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).

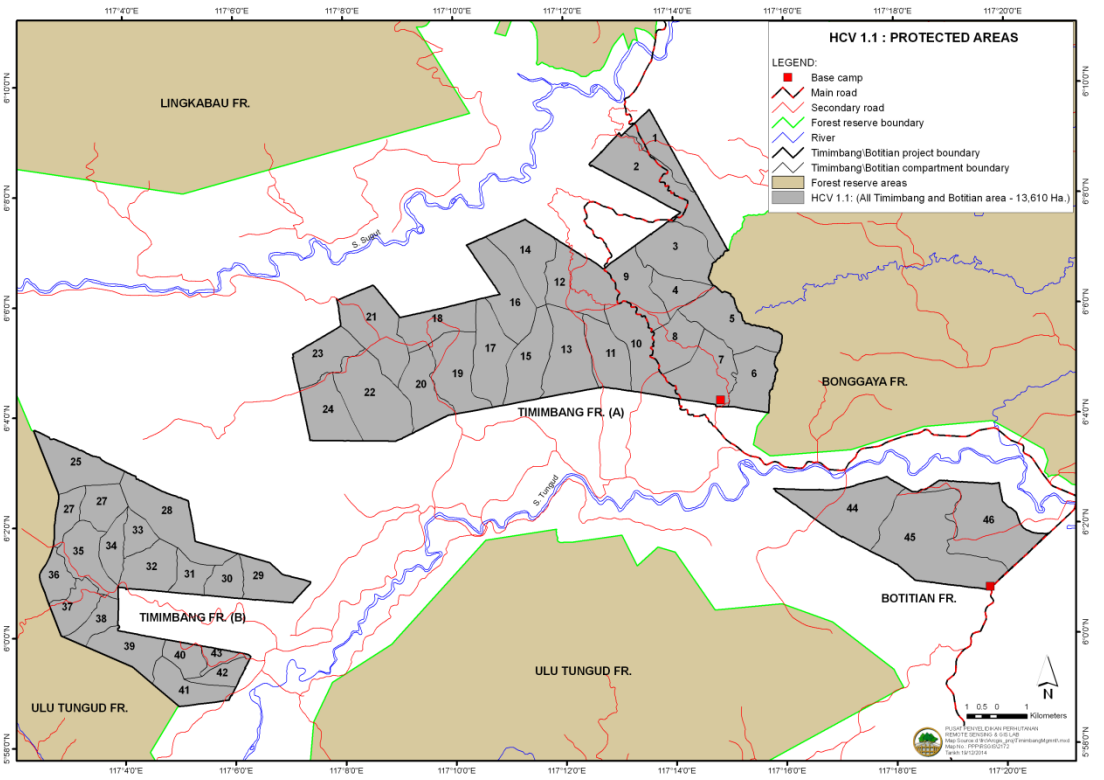

Figure 9. The whole TBSFM area should be desinated as HCV 1.1 due to the totally protected status of the reserves.

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)

