KUMPULAN PENGURUSAN KAYU KAYAN TERENGGANU SDN BHD (KPKKT)

MANAGEMENT PLAN
FOR THE HIGH CONSERVATION VALUE FORESTS (HCVF) IN CHERUL FOREST CONCESSION (CFC), TERENGGANU, MALAYSIA FOR THE PERIOD 2018 - 2027

By

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Kemaman, Malaysia
August 2019, Revised February 2023

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Executive Summary

This document represents the revised version of the second HCVF Management Plan for the same set of HCVF areas within Cherul Forest Concession (CFC) that had been prepared for the period 2018 – 2022, but with an extension of a further five years, till 2027, hence making it a 10-year management plan. This was necessary in order to streamline it with the management of KPKKT's existing HCVF areas which are already subjected to a management plan that ends in 2027. KPKKT took over the management and conservation of CFC from Pesama Timber Corporation (Pesama) since 2021 which means the management of HCVF areas within it as well, i.e. in conformity with the certification policy and standards of the Forest Stewardship Council (FSC). It follows the general guidelines as laid out by the Forestry Department of Peninsular Malaysia (FDPM) as well as those of the WWF-Malaysia "National Toolkit" for HCVF, *i.e.* within the bounds of the company's existing available resources, capacity and capability. As a responsible company, KPKKT acknowledge that the 20,243-ha rich and biologically-diverse mixed tropical rain forest (TRF) of Cherul Forest Concession (CFC) does support multitudes of HCVs that are, and should be identified, protected, studied, documented from time to time, and sustainably managed for the service of mankind in perpetuity. KPKKT's long-standing policy in this regard is to continue to further explore, study and understand the said forest resources in a continuous effort to improve its professionalism and sustainably manage and conserve CFC. The sound management of CFC is affected following the principle of sustainable forest management (SFM), using the Malaysian Selective Management System (SMS) and in accordance with the Forest Stewardship Council (FSC)'s standard of certification.

Similar to the previous HCVF Management Plan, the HCVF areas in this document remain the same, with no new additional area identified to be managed in tandem with the rest of the concession, as follows: :

1. The Keruing neram (*Dipterocarpus oblongifolia*) trees and ecosystem that hug and protect the banks of Cherul River, within Compartment 35 involving an approximate total area of 10,000m^2 (or 1.0 ha)

2. The traditional Durian fruit orchard of the local Orang Asli community located within Compartment 35, involving a total area of 5 ha.

This HCVF Management Plan will continue to be revised periodically from time to time, if possible on annual basis incorporating as much as possible the latest inputs and knowhow from credible professionals and experts in this field in order to further improve it.

Acknowledgement

I would like to acknowledge and extend my heartful gratitude to the following for all the supports and assistance rendered during the preparation of this HCVF Management Plan for Cherul Forest Concession for the period 2018 - 2027:

- Terengganu State Forestry Department (TSFD)
- The management and staff of Golden Pharos Berhad (GPB)
- The management and staff of Pesama Timber Corporation Sdn Bhd (PESAMA)
- The management and staff of Kumpulan Pengurusan Kayu Kayan Terengganu Sdn Bhd (KPKKT)
- The various reviewers and stakeholders who had generously contributed their comments and ideas toward this document
- Dr Borhan bin Mohd of Global Way Services who is also Pesama's and KPKKT's Resident Consultant
- To those who were involved either directly or indirectly in the project.

Chief Executive Officer
Golden Pharos Berhad

February 2023

Abbreviations

CFC	Cherul Forest Concession
Compt., C	Compartment
DTC	Dungun Timber Complex
DTCP	Department of Town and Country Planning
EMP	Environmental Management Plan
FDPM	Forestry Department of Peninsular Malaysia (Hq)
FELDA	Federal Land Development Authority
FMP	Forest Management Plan
FR	Forest Reserve
FRIM	Forest Research Institute Malaysia
FSC	Forest Stewardship Council, Asociación Civil
GPB	Golden Pharos Berhad
HCV	High Conservation Value
HCVF	High Conservation Value Forest
JaKOA	*Jabatan Kemajuan Orang Asli* (Orang Asli Development Department)
KPKKT	*Kumpulan Pengurusan Kayu Kayan Terengganu Sdn Bhd* (Terengganu Forest Management Group Pte Ltd)
MMD	Malaysian Meteorological Department
MNS	Malaysian Nature Society
MY	Malaysia
NTFP	Non-Timber Forest Produce
PERHILITAN	Department of Wildlife and National Parks
PESAMA	Pesama Timber Corporation Sdn Bhd
P&C	Principles and Criteria
PRF	Permanent Reserved Forest
RISDA	Rubber Industry Smallholders Development Authority
SFM	Sustainable Forest Management
SMS	Selective Management System
SOP	Standard Operating Procedure
STD	Standard
TRF	Tropical Rain Forest
TSFD/ JPNT	Terengganu State Forestry Department
UMT	Universiti Malaysia Terengganu
UPM	Universiti Putra Malaysia
WWF-Malaysia	World Wide Fund for Nature (Malaysia)

Management Plan
For The High Conservation Value Forests (HCVFs) Within Cherul Forest Concession (CFC), Terengganu, Malaysia For The Period 2018 - 2027

1.0 Introduction

Up till January 2021 Cherul Forest Concession (CFC) which covers a total of 20,243ha of rich natural tropical rain forest (TRF) in the District of Kemaman, Terengganu had been under a continuous management of Pesama Timber Corporation Sdn Bhd (Pesama) which is in turn based in Chukai town, about 45km to the east. Pesama had successfully managed CFC for four decades since 1983, but changes in local and international market realities such as the issue of international certification along with local strategic expediencies had necessitated the transfer of the management of CFC to Kumpulan Pengurusan Kayu Kayan Terengganu Sdn Bhd (KPKKT). With this shift in responsibility, KPKKT must now manage CFC along with its existing, much larger timber concession Dungun Timber Complex (DTC). Similar to the latter, current management of the TRF within CFC is based on the principles of sustainable forest management (SFM) as guided by the long-term Forest Management Plan (FMP) which covers a 30-year period from 2009 till 2038. In this FMP for CFC, the use of the Malaysian Selective Management System (SMS) for the production forest is advocated whereas the first round of selective timber harvesting in it was completed in 2001 involving virtually all the productive virgin forest stands within the Production Forest category. CFC was successfully accredited and certified by the Forest Stewardship Council as a "well-managed forest" in 2012.

2.0 Physical, Natural-Biological and Social Environments

2.1 Physical Environment

The whole of CFC area forms part of Cherul Permanent Reserved Forest (PRF) covering an area of approximately 20,243ha (approx. 50,000acres). It is located some 45km to the west of Cukai Town, Kemaman, in the Forest District of South Terengganu. Cukai Town can be reached from Malaysia's capital city of Kuala Lumpur (in the west) by road via the East Coast Expressway (Fig. 3) which passes through Gambang as well as Kuantan areas. Kuantan city itself lies only about 1.5-hour drive to the south of Cukai. From the north, Cukai can be reached from Kuala Terengganu city as well as Dungun town by the Terengganu state's coastal trunk road. There are at least 4 airports that serve Cukai and thence the project area. These are the Kuala Lumpur International Airport (KLIA) and Gambang Airport to the west (Fig. 3) and Sultan Mahmud (Kuala Terengganu) Airport and the smaller Kertih Airport to the north of Cukai (Fig. 4). CFC comprises a total of fifty-nine (59) forest compartments ranging in areas from 199.51ha to 486.03ha. Selective harvesting of trees under the first cycle of the Selective Management System (SMS) in the area was started in 1978 in Compartment 29 and ended in 2000 in Compartment 70.

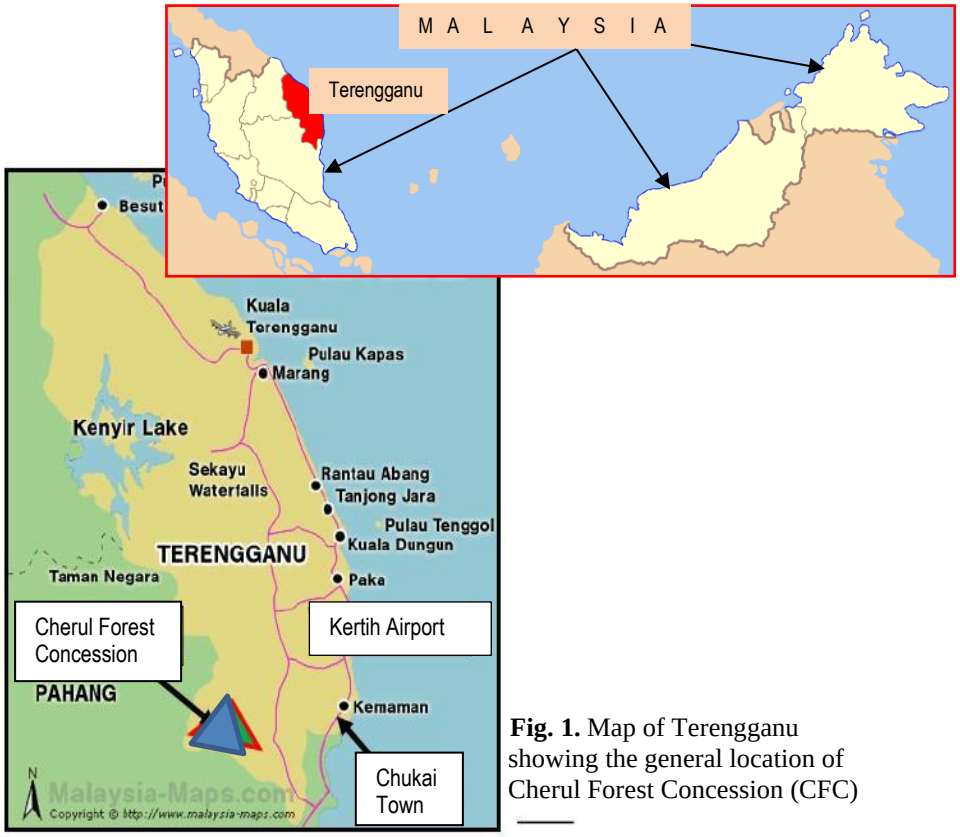


Fig. 1. Map of Terengganu showing the general location of Cherul Forest Concession (CFC)

