiaceae	past record
Praravinia borneensis (Merr.) Bremek.	Rubiaceae	10,11
Praravinia creaghii (Ridl) Brem.	Rubiaceae	4,T18,T20
Prismatomeris beccariana (Baill. ex K.Schum.) J.T.Johanss.	Rubiaceae	4,10
Psychotria agamae	Rubiaceae	1
Psychotria elmeri Merr.	Rubiaceae	2,3,4
Psychotria gyrulosa Stapf	Rubiaceae	2,7,9,10
Ptychopyxis arborea (Merr.) Airy Shaw	Euphorbiaceae	7
Pyrenaria serrata* var. *masocarpa (Korth.) H. Keng	Theaceae	8
Renellia borneensis Baill.	Rubiaceae	SAN 156320
Ryparosa acuminata Merr.	Achariaceae	2,4,5,6,7,10
Ryparosa hirsuta J.J. Sm	Achariaceae	9
Sageraea sarawakensis van Heusden	Annonaceae	10
Salacia leucoclada Ridl.	Celastraceae	1
Sarcoglaphys masiusii Miadin, A.L.Lamb & Emoi	Orchidaceae	
Saurauia borneensis Merr.	Actinidiaceae	1,6,8
Saurauia ferox Korth.	Actinidiaceae	L1
Scaphium longipetiolatum (Kosterm.) Kosterm.	Malvaceae	6,9,10
Schefflera bipalmatifolia Merr.	Araliaceae	T20
Scindapsus crassipes Engl.	Araceae	SAN 156305
Semecarpus bornensis Merr.	Anacardiaceae	TC4,5,16,22,23,49;L1
Shorea acuminatissima Symington	Dipterocarpaceae	6; TBC42,43; BC46
Shorea agamii P.S.Ashton	Dipterocarpaceae	5,8,11; TAC19,20; TAC7; TBC42,43; BC46
Shorea amplexicaulis P.S. Ashton	Dipterocarpaceae	TAC19,20; TBC42,43;BC46
Shorea argentifolia Symington	Dipterocarpaceae	Bot21; TAC7; TAC12,19;TAC7; TBC42,43; BC46
Shorea beccariana Burck	Dipterocarpaceae	TC7; TBC 43 & 42
Shorea falciferoides* subsp. *glaucesens (Meijer) P.S.Ashton	Dipterocarpaceae	TAC7; TBC42, 43; BC 19,20
Shorea ferruginea Dyer ex Brandis	Dipterocarpaceae	TC4,17
Shorea macroptera P.S.Ashton	Dipterocarpaceae	2,4,9
Shorea mecistopteryx Ridl.	Dipterocarpaceae	TAC19,20; TAC7; TBC42, 43; BC46
Shorea parvistipulata F.Heim	Dipterocarpaceae	TAC7;TB42,43;BC46
Shorea patoiensis P.S.Ashton	Dipterocarpaceae	TAC19,20; BC46

Shorea pilosa P.S.Ashton	Dipterocarpaceae	TBC42,43
Shorea smithiana Symington	Dipterocarpaceae	10,11; TAC19,20; TAC7; TBC42,43; BC46
Shorea superba Symington	Dipterocarpaceae	10; TAC19,20; BC46
Shorea symingtonii Wood	Dipterocarpaceae	4; BC46
Smilax borneensis A. DC.	Smilacaceae	1,6
Smilax gigantea Merr.	Smilacaceae	SAN 156275
Spatholobus viridis Wiriad & Ridd.	Fabaceae	7,9
Sphenodesma stellata Merr.	Lamiaceae	3,9,11
Stemonurus grandifolius Becc.	Stemonuraceae	2,3
Sterculia stipulata Korth.	Malvaceae	T21
Strychnos borneensis Leenh.	Loganiaceae	6
Sympetalandra borneensis Stapf	Fabaceae	past record
Syzygium cephalophorum (Ridl.) Merr. & L.M.Perry	Myrtaceae	2,8
Syzygium christmannii Merr. & L.M.Perry	Myrtaceae	4
Syzygium creaghii (Ridl.) Merr. & L.M.Perry	Myrtaceae	6,8
Syzygium elliptilimbum (Merr.) Merr. & L.M.Perry	Myrtaceae	8
Syzygium elopurae (Ridl.) Merr. & L.M.Perry	Myrtaceae	4
Syzygium glanduligenum (Ridl.) Merr. & L.M.Perry	Myrtaceae	5,11
Syzygium kiauense (Merr.) Merr. & L.M.Perry	Myrtaceae	1,10
Teijsmanniodendron sarawakanus (H. Pearson) Kosterm.	Lamiaceae	6,T20
Ternstroemia magnifica Stapf ex Ridl.	Pentaphylacaceae	2
Tetrastigma diepenhorstii (Miq.) Latiff.	Vitaceae	T18,T20
Thottea triserialis Ding Hou	Aristolochiaceae	T18
Timonius villamilli Merr.	Rubiaceae	7,10
Urophyllum congestiflorum Ridl.	Rubiaceae	1
Vatica albiramis Slooten	Dipterocarpaceae	4,5,6,9
Vatica dulitensis Symington	Dipterocarpaceae	3,8; BC46
Vatica micrantha Slooten	Dipterocarpaceae	3,4,5
Vatica oblongifolia Hook. *f.*	Dipterocarpaceae	11; TAC19,20; TAC7; TBC42,43; BC46
Vatica sarawakensis F. Heim	Dipterocarpaceae	TAC7,19,20; BC46
Willughbeia lanceolata (Markgr.) Mabb.	Apocynaceae	2
Xanthophyllum heterophyllum Meijden	Polygalaceae	4,5,6,9
Xanthophyllum neglectum Meijden	Polygalaceae	2,4
Xanthophyllum pachycarpon W.J.de Wilde & Duyfjes	Polygalaceae	10
Xanthophyllum pedicellatum Meijden	Polygalaceae	1,2,6,8,11
Xanthophyllum velutinum Chod	Polygalaceae	SAN 156307

Notes:

Italic bold=endemic to Borneo; Underlined italic bold=endemic to Sabah.

T=Timimbang; BC=Botitian Compartment; TAC=Timimbang A Compartment; TBC=Timimbang B Compartment; TC=Timimbang Compartment; Bot=Botitian

List of Threatened and Endangered species in Timimbang-Botitian FR

Species	Family	IUCN Red List	Plot
Dipterocarpus grandiflorus	Dipterocarpaceae	CR	3,4,5,8
Dipterocarpus hasseltii	Dipterocarpaceae	CR	TAC19,20
Dipterocarpus kerrii	Dipterocarpaceae	CR	1,2
Dipterocarpus kunstleri	Dipterocarpaceae	CR	6
Dipterocarpus tempehes	Dipterocarpaceae	CR	TAC7
Dipterocarpus validus	Dipterocarpaceae	CR	TAC7; TBC42 &43
Dryobalanops keithii	Dipterocarpaceae	CR	8
Hopea beccariana	Dipterocarpaceae	CR	1,2,10
Hopea nervosa	Dipterocarpaceae	CR	TAC7; TBC42 &43; BC46
Hopea semicuneata	Dipterocarpaceae	CR	5
Hopea wyath-smithii	Dipterocarpaceae	CR	TBC42 &43
Parashorea malaanonan	Dipterocarpaceae	CR	1
Shorea acuminatissima	Dipterocarpaceae	CR	6
Shorea almon	Dipterocarpaceae	CR	BC46
Shorea hopeifolia	Dipterocarpaceae	CR	10
Shorea inappendiculata	Dipterocarpaceae	CR	2
Shorea johorensis	Dipterocarpaceae	CR	6,10
Shorea seminis	Dipterocarpaceae	CR	6,9
Shorea smithiana	Dipterocarpaceae	CR	10,11
Shorea superba	Dipterocarpaceae	CR	10
Shorea symingtonii	Dipterocarpaceae	CR	4
Vatica sarawakensis	Dipterocarpaceae	CR	TAC7,19,20; BC46
Dipterocarpus globosus	Dipterocarpaceae	CR	TC1,2,5,6,7,8,9
Hopea aequalis	Dipterocarpaceae	CR	9
Hopea ferruginea	Dipterocarpaceae	CR	2
Hopea nutans	Dipterocarpaceae	CR	1
Hopea pentanervia	Dipterocarpaceae	CR	6,7
Hopea sangal	Dipterocarpaceae	CR	past record
Shorea foxworthyii	Dipterocarpaceae	CR	6,9
Shorea gibbosa	Dipterocarpaceae	CR	BL1,2,3; TC5,16,17 & 49

Shorea hypoleuca	Dipterocarpaceae	CR	BL3
Shorea kunstleri	Dipterocarpaceae	CR	2,5,10
Shorea tenuiramulosa	Dipterocarpaceae	CR	3
Shorea xanthophylla	Dipterocarpaceae	CR	3,4
Dryobalanops beccarii	Dipterocarpaceae	EN	2,3,4,6,7,9
Dryobalanops lanceolata	Dipterocarpaceae	EN	5,10
Shorea agamii	Dipterocarpaceae	EN	5,8,11
Shorea argentifolia	Dipterocarpaceae	EN	2,5,6
Shorea bracteolata	Dipterocarpaceae	EN	TAC19,20
Shorea falciferoides subsp. *glaucesens*	Dipterocarpaceae	EN	TAC7; TBC 42 &43; BC46
Shorea leprosula	Dipterocarpaceae	EN	1
Shorea obscura	Dipterocarpaceae	EN	4
Shorea pauciflora	Dipterocarpaceae	EN	7
Shorea domatiosa	Dipterocarpaceae	EN	9
Shorea faguetiana	Dipterocarpaceae	EN	4,9,10
Shorea ovata	Dipterocarpaceae	EN	10
Kokoona sabahana	Celastraceae	VU	7
Aglaia densisquama	Meliaceae	VU	10
Aquilaria malaccensis	Thymelaeaceae	VU	6,7
Baccaurea odoratissima	Phyllanthaceae	VU	3
Combretocarpus rotundatus	Anisophylleaceae	VU	past record
Cynometra inaequifolia	Fabaceae	VU	TC51
Diospyros daemona	Ebenaceae	VU	7
Durio acutifolius	Malvaceae	VU	1,5
Durio grandiflorus	Malvaceae	VU	4,7
Durio kutejensis	Malvaceae	VU	past record
Durio testudinarum	Malvaceae	VU	10
Gonystylus bancanus	Thymelaeaceae	VU	BL1,2,3
Gonystylus consanguineus	Thymelaeaceae	VU	2,4
Horsfieldia fragillima	Myristicaceae	VU	4
Mangifera pajang	Anacardiaceae	VU	past record
Mangifera rufocostata	Anacardiaceae	VU	3,9
Shorea macrophylla	Dipterocarpaceae	VU	7,8

Notes:

T=Timimbang; BC=Botitian Compartment; TAC=Timimbang A Compartment; TBC=Timimbang B Compartment; TC=Timimbang Compartment; Bot=Botitian; BL=Botitian Line

Prohibited species under Forest Rules 1969

Family	Species
Anacardiaceae	*Dracontomelon costatum*
Anacardiaceae	*Mangifera decandra*
Anacardiaceae	*Mangifera foetida*
Anacardiaceae	*Mangifera magnifica*
Anacardiaceae	*Mangifera pajang*
Anacardiaceae	*Mangifera parvifolia*
Anacardiaceae	*Mangifera rufocostata*
Anacardiaceae	*Mangifera* sp.
Anacardiaceae	*Mangifera swintonioides*
Burseraceae	*Dacryodes costata*
Burseraceae	*Dacryodes laxa*
Burseraceae	*Dacryodes rostrata*
Burseraceae	*Dacryodes rostrata* var. *cuspidata*
Burseraceae	*Dacryodes rubiginosa*
Burseraceae	*Dacryodes rugosa*
Burseraceae	*Dacryodes rugosa* var. *virgata*
Burseraceae	*Dacryodes* sp.
Burseraceae	*Santiria laevigatum*
Burseraceae	*Santiria tomentosa*
Burseraceae	*Triomma malaccensis*
Dipterocarpaceae	*Shorea amplexicaulis*
Dipterocarpaceae	*Shorea macrophylla*
Dipterocarpaceae	*Shorea mecistopteryx*
Dipterocarpaceae	*Shorea pilosa*
Fabaceae	*Intsia palembanica*
Fabaceae	*Koompassia* cf. *malaccensis*
Fabaceae	*Koompassia excelsa*
Fabaceae	*Koompassia malaccensis*
Fabaceae	*Sympetalandra borneensis*
Malvaceae	*Durio acutifolius*
Malvaceae	*Durio grandiflorus*
Malvaceae	*Durio graveolens*
Malvaceae	*Durio grifithii*
Malvaceae	*Durio kutejensis*
Malvaceae	*Durio lanceolatus*
Malvaceae	*Durio* sp.
Malvaceae	*Durio testudinarum*
Moraceae	*Artocarpus anisophyllus*
Moraceae	*Artocarpus dadah*
Moraceae	*Artocarpus elasticus*
Moraceae	*Artocarpus excelsus*

Moraceae	*Artocarpus glaucus*
Moraceae	*Artocarpus kemando*
Moraceae	*Artocarpus longifolius*
Moraceae	*Artocarpus nitidus*
Moraceae	*Artocarpus odoratissimus*
Moraceae	*Artocarpus peltatus*
Moraceae	*Artocarpus rigidus*
Moraceae	*Artocarpus* sp.
Moraceae	*Artocarpus tamaran*
Moraceae	*Parartocarpus* sp.
Phyllanthaceae	*Baccaurea bracteata*
Phyllanthaceae	*Baccaurea kunstleri*
Phyllanthaceae	*Baccaurea lanceolata*
Phyllanthaceae	*Baccaurea latifolia*
Phyllanthaceae	*Baccaurea macrocarpa*
Phyllanthaceae	*Baccaurea membranacea*
Phyllanthaceae	*Baccaurea minor*
Phyllanthaceae	*Baccaurea odoratissima*
Phyllanthaceae	*Baccaurea parviflora*
Phyllanthaceae	*Baccaurea pubera*
Phyllanthaceae	*Baccaurea racemosa*
Sapindaceae	*Dimocarpus longan*
Sapindaceae	*Nephelium cuspidatum*
Sapindaceae	*Nephelium daedaleum*
Sapindaceae	*Nephelium lappaceum*
Sapindaceae	*Nephelium lappaceum* var. *lappaceum*
Sapindaceae	*Nephelium mutabile*
Sapindaceae	*Nephelium ramboutan-ake*
Sapindaceae	*Nephelium* sp.
Sapindaceae	*Nephelium uncinatum*
Sapindaceae	*Paranephelium xestophyllum*