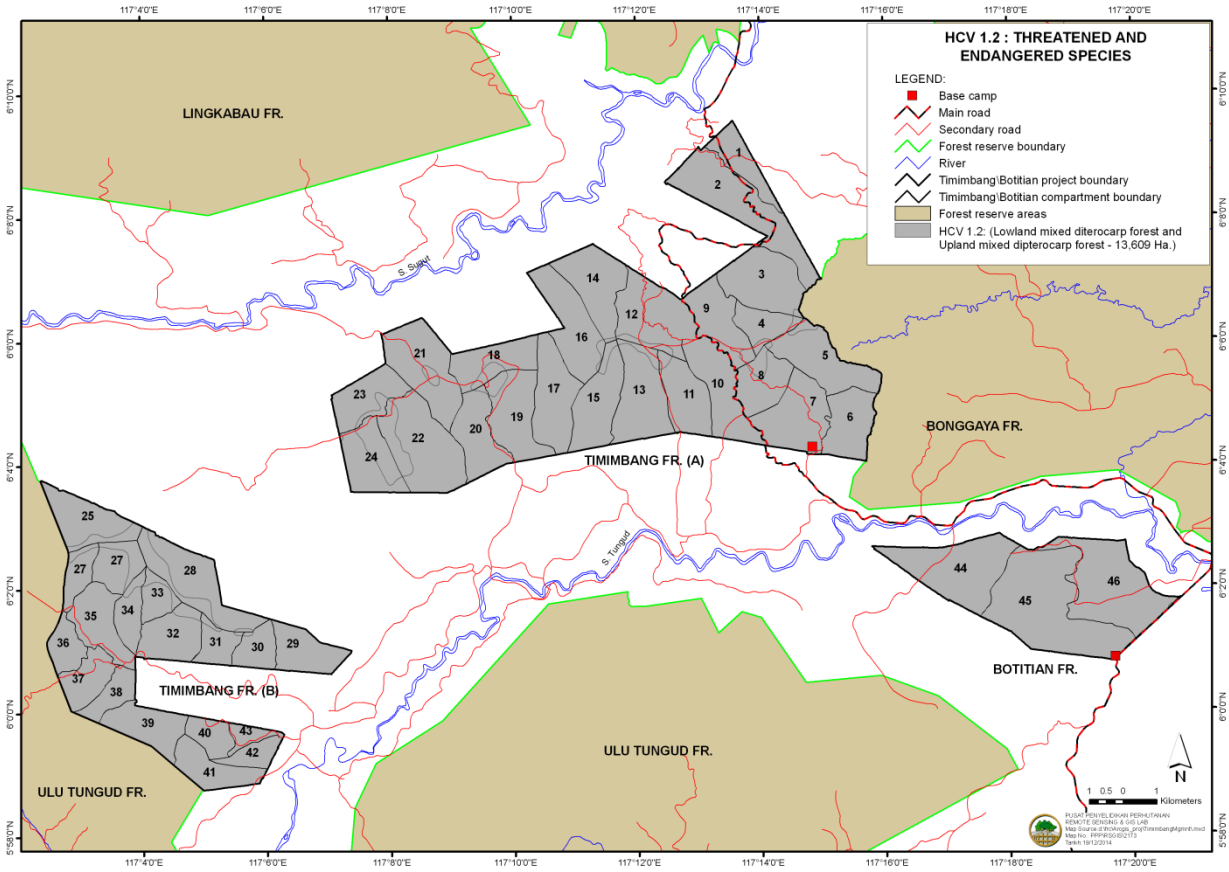

Figure 10. The original natural lowland and upland mixed dipterocarp forests in TBSFM area should be desinated as HCV 1.2 due to its important habitats for high conservation value flora and fauna.

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).