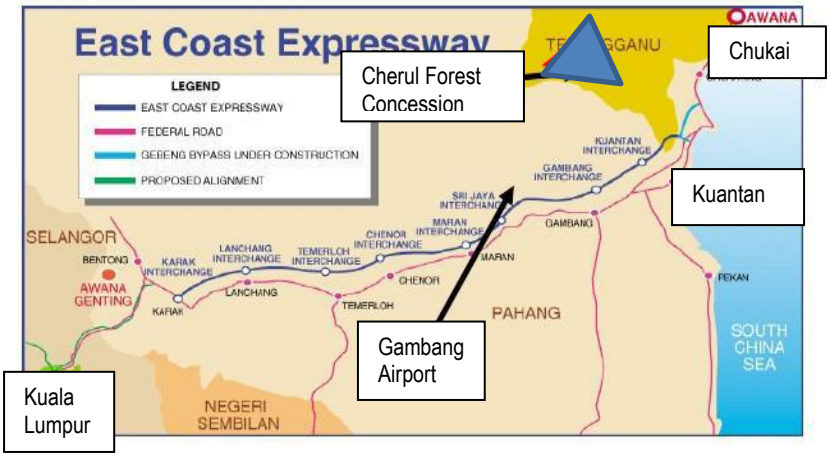


Fig. 2. General Access Plan to Cherul Forest Concession (CFC) from Kuala Lumpur & Kuantan cities and Cukai town.

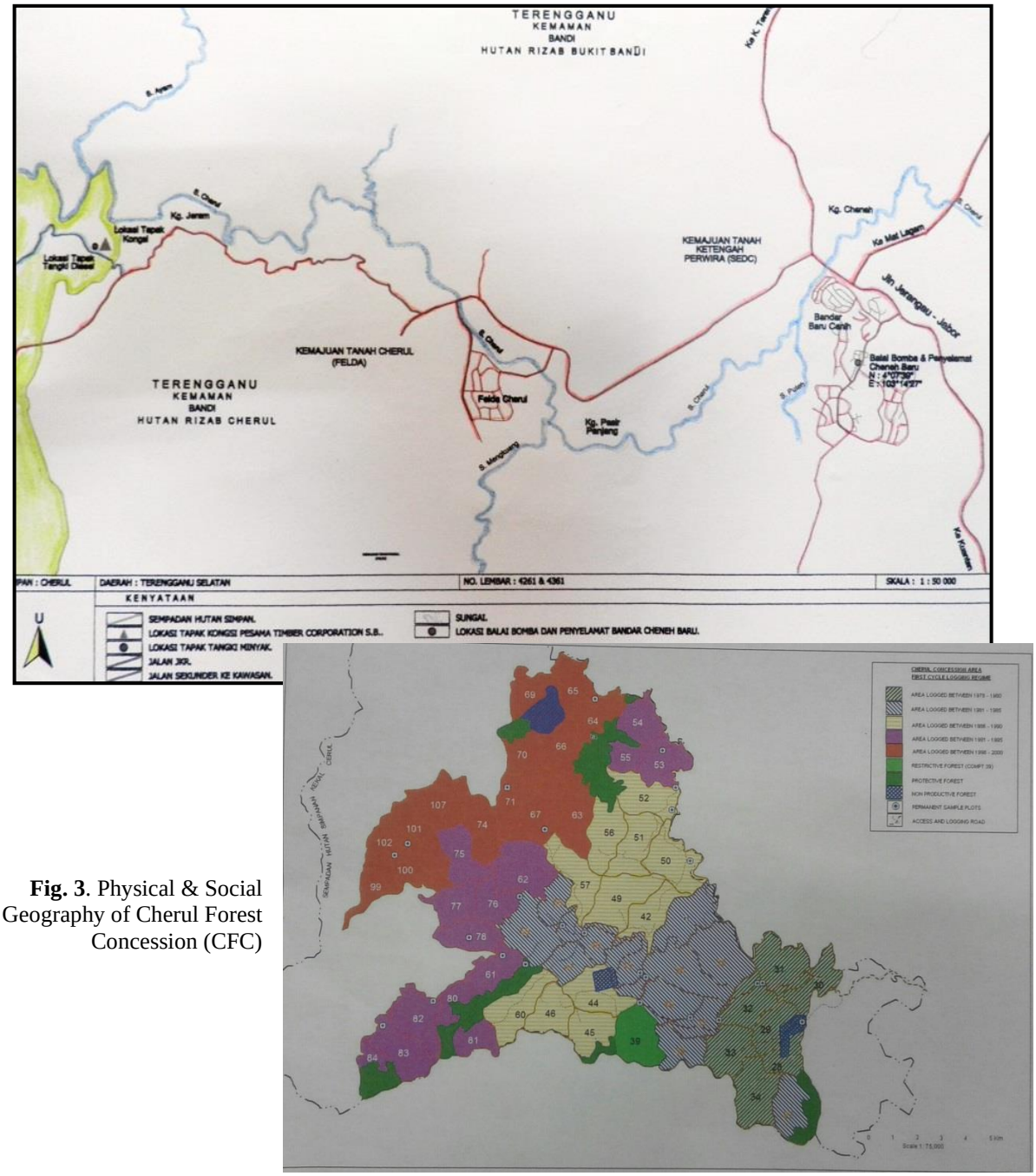
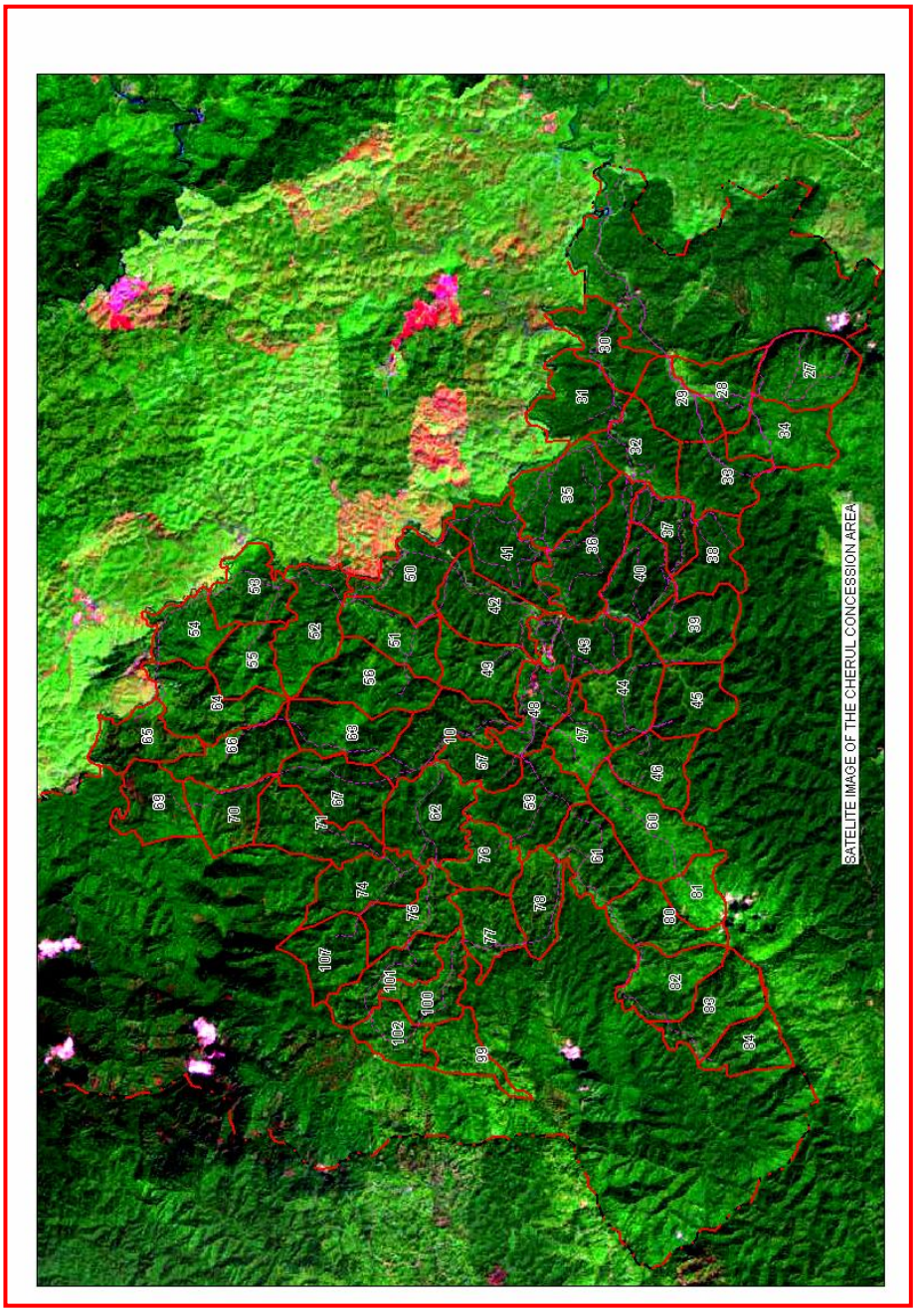


Fig. 3. Physical & Social Geography of Cherul Forest Concession (CFC)

Fig. 4. Cherul Forest Concession (CFC) showing forest compartments.