APPENDIX 5D:

Coordinates of compartment and line transect in Timimbang Botitian FR

Botitian Line

NO	NORT_Y	EAST_X	LAT	LONG	LENGTH(M)
1	666940.442	847496.213	6 0 55.90	117 19 41.59	500
2	667411.401	847665.547	6 1 11.19	117 19 47.20	500
3	666812.512	847095.610	6 0 51.82	117 19 28.53	500
4	667281.755	846922.066	6 1 7.13	117 19 22.99	500
5	667530.464	846482.857	6 1 15.33	117 19 8.76	500

Timimbang Comprtment and line

ID	CPT_NO	LINE	LONG	LAT	DEG	MIN	SEC	DEG	MIN	SEC	ANGLE	LENGTH
1	5	AC5_1	117.2378611	6.0998333	6	5	59.40	117	14	16.30	130	1000
2	4	AC4_2	117.2342222	6.0992222	6	5	57.20	117	14	3.20	340	1000
3	16	AC16_3	117.1890000	6.0915278	6	5	29.50	117	11	20.40	340	1000
5	17	AC17_5	117.1788056	6.0863889	6	5	11.00	117	10	43.70	200	1000
6	20	AC20_6	117.1605556	6.0846667	6	5	4.80	117	9	38.00	240	1000
7	23	AC23_7	117.1334722	6.0843611	6	5	3.70	117	8	0.50	270	1000
8	22	AC22_8	117.1329444	6.0804444	6	4	49.60	117	7	58.60	130	1000
9	51	BC51_9	117.0975278	5.9926389	5	59	33.50	117	5	51.10	200	1000
10	49	BC49_10	117.0898611	5.9948056	5	59	41.30	117	5	23.50	200	1000
12	32	BC32_12	117.0646111	6.0164167	6	0	59.10	117	3	52.60	355	1000

Appendix VII. Dipterocarp survey

CODE	SPECIES	LAT	LONG	ELEVATION	AOS	DATE
60	*Dipterocarpus acutangulus*	6.07003	117.24961	80 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:23:13AM
B24	*Dipterocarpus acutangulus*	6.01352	117.32909	78 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:23:11AM
38	*Dipterocarpus confertus*	6.08585	117.16504	523 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 11:01:51AM
B14	*Dipterocarpus confertus*	6.01258	117.32960	61 m	BONTITIAN COMPARTMENT 46	21-FEB-14 8:58:59AM
34	*Dipterocarpus conformis ssp. Borneensis*	6.08575	117.16486	521 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:55:31AM
49	*Dipterocarpus conformis ssp. Borneensis*	6.09189	117.16423	593 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 12:54:49PM
A31	*Dipterocarpus conformis ssp. Borneensis*	5.98899	117.09958	145 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 12:23:16PM
61	*Dipterocarpus grandiflorus*	6.07031	117.24934	94 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:27:21AM
48	*Dipterocarpus hasseltii*	6.09135	117.16494	595 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 12:33:34PM
41	*Dipterocarpus humeratus*	6.08874	117.16480	598 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 11:29:05AM
B37	*Dipterocarpus humeratus*	6.01778	117.32486	135 m	BONTITIAN COMPARTMENT 46	21-FEB-14 11:16:55AM
75	*Dipterocarpus kerii*	6.07253	117.24781	135 m	TIMIMBANG BASE	19-FEB-14

					CAMP	9:12:28AM
					COMPARTMENT 7 BONTITIAN	21-FEB-14
B39	*Dipterocarpus kunstleri*	6.01790	117.32683	98 m	COMPARTMENT 46 TIMIMBANG B MALSA	11:50:41AM
					COMPARTMENT 43 &	20-FEB-14
A14	*Dipterocarpus pachyphyllus*	5.99108	117.10488	102 m	42 BONTITIAN	9:57:47AM 21-FEB-14
B16	*Dipterocarpus pachyphyllus*	6.01332	117.32973	51 m	COMPARTMENT 46 TIMIMBANG BASE	9:11:39AM
					CAMP	19-FEB-14
55	*Dipterocarpus stellatus*	6.06993	117.24992	69 m	COMPARTMENT 7 TIMIMBANG B MALSA	8:16:30AM
					COMPARTMENT 43 &	20-FEB-14
A3	*Dipterocarpus stellatus*	5.99169	117.10557	114 m	42 BONTITIAN	9:29:10AM 21-FEB-14
B3	*Dipterocarpus stellatus*	6.01280	117.33060	48 m	COMPARTMENT 46 TIMIMBANG BASE	8:40:56AM
					CAMP	19-FEB-14
77	*Dipterocarpus tempehes*	6.07275	117.24761	141 m	COMPARTMENT 7 TIMIMBANG BASE	9:21:15AM
					CAMP	19-FEB-14
79	*Dipterocarpus validus*	6.07446	117.24722	127 m	COMPARTMENT 7 TIMIMBANG B MALSA	10:05:36AM
					COMPARTMENT 43 &	20-FEB-14
A4	*Dipterocarpus validus*	5.99149	117.10556	104 m	42 TIMIMBANG B MALSA	9:34:12AM
					COMPARTMENT 43 &	20-FEB-14
A15	*Dipterocarpus verrucosus*	5.99110	117.10489	102 m	42 TIMIMBANG A	9:58:03AM
					COMPARTMENT 19 &	18-FEB-14
35	*Dryobalanops beccarii*	6.08576	117.16490	522 m	20	10:57:15AM

54	*Dryobalanops beccarii*	6.06992	117.24991	69 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:16:20AM
B19	*Dryobalanops beccarii*	6.01358	117.32982	55 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:14:33AM
86	*Dryobalanops kethii*	6.07574	117.24764	82 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 11:06:28AM
A24	*Dryobalanops kethii*	5.99086	117.10267	101 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 10:47:20AM
43	*Dryobalanops lanceolata*	6.08987	117.16538	621 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 11:58:33AM
B38	*Dryobalanops lanceolata*	6.01976	117.32472	139 m	BONTITIAN COMPARTMENT 46	21-FEB-14 11:33:39AM
29	*Hopea beccariana*	6.08473	117.16371	480 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:30:19AM
A6	*Hopea beccariana*	5.99140	117.10534	95 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 9:41:03AM
B18	*Hopea beccariana*	6.01355	117.32985	55 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:14:05AM
B23	*Hopea beccariana*	6.01357	117.32900	78 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:22:42AM
33	*Hopea cernua*	6.08533	117.16407	497 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:47:08AM
47	*Hopea cernua*	6.09081	117.16540	613 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 12:25:04PM
42	*Hopea dryobalanoides*	6.08899	117.16470	604 m	TIMIMBANG A COMPARTMENT 19 &	18-FEB-14 11:32:30AM

70	*Hopea dryobalanoides*	6.07186	117.24882	117 m	20 TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:53:53AM
74	*Hopea nervosa*	6.07246	117.24801	131 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 9:07:19AM
A23	*Hopea nervosa*	5.99093	117.10278	100 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 10:40:20AM
B4	*Hopea nervosa*	6.01268	117.33057	53 m	BONTITIAN COMPARTMENT 46	21-FEB-14 8:42:24AM
50	*Hopea semicueta*	6.09191	117.16423	593 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 12:55:56PM
80	*Hopea semicueta*	6.07467	117.24720	121 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 10:08:51AM
A26	*Hopea semicueta*	5.98936	117.10034	150 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 11:48:48AM
A5	*Hopea wyath-smithii*	5.99152	117.10545	103 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 9:34:47AM
25	*Parashorea malaanonan*	6.08433	117.16343	462 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:17:40AM
83	*Parashorea malaanonan*	6.07610	117.24667	97 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 10:28:03AM
B5	*Parashorea malaanonan*	6.01265	117.33045	55 m	BONTITIAN COMPARTMENT 46	21-FEB-14 8:43:54AM

40	*Parashorea parvifolia*	6.08734	117.16493	565 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 11:18:12AM
B27	*Parashorea parvifolia*	6.01352	117.32804	111 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:48:42AM
A10	*Shorea acuminatissima*	5.99123	117.10524	97 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 9:47:42AM
B25	*Shorea acuminatissima*	6.01347	117.32904	81 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:25:05AM
A1	*Shorea acutangulus*	5.99167	117.10552	113 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 9:28:09AM
26	*Shorea agamii*	6.08434	117.16341	462 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:17:53AM
57	*Shorea agamii*	6.06988	117.24991	72 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:17:50AM
A16	*Shorea agamii*	5.99103	117.10479	106 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 9:59:47AM
B7	*Shorea agamii*	6.01241	117.33016	59 m	BONTITIAN COMPARTMENT 46	21-FEB-14 8:46:28AM
B15	*Shorea almon*	6.01300	117.32965	52 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:05:05AM
52	*Shorea amplexicaulis*	6.08843	117.16468	592 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 1:18:42PM
A13	*Shorea amplexicaulis*	5.99109	117.10517	89 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 9:52:56AM

B40	*Shorea amplexicaulis*	6.01782	117.32795	85 m	BONTITIAN COMPARTMENT 46	21-FEB-14 12:01:23PM
62	*Shorea angustifolia*	6.07043	117.24935	98 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:30:17AM
21	*Shorea argentifolia*	6.08368	117.16326	433 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:01:55AM
69	*Shorea argentifolia*	6.07170	117.24873	122 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:47:59AM
A11	*Shorea argentifolia*	5.99131	117.10534	97 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 9:48:55AM
B20	*Shorea argentifolia*	6.01364	117.32942	65 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:17:04AM
44	*Shorea atrinervosa*	6.09021	117.16558	621 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 12:14:56PM
76	*Shorea atrinervosa*	6.07253	117.24779	135 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 9:12:55AM
78	*Shorea beccariana*	6.07280	117.24750	148 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 9:24:29AM
A28	*Shorea beccariana*	5.98938	117.10036	149 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 11:55:10AM
32	*Shorea bracteolata*	6.08535	117.16420	497 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:45:28AM
A25	*Shorea exelliptica*	5.99078	117.10267	104 m	TIMIMBANG B MALSA COMPARTMENT 43 &	20-FEB-14 10:50:50AM

					42	
B35	*Shorea faguetiodes*	6.01712	117.32612	129 m	BONTITIAN COMPARTMENT 46	21-FEB-14 11:04:53AM
81	*Shorea falciferoides*	6.07468	117.24715	122 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 10:11:09AM
A30	*Shorea falciferoides*	5.98800	117.09894	145 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 12:14:41PM
B33	*Shorea falciferoides*	6.01616	117.32627	131 m	BONTITIAN COMPARTMENT 46	21-FEB-14 10:47:06AM
31	*Shorea havilandii*	6.08509	117.16392	485 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:35:55AM
B31	*Shorea havilandii*	6.01409	117.32694	140 m	BONTITIAN COMPARTMENT 46	21-FEB-14 10:05:47AM
A32	*Shorea inappendiculata*	5.99043	117.10285	99 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 12:44:27PM
B28	*Shorea inappendiculata*	6.01320	117.32783	133 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:58:17AM
B13	*Shorea johorensis*	6.01261	117.32963	59 m	BONTITIAN COMPARTMENT 46	21-FEB-14 8:58:13AM
B32	*Shorea kunstleri*	6.01450	117.32658	137 m	BONTITIAN COMPARTMENT 46	21-FEB-14 10:10:38AM
28	*Shorea laevis*	6.08472	117.16374	477 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:27:13AM
73	*Shorea laevis*	6.07225	117.24813	129 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 9:03:31AM
21	*Shorea leprosula*	6.08368	117.16326	433 m	TIMIMBANG A COMPARTMENT 19 &	18-FEB-14 10:01:55AM

24	*Shorea macroptera*	6.08435	117.16345	462 m	20 TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:17:27AM
56	*Shorea macroptera*	6.06993	117.24993	69 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:16:35AM
A17	*Shorea macroptera*	5.99103	117.10479	106 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 9:59:51AM
B9	*Shorea macroptera*	6.01235	117.33003	58 m	BONTITIAN COMPARTMENT 46	21-FEB-14 8:49:11AM
53	*Shorea mecistopteryx*	6.08798	117.16465	591 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 1:20:01PM
66	*Shorea mecistopteryx*	6.07125	117.24909	110 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:42:04AM
A8	*Shorea mecistopteryx*	5.99126	117.10532	96 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 9:46:43AM
B1	*Shorea mecistopteryx*	6.01303	117.33076	41 m	BONTITIAN COMPARTMENT 46	21-FEB-14 8:38:00AM
58	*Shorea multiflora*	6.06992	117.24992	73 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:18:00AM
A19	*Shorea multiflora*	5.99089	117.10454	116 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 10:06:01AM
71	*Shorea obscura*	6.07193	117.24871	121 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:55:45AM

22	*Shorea ovalis*	6.08436	117.16339	462 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:17:04AM
67	*Shorea ovalis*	6.07130	117.24900	112 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:43:29AM
A9	*Shorea ovalis*	5.99126	117.10529	96 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 9:46:50AM
B2	*Shorea ovalis*	6.01300	117.33067	45 m	BONTITIAN COMPARTMENT 46	21-FEB-14 8:39:50AM
21	*Shorea parvifolia*	6.08368	117.16326	433 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:01:55AM
65	*Shorea parvifolia*	6.07104	117.24905	106 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:40:11AM
A22	*Shorea parvifolia*	5.99100	117.10292	107 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 10:36:40AM
B6	*Shorea parvifolia*	6.01244	117.33024	58 m	BONTITIAN COMPARTMENT 46	21-FEB-14 8:45:43AM
84	*Shorea parvistipulata*	6.07615	117.24731	84 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 10:33:35AM
A20	*Shorea parvistipulata*	5.99110	117.10324	112 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 10:28:49AM
B34	*Shorea parvistipulata*	6.01624	117.32634	132 m	BONTITIAN COMPARTMENT 46	21-FEB-14 10:48:33AM
51	*Shorea patoensis*	6.09188	117.16420	593 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 12:56:29PM