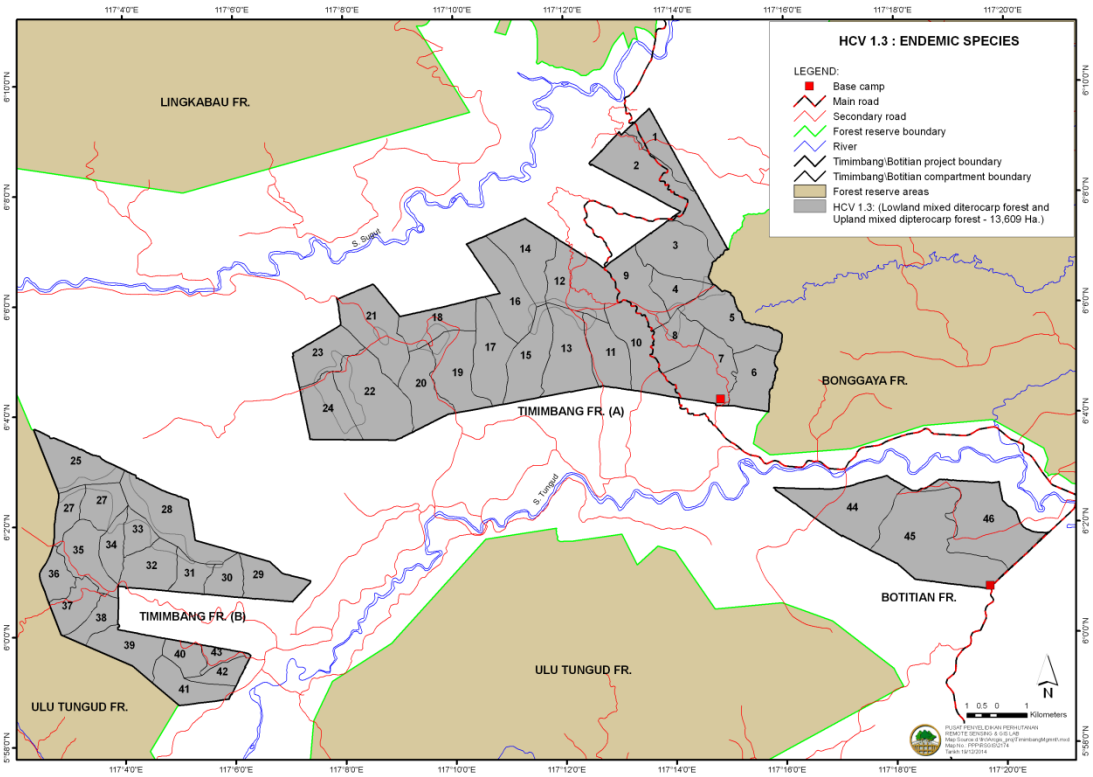

Figure 11. The original natural lowland and upland mixed dipterocarp forests TBSFM area should be desinated as HCV 1.3 due to its important habitats for high conservation value endemic flora and fauna.

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.

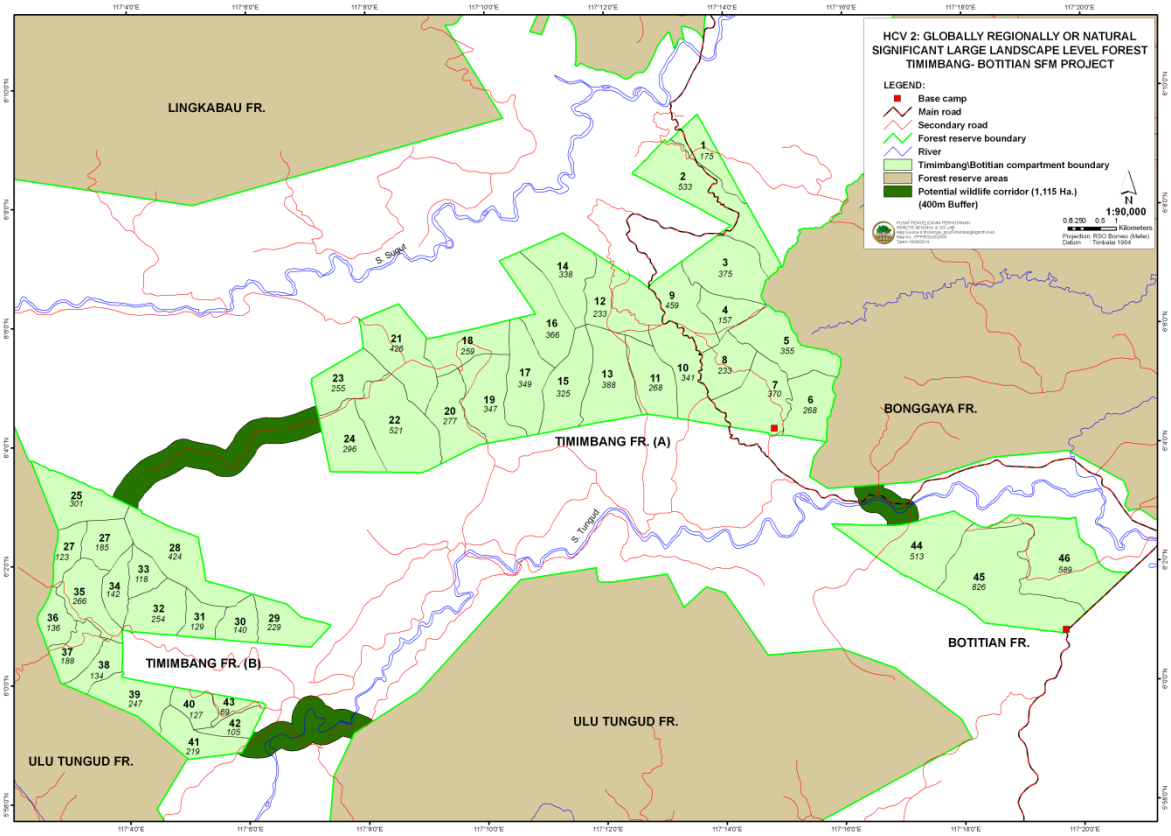

Figure 12. Potential connectivity and wildlife corridor (dark green shades) between forest reserve units in TBSFM, Sabah.

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.