2.2 Geology, Soil and Topography

The geology of the CFC area consists of 3 rock types, namely Carbonaceous Slate, Igneous Rock and Metamorphic Rock. The eleven soil series identified in it fll three soil groups: (1) soils developed on igneous and high-grade metamorphic rock; (2) soils which developed on sedimentary and low-grade metamorphic rocks (i.e. the largest soil group in the area); and (3) soils developed on recent riverine alluvium. Topographically, the concession area has a very hilly topography ranging between 50 and 650 meters above sea level (a.s.l.) with majority of it lying within the range of 50 to 300 meters a.s.l.

Fig. 5. The General Geology of Cherul Forest Concession (within Terengganu Selatan region)

2.3 Natural and Biological Environments

The natural TRF within CFC embraces various forest functions and zones as follows (see Table 1):

1) Soil and water conservation area (*i.e.*, areas with slope gradient between 21° - 30°),
2) Soil and water protection area (*i.e.*, areas with slope gradient above 30°);
3) Riparian buffer protection;
4) Amenity forest;
5) Rare ecosystem protection;
6) Areas for sustainable timber production (TP);
7) Research forests.

Table 1. Forest Functions in CFC Relative To The Functions As Defined In NFA 1993.

National Forest Policy 1992 & National Forestry Act 1993			Forest Zonation in CFC	Area (ha.)
Production Forest	(1) Sustainable Timber Production, (2) Safeguarding of Water Resource, (3) Preservation of Biodiversity		Timber Production (TP), Water Catchment, Conservation (HCVF) (Gross Area)	17,968 (Gross Area)
Protection Forest	Soil Protection	Conditional zone Soil Protection	(1) Non-Productive Area (2) Main & Secondary Forest Road (3) Matau in Compt. 43	1,306 104 10
	Safeguarding of Water Resources		Riparian Buffer Protection (RBP/ HCVF): (1) Sg. Cherul (2) Sg. Mas	 72 24
	State Boundary		Kemaman – Kuantan	49
Amenity Forest	(1) Recreation; (2) Ecotourism; (3) Amenity, (4) Rare Ecosystem Protection		HOT SPRING IN C66, C69, C70	163
Research & Education F.	ITTO/JPSM Research Forest in Compartment 39			380
Mining concession			Parts of C28, C29, C43, C44	167
TOTAL (ha)				20,243

2.4 Hydrology

Much of the area is drained by Cherul River which flows transversely from West to East, almost dividing the concession into two equal portions. The other large river is Terajol River, which is the tributary of Cherul River and forms the north-eastern border of the concession, flowing from north of the concession area and separating it from the Chenderong oil palm plantation. Bakar River, which is the tributary of Terajul River on the north separates the northern part of CFC from the rest of Cherul Permanent Reserved Forest. Mas River, which is also a tributary of Sungai Cherul forms the south-west border of CFC.

2.5 Climate

CFC forest area lies within the tropical monsoon climate belt which is characterised by high temperatures (24^{o} – 30^{o}C), high humidity (70% - 98%) and an average rainfall of more than 4,000mm per year. The wet

monsoon season usually occurs from November to January. Daily sunshine period is about 6 – 7 hours but can reach up to 8 – 9 hours especially during the dry months of February – April.

2.6 Biological Environment

The general composition of the natural TRF in CFC is made up of the two main groups of tree species: the Dipterocarps and the non-Dipterocarps. Among the Dipterocarps, the following tree species are present: Meranti *(Shorea species, e.g.* incl. Meranti seraya (*Shorea curtisii),* Meranti sarang punai (S. *parvifolia),* Meranti rambai daun, Meranti langgung, Meranti tembaga (S. *leprosula),* and Damar hitam), Keruing *(Dipterocapus species),* Balau (Heavy hardwood *Shorea* species, *e.g.* Balau laut merah), Merawan (*Hopea spp.),* Mersawa (*Anisoptera spp.),* and Chengal (*Neobalanocarpus heimii).* Among the non- Dipterocarps, the dominant tree flora are: Kelat (*Syzygium species),* Medang *(Lauraceae),* Kempas *(Kompassia malaccensis),* Merbau (*Intsia palembanica),* Sepetir (*Sindora* spp.), Rengas (*Gluta* & *Melanochylla* species), Bitis, Machang (*Mangifera sp.),* Mengkulang (*Heritiera sp.),* Jelutong (*Dyera costulata),* Durian (*Durio* spp.), Bintangor (*Callophylum inophyllum),* Kembang semangkuk (*Scaphium spp.*), Melunak (*Pentacme spp.),* and Mahang *(Macaranga spp.).*

3.0 Management Objectives

In managing the TRF resources within CFC, KPKKT has determined a set of key SFM objectives as follows:

1) To manage and, at the same time conserve the forest resources within CFC, their biodiversity, functions and services as multifunctional resources; in such a way as to ensure that their values (be they economic, environmental, climatic, social, scientific,

cultural, *etc*) are closely safeguarded and continuously upgraded in a sustainable manner in perpetuity, both quantitatively and qualitatively.

2) To develop and promote harvesting techniques which are environmentally-benign, economically-viable, technically-sound as well as socially-acceptable.

3) To help uplift the economy and social wellbeing of the forest-dependent communities in the region through the creation of employment and business opportunities as well as good neighbourliness.

4) To foster good governance, sound professional ethics and business goodwill with stakeholders which would lead to appropriate recognition by relevant international agencies such as the Forest Stewardship Council (FSC), and local certifying bodies of SFM as subscribed by KPKKT.

KPKKT's strategic approach towards achieving the above SFM objectives are as follows:

1) A continued monitoring, assessment and evaluation of the current position, functional zoning and inventory of the resource within the context of current and future social and economic realities.

2) Implementation of corresponding mitigation, protection and conservation measures including a strict adherence to the dictates of SMS and Reduced Impact Logging (RIL), continued and sustained enforcement of relevant documentary and field procedures, and establishment of a network of High Conservation Value Forests (HCVFs) within CFC.

3) Implementation and maintenance of a sound corporate social responsibility (CSR) with relevant stakeholders.

4) Continuous capacity building and training of relevant staff and contractors.

4.0 The Conservation-Oriented Management of CFC under the Malaysian Selective Management System (SMS)

4.1 Approach to Conservation Management of the Resource and Ecosystem Health

Management decisions within CFC take into consideration of the following:

1) The concept of forest zonation by function in which different major groups of activities and uses of the forest are conducted within the areas zoned up for that particular activities/ uses. The idea is to minimise conflict of land uses as well as to maintain resource integrity.
2) The concept of High Conservation Value Forest (HCVF) covering aspects on delineation, census, documentation, planning, future development, formal assessment and monitoring of measurable effectiveness indicators, etc.
3) Management and protection policies on totally protected areas (TPAs).

   Standard and guidelines on the control of erosion, minimisation of forest damage during selective tree harvesting, road construction, and all other mechanical disturbances, and to protect water resources, as well as the relevant mitigation measures to minimise the negative impacts of those operations.
4) An emphasis on Ecosystem health which can be defined as a condition wherein an ecosystem has the capacity across the landscape for renewal, for recovery from a wide range of disturbances, and for retention of its ecological resiliency while meeting current and future needs of people for desired levels of values, uses, products, and services. Ecosystem health in CFC is monitored throughout the planning period.

The conservation-oriented selective harvesting and rehabilitation of the trees and stands within CFC adheres strictly to the dictates of the Malaysian SMS. The latter consists of a series of desk and field operations which can be briefly described as follows:

4.2 Pre-Felling Operations

Boundary Demarcation

Boundary Demarcation, being the first step, involves surveying and marking on the ground the external boundary of the working area beyond which logging is prohibited, and is carried out by KPKKT staff under the supervision of the District Forest Office.

Pre-Felling Inventory

Pre-F Inventory is carried out by KPKKT staff for the purpose of determining the pre-felling stocking of the proposed working area, following the standard procedures as prescribed by the Forestry Department. The data collected is used to determine the set of minimum DBH cutting limits for dipterocarps and non-dipterocarp tree species. For the case of Chengal, this dipterocarp tree species is always given a higher minimum DBH cutting limits due to its high market value.

Tree Marking (TM)

TM operation is done once the minimum DBH cutting limits are determined and prescribed based on calculation conducted on Pre-F Inventory data. Trees above the minimum DBH cutting limits are marked by using plastic tags containing the relevant information which are nailed to the stem as well on the base to indicate the desired direction of fall when the tree was cut during felling operation, i.e in conformity with the reduced impact logging (RIL) protocols under the system. The use of plastics tags and serial numbers is to facilitate the stump-to-millgate tracking of the timber which forms part of the accounting and chain-of-custody certification processes. Certain trees of special significance such as mother trees, fruit trees, nesting trees for wildlife and birds, protection trees and trees standing within the riparian buffer zones are spared from logging for obvious reasons, regardless of their species and size.

Road and Bridge Construction and Maintenance

Road construction is carried out by appointed contractors upon approval of the road alignment by the Forestry Department, well before the start of logging operation and under close supervision of the Forestry Department as well as KPKKT staff. The design and layout of the road system including skid trails, cross drains, side drains, culverts, sumps etc follow the specifications in the Forestry Department guidelines, namely the Forest Road Specification, 2010.