B17	*Shorea patoensis*	6.01334	117.32972	51 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:11:45AM
45	*Shorea pauciflora*	6.09022	117.16558	621 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 12:15:33PM
46	*Shorea pauciflora*	6.09067	117.16551	616 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 12:21:38PM
B22	*Shorea pauciflora*	6.01351	117.32907	78 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:21:41AM
A29	*Shorea pilosa*	5.98858	117.09929	141 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 12:07:10PM
36	*Shorea scrobiculata*	6.08584	117.16498	524 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 11:01:40AM
64	*Shorea scrobiculata*	6.07063	117.24901	104 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:34:30AM
A27	*Shorea scrobiculata*	5.98928	117.10023	149 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 11:51:32AM
A12	*Shorea seminis*	5.99125	117.10530	95 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 9:50:16AM
23	*Shorea smithiana*	6.08434	117.16343	462 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:17:17AM
68	*Shorea smithiana*	6.07165	117.24871	124 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:47:14AM
A7	*Shorea smithiana*	5.99125	117.10540	96 m	TIMIMBANG B MALSA	20-FEB-14 9:46:29AM

B12	*Shorea smithiana*	6.01266	117.32968	59 m	COMPARTMENT 43 & 42 BONTITIAN COMPARTMENT 46	21-FEB-14 8:58:05AM
27	*Shorea superba*	6.08433	117.16341	462 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:18:01AM
B26	*Shorea superba*	6.01359	117.32866	83 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:30:44AM
B36	*Shorea symingtonii*	6.01721	117.32609	130 m	BONTITIAN COMPARTMENT 46	21-FEB-14 11:06:38AM
72	*Vatica albiramis*	6.07203	117.24854	127 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:59:15AM
A21	*Vatica albiramis*	5.99092	117.10295	106 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 10:34:20AM
B29	*Vatica albiramis*	6.01328	117.32779	132 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:58:56AM
B8	*Vatica dulitensis*	6.01233	117.33006	58 m	BONTITIAN COMPARTMENT 46	21-FEB-14 8:48:22AM
59	*Vatica micrantha*	6.06994	117.24993	72 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:18:07AM
A18	*Vatica micrantha*	5.99086	117.10458	115 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 10:04:09AM
37	*Vatica oblongifolia*	6.08585	117.16501	523 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 11:01:43AM
63	*Vatica oblongifolia*	6.07048	117.24925	99 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 8:30:49AM

A2	*Vatica oblongifolia*	5.99166	117.10561	114 m	TIMIMBANG B MALSA COMPARTMENT 43 & 42	20-FEB-14 9:28:57AM
B21	*Vatica oblongifolia*	6.01364	117.32922	70 m	BONTITIAN COMPARTMENT 46	21-FEB-14 9:19:08AM
30	*Vatica odorata*	6.08505	117.16386	485 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 10:34:41AM
B10	*Vatica rassak*	6.01223	117.32981	62 m	BONTITIAN COMPARTMENT 46	21-FEB-14 8:52:36AM
39	*Vatica sarawakensis*	6.08585	117.16506	523 m	TIMIMBANG A COMPARTMENT 19 & 20	18-FEB-14 11:02:02AM
82	*Vatica sarawakensis*	6.07600	117.24662	99 m	TIMIMBANG BASE CAMP COMPARTMENT 7	19-FEB-14 10:26:21AM
B11	*Vatica sarawakensis*	6.01223	117.32980	62 m	BONTITIAN COMPARTMENT 46	21-FEB-14 8:52:38AM

Appendix IV: Wildlife List

A. List of mammals recorded in Timimbang-Botitian Sustainable Forest Management Area, Sabah.

Family	*Scientific Name*	Common Name	WCA [SWD]	CITES status	IUCN red list
Petauristinae	*Aeromys thomasi*	Thomas flying squirrel		N/A	Data Deficient; Pop. trend: unknown
Viverridae	*Arctictis binturong*	Binturong/Bearcat	II	Appendix III	Vulnerable A2cd; Pop. trend: decreasing
Sciuridae	*Callosciurus notatus*	Plaintain Squirrel	II	N/A	Least concern; Pop. trend: decreasing
Sciuridae	*Callosciurus prevostii*	Prevost's Squirrel	II	N/A	Least concern; Pop. trend: decreasing
Cervidae	*Cervus unicolor*	Sambar deer	III	N/A	Vulnerable A2cd+3cd+4cd; Pop. trend: decreasing
Elephantidae	*Elephas maximus*	Asian elephant	II	Appendix I	Endangered A2c; Pop. trend: decreasing
Sciuridae	*Exilisciurus exilis*	Plain pigmy squirrel (Least pygmy squirrel)	II	N/A	Data Deficient; Pop. Trend: unknown
Canidae	*Helarctos malayanus*	Sun bear	I	Appendix I	Vulnerable A2cd+3cd+4cd
Viverridae	*Hemigalus derbyanus*	Banded palm civet	II	Appendix II	Vulnerable A2cd+3c; Pop. trend: decreasing
Hylobatidae	*Hylobates muelleri*	Bornean gibbon	II	Appendix I	Endangered A2cd; Pop. trend: decreasing
Hystricidae	*Hystrix brachyuran*	Common porcupine	III	N/A	Least concern
Cercopithecidae	*Macaca fascicularis*	Long-tailed macaque	II	Appendix II	Least concern Pop. trend: decreasing
Cercopithecidae	*Macaca nemestrina*	Pig-tailed macaque	II	Appendix II	Vulnerable A2cd; Pop. trend: decreasing
Muridae	*Maxomys whiteheadi/rajah*	Whitehead rat (Whitehead's Sundaic Maxomys or Whitehead's Spiny Rat)	II	N/A	Vulnerable A2c; Pop. trend: decreasing
Cervidae	*Muntiacus muntjac*	Barking deer	III	N/A	Least Concern; Pop. trend: decreasing
Mustelidae	*Mydaus javanensis*	Malay badger	II	N/A	Least Concern; Pop. trend: unknown
Felidae	*Neofelis nebolusa*	Clouded leopard	I	N/A	Vulnerable C1+2a(i); Pop. trend: decreasing
Muridae	*Niviventer cremoriventer*	Dark tailed tree rat	II	N/A	Vulnerable A2c; Pop. trend: decreasing
Lorisidae	*Nycticebus coucang*	Slow loris	II	Appendix I	Vulnerable A2cd; Pop. trend: decreasing

Viverridae	*Paradoxurus hermaphrodites*	Common palm civet	II	N/A	Least Concern; Pop. trend: stable
Petauristinae	*Petaurista petaurista*	Red giant flying squirrel		N/A	Least Concern; Pop. trend: decreasing
Pongidae	*Pongo pygmaeus*	Orang utan	I	Appendix I	Endangered A2cd+3cd+4cd; Pop. trend: decreasing
Cercopithecidae	*Presbytis rubicunda*	Maroon langur or Red leaf monkey	II	Appendix II	Least concern Pop. trend: decreasing
Felidae	*Prionailurus bengalensis*	Leopard cat	II	Appendix I/II	Least concern; ; Pop. trend: stable
Viverridae	*Prionodon linsang*	Banded linsang		Appendix II	Least Concern; Pop. trend: decreasing
Muridae	*Rattus steini*	Small spiny rat	II	N/A	Least concern; Pop. trend: stable
Sciuridae	*Ratufa affinis*	Pale giant squirrel		Appendix II	Near threatened Pop. trend: decreasing;
Muridae	*Sundamys muelleri*	Műller's sundamys (Műller's giant sunda rat)	II	N/A	Least concern; Pop. trend: decreasing
Sciuridae	*Sundasciurus lowii*	Low's squirrel	II	N/A	Least Concern; Pop. trend: Stable
Suidae	*Sus barbatus*	Bearded pig	III		Vulnerable A2cd; Pop. trend: decreasing
Tarsiidae	*Tarsius bancanus*	Horsfield's tarsier	II	Appendix II	Vulnerable A2cd; Pop. trend: decreasing
Tragulidae	*Tragalus javanicus*	Lesser mouse deer	III	N/A	Data Deficient; Pop. trend: unknown
Tragulidae	*Tragulus napu*	Greater mouse deer	III	N/A	Least Concern; Pop. trend: decreasing
Tupaiidae	*Tupaia glis*	Common tree shrew	II	Appendix II	Least Concern; Pop. Trend: Decreasing
Tupaiidae	*Tupaia tana*	Large tree shrew	II	Appendix II	Least Concern; Pop. Trend: decreasing
Viverridae	*Viverra tangalunga*	Malay civet	II	N/A	Least Concern; Pop. trend: stable

B. List of bird species recorded in Timimbang-Botitian SFM Area, Sabah.

No	Common Name	*Scientific Name*	Family	Comment / Status	IUCN Red List
1	Asian black hornbill	*Anthracoceros malayanus*	**Bucerotidae**	Common resident	NT
2	Asian fairy bluebird	*Irena puella*	**Oriolidae**	Common resident	LC
3	Asian glossy starling	*Aplonis panayensis*	**Sturnidae**	Abundant resident	LC
4	Asian palm swift	*Cypsiurus balasiensis*	**Apodidae**	local resident	LC
5	Asian paradise flycatcher	*Terpsiphone paradise*	**Monarchidae**	Common resident	LC
6	Banded bay cuckoo	*Cacomantis sonneratii*	**Cuculidae**	Common resident	LC

7	Banded broadbill	*Eurylaimus javanicus*	**Eurylaimidae**	Common resident	LC
8	Banded woodpecker	*Picus mineaceus*	**Picidae**	Common resident	LC
9	Bar winged flycatcher shrike	*Hemipus picatus*	**Campephagidae**	Common resident	LC
10	Barn owl	*Tyto alba*	**Strigidae**	local resident	LC
11	Barred eagle owl	*Bubo sumatranus*	**Strigidae**	Scare resident	LC
12	Bat hawk	*Machaeramphus alcinus*	**Accipitridae**	local resident	LC
13	Black and yellow broadbill	*Eurylaimus ochromalus*	**Eurylaimidae**	Common resident	NT
14	Black backed kingfisher	*Ceyx erithaca*	**Alcedinidae**	possible vagrant	LC
15	Black bellied malkoha	*Phaenicophaeus diardi*	**Cuculidae**	local resident	NT
16	Black capped babbler	*Pellorneum capistratum*	**Timaliidae**	Common resident	LC
17	Black headed bulbul	*Pycnonotus atriceps*	**Pycnonotidae**	Common resident	LC
18	Black headed pitta	*Pitta ussherri*	**Pittidae**		NT
19	Black magpie	*Platysmurus leucopterus*	**Corvidae**		NT
20	Black naped monarch	*Hypothymis azurea*	**Monarchidae**	Common resident	LC
21	Black throated babbler	*Stachyris nigricollis*	**Timaliidae**	Common resident	NT
22	Black winged flycatcher shrike	*Hemipus hirundinaceus*	**Campephagidae**	local resident	LC
23	Blue Crowned Hanging Parrot	*Loriculus galgulus*	**Psittacidae**	Common resident	LC
24	Blue Eared Barbet	*Megalaima australis*	**Ramphastidae**	Common resident	LC
25	Blue Headed Pitta	*Pitta baudii*	**Pittidae**	common and endemic in Borneo	VU
26	Blue Rumped Parrot	*Psittinus cyanurus*	**Psittacidae**	local resident	NT
27	Blue Throated Bee-Eater	*Merops viridis*	**Meropidae**	common nomadic resident	LC
28	Blyth's hawk eagle	*Nisaetus alboniger*	**Accipitridae**	Scare resident	LC
29	Bronzed drongo	*Dicrurus aeneus*	**Dicruridae**	Common resident	LC
30	Brown barbet	*Calorhamphus fuliginosus*	**Ramphastidae**	Common resident	LC
31	Brown fulvetta	*Alcippe brunneicauda*	**Timaliidae**	local resident	NT
32	Brown wood owl	*Strix leptogrammica*	**Strigidae**	local resident	LC
33	Buff vented bulbul	*Iole olivacea*	**Pycnonotidae**	Scare resident	LC
34	Buffy Fish Owl	*Ketupa ketupu*	**Strigidae**	Common resident	LC
35	Bushy Crested Hornbill	*Anorrhinus galeritus*	**Bucerotidae**	Common resident	LC
36	Cattle Egret	*Bubulcus ibis*	**Ardeidae**	migrant	LC
37	Changeable hawk eagle	*Nisaetus cirrhatus*	**Accipitridae**	Scare resident	LC
38	Chestnut Backed Scimitar Babbler	*Pomatorhinus montanus*	**Timaliidae**	Scare resident	LC
39	Chestnut Bellied Malkoha	*Phaenicophaeus sumatranus*	**Cuculidae**	local resident	NT
40	Chestnut Breasted Malkoha	*Phaenicophaeus curvirostris*	**Cuculidae**	Common resident	LC
41	Chestnut Munia	*Lonchura atricapilla*	**Estrildidae**	Common resident	LC
42	Chestnut Naped Forktail	*Enicurus ruficapillus*	**Turdidae**	local resident	NT
43	Chestnut necklaced hill partridge (Scaly breasted patridge)	*Arborophila chloropus*	**Phasianidae**	Common resident	LC
44	Chestnut Rumped Babbler	*Stachyris maculate*	**Timaliidae**	Common resident	NT
45	Chestnut Winged Babbler	*Stachyris erythroptera*	**Timaliidae**	Common resident	LC
46	Common Iora	*Aegithina tiphia*	**Aegithinidae**	Common resident	LC
47	Common Sandpiper	*Actitis hypoleucos*	**Scolipacidae**	Common winter visitor	LC
48	Cream Vented Bulbul	*Pycnonotus simplex*	**Pycnonotidae**	Common resident	LC