4.3 Selective Tree Harvesting Operations

Trees are felled by using chainsaw following as much as possible the recommended felling direction while at all times observing all the precautionary and safety measures to the workers as well as the surrounding vegetation and ecosystem, and de-limbed. No tree shall be felled into the buffer zones or into rivers, and no felling activity shall be carried out during rainy days or windy times. In order to minimise damage through destruction of vegetation and compaction of soil surface, the recommended combination of chainsaw: crawler tractor: skidder operating in an area is always kept at 1:1:2.

Timber Haulage and Transportation

The timber is subsequently pulled (i.e. skidded) by a cable withdrawn from a bulldozer sitting on a skid trail to the nearest matau to be bucked, sorted and recorded. A santaiwong would later transport loads of these timbers to the main matau for further processing for a long haulage on public roads to the mills. Timber harvesting, haulage and transportation are done by contract loggers with close supervision by staff of KPKKT.

4.4 Post-Felling Operations

Area Inspection and Closing Report (CR)

Upon completion of logging in a forest compartment, a closing report is prepared by the Range Officer on the authority of the DFO upon a close inspection of the worked area. This involves a scrutiny on the number

of trees felled, volumes of timber rendered waste, damage inflicted to the residual stand, buffer zones, rivers and the general ecosystem. Findings recorded on the CR are used as a basis for computing the penalty to be levied to KPKKT as the manager of CFC.

Forest Rehabilitation and Timber Stand Improvement (TSI)

Damages inflicted on residual stand due to logging are assessed during Closing Report preparation which is submitted to the DFO for subsequent decisions. Under normal circumstance, a post-felling inventory operation is conducted at 2 – 5 years after completion of logging, with the view to determine the regeneration status of the residual stand and to help decide on the type of timber stand improvement (TSI) operations that would be appropriate to rehabilitate and repatriate the logged forest into a "Regenerated Status" within the time period stipulated. At present the most common TSI operation resorted to is the "open-area planting" (*Tanaman Kawasan Lapang* – TKL) by using fast-growing indigenous species.

5.0 The High Conservation Value Forests (HCVFs)

5.1 General Precepts

According to the Forest Stewardship Council (FSC) Principles and Criteria (P&C) of Forest Management and Conservation, HCVFs comprise areas that carry one or more of the following attributes:

a. Forest areas containing globally, regionally or nationally significant :

   i. Concentrations of biodiversity values (e.g., endemism, endangered species, refugia); and/or

   ii. Large landscape level forests, contained within, or containing the management unit, where viable populations of most (if not all) naturally occurring species exist in natural patterns of distribution and abundance.

b. Forest areas that are in or contain rare, threatened or endangered ecosystems.

c. Forest areas that provide basic services of nature in critical situations (*e.g.*, watershed protection, erosion control).

d. Forest areas fundamental to meeting basic needs of local communities (*e.g.*, subsistence, health) and/or critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

Principle 9 of FSC P & C requires that management activities in HCVFs "maintain and enhance the attributes which define such forests". Principle 9 contains four criteria:

- Criterion 9.1 requires an assessment to determine the presence of attributes consistent with HCVFs.
- Criterion 9.2 guides certifiers on the consultative portion of the certification process.
- Criterion 9.3 requires a precautionary level of management and activities that ensure the maintenance or enhancement of High Conservation Values.
- Criterion 9.4 requires monitoring the effectiveness of the management and activities implemented.

5.2 HCVF Sites Within CFC

For reasons of practicality, resource availability and managerial expediency, the following areas have been set aside and maintained as our HCVF areas:

1) **T**he unique Keruing neram (*Dipterocarpus oblongifolia*) trees and ecosystem that grow along Cherul River (i.e.; Neram stream) within **Compartment 35 -** Approximate area (500m length x 20m width = 10,000 m^2).

2) A small durian fruit orchard located within **Compartment 35** with a total area of 5.0 ha and traditionally maintained by the local Orang Asli (Natives) community. The latter actually hail from Kampung Sg Pergam which is located some 10km from CFC where they permanently reside. Under the circumstance, due to the long distance and the fact that the Orang Asli themselves enjoy some stable and comfortable income from a FELCRA land development scheme close to their village, the said durian orchard and the surrounding forest only serve as destinations to which they would ocassionally go for fishing and picnicking. This is particularly more so during the durian fruiting season which probably takes place once a year, during which time they would rebuild their temporary hut.

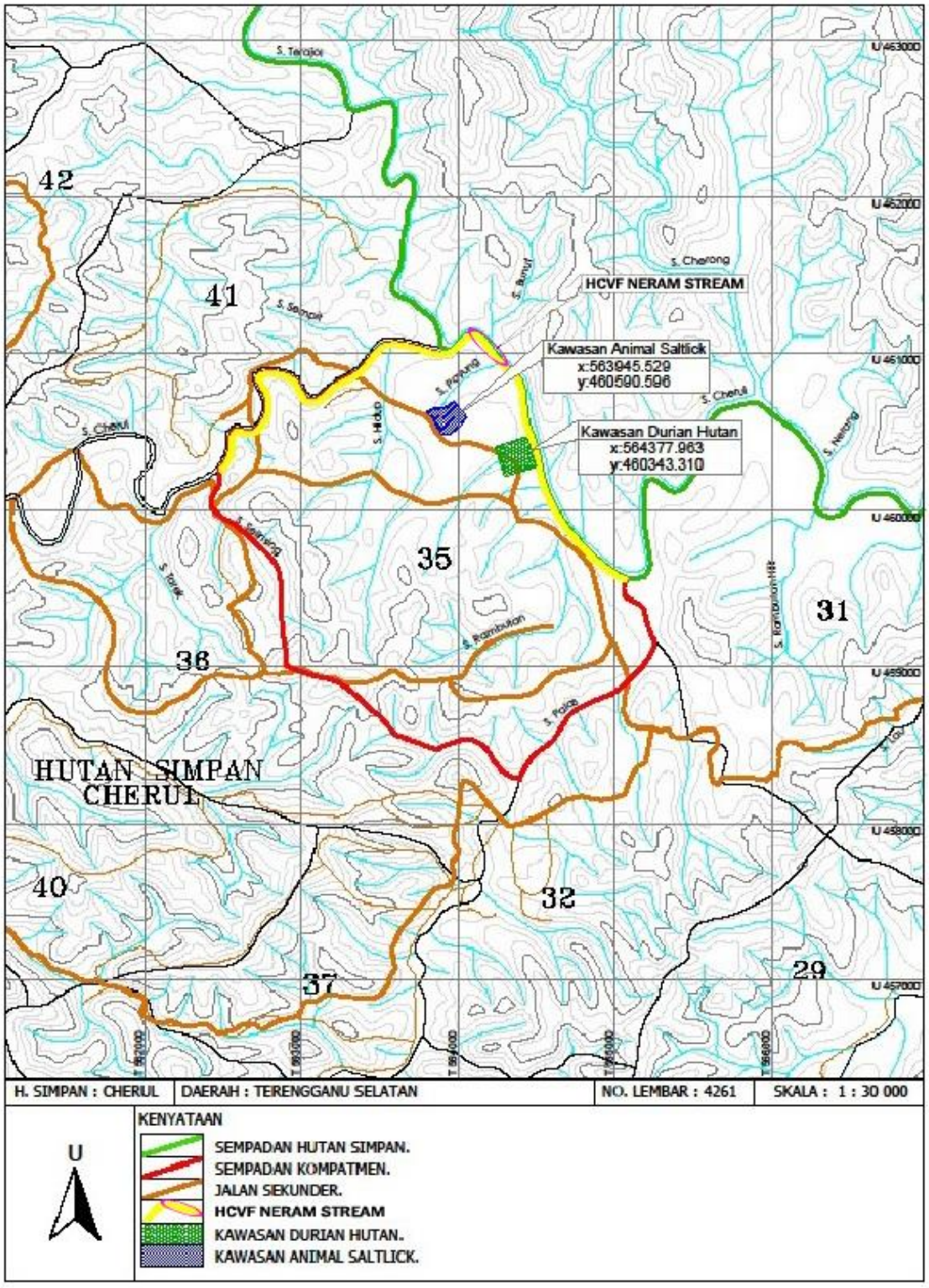


Fig. 6. Locations of HCVFs within Compt. 35, Cherul Forest Concession.

Note: The Animal Saltlick HCVF had been closed in 2019 after it was damaged during the construction of access road leading to FD Hydrological Monitoring Station

5.3 Stakeholders Consultations

The choice of the two areas as HCVFs for CFC was technically justified through a selection process which involved a series of field surveys conducted on the resource, stakeholder consultations, as well as based on information gathered from various other sources. Inputs and ideas on the HCVFs and approach in their management were solicited from various stakeholders at different times on a continuous basis over the years whereby new stakeholders were identified to be included while certain others were removed from the original list for reasons of having lost their relevance to the project or ineffective. The present list of stakeholders stands as follows:

- The Terengganu State Forestry Department (TSFD)
- World Widlife Fund (WWF) Malaysia
- Forest Research Institute of Malaysia (FRIM)
- Malaysian Nature Society (MNS)
- Universiti Putra Malaysia (UPM) – Forestry Faculty
- Universiti Malaysia Terengganu (UMT)
- Department of Wildlife and National Parks (PERHILITAN)
- Local villagers,
- the local Orang Asli (Aboriginal) community of Kg Sg Pergam
- Staff of PESAMA, PESAMA's contractors and their workers.
- Staff of KPKKT, KPKKT's contractors and their workers
- Local major land users, such as FELDA, Ladang Rakyat, RISDA.
- Etc.