49	Crested Fireback	*Lophura ignita*	**Phasianidae**	local resident	NT
50	Crested Goshawk	*Accipiter trivirgatus*	**Falconidae**	local resident	LC
51	Crested jay	*Platylophus galericulatus*	**Corvidae**	Common resident	NT
52	Crested Serpent Eagle	*Spilornis cheela*	**Accipitridae**	Common resident	LC
53	Crimnson Winged Woodpecker	*picus puniceus*	**Picidae**	Scare resident	LC
54	Dark Throated Oriole	*Oriolus xanthonotus*	**Oriolidae**	Common resident	NT
55	Diard's Trogon	*Harpactes diardii*	**Trogonidae**	lowland resident	NT
56	Dusky Broadbill	*Corydon sumatranus*	**Eurylaimidae**	Scarce resident	LC
57	Dusky Munia	*Lonchura fuscans*	**Estrildidae**	common endamic	LC
58	Emerald Dove	*Chalcophaps indica*	**Columbidae**	Common nomadic resident	LC
59	Eurasian Tree Sparrow	*Passer montanus*	**Passeridae**	Common resident	LC
60	Ferruginous Babbler	*Trichastoma bicolor*	**Timaliidae**	local resident	LC
61	Fiery Minivet	*Pericrocotus igneus*	**Campephagidae**	local resident	NT
62	Finsch's bulbul	*Alophoixus finschii*	**Pycnonotidae**	Scarce resident	NT
63	Fluffy Backed Tit-Babbler	*Macronous ptilosus*	**Timaliidae**	Common resident	NT
64	Glossy Swiftlet	*Collocalia esculenta*	**Apodidae**	Common resident	LC
65	Gold-Whiskered Barbet	*Megalaima chrysopogon*	**Ramphastidae**	Common resident	LC
66	Great Argus	*Argusianus argus*	**Phasianidae**	local resident	NT
67	Greater Coucal	*Centropus sinensis*	**Cuculidae**	Common resident	LC
68	Greater Green Leafbird	*Chloropsis sonnerati*	**Aegithinidae**	Common resident	LC
69	Greater Racquet Tailed Drongo	*Dicrurus paradiseus*	**Dicruridae**	Common resident	LC
70	Green Imperial Pigeon	*Ducula aenea*	**Columbidae**	Common resident	LC
71	Green Iora	*Aegithina viridissima*	**Aegithinidae**	Common resident	NT
72	Grey And Buff Woodpecker	*Hemicircus concretus*	**Picidae**	local resident	LC
73	Grey Capped Woodpecker	*Dendrocopos canicapillus*	**Picidae**	local resident	LC
74	Grey Cheeked Bulbul	*Alophoixus bres*	**Pycnonotidae**	Common resident	LC
75	Grey Chested Jungle Flycatcher	*Rhinomyias umbratilis*	**Muscicapidae**	Common resident	NT
76	Grey Headed Babbler	*Stachyris poliocephala*	**Timaliidae**	local resident	LC
77	Grey Rumped Treeswift	*Hemiprocne longipennis*	**Apodidae**	Common resident	LC
78	Hairy Backed Bulbul	*Tricholestes criniger*	**Pycnonotidae**	Common resident	LC
79	Helmeted Hornbill	*Buceros vigil*	**Bucerotidae**	Scarce resident, large hornbill	NT
80	Hill Myna	*Gracula religiosa*	**Sturnidae**	Common resident	LC
81	Horsfield's Babbler	*Malacocincla sepiaria*	**Timaliidae**	local resident	LC
82	House Swift	*Apus nipalensis*	**Apodidae**	Common resident	LC
83	Indian Cuckoo	*Cuculus micropterus*	**Cuculidae**	Resident and winter visitor	LC
84	Jambu Fruit Dove	*Ptilinopus jambu*	**Columbidae**	Local resident and nomadic	NT
85	Javan hawk cuckoo (Hodgson's hawk cuckoo)	*Cuculus fugax*	**Cuculidae**	local resident	LC
86	Jerdon's Baza	*Aviceda jerdoni*	**Accipitridae**	Scare resident	LC
87	Large Green Pigeon	*Treron capellei*	**Columbidae**	Scare resident	VU
88	Large Wood Shrike	*Tephrodornis gularis*	**Campephagidae**	Scare resident	LC
89	Lesser Coucal	*Centropus bengalensis*	**Cuculidae**	Common resident	LC
90	Lesser Cuckooshrike	*Coracina fimbriata*	**Campephagidae**	Common resident	LC

91	Lesser Fish Eagle	*Ichthyophaga humilis*	**Accipitridae**	Scare resident	NT
92	Lesser Green Leafbird	*Chloropsis cyanopogon*	**Aegithinidae**	Common resident	NT
93	Little Green Pigeon	*Treron olax*	**Columbidae**	Common nomadic resident	LC
94	Little Spiderhunter	*Arachnothera longirostra*	**Nectarinidae**	Common resident	LC
95	Malaysian Blue Flycatcher	*Cyornis turcosus*	**Muscicapidae**	Common resident	NT
96	Maroon Breasted Philentoma	*Philentoma velata*	**Muscicapidae**		NT
97	Maroon Woodpecker	*Blythipicus rubiginosus*	**Picidae**	Scare resident	LC
98	Moustached Babbler	*Malacopteron magnirostre*	**Timaliidae**	Common resident	LC
99	Moustached Hawk Cuckoo	*Cuculus vagans*	**Cuculidae**	Common resident	NT
100	Olive Backed Woodpecker	*Dinopium rafflesii*	**Picidae**	Scare resident	NT
101	Olive Winged Bulbul	*Pycnonotus plumosus*	**Pycnonotidae**	Common resident	NT
102	Orange Backed Woodpecker	*Reinwardtipicus validus*	**Picidae**	Scare resident	LC
103	Orange Bellied Flowerpecker	*Dicaeum trigonostigma*	**Dicaeidae**	Common resident	LC
104	Oriental Bay Owl	*Phodilus badius*	**Strigidae**	Scare resident	LC
105	Oriental Darter	*Anhinga melanogaster*	**Pelicanidae**	local resident	NT
106	Oriental Magpie Robin	*Copsychus saularis*	**Turdidae**	Common resident	LC
107	Oriental Pied Hornbill	*Anthracoceros albirostris*	**Bucerotidae**	common resident	LC
108	Pacific Swallow	*Hirundo tahitica*	**Artamidae**	Common resident	LC
109	Pied Fantail	*Rhipidura javanica*	**Monarchidae**	local resident	LC
110	Pink Necked Green Pigeon	*Treron vernans*	**Columbidae**	Common resident	LC
111	Plain Sunbird	*Anthreptes simplex*	**Nectarinidae**	Common resident	LC
112	Plaintive Cuckoo	*Cacomantis merulinus*	**Cuculidae**	Common resident	LC
113	Puff Backed Bulbul	*Pycnonotus eutilotus*	**Pycnonotidae**	Common resident	NT
114	Purple Naped Sunbird	*Hypogramma hypogrammicum*	**Nectarinidae**	Common resident	LC
115	Raffles's Malkoha	*Phaenicophaeus chlorophaeus*	**Cuculidae**	Common resident	LC
116	Red Bearded Bee-Eater	*Nyctyornis amictus*	**Meropidae**	Common resident	LC
117	Red Crowned Barbet	*Megalaima rafflesii*	**Ramphastidae**	Common resident	NT
118	Red eyed Bulbul	*Pycnonotus brunneus*	**Pycnonotidae**	Common resident	LC
119	Red Headed Tailorbird	*Orthotomus ruficeps*	**Sylviidae**	Common resident	LC
120	Red Naped Trogon	*Harpactes kasumba*	**Trogonidae**	lowland resident	NT
121	Red Throated Barbet	*Megalaima mystacophanos*	**Ramphastidae**	Common resident	NT
122	Rhinoceros Hornbill	*Buceros rhinoceros*	**Bucerotidae**	Common resident	NT
123	Roulroul (Crested partridge)	*Rollulus rouloul*	**Phasianidae**	Common resident	NT
124	Ruby Cheeked Sunbird	*Anthreptes singalensis*	**Nectarinidae**	local resident	LC
125	Rufous Crowned Babbler	*Malacopteron magnum*	**Timaliidae**	Common resident	NT
126	Rufous Piculet	*Sasia abnormis*	**Picidae**	Common resident	LC
127	Rufous Tailed Shama	*Trichixos pyrropygus*	**Turdidae**	Scare resident	NT
128	Rufous Tailed Tailorbird	*Orthotomus sericeus*	**Sylviidae**	Common resident	LC
129	Rufous Woodpecker	*Celeus brachyurus*	**Picidae**	Common resident	LC
130	Scarlet Minivet	*Pericrocotus flammeus*	**Campephagidae**	common lowland resident	LC
131	Scarlet Rumped Trogon	*Harpactes duvaucelii*	**Trogonidae**	Common resident	NT
132	Short Tailed Babbler	*Malacocincla malaccensis*	**Timaliidae**	Common resident	NT
133	Silver Rumped Spinetail	*Rhaphidura leucopygialis*	**Apodidae**	Common resident	LC

134	Slender Billed Crow	*Corvus enca*	**Corvidae**	local resident	LC
135	Sooty Capped Babbler	*Malacopteron affine*	**Timaliidae**	Common resident	NT
136	Spectacled Bulbul	*Pycnonotus erythropthalmos*	**Pycnonotidae**	Common resident	LC
137	Spectacled Spiderhunter	*Arachnothera flavigaster*	**Nectarinidae**	Scare resident	LC
138	Spotted Fantail	*Rhipidura perlata*	**Monarchidae**	local resident	LC
139	Spotted Necked Dove (Spotted dove)	*Streptopelia chinensis*	**Columbidae**	Common resident	LC
140	Square tailed drongo cuckoo (Drongo cuckoo)	*Surniculus lugubris*	**Cuculidae**	Common resident	LC
141	Stork Billed Kingfisher	*Pelargopsis capensis*	**Alcedinidae**	Common resident	LC
142	Streaked Bulbul	*Ixos malaccensis*	**Pycnonotidae**	Scare resident	NT
143	Streaky Breasted Spiderhunter	*Arachnothera affinis*	**Nectarinidae**	local resident	LC
144	Thick Billed Green Pigeon	*Treron curvirostra*	**Columbidae**	Local resident and nomadic	LC
145	Velvet Fronted Nuthatch	*Sitta frontalis*	**Pachcephalidae**	Common resident	LC
146	Violet Cuckoo	*Chrysococcyx xanthorhynchus*	**Cuculidae**	Common resident	LC
147	Wallace's Hawk Eagle	*Nisaetus nanus*	**Accipitridae**	Scare resident	VU
148	Whiskered Treeswift	*Hemiprocne comate*	**Apodidae**	local resident	LC
149	White Bellied Woodpecker	*Dryocopus javensis*	**Picidae**	local resident	LC
150	White Breasted Waterhen	*Amaurornis phoenicurus*	**Rallidae**	Common resident	LC
151	White Breasted Woodswallow	*Artamus leucorynchus*	**Artamidae**	local resident	LC
152	White Collared Kingfisher (Collared kingfisher)	*Todiramphus chloris*	**Alcedinidae**	Common resident	LC
153	White Crowned Forktail	*Enicurus leschenaultia*	**Turdidae**	local resident	LC
154	White Crowned Hornbill	*Aceros comatus*	**Bucerotidae**	Scare resident	NT
155	White-Crowned Shama	*Copsychus stricklandii*	**Turdidae**	common endamic	unknown status
156	Wreathed Hornbill	*Aceros undulates*	**Bucerotidae**	Scare resident	LC
157	Yellow Bellied Bulbul	*Alophoixus phaeocephalus*	**Pycnonotidae**	Common resident	LC
158	Yellow Breasted Flowerpecker	*Prionochilus maculates*	**Dicaeidae**	local resident	LC
159	Yellow Eared Spiderhunter	*Arachnothera chrysogenys*	**Nectarinidae**	Scare resident	LC
160	Yellow vented Bulbul	*Pycnonotus goiavier*	**Pycnonotidae**	Common resident	LC
161	Zebra Dove	*Geopelia striata*	**Columbidae**	Common resident	LC

C. List of insects recorded in Timimbang-Botitian SFM Area, Sabah.

I. Tentative butterfly list from Timimbang-Botitian FR

No.	Species	Author	Family	Remarks
1	*Catopsilia pomona pomona*	Fabricius	Pieridae	
2	*Cepora iudith hespera*	Butler	Pieridae	
3	*Eurema hecabe hecabe*	Linnaeus	Pieridae	
4	*Eurema nicevillei nicevillei*	Butler	Pieridae	
5	*Leptosia nina malayana*	Fruhstorfer	Pieridae	

6	*Graphium agamemnon agamemnon*	Linne	Papilionidae	
7	*Graphium antiphates itamputi*	Butler	Papilionidae	
8	*Troides (Trogonoptera) brookiana*	Wallace	Papilionidae	At base camp & N6.07574, E117.24764 (82m asl).
9	*Troides miranda miranda*	Butler	Papilionidae	
10	*Amathusia phidippus phidippus*	Linnaeus	Nymphalidae	
11	*Cethosia hypsea hypsea*	Doubleday	Nymphalidae	
12	*Cyrestis nivea borneensis*	Martin	Nymphalidae	
13	*Euploea diocletianus lowii*	Butler	Nymphalidae	
14	*Euploea mulciber portia*	Fruhstorfer	Nymphalidae	
15	*Graphium doson evemoides*	Honrath	Nymphalidae	
16	*Hypolimnas bolina philippensis*	Butler	Nymphalidae	
17	*Ideopsis vulgaris interposita*	Fruhstorfer	Nymphalidae	
18	*Junonia atlites atlites*	Linnaeus	Nymphalidae	
19	*Junonia orithya metion*	Fruhstorfer	Nymphalidae	
20	*Mycalesis anapita fucentia*	Fruhstorfer	Nymphalidae	
21	*Neorina lowii lowii*	Doubleday	Nymphalidae	
22	*Pandita sinope sinope*	Moore	Nymphalidae	
23	*Parantica agleoides borneensis*	Staudinger	Nymphalidae	
24	*Parthenos sylvia borneensis*	Staudinger	Nymphalidae	
25	*Tanaesia clathrata coerulescens*	Vollenhoeven	Nymphalidae	
26	To be identified later		Nymphalidae	
27	*Ypthima pandocus sertorius*	Fruhstorfer	Nymphalidae	
28	To be identified later		Lycaenidae	
29	To be identified later		Lycaenidae	
30	To be identified later		Hesperiidae	
31	To be identified later		Hesperiidae	

II. Selected moths recorded from Timimbang-Botitian FR

No.	Species	Author	Family	Subfamily	Remarks
1	*Creatonotos transiens*	Walker	Arctiidae	Arctiinae	
2	*Nyctemera sonticum*	Swinhoe	Arctiidae	Arctiinae	
3	*Barsine euprepioides*	Walker	Arctiidae	Lithosiinae	
4	*Barsine'* nr *porphyrea*	Snellen	Arctiidae	Lithosiinae	
5	*Barsine* sp.		Arctiidae	Lithosiinae	
6	*Cyana costifimbria*	Walker	Arctiidae	Lithosiinae	
7	*Cyana malayensis*	Hampson	Arctiidae	Lithosiinae	
8	*Cyana perornata*	Walker	Arctiidae	Lithosiinae	
9	*Eugoa aequalis*	Walker	Arctiidae	Lithosiinae	
10	*Lyclene circumdata*	Walker	Arctiidae	Lithosiinae	
11	*Amata prepuncta*	Holloway	Arctiidae	Syntominae	Endemic
12	*Spilosoma* nr hypogopa	Hampson	Arctiidae	Arctiinae	
13	*Mustilia dierli*	Holloway	Bombycidae		
14	*Penicillifera apicalis*	Walker	Bombycidae		

15	*Xyleutes ceramica*	Walker	Cossidae		
16	*Xyleutes mineus*	Cramer	Cossidae		
17	*Xyleutes strix*	Linnaeus	Cossidae		
18	*Zeuzera borneana*	Roepke	Cossidae		Endemic
19	*Zeuzera indica*	Herrich-Schaffer	Cossidae		
20	*Canucha specularis*	Moore	Drepanidae		
21	*Cleora pendleburyi*	Prout	Geometridae	Ennominae	
22	*Heterostegane warreni*	Prout	Geometridae	Ennominae	
23	*Hypephyra brunneiplaga*	Swinhoe	Geometridae	Ennominae	
24	*Hypochrosis binexata*	Walker	Geometridae	Ennominae	
25	*Omiza lycoraria*	Guenee	Geometridae	Ennominae	
26	*Agathia quinaria*	Moore	Geometridae	Geometrinae	
27	*Berta* sp.		Geometridae	Geometrinae	
28	*Cosmostola chlorargyra*	Walker	Geometridae	Geometrinae	
29	*Herochroma* sp.		Geometridae	Geometrinae	
30	*Ornithospila cincta*	Walker	Geometridae	Geometrinae	
31	*Antitrygodes divisaria*	Walker	Geometridae	Sterrhinae	
32	*Kunugia* sp.		Lasiocampidae		
33	*Lebeda* sp.		Lasiocampidae		
34	*?Carriola* sp.		Lymantriidae		
35	*Arctornis* sp.		Lymantriidae		
36	*Artaxa* sp.		Lymantriidae		
37	*Lymantria brunneiplaga*	Swinhoe	Lymantriidae		
38	*Nygmia guttulata*	Snellen	Lymantriidae		
39	*Asota heliconia*	Linnaeus	Noctuidae	Aganainae	
40	*Artena inversa*	Walker	Noctuidae	Catocalinae	
41	*Bastilla crameri*	Moore	Noctuidae	Catocalinae	
42	*Bastilla fulvotaenia*	Guenee	Noctuidae	Catocalinae	
43	*Erebus ephesperis*	Hubner	Noctuidae	Catocalinae	
44	*Yepcalphis dilectissima*	Walker	Noctuidae	Hadeninae	
45	*Metaemene* sp.		Noctuidae		
46	Unidentified		Noctuidae?		Interesting moth
47	*Botyodes* sp.		Pyralidae		
48	*Glyphodes bivitralis*	Guenee	Pyralidae		
49	*Glyphodes militaris*	Munroe	Pyralidae		Endemic
50	*Heortia vitessoides*	Moore	Pyralidae		
51	*Syllepte* nr *fabiusalis*	Walker	Pyralidae		
52	Unidentified		Pyralidae		
53	*Xanthomelaena* sp.		Pyralidae		
54	*Attacus atlas*	Linnaeus	Saturniidae		
55	*Acosmeryx shervillii*	Boisduval	Sphingidae		
56	*Enpinanga borneensis*	Butler	Sphingidae		
57	*Hippotion rosetta*	Swinhoe	Sphingidae		
58	*Meganoton rufescens*	Butler	Sphingidae		

59	*Banisia* sp.		Thyrididae		
60	*Lyssa menoetius*	Hopffer	Uraniidae		
61	*Urapteroides astheniata*	Guenee	Uraniidae		

III. Beetles recorded from Timimbang-Botitian FR

No.	Species	Author	Family	Subfamily	Remarks
1	*Catoxantha opulenta borneensis*	Kurosawa	Buprestidae		
2	Unidentified		Chrysomelidae	Galerucinae	
3	*Calomera crespignyi*		Cicindelidae		
4	*Cosmodela aurulenta*	Fabricius	Cicindelidae		
5	*Heptodonta ?analis*		Cicindelidae		
6	Unidentified		Elateridae		
7	*Pseudozaena orientalis*	Klug	Harpalidae		
8	*Pteroptyx* sp.		Lampyridae		
9	*Cyclommatus cannaliculatus* ssp. *consanguineus*		Lucanidae		
10	*?Apogonia* sp.		Scarabaeidae		
11	*Anomala pallida*	(Fabricius)	Scarabaeidae		
12	*Anomala* sp.		Scarabaeidae		
13	*Apogonia* sp.		Scarabaeidae		
14	*Chalcosoma atlas*	Linnaeus	Scarabaeidae		
15	*Chalcosoma moellenkampi*	Kolbe	Scarabaeidae		Endemic
16	*Hoplia* sp. 1		Scarabaeidae		
17	*Hoplia* sp. 2		Scarabaeidae		
18	*Lepidiota stigma*	(Fabricius)	Scarabaeidae		
19	*Leucopholis staudingeri*	Brenske	Scarabaeidae		
20	*Parastasia* sp.		Scarabaeidae		
21	*Wadaia kaorui*		Scarabaeidae	Melolonthinae	
22	*Setenis* sp.		Tenebrionidae		

IV. Dragonflies and damselflies recorded from Timimbang-Botitian FR

No.	Species	Author	Family		Remarks
1	*Indaeschna grubaueri*	Forster	Aeshnidae		hw = 6cm, bl = 9cm, 134 m asl
2	*Devadatta podolestoides*	Laidlaw	Amphipterygidae		EK, Endemic
3	*Vestalis* sp.		Calopterygidae		
4	*Heliocypha biseriata*	(Selys)	Chlorocyphidae		Endemic
5	*Rhinocypha humeralis*	Selys	Chlorocyphidae		
6	*Agriocnemis femina*	(Brauer)	Coenagrionidae		
7	*Argiocnemis ?rubescens*	Selys	Coenagrionidae		
8	*Ceriagrion cerinorubellum*	(Brauer)	Coenagrionidae		
9	*Euphaea impar*	(Selys)	Euphaeidae		
10	*Euphaea* sp.		Euphaeidae		EK
11	*Ictinogomphus decoratus*	(Selys)	Gomphidae		

12	*Diplacodes trivialis*	(Rambur)	Libellulidae		
13	*Neurothemis fluctuans*	(Fabricius)	Libellulidae		
14	*Neurothemis ramburii*	(Brauer)	Libellulidae		
15	*Orthetrum chrysis*	(Selys)	Libellulidae		
16	*Orthetrum glaucum*	(Brauer)	Libellulidae		
17	*Orthetrum pruinosum*	Forster	Libellulidae		
18	*Orthetrum sabina*	(Drury)	Libellulidae		
19	*Orthetrum testaceum*	Burmeister	Libellulidae		
20	*Rhyothemis phyllis*	(Sulzer)	Libellulidae		
21	*Rhyothemis triangularis*	Kirby	Libellulidae		
22	*Tetrathemis irregularis*	Kirby	Libellulidae		
23	*Trithemis aurora*	(Burmeister)	Libellulidae		
24	*Trithemis festiva*	(Rambur)	Libellulidae		
25	*Coeliccia ?nigrohamata*	Laidlaw	Platycnemididae		ID by CYC, Endemic
26	*Coeliccia* sp.?		Platycnemididae		
27	*Copera vittata*	(Selys)	Platycnemididae		

V. Other insects recorded from Timimbang-Botitian FR

No.	Species	Author	Order	Family	Common name
1	*Discuspiditermes* sp.		Dictyoptera	Termitoidae	Termites
2	*Hospitalitermes* sp.		Dictyoptera	Termitoidae	Termites
3	*Macrotermes* sp.		Dictyoptera	Termitoidae	Termites
4	*Microcerotermes* sp.		Dictyoptera	Termitoidae	Termites
5	Unidentified		Diptera		Hornet-like Fly
6	*Mictis* sp.		Hemiptera	Coreidae	Stink Bug Nymphs
7	*Apis dorsata*	Fabricius	Hymenoptera	Apidae	Wild Honeybee
8	*Camponotus gigas*	(Latreille)	Hymenoptera	Formicidae	Giant Forest Ant
9	*Myrmicaria* sp.		Hymenoptera	Formicidae	Hunchback Ant
10	*Odontoponera denticulata*	Smith	Hymenoptera	Formicidae	Ponerine Ant
11	*Pohyrhachis armata*	(Le Guillou)	Hymenoptera	Formicidae	Spiky Ant
12	*Provespa anomala*	Saussure	Hymenoptera	Vespidae	Night Wasp
13	*Vespa* sp.		Hymenoptera	Vespidae	Wasp
14	*?Ephestiasula* sp.		Mantodea		Boxer Mantis
15	Unidentified		Neuroptera	Mantispidae	Pseudo Praying Mantis
16	Phasmida sp. 1		Phasmida		Stick Insect
17	Phasmida sp. 2		Phasmida		Stick Insect
18	*Marmessoidea rubescens*		Phasmida		Stick Insect
19	Phasmida sp. 3		Phasmida		Stick Insect

APPENDIX V: FAUNA SURVEY FORMS

Annex II – Night Spot Datasheet

Date: 8.5.2014 | Activity: Night Spot | Weather Before: Good | Form: 1/2014
Team Recorder: Wildlife Unit (US-M&Tim-Botitian) | Starting Point [GPS]: N 06 02 36.0 / E 117 17 11.9 | Weather After: Good
Starting Time: 7:50 pm | Ending Point [GPS]: N 06 02 01.6 / E 117 16 41.8 (EP) | Survey Route: Botitian Forest Reserve
Ending Time: 8:30 pm | Distance Covered (m): 1500m

No	Dist on the Road (m)	Time (12hrs)	Topo*	Habitat Type*	GPS Location		Alt (m)	Area/Cpt	Type of Sign*	Wildlife Species	No. of Object	Note (age, sex, food plants, tree species, etc)
					X_coor	Y_coor						
1	100	7:49 PM	3	3	117 17 12.1	06 02 31.8	33	Botition	1	Thomas flying squirrel	1	GPS ID: P1
2	900	8:01 PM	3	3	117 16 50.7	06 02 11.4	35	Botition	1	Red giant flying squirrel	1	GPS ID: P2

Note *:
Habitat Type*: 1- Lowland (< 500m), 2- Upland (>500m), 3- Dry Lowland, 4- Open Area, 5- Semi Inundated, 6- Swamp, 7- River, 8- Riparian
Topo: 1: Flat, 2: 0-10°, 3: 10°-45°, 4: >45°, 5: Top Ridge , 6: Undulating
Type of Sign*: 1- Direct Sighting, 2- footprint, 3- dung, 4- Calling, 5- Feeding Sign, 7- Claw Mark, 8- Mud Rubbing, 9- Urine, 10- Wallow, 11- Twisted, 12- Nest

Date: 9.5.2014 | Activity: Night Spot | Weather Before: Raining | Form: 1/2014
Team Recorder: Wildlife Unit (US-M&Tim- Botitian) | Starting Point [GPS]: N 06 05 58.0 / E 117 13 18.7 | Weather After: Drizzling
Starting Time: 7:45 pm | Ending Point [GPS]: N 06 07 04.7 / E 117 10 23.7 | Survey Route: Timimbang Forest Reserve (Part A)
Ending Time: 8:41 pm | Distance Covered (m): 8700m

No	Dist on the Road (m)	Time (12hrs)	Topo*	Habitat Type*	GPS Location		Alt (m)	Area/Cpt	Type of Sign*	Wildlife Species	No. of Object	Note (age, sex, food plants, tree species, etc)
					X_coor	Y_coor						
1	100	7:49 PM	3	3	117 13 14.0	06 05 56.9	355	Tim A	1	Leopard cat	1	GPS ID:035
2	1900	8:01 PM	3	3	117 12 33.4	06 05 36.1	482	Tim A	1	Malay civet	1	GPS ID:036
3	2100	8:03 PM	3	3	117 12 29.3	06 05 41.3	489	Tim A	1	Crested serpent eagle	1	GPS ID:037
4	2400	8:06 PM	3	3	117 12 22.4	06 05 45.1	498	Tim A	1	Leopard cat	1	GPS ID:038
5	3700	8:15 PM	3	3	117 11 48.5	06 05 58.3	489	Tim A	1	Thomas flying squirrel	1	GPS ID:039

Note *:
Habitat Type*: 1- Lowland (< 500m), 2- Upland (>500m), 3- Dry Lowland, 4- Open Area, 5- Semi Inundated, 6- Swamp, 7- River, 8- Riparian
Topo: 1: Flat, 2: 0-10°, 3: 10°-45°, 4: >45°, 5: Top Ridge , 6: Undulating
Type of Sign*: 1- Direct Sighting, 2- footprint, 3- dung, 4- Calling, 5- Feeding Sign, 7- Claw Mark, 8- Mud Rubbing, 9- Urine, 10- Wallow, 11- Twisted, 12- Nest

Date: 12.5.2014 | Activity: Night Spot | Weather Before: Good | Form: 1/2014

Team Recorder: Wildlife Unit (US-M&Tim- Botitian) | Starting Point [GPS]: N 05 59 35.7 / E 117 06 17.5 (075) | Weather After: Good

Starting Time: 8:00 pm | Ending Point [GPS]: N 05 59 47.0 / E 117 05 31.5 (076) | Survey Route: Timimbang Forest Reserve (Part B)

Ending Time: 8:22pm | Distance Covered (m): 2000m

No	Dist on the Road (m)	Time (12hrs)	Topo*	Habitat Type*	GPS Location		Alt (m)	Area/Cpt	Type of Sign*	Wildlife Species	No. of Object	Note (age, sex, food plants, tree species, etc)
					X_coor	Y_coor						
No wildlife detection during survey, open area (degraded forest), Restoration Project area, Closest to OPP, speed limitation (15-20 km/hr), food availability												

Note *:

Habitat Type*: 1- Lowland (< 500m), 2- Upland (>500m), 3- Dry Lowland, 4- Open Area, 5- Semi Inundated, 6- Swamp, 7- River, 8- Riparian