Table 2 summarises inputs received from some of the stakeholders consulted by KPKKT and PESAMA concerning this HCVF initatives. It is to be noted that PESAMA was the original initiator of the HCVFs within CFC, i. e with strong support and inputs from KPKKT.

Table 2: Summary of Inputs Received From Stakeholders Consulted Concerning Pesama's and KPKKT's Joint Initiative on HCVF within CFC Based on Engagements in 2012 - 2019

No	Stakeholder	Status	Stakeholder's Comment/ Input	Follow up Action by KPKKT & Pesama
1	Dept of Forestry, State of Terengganu (JPNT) **Date received**: 20 Sept. 2012 7 Aug. 2016 20 Aug 2018	Government Agency	1. Basically JPNT has no objection to the HCVF initiative. 2. JPNT is of the opinion that the area of Keruing neram recommended as HCVF might be unnecessarily too large. 3. The width of Keruing neram strip should be at a minimum of 20 metres along both sides of Sg Cherul. 4. But JPNT leaves it to the wisdom of KPKKT and Pesama for as long as it does not jeopardize the company's short and long term business operations. 5. For the Orang Asli's durian plot, the initiative is welcome on the condition that the Orang Asli should not take advantage of the situation and breach the 5ha limit allocated for them, neither can they create any new planting or orchard within CFC area. 6. There is a need to comply with the relevant provisions in the National Forest Act and Forest Rules.	1. Since Neram trees are found only on certain patches of the river bank, it has now been decided to limit the Neram Stream HCVF area to only 500m along Cherul river that hugs the CFC side of the boundary, and to the width of 20 m from the river bank.. 2. The Orang Asli durian orchard has its boundary marked 3. Monitoring visits continue to be conducted on regular basis.
2	District Forest Office, South Terengganu – DFO. **Date received**: 16 Aug. 2012 7 Aug. 2016 20 Aug 2018	Government Agency	1. No objection. 2. KPKKT/ Pesama will be required to place appropriate signs on the ground, as well as to conduct maintenance & monitoring on the ground. 3. HCVF areas which fall inside timber harvesting areas must be delineated and excluded from such activity.	1. As above. 2. Sign posts showing location of HCVFs have been put up on the ground.
3	Dept of Environment, Terengganu (DOE). **Date received**: 10 Sept. 2012	Government Agency	DOE takes note but has no comment on the HCVF.	

4	Forest Research Institute, Malaysia (FRIM) – Director of Forestry & Environment. **<u>Date received</u>**: 10 Sept. 2012 7 Aug. 2016 8 May 2019 22 Sept 2019 On-going	Semi-Government Agency	1. In support of the HCVF initiatives. 2. Proposes that a comprehensive "assessment of potential HCVF sites" be conducted within CFC for the purpose of identifying other HCVs and salt licks therein, by involving other government agencies and NGOs. 3. Proposes the development of appropriate management prescriptions for individual HCVFs. 4. Regular consultation and contacts with relevant scientists at FRIM is continuing on almost monthly basis. FRIM has promised to increase their presence and research activities in this field in order to improve on the implementation of this HCVF Management Plan. 5. The latest communication from FRIM came from FRIM's Zoologist Mr Mohammad Shahfiz Azman who recommended for Pesama to conduct more monitoring of wildlife within our HCVF areas as well as enrichment of the habitat. FRIM's input during consultation held on 22 Sept. 2019: (i) FRIM renewed their commitment to continue to provide full support to KPKKT/ Pesama in their initiatives on HCVF (ii) FRIM is of the opinion that further surveys on HCVs within Cherul should be conducted in coordinated manner, but this would take **time** in terms of planning, implementation and dissemination of results. (iii) Such field surveys should be conducted in such a way as to enable KPKKT/ Pesama and relevant parties to be more focused on efforts on HCVF (iii) FRIM suggested further improvement be made on existing HCVF Management Plan by deliberating on the "Action Plan" and detailing on implementation part of it as well as data from the field. (iv) Since 2017, FRIM has been conducting research on micro-fungi within our Cherul Forest Concession (CFC), focusing on impacts of selective timber harvesting on micro-flora such as fungi as well as other flora and fauna. (v) FRIM's study and monitoring on Keruing Neram within the Neram Stream HCVF within Compartment 35 of CFC is continuing. The survey	1 The idea of conducting a "Comprehensive assessment of potential HCVF Sites within CFC" was deliberated amongst the relevant sakeholders on 22/9/2019 and more discussions on it are to follow. It is still in the early stages and require proper planning in terms of expert manpower and budgeting before it can be finalised and implemented. KPKKT & Pesama take note of FRIM's opinion that such activities takes time to realise before seeing the results. Monitoring of wildlife within CFC is continuing and some fo the results are presented in this report. Improvement on the HCVF Management Plan continue to be done from time to time. KPKKT & Pesama will continue to provide appropriate support to FRIM's R.O Pn Fatahayah who conducts research on mycology within CFC.

			found a total of 53 adult Keruing neram trees within a stretch of 500m along the bank of Cherul River on the CFC side. (vi) The study on the demography of Kr Neram trees and their roles/functions in the context of the riverine ecosystem and high conservation values within CFC will proceed in collaboration with FRIM team. (vii) FRIM has identified that the small (5-ha) Durian Tree Orchard HCVF falls under the category of HCV5. KPKKT's & Pesama's observations and engagement with them show that the Natives/ Orang Asli (who live in a permanent village located 10km away from CFC) are not dependent on the Durian trees, except perhaps during fruiting season which occurs once in every one or two years (viii) Appropriate strategy will need to be devised on the best way to monitor and assess the relevance and effectiveness of all managed HCVFs within CFC. (ix) Efforts on managing and sharing of results from research and surveys conducted within CFC, and dissemination of relevant information among the parties involved need to be further strengthened and coordinated.	KPKKT will follow up to mark and monitor the Kr Neram trees concerned. KPKKT will continue to monitor the Durian orchard and collaborate with the Ornag Asli community as usual. Field activities to collected data on the wildlife within the HCVF as well as the CFC as a whole will continue to be conducted by Pesama in concultation with other agencies such as PERHILITAN, FRIM, FD, MNS, and WWF-Malaysia.
5	WWF-Malaysia. **Date received**: 20 Sept. 2012 2 July 2019	Local Environmen-tal NGO	1. Comments focus on presentation style, methodologies and depth of coverage of HCVs in the HCVF Management Plan. 2. Requires more comprehensive assessment of fauna. 3. Requires more/wider stakeholder consultation. 4. Need more data on extent and use of NTFP by local communities. 5. Acknowledges the best management practices conducted by Pesama in managing CFC. 6. Dr Adrian Choo alludes to the need to conduct regular assessment on HCVF areas	Similar with comments received from FRIM; KPKKT/Pesama will continue to improve on the HCVF Management Plan document. On the need for a regular assessment on HCVF areas, similar ideas were put forward by other stakeholders such as UMT, MNS, FRIM, FD and PERHILITAN. As of now our communication and rapport with WWF-Malaysia remain strong although WWF-Malaysia themselves face limitations in terms of manpower and time, and has always tried to accommodate all our requests for assistance and collaborations. Under the circumstance, our policy wrt WWF-Malaysia

				remains along the following line: (1) To keep maintaining a strong and cordial professional relationship with them (2) To keep adhering to the "National Toolkit on HCVF" as propounded by WWF- Malaysia (3) To coordinate all research collaboration within CFC with relevant key stakeholders including WWF-Malaysia, FRIM, UMT, PERHILITAN, Terengganu State Forest Department, MNS, etc.
6	FELDA Cherul 1 – Manager. **Date received**: 28 Aug. 2012. 7 Aug 2016	1. Semi-Government Agency, 2. Neighbouring land users	1. No objection. 2. Confident that KPKKT/ Pesama can manage the whole of CFC and HCVF well. 3. the issue of human- elephant conflict was raised.	The issue of human-elephant conflict is being handled by PERHILITAN. KPKKT to continue to minitor thr situation.
7	FELDA Cherul 2 – Chairman of JKKK/ MPKK (Village Committee). **Date received**: 3 Sept. 2012 7 Aug 2016.	1. Local community. 2. Neighbouring land users	1. The village head appreciated Pesama's invitation to give input. 2. Acknowledges that KPKKT/ Pesama initiative does yield some positive aspects to the life of the local people. 3. Has no objection, supports the HCVF initiative. 4. Looks forward to a better understanding between both sides.	Same as above.
8	Orang Asli Village of Sungai Pergam - Chairman of JKKK/ MPKK) **Input received:** - on going -	1. Local community. 2. "Custodian" of one of the HCVFs described in this report (Ocassional land users, i.e. only during fruting seasons).	1. Have no objection to the HCVF initiative of KPKKT/ Pesama. 2. In total support of KPKKT/ Pesama's and government's policy on sustainable forest management and forest conservation. 3. KPKKT is in constant communication with the Orang Asli Village and the Village Head (Chairman of JKKK/ MPKK) 4. Issue of Elephant encroachment from CFC into the village was raised.	KPKKT to continue to work closely with the Orang Asli community and render assistance whenever appropriate and necessary.
9	Forestry Faculty, University Putra Malaysia 7 Aug 2016 20 August 2018	Public University – Academic and Research Institution	No comment Assoc. Prof. Zaki Hamzah provided counselling wrt forest resource management with special reference to HCVF.	KPKKT to maintain sound working relationship with UPM in relevant areas.
10	Malaysian Nature Society (MNS) 23 April 2019. 22 Sept. 2019	Local Environmen-tal NGO	On 23 April 2019, the late Mr Balu Perumal of MNS paid a visit to KPKKT & Pesama, had a discussion and agreed to help in conducting resource assessment in our HCVF areas. During meeting on 22 Sep 2019:	KPKKT to continue to collaborate and render assistance to MNS as and when approapriate and necessary.

			(i) MNS agreed to provide greater support to Pesama in the area of biodiversity assessment (ii) Assessment of Biodiversity resources should be conducted on compartment by compartment basis, i.e. as part of pre-harvesting activities. This view was also shared by FRIM. (iii) MNS in its capacity as a member of FSC will also provide support in outreach and awareness programmes,	
11	Ladang Rakyat	Neighbouring land users	No response	
12	Universiti Malaysia Terengganu Feb 2019 22 Sept 2019	Public University	KPKKT & Pesama has been in regular communication through 2018 with the Institut Biodiversiti Tropika (Assoc. Prof. Jamilah Salim) of UMT who had promised to cooperate with KPKKT & Pesama and render assistance w.r.t HCVF matters in the future. UMT welcomes the idea of greater collaborations between all the parties involved in the identification and management of biodiversity resources and HCVF.	KPKKT to continue to forge closer collaboration with UMT in relevant areas, especially on HCVF management and ecosystem health.
13	Dept Wildlife & National Parks (PERHILITAN) 22 Sept. 2019		(i) So far PERHILITAN had installed a total of 11 camera traps within Cherul Forest Reserve during April 2019; (ii) Results from the camera-trapping will be made available soon by the team from UKM (iii) PERHILITAN is always responsive to all requests for collaboration from all parties. For the case of CFC, PERHILITAN pays special attention due to the proximity of CFC with nearby agricultural plantations and villages and the risks posed by marauding wildlife.	KPKKT has always treated PERHILITAN as one of its key stakeholders, and looks up to PERHILITAN to help in works related to wildlife assessment and monitoring and to resolve conflicts with wildlife within as well as around CFC area. **Remarks**: Information concerning the existence of rare, threatened and endangered animal species protected by national law within the concession area have been identified to geographic location (i.e. HCV1) as shown in **Table 3 and Table 4** and on Maps in Appendices. The wildlife present within CFC include Elephant, Tiger, Tapir, Otter, Porcupine, Gibbon, Civet Cat , Mountain goat, Sambar deer, Barking deer, Mousedeer, Kingfisher and Hornbill, etc.

Table 3. Wildlife Presence within CFC by Forest Compartments

Wildlife Species	Forest Compartment Nos.:
(1) Elephant	35,36,37,42,62,43,48,40,50
(2) Porcupine	30,35,36,37,42,43,48,50
(3) Tapir	30,35,36,37,42,43,48,50
(4) Tiger	30,35,37,42,50,48,62
(5) Otter	30,35,42,48,50,62
(6) Hornbills	30,35,36,37,42,43,40,50.
(7) Gibbon	35,36,37,42,43,40,50,62
(8) Mousedeer & Barking Deer	35,36,37,42,43,49,40,50,62
(9) Mountain Goat	48
(10) Malayan Sun Bear	30,31,42,43,48,35.40
(11) Freshwater fishes:	Freshwater fish species present within permanent streams/ rivers within CFC (a) Kelah, (e) Baung (b) Peras, (f) Lampam (c) Haruan, (g) Tapah (d) Bujuk, (h) Kawan

Table 4. Results from Wildlife Monitoring During 2015 – 2018

Date	Wildlife Species
10/2/2015	Oriental pied hornbill, Elephant, Tapir
13.4.2015	Barking deer, Otter, Jungle fowl
5/6/2015	White-handed gibbon, Helmeted hornbill
22/8/2015	Racket-tailed drongo, Brahminy kite, White-collared kingfisher
07/2/2016	Elephant,
11/2/2016	Tapir, Mousedeer, Tiger
15/5/2016	Elephant
15/8/2016	Gibbon, Wild boar,
15/12/2016	Wild boar, Malayan sun bear, Elephant, Porcupine, Birds, Tapir
15/2/2017	Wild boar, Elephant, Sambar deer, Barking deer, Mousedeer, Tapir, Civet cat
4/3/2017	Civet cat
23/7/2017	Mousedeer, Tapir
11/10/2017	Wild boar, Elephant, Barking deer, Varanus
15/3/2018	Kingfisher, Wild boar, Sambar deer
28/6/2018	Mousedeer
15/8/2018	Kingfisher, Wildboar
14/10/2018	Wild boar, Tapir

6.0 HCVF Management Plan

6.1 Management Objectives

(1) To establish a network of HCVFs in identified spots/areas within CFC and to manage and protect such HCVs/ HCVFs within the framework of sustainable forest management (SFM) of CFC as a whole, and in the wider contexts of HCVF management in Terengganu and Malaysia.

(2) To make sure that the management of KPKKT adheres to FSC's protocols on the identification, maintenance and long–term management, monitoring and protection of such HCVFs within CFC.

(2) To develop and refine in-house expertise within KPKKT in the area of HCVF management through continuous training and skill upgrading of the relevant staff.

(3) To extend the concept and practice of HCVF management to as wide an audience as possible.

(4) Over the long term, to continue to keep the existing HCVFs and to expand it so as to achieve and fulfil FSC specification that at least 10 percent of the whole forest concession be declared and set aside as HCVF and conservation areas.

(5) To collaborate with relevant agencies, NGOs and other stakeholders on the management and research on HCVFs.

(6) To identify areas of research and management which have the potential to contribute to add value to the existing HCVFs initiative.

6.2 General Line of Actions

In managing its present and future HCVFs, KPKKT adopts the following general line of actions, which are subject to further modifications and refinements as and when required depending on the dictate of the particular situation and the resources at hands, as well as in the light of new findings.

HCV and HCVF Screening Procedure

a. Fresh data and information on any new HCV or potential HCVF within CFC will be sourced from any of the following means:

- Pre- and Post-Felling Inventories and research plots conducted by, either KPKKT or its contractors
- Communications with local communities: KETENGAH, FELDA, RISDA and Ladang Rakyat settlers, villagers, Orang Asli
- Personal encounters and experience of staff of KPKKT, PERHILITAN, TSFD/ JPNT, enforcement agencies, etc
- Expert advice from various organisations/ agencies/ NGOs: FRIM, MNS, WWF-Malaysia, academics, etc
- Published and unpublished reports.

b. KPKKT will take the initiative to archive the data and information on its dossiers of HCVs and HCVFs, and compare them with the national registry on HCVFs.

c. KPKKT (with the help of other agencies, (e.g. PERHILITAN, TSFD, etc)) to despatch teams to conduct verification exercise on the ground (ground truthing). Study teams to take photographs and samples and, if necessary set camera traps – continuous data collection

d. KPKKT to hold Stakeholder Consultations on new HCV findings and plans for new HCVFs from time to time

e. KPKKT to liaise with TSFD, FDPM, PERHILITAN and FRIM to verify and confirm the conservation status of any new HCV within CFC vis-à-vis the national registry of HCVFs.

f. TSFD to issue appropriate written instructions to KPKKT to take any of the following courses of action:

- Delineate and exclude the species its habitat from any future logging or road construction or other violations

- Demarcate on the ground, appropriate size of area for conservation of the species/ habitat, mark the boundary and install signboard with appropriate information.
- Regularly identify potential threats to the HCV
- Formulate strategies for conservation and protection, alleviation of threats and possible non-consumptive utilisation of the species and habitats.
- Conduct detailed surveys on the resources therein and document the results

g. KPKKT to implement TSFD insructions on the ground

h. KPKKT to conduct continuous monitoring and data collection on HCVF attributes and values.

6.3 Management Guidelines

a. Identification of HCVF

In line with FSC Indicator 6.4.2, KPKKT will continue to analyse protected areas within the regional landscape as well as KPKKT's own protected areas, to determine if existing ecosystems are adequately represented, either at local, regional or national level. Where ecosystems are not adequately represented, and opportunities exist for KPKKT to fill these gaps, KPKKT will contribute to the regional network of representative areas.

b. Preparation of Maps showing details of

- Topography, terrain, roads and access, rivers, human settlements, land use patterns
- Forest types and habitats
- Soil types and geology
- Physical and biological resources

c. Determination of attributes to be used in considering HCVF

d. Development of time scheduling for Plan of Actions

e. Training and skill upgrading of staff and contractors in relevant fields

f. Allocation of appropriate budget for commission of compliance activities

g. Coordination and Staffing:

- KPKKT to establish a dedicated HCVF Team which will meet regularly, collate its findings and report to the management of KPKKT and GPB, *i.e*. internal coordination
- Coordination with external agencies: governmental and NGOs, as well as other stakeholders
- Documentation and packaging of information

h. Stakeholder Consultation

i. Protection (incl. identification of threats):

- Protection from encroachment and theft
- Protection from fire, landslides, floods, wind damages and other natural catastrophes
- Protection from diseases and pollution
- Protection from site modification
- Protection from intrusion by foreign materials and exotic species
- Area protection: regular patrol, inspection and maintenance of boundaries, closure of unused/ inactive roads and bridges, warning signboards

j. R & D including, wherever possible and practicable, breeding programme – scientific expeditions, *in situ* and *ex situ* conservations, rescue harvesting, permanent sample plots, nursery research, herbarium and taxidermy collections. Data will be collected on the following basic parameters:

    - History of forest compartment
    - Climate

- Forest management system
- Presence of wildlife
- Incidence of damage and injuries due to biological and non-biological elements, as well as environmental factors
- Phenological behaviours (incl. flushing, flowering, fruiting & seed dispersal, *etc*)
- Standing stock: Tree distribution, standing volume, basal area, *etc*
- Market value
- Target & key stone species
- Costing

k. Monitoring, Evaluation and Control (MEC). To evaluate and review from time to time, the status of HCVF and the need to re-define direction

l. Eco-tourism & Other Non-Destructive Pursuits.

m. Documentation and maps, dissemination, publication and publicity. KPKKT to package the latest information and knowledge on HCVF and present in relevant meetings/ seminars/ exhibitions, etc.