Topo: 1: Flat, 2: 0-10°, 3: 10°-45°, 4: >45°, 5: Top Ridge , 6: Undulating

Type of Sign*: 1- Direct Sighting, 2- footprint, 3- dung, 4- Calling, 5- Feeding Sign, 7- Claw Mark, 8- Mud Rubbing, 9- Urine, 10- Wallow, 11- Twisted, 12- Nest

Annex III – Morning Drive Datasheet

Date: 10.5.2014 | Activity: morning drive | Weather Before: good | Form: 1/2014
Team Recorder: RB, ZK, SA & YJ | Starting Point [GPS]: N 06 05 58.0 / E 117 13 18.7 | Weather After: good
Starting Time: 5:50 am | Ending Point [GPS]: N 06 07 04.7 / E 117 10 23.7 | Survey Route: Timimbang Forest Reserve (Part A)
Ending Time: 7:04 am | Distance Covered (m): 8700m

No	Dist on the Road (m)	Time (12hrs)	Topo*	Habitat Type*	GPS Location		Alt (m)	Area/Cpt	Type of Sign*	Wildlife Species	No. of Object	Note (age, sex, food plants, tree species, etc)
					X_coor	Y_coor						
1	220	6:02 AM	3	2	117 12 31.1	06 05 38.6	506	Tim A	1	Wreathed Hornbill	1	GPS ID: 041
2	3000	6:07 AM	3	2	117 12 09.1	06 05 58.8	537	Tim A	1	Red leaf monkey	4	GPS ID: 042
3	3000	6:09 AM	3	2	117 12 09.5	06 05 58.7	537	Tim A	4	Bornean gibbon		GPS ID: 043
4	3000	6:09 AM	3	2	117 12 09.5	06 05 58.7	537	Tim A	4	Rhinoceros hornbill		GPS ID: 043
5	3900	6:13 AM	3	2	117 11 44.7	06 06 01.3	503	Tim A	2	Wild pig		GPS ID: 044
6	3900	6:13 AM	3	2	117 11 44.7	06 06 01.3	503	Tim A	4	Great Argus		GPS ID: 044
7	4100	6:16 AM	3	3	117 11 39.5	06 06 02.9	482	Tim A	4	Great Argus		GPS ID: 045
8	4100	6:16 AM	3	3	117 11 39.5	06 06 02.9	482	Tim A	1	Crested serpent eagle	1	GPS ID: 045
9	4100	6:16 AM	3	3	117 11 39.5	06 06 02.9	482	Tim A	4	Rhinoceros hornbill		GPS ID: 045
10	4200	6:19 AM	3	3	117 11 37.2	06 06 04.2	469	Tim A	4	Great Argus		GPS ID: 046
11	4400	6:25 AM	3	3	117 11 32.4	06 06 10.0	444	Tim A	4	Rhinoceros hornbill		GPS ID: 047
12	4400	6:25 AM	3	3	117 11 32.4	06 06 10.0	444	Tim A	4	Great Argus		GPS ID: 047
13	4600	6:29 AM	3	3	117 11 29.1	06 06 14.6	446	Tim A	1	Bornean gibbon	3	GPS ID: 048
14	4600	6:34 AM	3	3	117 11 28.3	06 06 16.1	441	Tim A	4	Bornean gibbon		GPS ID: 050
15	4600	6:34 AM	3	3	117 11 28.3	06 06 16.1	441	Tim A	4	Great Argus		GPS ID: 050
16	4600	6:34 AM	3	3	117 11 28.3	06 06 16.1	441	Tim A	2	Barking deer		GPS ID: 050
17	4900	6:37 AM	3	3	117 11 27.2	06 06 17.5	442	Tim A	4	Rhinoceros hornbill		GPS ID: 051
18	5300	6:41 AM	3	3	117 11 22.9	06 06 26.8	428	Tim A	1	Crested serpent eagle	1	GPS ID: 052
19	5500	6:43 AM	3	3	117 11 19.8	06 06 38.1	397	Tim A	1	Wild pig	2	GPS ID: 053
20	5900	6:50 AM	3	3	117 11 17.9	06 06 48.1	349	Tim A	4	Great Argus		GPS ID: 054
Wildlife encountered:												
1	Oriental pied hornbill (4 ind), GPS ID:055, on the tree, vocalizing & flying											

Note *:
Habitat Type*: 1- Lowland (< 500m), 2- Upland (>500m), 3- Dry Lowland, 4- Open Area, 5- Semi Inundated, 6- Swamp, 7- River, 8- Riparian
Slope: 1: Flat, 2: 0-10°, 3: 10°-45°, 4: >45°, 5: Top Ridge , 6: Undulating
Type of Sign*: 1- Direct Sighting, 2- footprint, 3- dung, 4- Calling, 5- Feeding Sign, 7- Claw Mark, 8- Mud Rubbing, 9- Urine, 10- Wallow, 11- Twisted, 12- Nest

Annex IV – Recce Walks Datasheet

Date: 9.05.2014 | Activity: recce walk | Weather Before: Good | Form: 1/2014

Team Recorder: Wildlife unit (USM & Tim- Botitian) | Starting Point [GPS]: N06°01'19.0"E117°20'28.0" | Weather After: Good

Starting Time: 6:15 AM | Ending Point [GPS]: N06°00'53.9"E117°20'00.9" | Survey Route: Botitian FR (Class I)

Ending Time: 9:21 AM | Distance Covered (m): 1895m

No	Dist on the Road (m)	Time (12hrs)	Topo*	Habitat Type*	GPS Location		Alt (m)	Area/Cpt	Type of Sign*	Wildlife Species	No. of Object	Note (age, sex, food plants, tree species, etc)
					x_coor	y_coor						
1	150	6:31 AM	3	1	117°20'24.0"	06°01'19.3"	47	Botition	2/8	Wild pig	# #	GPS ID:024
2	284	6:48 AM	3	1	117°20'19.0"	06°01'15.5"	55	Botition	2/13	Sambar Deer	#	GPS ID:025
3	348	6:55 AM	3	1	117°20'17.0"	06°01'15.7"	41	Botition	4	Great Argus	#	GPS ID:026
4	454	7:06 AM	2	1	117°20'16.0"	06°01'14.9"	32	Botition	2	Wild pig	# #	GPS ID:027
5	511	7:14 AM	2	1	117°20'15.1"	06°01'12.3"	41	Botition	2	Wild pig	# #	GPS ID:028
6	561	7:19 AM	2	1	117°20'15.1"	06°01'12.3"	32	Botition	2	Sambar Deer	#	GPS ID:029
7	761	7:39 AM	2	1	117°20'03.9"	06°01'08.4"	75	Botition	2/10	Wild pig	# #	GPS ID:030
Data from interviews (SFD Botition):												
1	Sun bear (2008)											
2	Reticulated python (March 2014)											
3	Bornean gibbon (vocalizing)											

Note *:

Habitat Type*: 1- Lowland (< 500m), 2- Upland (>500m), 3- Dry Lowland, 4- Open Area, 5- Semi Inundated, 6- Swamp, 7- River, 8- Riparian

Slope/Topo: 1: Flat, 2: 0-10°, 3: 10°-45°, 4: >45°, 5: Top Ridge , 6: Undulating

Type of Sign*: 1- Direct Sighting, 2- footprint, 3- dung, 4- Calling, 5- Feeding Sign, 7- Claw Mark, 8- Mud Rubbing, 9- Urine, 10- Wallow, 11- Twisted, 12- Nest, 13-horn marked

Date: 10.05.2014 | Activity: Recce walk | Weather Before: Good | Form: 1/2014

Team Recorder: Wildlife unit (USM & Tim-Boti) | Starting Point [GPS]: N06°04'10.9"E117°15'03.4" (056) | Weather After: Good

Starting Time: 10:02 AM | Ending Point [GPS]: N06°04'09.3"E117°14'46.1" (074) | Survey Route: Timimbang A FR (Class II)

Ending Time: 1:04 PM | Distance Covered (m): 1650m

No	Dist on the Road (m)	Time (12hrs)	Topo*	Habitat Type*	GPS Location		Alt (m)	Area/Cpt	Type of Sign*	Wildlife Species	No. of Object	Note (age, sex, food plants, tree species, etc)
					x_coor	y_coor						
1		10:12 AM	2	1	117°15'05.2"	06°04'13.3"	90	Tim A	4	Great Argus	#	GPS ID:057
2		10:12 AM	2	1	117°15'05.2"	06°04'13.3"	90	Tim A	4	Bornean gibbon	#	GPS ID:057
3		10:24 AM	2	1	117°15'00.5"	06°04'17.7"	108	Tim A	13	Sambar Deer	#	GPS ID:058
4		10:24 AM	2	1	117°15'00.5"	06°04'17.7"	108	Tim A	4	Great Argus	#	GPS ID:058
5		10:29 AM	2	1	117°14'58.5"	06°04'17.8"	116	Tim A	1	Bornean gibbon	2	GPS ID:059
6		10:37 AM	2	1	117°14'56.5"	06°04'18.7"	125	Tim A	4	Great Argus	#	GPS ID:060
7		10:39 AM	2	1	117°14'56.1"	06°04'18.6"	128	Tim A	4	Great Argus	# #	GPS ID:061
8		10:57 AM	2	1	117 14 55.1	06 04 19.1	137	Tim A	4	Great Argus	#	GPS ID:062
9		10:59 AM	2	1	117 14 54.3	06 04 19.4	139	Tim A	8	Wild pig	#	GPS ID:063
10		11:37 AM	2	1	117 14 49.5	06 04 25.0	140	Tim A	1	Bornean gibbon	1	GPS ID:065
11		11:42 AM	2	1	117 14 49.1	06 04 26.6	134	Tim A	8	Wild pig	#	GPS ID:066
12		11:51 AM	2	1	117 14 49.9	06 04 28.7	122	Tim A	7	Sun bear	#	GPS ID:067
13		11:51 AM	2	1	117 14 49.9	06 04 28.7	122	Tim A	4	Rhinoceros hornbill	#	GPS ID:067
14		11:59 AM	2	1	117 14 50.3	06 04 28.7	124	Tim A	4	Bornean gibbon	#	GPS ID:068
15		12:13 PM	2	1	117 14 48.0	06 04 24.9	115	Tim A	2/10	Wild pig	# #	GPS ID:069
16		12:18 PM	2	1	117 14 48.4	06 04 24.8	127	Tim A	7	Sun bear	#	GPS ID:070
17		12:21 PM	2	1	117 14 49.2	06 04 24.7	142	Tim A	2/10	Wild pig	# #	GPS ID:071, active wallow
18		12:33 PM	2	1	117 14 47.4	06 04 19.3	100	Tim A	7	Clouded leopard	#	GPS ID:072
19		1:00 PM	2	1	117 14 42.0	06 04 12.0	42	Tim A	2/3	Wild pig	# #	GPS ID:073
* Human sign (old cutting sign) found during the survey, could be poachers												
Data from interviews (SFD Botitian):												
1	Orangutan, 2007 (walking on the ground)											

Note *:

Habitat Type*: 1- Lowland (< 500m), 2- Upland (>500m), 3- Dry Lowland, 4- Open Area, 5- Semi Inundated, 6- Swamp, 7- River, 8- Riparian

Slope/Topo: 1: Flat, 2: 0-10°, 3: 10°-45°, 4: >45°, 5: Top Ridge , 6: Undulating

Type of Sign*: 1- Direct Sighting, 2- footprint, 3- dung, 4- Calling, 5- Feeding Sign, 7- Claw Mark, 8- Mud Rubbing, 9- Urine, 10- Wallow, 11- Twisted, 12- Nest, 13-horn marked

Date: 13.5.2014 | Activity: recce walk | Weather Before: Good | Form: 1/2014
Team Recorder: Wildlife Unit (US-M&Tim- Botitian) | Starting Point [GPS]: N 05 59 35.7 / E 117 06 17.5 (075) | Weather After: Good
Starting Time: 6:00 am | Ending Point [GPS]: N 05 59 47.0 / E 117 05 31.5 (076) | Survey Route: Timimbang B (class II) - old logging road
Ending Time: 7:53 am | Distance Covered (m): 2000m

No	Dist on the Road (m)	Time (12hrs)	Topo*	Habitat Type*	GPS Location		Alt (m)	Area/Cpt	Type of Sign*	Wildlife Species	No. of Object	Note (age, sex, food plants, tree species, etc)
					X_coor	Y_coor						
1		6:05 AM	2	1 (open)	117 06 17.2	05 59 35.8	86	Tim B	calling	Bornean gibbon	#	GPS ID: 077
2		6:09 AM	2	1 (open)	117 06 13.3	05 59 35.5	88	Tim B	sighted	Long tailed macaque	3	GPS ID:078
3		6:13 AM	2	1 (open)	117 06 09.8	05 59 35.3	91	Tim B	calling	Bornean gibbon	#	GPS ID:079, heard from the road
4		6:17 AM	2	1 (open)	117 06 05.3	05 59 32.3	87	Tim B	prints	Wild pig	##	GPS ID:080, fresh prints
5		6:20 AM	2	1 (open)	117 06 05.0	05 59 32.4	86	Tim B	prints	Common palm civet	1	GPS ID:081, fresh print
6		6:23 AM	2	1 (open)	117 06 04.5	05 59 32.1	85	Tim B	prints	Sambar deer	1	GPS ID:082, fresh print
7		6:27 AM	2	1 (open)	117 06 00.0	05 59 29.6	80	Tim B	calling	Great Argus	#	GPS ID:083
8		6:29 AM	2	1 (open)	117 05 59.1	05 59 29.1	79	Tim B	prints	Wild pig	#	GPS ID:084, fresh prints
9		6:30 AM	2	1 (open)	117 05 58.7	05 59 29.2	78	Tim B	prints	Sambar deer	#	GPS ID:085, fresh prints
10		6:35 AM	2	1 (open)	117 05 57.3	05 59 28.4	79	Tim B	prints	Wild pig	##	GPS ID:086, fresh prints
11		6:37 AM	2	1 (open)	117 05 55.0	05 59 28.2	87	Tim B	sighted	Black hornbill	3	GPS ID:087, resting and flying
12		6:40 AM	2	1 (open)	117 05 52.7	05 59 29.7	81	Tim B	prints	Wild pig	##	GPS ID:088, frsh prints
13		6:46 AM	2	1 (open)	117 05 48.2	05 59 26.9	93	Tim B	sighted	Black hornbill	1	GPS ID:089
14		6:48 AM	2	1 (open)	117 05 50.0	05 59 28.5	94	Tim B	Dung	Bornean elephant	#	GPS ID:090, only one ind.
15		6:51 AM	2	1 (open)	117 05 47.9	05 59 26.6	91	Tim B	prints	Wild pig	#	GPS ID:091, fresh prints
16		6:51 AM	2	1 (open)	117 05 47.9	05 59 26.6	91	Tim B	calling	Great Argus	#	GPS ID:091
17		6:53 AM	2	1 (open)	117 05 46.8	05 59 25.8	90	Tim B	prints	Sambar deer	2	GPS ID:092, infant + mother (fresh prints)
18		6:58 AM	2	1 (open)	117 05 46.6	05 59 24.6	90	Tim B	Dung	Civet sp.	1	GPS ID:093
19		7:02 AM	2	1 (open)	117 05 43.9	05 59 24.8	90	Tim B	calling	Great Argus	#	GPS ID:094, heard from the road
20		7:04 AM	2	1 (open)	117 05 42.4	05 59 24.1	89	Tim B	prints	Wild pig	##	GPS ID:095, fresh prints
21		7:06 AM	2	1 (open)	117 05 38.2	05 59 23.8	90	Tim B	sighted	Crested serpent eagle	1	GPS ID:096
22		7:09 AM	2	1 (open)	117 05 37.4	05 59 25.9	93	Tim B	prints	Wild pig	#	GPS ID:097
23		7:17 AM	2	1 (open)	117 05 37.3	05 59 26.8	88	Tim B	prints	Malay badger	1	GPS ID:098
24		7:17 AM	2	1 (open)	117 05 37.3	05 59 26.8	88	Tim B	calling	Great Argus	1	GPS ID:098, heard from road
25		7:23 AM	2	1 (open)	117 05 38.3	05 59 29.9	112	Tim B	print	Bornean elephant	1	GPS ID:099
26		7:23 AM	2	1 (open)	117 05 38.3	05 59 29.9	112	Tim B	calling	Bornean gibbon	1	GPS ID:099
27		7:28 AM	2	1 (open)	117 05 36.0	05 59 33.4	101	Tim B	prints	Leopard cat	1	GPS ID:100, small print with 4 toes
28		7:32 AM	2	1 (open)	117 05 34.7	05 59 34.2	90	Tim B	sighted	Oriental pied hornbill	2	GPS ID:101
29		7:32 AM	2	1 (open)	117 05 34.7	05 59 34.2	90	Tim B	prints	Wild pig	##	GPS ID:101
30		7:35 AM	2	1 (open)	117 05 33.7	05 59 35.5	91	Tim B	calling	Bornean gibbon	##	GPS ID:102, heard from the road

31		7:38 AM	2	1 (open)	117 05 33.9	05 59 37.0	92	Tim B	print	Leopard cat	1	GPS ID:103
32		7:38 AM	2	1 (open)	117 05 33.9	05 59 37.0	92	Tim B	calling	Great argus	#	GPS ID:103
33		7:40 AM	2	1 (open)	117 05 33.4	05 59 38.6	94	Tim B	print	Wild pig	##	GPS ID:104
34		7:43 AM	2	1 (open)	117 05 32.0	05 59 42.8	105	Tim B	prints	Wild pig	##	GPS ID:105
35		7:48 AM	2	1 (open)	117 05 31.9	05 59 46.6	89	Tim B	print	Bearcat / Binturong	1	GPS ID:106
36		7:48 AM	2	1 (open)	117 05 31.9	05 59 46.6	89	Tim B	prints	Wild pig	##	GPS ID:106
* found flatform (GPS ID:101, less one month old-poacher)												
Note *: Habitat Type*: 1- Lowland (< 500m), 2- Upland (>500m), 3- Dry Lowland, 4- Open Area, 5- Semi Inundated, 6- Swamp, 7- River, 8- Riparian Topo: 1: Flat, 2: 0-10°, 3: 10°-45°, 4: >45°, 5: Top Ridge , 6: Undulating Type of Sign*: 1- Direct Sighting, 2- footprint, 3- dung, 4- Calling, 5- Feeding Sign, 7- Claw Mark, 8- Mud Rubbing, 9- Urine, 10- Wallow, 11- Twisted, 12- Nest												

Annex V – Opportunistic Wildlife Sighting

Recorder	Date	Time (12hrs)	Type of sign's	Wildlife Species	No. of detection	Weather*	Habitat Type*	Canopy Cover	GPS Coordinate		Alt (m)	Area / Cpt	Sex*	Age*	Note
									X_coor	Y_coor					
US-M wildlife team	7.05.2014	6:15 PM	DS	PTM	> 10 Ind.	good							unknown	unknown	near Timimbang-Botitian office
US-M wildlife team	8.05.2014	6:55 AM	calling	Bornean gibbon	1	good							unknown	unknown	heard from T-B office
US-M wildlife team	8.05.2014	6:55 AM	calling	Great argus	1	good									
US-M wildlife team	8.5.2014	7:46 PM	sighting	wild pig	2	good	OPP					Botition		adult	sight before night spot
Tim-Boti & US-M	8.5.2014	8:35 PM	sighting	slow loris	1	good	1		117 17 04.5	06 02 21.8		Botition	unknown	Juv.	sight after night spot (gps id:P3)
Note Wildlife species that need to records:* i. Carnivores - Bay cat, Clouded Leopard, Marble Cat, Sun Bear, Oriental Small - Clawed Otter, Binturong & Otter Civet ii. Pangolin iii. Pygmy elephant iv. Rhino v. Birds - All Hornbill Species vi. Primates - Red leaf monkey, Grey leaf monkey, Slow Loris, Western tarsier, Orang Utan, Proboscis monkey, Pig tailed macaque, Long tailed macaque & Silvered langur vii. Ungulates - Tembadau, Mouse Deer, Sambar deer & Muntjac/Barking deer															

Annex VI – Camera Trapping

CT ID Number	X_Coor	Y_Coor	Location / Area/Cpt	Date set-up	Date checked	Disturbed	Battery (%)_Old	Battery (%)_New	No. of Photo	Wildlife Species	No. of Images	Percentage %	Note
Boti CT1	117 19 57.5	06 00 59.0	Botitian FR	9.5.2014	22.05.2014	nill	66	98	14	Nil	0	0.00	GPS ID:031, old l.road (ridge), CT-USM
Boti CT2	117 20 27.8	06 01 21.6	Botitian FR	9.5.2014	22.05.2014	nill		-	138	Pig tailed macaque	112	81.16	GPS ID:033, ridge, CT-Tim
										none	26	18.84	
Timi (A) CT 1	117 12 32.2	06 05 30.8	Timimbang A	10.5.2014	22.05.2014			92	20	Bearded pig	5	25.00	GPS ID:055, old logging road, CT-USM
										none	15	75.00	
Tim (A) CT 2	117 14 53.8	06 04 20.4	Timimbang A	10.5.2014	22.05.2014	yes		-	808	Malay civet	4	0.50	GPS ID:064, top ridge, CT-Tim
										Mouse deer	4	0.50	
										Great argus	496	61.39	
										Pig tailed macaque	143	17.70	
										Bearded pig	13	1.61	
										none	147	18.19	
Tim (B) CT1	117 05 36.3	05 59 26.8	Timimbang B	13.5.2014	21.05.2014	nill	40	84	20	Pig tailed macaque	12	60.00	GPS ID:107, wildlife trail, CT-USM
										Sun bear	3	15.00	
										none	5	25.00	
Tim (B) CT2	117 05 35.5	05 59 26.7	Timimbang B	13.5.2014	21.05.2014	nill		-	32	Wild pig	14	43.75	GPS ID:108. wildlife trail, CT-Tim
										Pig tailed macaque	2	6.25	
										none	16	50.00	
Tim (B) CT3	117 05 51.3	05 59 26.8	Timimbang B	13.5.2014	21.05.2014	nill		-	18	Barking deer	2	11.11	GPS ID:109, ridge (old l. road), CT-Tim
										Mouse deer	2	11.11	
										Sambar deer	2	11.11	
										none	12	66.67	

APPENDIX 6a: Pre SBS Survey Forms

DATA PERKAMPUNGAN / PERTANIAN
DALAM HUTAN SIMPAN KERAJAAN NEGERI SABAH

BORANG SFM/Pre-SBS/A1

Maklumat Am

No Siri	
Pejabat Perhutanan	
Nama Hutan Simpan	
Kelas HS	
Keluasan HS (ha)	
Tahun Diwartakan	
Maklumat Kampung	
* Nama Kampung	
* Tarikh Kampung Wujud/Dibuka/Bermula	
* Jumlah Rumah	
* Bilangan Ketua Keluarga	
* Jumlah Keseluruhan Penduduk	
* Suku Utama	
* % Warganegara Malaysia	
* Ugama Majoriti	
Maklumat Kawasan	
* Luas Kampung (ekar)	
Peratus drp Keluasan HS (%) (jika dalam HS)	
* Luas Kawasan Ladang dalam HS (ekar)	
Peratus drp Keluasan HS (%)	
* Jenis Tanaman Utama	
Peta Lokasi Rumah & Ladang	Ada / Tiada Dikepilkan
Gambar Rumah & Ladang	Ada / Tiada Dikepilkan
GPS Kampung	N E
* Infrastruktur Sedia-ada & Kualiti (Tandakan √)	

Jalanraya		Balairaya		TADIKA:		Lain^2	
Rumah		Dewan		Padang		Lain^2	
Air		Surau		Gelanggang		Lain^2	
Letrik		Gereja		Telefon		Lain^2	
Klinik		Sekolah		Perkhidmat		Lain^2	

Untuk diisikan oleh wakil penduduk kampung.

Sila lampirkan:

1. Peta Lokasi Perumahan & Perladangan
2. Gambar Perumahan & Perladangan.
3. Borang SFM/Pre-SBS-A2 (Senarai Penduduk)

BORANG SENARAI PENDUDUK
PERKAMPUNGAN / PERTANIAN DALAM
HUTAN SIMPAN KERAJAAN NEGERI SABAH

BORANG SFM/Pre-SBS/A2

Nama Kampung:		
Nama Daerah:		
Nama Ketua Kampung:		*No. Handfon*
Nama Pengerusi JKKK:		*No. Handfon*
Nama Orang Penghubung:		*No. Handfon*

No	***Nama Ketua Keluarga***	***No. Kad Pengenalan***	***Kampung & Daerah Asal***	***Jumlah Ahli Keluarga*** *(termasuk Ketua Keluarga)*	***Luas Tanah/ Ladang (ekar)***	
					Dalam Hutan Simpan	**Luar Hutan Simpan**
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
22						
23						
			Jumlah:			

Sila fotokopi borang ini untuk memuatkan keseluruhan jumlah keluarga dalam kampung ini

APPENDIX 6b: SBS Community Survey Forms

BORANG SOALSELIDIK SBS KOMUNITI

JABATAN PERHUTANAN SABAH

KAJIAN SBS (SOCIAL BASELINE SURVEY)
TERHADAP KOMUNITI DALAM & PERSEKITARAN
HUTAN SIMPAN KERAJAAN NEGERI SABAH

PROJEK HEART OF BORNEO

BORANG SOALSELIDIK KOMUNITI

Terimakasih atas kesudian dan kerjasama tuan/puan dalam melengkapkan borang soalselidik ini.

Soalselidik ini bertujuan untuk mengumpul maklumat SBS daripada penduduk-penduduk di sekitar kawasan Hutan-hutan Simpan Kerajaan Negeri Sabah. Kajian SBS (Social Baseline Survey – Survei Garisdasar Sosial) bertujuan untuk mengetahui maklumat asas komuniti daripada pelbagai aspek sosial, ekonomi dan perhutanan.

Semua maklumat yang diperolehi adalah SULIT. Penyertaan tuan/puan di dalam kajian ini adalah penting dan merupakan sumbangan produktif tuan/puan terhadap pembangunan Negeri Sabah dan amnya Negara Malaysia.

ARAHAN:

1. ***BORANG INI ADALAH KHAS UNTUK PEMIMPIN KAMPUNG (TERUTAMANYA PENGERUSI JKKK).***
2. ***BORANG INI HENDAKLAH DITANDA ATAU DIISI OLEH PIHAK PENGKAJI.***
3. ***PEMIMPIN KAMPUNG JUGA HARUS MENGISI BORANG SOALSELIDIK KELUARGA.***

No. Borang. ____

Tarikh:		Nama Kampung			
Nama Penemuduga:		Nama Responden:			
Masa Mula:		No. Kad Pengenalan:		Umur:	
Masa Tamat:		Status dlm Kg:			

A. INFORMASI KAMPUNG

1. Daerah Perhutanan:		5. Nama Ketua Kampung:	
2. Wilayah Perhutanan:		6. Nama Pengerusi JKKK:	
3. Tahun Penubuhan Kg:		7. Kedudukan Perumahan:	DALAM / LUAR Hutan Simpan
4. Asas/Mengapa Kampung Ditubuhkan:		8. Kedudukan Perladangan	DALAM / LUAR Hutan Simpan

B. CIRI-CIRI PENEMPATAN *(Isikan maklumat atau bulatkan di abjad berkenaan)*

1. Bentuk penempatan: a. Tertumpu b. Tersebar c. Lurus d. Tiada bentuk tertentu e. Rumah panjang
2. Perhubungan kampung: a. Jalan b. Sungai c. Jln Balak d. Lain2 (Nyatakan):_____
3. Pekan/Bandar terdekat: _____ Jarak (batu): _____

4. Tumbuhan Sekitar Kampung: a. Hutan Telah Dibalak b. Bekas Ladang c. Lalang d. Tanaman Pertanian e. Lain2:_____

C. INFORMASI DEMOGRAFI

1.	Bilangan rumah:		1.1. Bilangan keluarga:			
2.	Bilangan penduduk:					
3.	Bangsa/Kumpulan Etnik :					
4.	Ugama (% Bil. Keluarga):	a. Islam:		b. Kristian:		c. Lain2:
5.	Pengurusan Kampung:	a. Ket. Kampung	b. JKKK	c. KAN (Ket Anak Negeri)	d. Wakil KAN	e. Lain2:_____
6.	Organisasi Tempatan:	a. Koperatif	b. Persatuan Peladang	c. Badan Ugama	d. Lain2: _____	

D. INFRASTRUKTUR KAMPUNG

Air Minum (Sumber):	a. Jab. Air	b. Sungai	c. Hujan	d. Perigi	e. Air graviti	f. Lain2:_____
1.1. Nama Sungai:		1.2. Nama sungai punca air graviti:			
Air utk Mencuci, dll.	a. Jab. Air	b. Sungai	c. Hujan	d. Perigi	e. Air graviti	f. Lain2:_____
2.1. Nama Sungai:					
Bekalan Elektrik:	a. SESB	b. Janakuasa	c. Lampu Minyak	d. Lain2:_____	
Pelupusan Sampah:	a. Tanah Korek	b. Majlis Daerah	c. Membakar	d. Sungai	e. Lain2:_____
Pelupusan Bahan Kumuhan:	a. Tandas Pam	b. Tandas Siram	c. Tandas Lubang	d. Tandas Kongsi	e. Lain2:_____
Tele-komunikasi:	a. Tiada	b. Telekom	c. Telefon Bimbit	d. Lain2:_____	
Khidmat Perubatan:	a. Tiada	b. Klinik Desa	c. Hospital Daerah	d. Dr Udara	e. Lain2:_____
7.1. Bilangan Dr.:		7.2. Bilangan Pembantu Perubatan.:			
Bangunan Ibadat:	a. Masjid	b. Surau	c. Gereja	d. Kuil	e. Tanah Perkuburan
8.1. Lokasi Tanah Perkuburan		8.2 Kaedah Penguburan Tradisi atau Moden?:			
Lain2 Kemudahan Awam:	a. Balairaya	b. Padang	c. Rumah rehat	d. Lain2:_____	
Kedai/ Pasar	a. Bil Kedai.		b. Bil Gerai.		c. Bil Pasar.	