6.4 Management Recommendations On The Plan of Actions And Measures to Enhance HCV Areas.

- The second rotation selective logging activities within CFC needs to maintain high minimum diameter cutting limits for the harvested trees whilst leaving behind adequate stocking of potential crop trees (PCTs), and should embrace the RIL methodology to minimise the impacts to the environmentally (biodiversity) sensitive areas.

- Ground cutting of the side/ slip roads on the ridges to get excess to the timber trees must be minimised or if possible totally avoided. The same also should apply to road cuttings along rivers or bridges across rivers.
- As far as possible try to make use of old first-rotation logging roads, and avoid from having to cut and open new logging roads. No logging road should be permitted or allowed in high ridge/ summit areas termed as hilltops for they may harbour unique forest habitat types.
- All logging roads are to be constructed by strictly following the most recent FDPM specifications and guideline on forest roads.
- It is recommended that strict river buffer areas be observed at all times. In saying this, the full impact of the logging work can be seen in the flow of the river and the water quality itself. Increasing the flow of water and sedimention build-up in the rivers must be avoided at any cost, as it would have undesirable impact on the endemic riparian species.
- Environmental sensitive (including HCV) areas within CFC need to be identified, reserved and protected from future logging activities. This can be in the form of river reserves, catchment protection, areas reserved for biodiversity and enhancement of cultural value (Orang Asli village/ orchard), and these HCVFs could eventually sum-up to ***no less than 10%*** of the total area of CFC.
- Biodiversity corridors for wildlife movement need to be identified (*e.g* elephant and tapir trails) and created for all compartments that will be subjected to logging exercise (*i.e.* as part of the Environmental Management Plan (EMP) for the area concerned). There will be a need for wildlife management plan for the forest concession, which, among others, addresses hunting by local communities and specific research study on flagship wildlife species *e.g*. tiger, gibbon, hornbill, etc.

- Plant species rescue operation should be considered before and after logging operation. The target groups, amongst others should include the endemic and rare species, also herbal plants with ornamental and medicinal properties. If possible a dedicated nursery need to be established to nurture these plants or small areas within the undisturbed forests patches demarcated as species conservation area. No point of trying to raise the highland plant species elsewhere (*ex-situ*) because it may not survive the change in environment.
- Some species of the Dipterocarpaceae are listed in the IUCN Red Data List; hence some tree species need to be identified and conserved within the logging concession. For endangered and rare flora species, the viable population needs to be estimated before cutting limits and/or qouta can be determined. In some instances, specially targeted species management plan would be needed. For highest endemic species protection – it is recommended to consider conserving the compartment in part or full. In the case of *Licuala fractiflexa it is* suggested that a population study of the species be conducted for Cherul FR before considering adopting the latter suggestion.
- Logging operators should take extreme care that the forest area is not excessively opened up.
- The management of KPKKT to allow continued use of forest for the identified forest-dependent communities (*e.g*. Orang Asli community) by identifying and designating reserved areas within the concession. It is suggested for KPKKT to allow co-management by local community for extraction of NTFP and in the management of buffer areas. If possible to also provide employment opportunities to local people in order to reduce the dependence on forest resources. At the same time, KPKKT will take the initiative to also prevent unauthorised outsiders from encroaching into CFC, and local communities should be engaged in the effort.

- SOPs will be critical to address the HCV values identified for CFC. It must be rolled out in collaboration with all stakeholders (including the local communities) in appropriate form. This SOPs will have to be monitored twice a year to ensure that FR's value are maintained and continuously being enhanced.

6.5 Training Needs And Capacity Building

The following will be some of the areas in which training and capacity building on HCVF might be relevant to KPKKT:

1) Plant and tree identification within HCVF area;
2) Fauna and faunal habitat identification and conservation;
3) Multi-resource Survey methodologies;
4) Monitoring of environmental parameters within HCVF areas;

6.6 Review of The HCV Forest Management Plan

The HCVF Management Plan will continue to be reviewed and updated on an **annual basis** with the following objectives:

1) To consider new inputs and proposals for the possibility of establishing new HCVF areas, or drop the exiting ones based on the evidence presented before the management of Pesama,
2) To apprise the progress during the preceding year, with emphasis on complying with the relevant Principle and Criteria of the Forest Stewardship Council (FSC);
3) To assess and consider the need for new research;

4) To evaluate the relevance of existing HCVFs and, if necessary reinforce them;

5) To collate relevant findings from surveys and research and, if deemed appropriate, publish such findings;

6) To evaluate existing and new collaborations on HCVF research and management with external parties/ agencies.

7.0 Plan Implementation

Based on the foregoing, the implementation of this HCVF Management Plan for CFC over the period 2018 - 2027 is anticipated to take place along the following time line (**Table 5**):

Table 5: Summary of Plan of Actions for Implementing HCVF Management Plan in CFC the Period During 2018 – 2027.

No	ACTIVITY	Y E A R									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
1	Start of the revised HCVF Management Plan	√				√					
	KPKKT takes full control management of CFC from PESAMA					√					
2	***Documentation***										
2a	HCVF Management Plan revised and approved	√					√				
2b	HCVF Management Plan review & updating		√	√	√	√		√		√	
3	***HCV/ HCVF Establishment and Maintenance***										
3a	**Neram stream in C35 (H1)** • Area surveillance (routine programme): ➢ Boundary of river buffer and HCVF area, (i) Boundary marker-posts, exist & in good condition ➢ River buffer undamaged and in generally intact condition. Neram trees are in excellent health. • Identification & assessment of threats (monthly): ➢ Pollution in river: Pollution from (i) floating rubbish, plastic, rubber & logging debris, logging waste, &	√	√	√	√	√	√	√	√	√	√

	(ii) mudflow due to excess earth from road construction, (iii) presence of chemicals ➢ Unorganised / illegal / improper usufruct of river by visitors & outsiders, e.g. over- fishing, and use of river buffer as camping site. ➢ Treefall/ windthrows ➢ River-bank collapse fro natural and man-made causes ➢ Presence of foreign objects ➢ Presence of fish traps, animal snares etc ➢ Introduction of foreign plant or animal species into river buffer and river water ➢ Extraction of any materials or components of forest ecosystem from HCVF buffer area ➢ Extraction of water from the river. ➢ Incidence of fire • Documentation of threats • Remove obstruction to water flow & clearance of river										
3b	**<u>Orang Asli Fruit Orchard in C35 (H2)</u>** • Boundary identification & marking (routine) • Identification of threats ➢ Pollution: (i) Rubbish made & left by Orang Asli, (ii) traces of oil, (iii) plastics & rubber, (iv) metal parts & metal containers, (v) construction materials (vi) other foreign objects. ➢ Fire incidence in all HCVF areas (natural and man-made) ➢ Diseases & pests of durian trees & fruits ➢ Human encroachment ➢ Introduction of foreign/ exotic plants or animals into HCVF • Documentation of threats & actions talen	√	√	√	√	√	√	√	√	√	√
4	➢ Stakeholder Consultation (periodic, but at least once a year) ➢ Dialogues (formal and informal) ➢ Conservation and environmental education (formal & informal)	√	√	√	√	√	√	√	√	√	√
5	Training, Capacity Building & FSC Mentoring ➢ Training in (i) conservation methodology (ii) conflict resolution (iii) forest ecology (iv) FSC P&C. (v) Monitoring Data collection (vi) Conservation education	√	√	√	√	√	√	√	√	√	√

	(vii) EIA, SIA										
6	Multi-resource Inventory • Flora • Fauna ➢ Terrestrial ➢ Avifauna ➢ Aquatic fauna in riverine ecosystem		√		√		√		√		√
7	Patrolling (Routine) (Incl. monitoring of impacts of management activities) • Water quantity & quality: ➢ Monitoring of water quality & quantity ➢ Monitoring of Water quality (physical, biological & chemical)	√	√	√	√	√	√	√	√	√	√
8	Evaluation of impacts of management activities on HCVF	√	√	√	√	√	√	√	√	√	√
9	Adaptation to management activities – ➢ findings from HCVF monitoring will be documented to be applied/ adapted into management/ operational decisions. ➢ Presentation of findings in meetings/ seminars	√	√	√	√	√	√	√	√	√	√
10	R & D (incollaboration with relevant R & D institutions and NGOs • FRIM • UPM • UMT • WWF Malaysia • Consultants	√	√	√	√	√	√	√	√	√	√
12	***FSC Auditing***										
12a	Certification Audit					√					√
12b	Surveillance Audit	√	√	√	√		√	√	√	√	

8.0 Summary And Recommendations

According to WWF-Malaysia (2009), the identification and management of HCVFs at the Forest Management Unit (FMU) level requires the following steps:

(1) Interpret the global definition

(2) Identify potential HCVF

(3) Identify specific HCVF components in the field and through consultation

(4) Zone HCVF areas, buffer zones and note compartments

(5) Identify Limits of Acceptable Change (LAC) for maintaining HCVF (this issue never arises since we never conduct any operation or interfere/ modify the ecosystems within HCVF areas)

(6) Plan precautionary management prescriptions for HCVF compartments

(7) Implement management activities

(8) Monitor impacts of management activities

(9) Evaluate impacts of management activities

(10) Adapt management where appropriate.

For the case of CFC, it is recommended for KPKKT to adopt the approach of management as propounded in this HCVF Managament Plan document while at the same time adapting wherever

possible, the above conceptual approach of WWF-Malaysia and the Forest Department of Peninsular Malaysia.