11. TADIKA (Nama):		Bil Kelas		Bil Murid:	
11.1 Sekolah Rendah (Nama):		Lokasi		Jarak	
12. Sek. Menengah (Nama):		Lokasi		Jarak	
13. Jabatan Kerajaan (yg ada di kampung):					
14. Projek Pembangunan Dulu & Akan Datang:					

E. AKTIVITI EKONOMI

1.	Aktiviti Ekonomi Utama:	a. Perkebunan	b. Perikanan	c. Perladangan Sawit	d. Perladangan Getah	e. Lain2:_____
2.	Perkebunan:	Jumlah Luas Ladang Kampung (ekar):		Jumlah Luas Ladang yang termasuk di dalam Hutan Simpan (ekar):		
3.	Tanaman Utama (Makanan):					
4.	Tanaman Utama (Jualan)					
5.	Haiwan Peliharaan Utama:					
6.	Status Tanah Kampung:	a. Bergeran	b. Dlm Permohonan	c. Native Title	d. Country Lease	e. Tanah Kampung
7.	Kegunaan Hutan:	a. Kayu api	b. Bahan binaan	c. Sumber makanan	d. Kraftangan	e. Lain2:_____
8.	Kerja Luar-Masa-Berkebun Penduduk:					

F. MASALAH UTAMA KAMPUNG DAN CADANGAN MENGATASI

	Masalah Sosial	Cadangan Mengatasi Masalah
1		
2		
3		
	Masalah Ekonomi	Cadangan Mengatasi Masalah
1		
2		
3		
	Masalah Perhutanan	Cadangan Mengatasi Masalah
1		
2		
3		

SEKIAN DAN TERIMA KASIH DI ATAS KERJASAMA TUAN/PUAN,
DAN SALAM 1-MALAYSIA.

APPENDIX 5: BORANG SOALSELIDIK SBS KELUARGA

JABATAN PERHUTANAN SABAH

KAJIAN SBS (SOCIAL BASELINE SURVEY) TERHADAP KOMUNITI DALAM & PERSEKITARAN HUTAN SIMPAN KERAJAAN NEGERI SABAH

PROJEK HEART OF BORNEO

BORANG SOALSELIDIK KELUARGA

Ver.2(3/3/2014)

Terimakasih atas kesudian dan kerjasama tuan/puan dalam melengkapkan borang soalselidik ini.

Soalselidik ini bertujuan untuk mengumpul maklumat SBS daripada penduduk-penduduk di sekitar kawasan Hutan-hutan Simpan Kerajaan Negeri Sabah. Kajian SBS (Social Baseline Survey – Survei Garisdasar Sosial) bertujuan untuk mengetahui maklumat asas komuniti daripada pelbagai aspek sosial, ekonomi dan perhutanan.

Semua maklumat yang diperolehi adalah SULIT. Penyertaan tuan/puan di dalam kajian ini adalah penting dan merupakan sumbangan produktif tuan/puan terhadap pembangunan Negeri Sabah dan amnya Negara Malaysia.

ARAHAN:

4. ***BORANG INI HENDAKLAH DITANDA DAN DIISI SEPENUHNYA OLEH PIHAK PEMBANCI.***
5. ***SILA TULIS DENGAN JELAS, RINGKAS DAN TEPAT.***
6. ***PEMIMPIN KAMPUNG JUGA HARUS MENGISI BORANG SOALSELIDIK KOMUNITI.***

No. Borang:

Tarikh:		Nama Kampung			
Nama Penemuduga:		Nama Responden:			
Masa Mula:		No. Kad Pengenalan:		Umur:	
Masa Tamat:		Status dlm Kg:			

I. MAKLUMAT RESPONDEN & KELUARGA

a. Nama Ketua Keluarga :_____

b. Umur :_____tahun

c. Jantina : (Lelaki / Perempuan)

d. Taraf Perkahwinan : (kahwin, duda, balu, janda)

e. Adakah ini kampung asal anda? Ya/tidak. :_____

f. Kalau (e)'tidak' apa nama kampung asal anda? :_____

g. Kalau (e) 'tidak' mengapa pindah ke sini? :_____

h. Kalau (e) 'tidak' sejak bila pindah? :_____

i. Taraf pendidikan (SRK/ SMK/ Kolej/Universiti dll.) :_____

j. Pekerjaan:- i. Tetap:_____ii. Lain2:_____

k. Anggaran pendapatan bulanan:-

Tiada	< RM100	RM101-300	RM301-500	RM501-700	RM701-1000	RM1001-1500	>RM1501

I. Maklumat Keluarga:-

No.	Nama	Um-ur	Jan-tina	Hubungan dgn Ketua Keluarga	Status Perkah-winan	Tahap Pendidi-kan	Status Kesiha-tan
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

II. KEADAAN RUMAH (State Of Housing)

a. Bilangan penghuni :_____,_____

b. Bilangan bilik :_____

c. Rumah diperbuat daripada bahan apa(kayu/konkrit) :_____

d. Bila di bina ? :_____

e. Keadaannya kini?_____

f. Rumah ada memiliki kemudahan tandas atau tidak? Ya/tidak

   i. Tandasnya di luar atau di dalam rumah? _____

g. Jenis perabut yang terdapat dalam rumah. Nyatakan _____

h. Anggaran Kos keseluruhan rumah :_____

i. Sumber air (hujan, perigi, sungai, paip, sistem graviti) _____

j. Harta milik Responden

	Jenis	Bil.		Jenis	Bil.
i	Motokar		xi	Mesin jahit	
ii	Motosikal		xii	Dapur gas	
iii	Basikal		xiii	Peti sejuk	
iv	Bot		xiv	Telefon Rumah	
v	Enjin bot (dan kuasanya)		xv	Telefon Bimbit	
vi	Janakuasa letrik (kuasanya)		xvi	Komputer	
vii	Chainsaw (gergaji rantai)		xvii	Pencetak Komputer	
viii	Television		xviii	Kedai runcit	
ix	Astro		xix	Lain2:	

x	Radio		xx	Lain2:	

III. HARTANAH (Landownership)

i. Adakah anda memiliki tanah?_____ Ada berapa lot?_____

ii. Berapa kahkah luas keseluruhannya (ekar)? _____

iii. Tanah sudah bergeran? (NT/TOL) _____

iv. Berapa jaraknya dari rumah?_____

v. Bila di buka?_____

vi. Masa terbiar di antara penuaian padi (length of fallow) _____

vii. Tanaman utama_____

viii. Tanaman rangkaian mengikut urutannya _____

ix. Sayur-sayuran? Nyatakan _____

x. Buah-buahan? Nyatakan _____

IV. TERNAKAN (Livestocks)

Bil	Ternakan	Jumlah	Untuk Sendiri	Untuk Dijual	Lain-Lain
1	Ayam				
2	Kambing				
3	Kerbau				
4	Ikan				
5	Lembu				
6	Babi/Khinzir				
7	Itik				
8	Lain-Lain				

V. KEGIATAN SAMPINGAN (Side Activities)

i. Apakah binatang yang <u>dulunya ada</u> di hutan berdekatan ?_____

_____

Sekarang?_____

ii. Berapa kali dalam sebulan anda memburu ? _____

iii. Bilakah masa yang paling sesuai untuk memburu? _____

iv. Jarak perjalanan ke kawasan memburu?_____

v. Cara/ alat yang digunakan untuk memburu.

Bil	Jenis alat yang digunakan	Ya	Tidak	Cara yang selalu digunakan?
1	Senapang			
2	Jerat			
3	Bujak/anjing			
4	Lain-lain			

vi. Bila anda pergi memburu, adakah anda: (bersendirian /dengan kawan-kawan)?

vii. Jenis binatang yang biasanya didapati:_____

_____

viii. Berapa banyak binatang yang anda dapat pada expedisi yang terakhir? (Jenis & Bil.)

VI. PERHUTANAN

i. Adakah anda/keluarga bekerja dalam pembalakan? _____

ii. Kalau ya, apakah tugas anda/keluarga? _____

iii. Apakah pendapat anda mengenai dengan kegiatan pembalakan di sekitar kawasan anda?

a. Kebaikan pembalakan _____

b. Keburukan pembalakan: _____

iv. Apakah pandangan anda terhadap Jabatan Perhutanan dan aktiviti pembalakannya?

a. Kebaikannya : _____

b. Keburukannya : _____

v. Apakah peluang kerjasama dengan Jabatan Perhutanan di kampung ini?

a. Eko-pelancongan : _____

b. Homestay : _____

c. Latihan Mencegah Api Hutan : _____

d. Latihan Lain : _____

e. Peluang kerjasama lain: _____

VII. HASIL HUTAN MINOR

GAHARU:-

i. Tahukah anda tentang kayu gaharu? _____

ii. Ada berapa pokokkah yang anda ada? _____

LAIN-LAIN TUMBUHAN:-

iii. Senaraikan pokok/tumbuhan yang terdapat di sekitar halaman/kebun anda/hutan mengikut kegunaannya dan sumbernya:-

a. Jenis tumbuhan ubatan: _____

*Sumber dari mana:*_____

b. Jenis kayu api:_____

*Sumber dari mana:*_____

c. Jenis rotan:_____

*Sumber dari mana:*_____

d. Jenis kayu sebagai bahan binaan:_____

*Sumber dari mana:*_____

e. Jenis tumbuhan untuk kraftangan:_____

*Sumber dari mana:*_____

f. Jenis tumbuhan untuk acara sembahyang:_____

*Sumber dari mana:*_____

g. Jenis buah-buahan/makanan hutan:_____

*Sumber dari mana:*_____

VIII. KEGIATAN PERIKANAN (Fishing)

i. Berapa kali kah anda pergi menangkap ikan dalam seminggu? _____

ii. Di manakah tempat anda menangkap ikan?_____

iii. Cara menangkap ikan:

Bil	Jenis alat digunakan	Ya	Tidak	Cara paling kerap digunakan
i	Pukat			
ii	Rambat/Jala			
iii	Tuba			
iv	Bubu			
v	Rawai			
vi	Racun/Bom			
vii	Elektrik			
viii	Lain2:			

iv. Jenis ikan yang biasa ditangkap?_____

v. Untuk kegunaan sendiri atau dijual? _____

IX. KESIHATAN AM (General Health)

i. Adakah anda mengalami sebarang penyakit serius?

- Sebutkan jenis penyakit itu._____
- Berapa lamakah penyakit itu dialami? _____
- Bagaimana anda merawatnya? _____
- Apakah nama ubat moden yang anda gunakan?_____ _____
- Apakah ubat/cara tradisional yang anda gunakan?_____
- Di manakah Klinik Perubatan yang anda pergi?_____

iii. Pernahkah Ahli Keluarga anda mengalami penyakit serius? Ya/Tidak

- Nyatakan:_____

iv. Adakah anda sekeluarga memakai kelambu semasa tidur? Ya/Tidak

- Jika tidak, mengapa?_____

v. Pernahkah anda menghidap penyakit malaria? Ya/Tidak

- Jika ya, dimana kena?_____

vi. Pernahkah anda mendapat suntikan pencegah malaria, batuk kering, campak dsbnya.? Ya/Tidak

- Dari mana? (Jabatan Kerajaan/ Bukan Kerajaan) _____

vii. Adakah anda masih mengamal ubatan tradisi yang lain? Ya/Tidak

Jika ya, nyatakan jenis sakit (dan ubatnya):_____

_____

viii. Apakah masalah besar yang keluarga anda hadapi dalam urusan perbidanan dan kelahiran anak?

_____

_____

X. SUMBER AIR (Water Source)

i. Dimanakah anda mendapat sumber air anda (dulu/sekarang)?

- Sumber air dulu?

  :_____

- Sumber air sekarang?

  :_____

- Kualiti air sekarang?

  :_____

ii. Adakah rumah anda mempunyai tangki air? _____Berapa?_____

iii. Adakah anda memasak air untuk minuman anda sekeluarga? _____

iv. Berapa lamakah air graviti bertahan di musim kemarau? _____

XI. MASALAH & CADANGAN

i. Apakah masalah besar yang dialami oleh keluarga anda sekarang ini?

   a. Nyatakan: _____

   b. Cadangan mengatasinya:_____

ii. Apakah masalah besar yang dialami oleh anak-anak anda yang masih dalam tanggungan?

   a. Nyatakan: _____

   b. Cadangan mengatasinya:_____

iii. Apakah masalah besar yang dialami oleh isteri atau golongan ibu?

   a. Nyatakan: _____

   b. Cadangan mengatasinya:_____

iv. Apakah latihan/kursus yang anda fikirkan sesuai untuk anda atau keluarga?

   a. Nyatakan:_____

   b. Penganjur kursus:_____