9.0 References

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Annexes

Annex 1: Cherul Forest Concession in Photos:

1- General View

2 – Logging Road

3 – Base Camp

4 - Palas River

5 – Hill top

6 – Tall trees

7- Forest Palm

8- Livingstonia speciosa

9 – Riverine Forest

10- Tacca

11- Globba cornerii

12 – Neram Stream

13- Secondary Forest

14-Orang Asli Durian Tree Orchard

15-Licuala fractiflexa

16 – Dendrocalamus pendulus

17-Johannesteynmannia altifrons

18-Elephant's dung

19-Elephant's trail

20- Tiger's Footprint

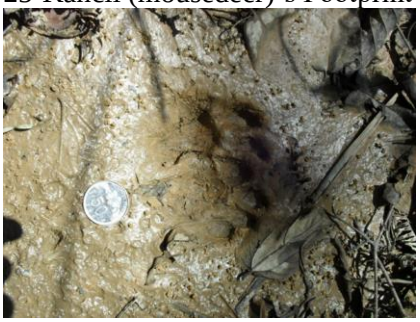
21 – Wild Boar's Footprint

22 – Wollowing Mudhole

23 – Tapir’s Footprint

24-Kijang (Barking deer)’s Footprint

25-Kancil (mousedeer)’s Footprint



26-Otter’s Footprint

18-Elephant’s dung

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Annex 2:

Recorded Taxa from Cherul Forest Concession (CFC), Kemaman, Terengganu (Compt. nos. 29, 30, 32, 35 and 40)

1. *Aglaia yzermannii* Boerl. & Koord. [Meliaceae]; rheophytic tree to 5m tall; on riverbanks; distribution: Kl, Tg, Pk, Ph; rare. Distribution of the plant species within the study area: B – C30.
2. *Agrostistachys longifolia* (Wight) Benth. var. *leptostachya* (Pax & K. Hoffm.) Whitmore [Euphorbiaceae]; small tree to 9m tall; lowland and hill forest; distribution: Kd, Tg, Pk, Ph. Distribution of the plant species within the study area: A – C29.
3. *Alpinia scabra* (Blume) Baker [Zingiberaceae; Tepus]; herb to 3m tall; lowlands and hills; distribution: commonest at 300-900 m, widespread. Distribution of the plant species within the study area: C – C35.
4. *Arenga westerhoutii* Griff. [Palmae; Langkap]; feather palm to 10m or more tall; locally gregarious in hillside forest including on limestone; distribution: widespread. Distribution of the plant species within the study area: A – C29 & B-C35.
5. *Asplenium nidus* L. [Aspleniaceae; Paku langsuyar]; common epiphytic fern; lowlands and mountains; distribution: throughout. Distribution of the plant species within the study area: A – C29 & B – C32.
6. *Bouea oppositifolia* (Roxb.) Meisn. [Anacardiaceae; Kundang]; tree to 33m tall; lowland forest to 700m; distribution: widfespread. Distribution of the plant species within the study area: A – C35.
7. *Calamus corneri* Furtado [Palmae; Rotan perut ayam]; clustering rattan climbing to 20m; lowland forest; distribution: Ulu Kemaman, Tg, and near Kuantan, Ph, endemic to Malaya. Distribution of the plant species within the study area: A – C29 & B – C35.
8. *Calamus diepenhorstii* Miq. [Palmae; Rotan kerai]; distribution: Kl, Tg, Pn, Pk, Ph, Sl, NS, Ml, Jh, Sp. Distribution of the plant species within the study area: B - C35 & C – C35.
9. *Calophyllum flavoramulum* M.R. Hend. & Wyatt-Sm. [Guttiferae; Bintangor]; tree to 38m tall; lowland forest; distribution: Tg, Ph, Jh; rare. Distribution of the plant species within the study area: A – C29.
10. *Campnosperma auriculatum* (Blume) Hook. f. [Anacardiaceae; Terentang]; big tree to 33m tall; lowland and montane forest to 1,600m, often in swampy places; distribution: widespread. Distribution of the plant species within the study area: B – C35 & C - 35.

11. *Cinnamomum porrectum* (Roxb.) Kosterm. [Lauraceae; Medang teja]; tree to 45m tall; lowlands to mountains; distribution: Ml and Ph northward. Distribution of the plant species within the study area: A-C29.
12. *Cyathea latebrosa* (Wall. ex Hook.) Copel. [Cyatheaceae; Paku gajah]; tree fern to 3-m; open forest in lowlands and hills to 2,000m; widespread. Distribution of the plant species within the study area: B-C30 & C-C35.
13. *Cycas rumphii* Miq. [Cycadaceae]; cycad to 6m tall; mostly rocky shores; distribution: widespread. Distribution of the plant species within the study area: A – C29.
14. *Daemonorops angustifolia* (Griff.) Mart. [Palmae; Rotan semelus]; thicket forming rattan to 40m tall; damp lowland forests, riverbanks; distribution: Kd, Kl, Tg, Pk, Ph, Sl, NS, Ml, Jh, Sp. Distribution of the plant species within the study area: B – C35.
15. *Dendrocalamus pendulus* Ridl. [Gramineae; Buloh akar]; bamboo to 25m tall; opening in lowland forest to 800m; distribution: Ps, Kd, Pn, Kl, Tg, Pk, Ph, Sl, NS, Ml, Jh, endemic to Malaya. Distribution of the plant species within the study area: B-C35 & C-C35.
16. *Dialium indum* L. var. *indum* [Leguminosae; Keranji]; tree to 35m tall; scattered in lowland forest; distribution: widespread. Distribution of the plant species within the study area: A-C29.
17. *Dicranopteris linearis* (Burm. f.) Underw. var. *linearis* [Gleicheniaceae; Resam]; very common thicket; lowlands to mountains to 1,400m; distribution: throughout. Distribution of the plant species within the study area: C-C35.
18. *Dillenia indica* L. [Dilleniaceae; Simpoh]; tree to 20m tall; often on stream banks; distribution: Kl, Tg, Pk, Ph, Sl, Jh. Distribution of the plant species within the study area: B-C30.
19. *Dipterocarpus oblongifolius* Blume [Dipterocarpaceae; Keruing neram]; large tree; banks of fast-flowing rivers; distribution: mostly east of Main Range; rare. Distribution of the plant species within the study area: B-C30.
20. *Dipterocarpus rigidus* Ridl. [Dipterocarpaceae; Keruing cogan]; tree sometimes exceeding 3m girth; coastal hill forest; distribution: Tg southward, Malay Peninsular; the Riau and Lingga archipelagos, Borneo and the Anamba Islands. Distribution of the plant species within the study area: A-C29.
21. *Donax grandis* (Miq.) Ridl. [Marantaceae; Bemban]; lowland forest herb to 5m tall; distribution: widespread. Distribution of the plant species within the study area: B-C30 & C-C35.
22. *Durio zibethinus* Murray [Bombacaceae; Durian]; large tree over 30m tall; distribution: widespread in cultivation in the Asian tropics; possibly wild in Sumatra anb Borneo. Distribution of the plant species within the study area: C-C35.

23. *Elateriospermum tapos* Blume [Euphorbiaceae; Perah]; tree to 27m tall; lowland and hill forest to 600m; distribution: throughout. Distribution of the plant species within the study area: A-C29 & C-32.
24. *Endospermum diadenum* (Miq.) Airy Shaw [Euphorbiaceae; Sesenduk]; tree to 40m tall; lowland to lower montane forest at 1,000m; distribution: common throughout Peninsular Malaysia, Thailand, Sumatra and Borneo. Distribution of the plant species within the study area: B-C35 & C-C32.
25. *Eurycoma longifolia* Jack [Simaroubaceae; Tongkat ali]; treelet to 5m tall; lowlands and hills; distribution: throughout. Distribution of the plant species within the study area: A-C29.
26. *Globba corneri* A. Weber [Zingiberaceae; Tepus]; herb to 30cm tall; lowland and hill forest; distribution: ?Kl, Tg, endemic to Malaya. Distribution of the plant species within the study area: B-C35.
27. *Goniothalamus macrophyllus* (Blume) Hook. f. & Thomson [Annonaceae; Gajah beranak]; shrub to 5m tall; common in lowland forest; distribution: Kd, Kl, Tg, Pk, Ph, Sl, NS, Ml, Jh, Sp. Distribution of the plant species within the study area: A-C29 & B-C35.
28. *Hanguana malayana* (Jack) Merr. [Hanguanaceae; Lobak]; herb to 2m tall; terrestrial or aquatic; in lowland and hill forest to 1,500m or in lowland ponds and rivers; distribution: widespread. Distribution of the plant species within the study area: A-C29 & B-C35.
29. *Hydnocarpus woodii* Merr. [Flacourtiaceae; Setum,pol]; tree to 36m tall; lowland and hill forest to 1,000m; distribution: Ps, Tg, Pk, Ph, Sl, NS, Jh. Distribution of the plant species within the study area: A-C29.
30. *Ixora javanica* (Blume) DC. var. *javanica* [Rubiaceae; Jejarum hutan]; shrub to 4m tall; lowland and hill forest, often cultivared; distribution: widespread. Distribution of the plant species within the study area: B-C29.
31. *Johannesteijsmanni altifrons* (Rchb. f. & Zoll.) H.E. Moore [Palmae; Pok lah]; solitary stemless simple-leafed palm to 6m tall; primary lowland forest; distribution: Kl, Ph, Sl, Jh; rare. Distribution of the plant species within the study area: A-C29.
32. *Korthalsia echinometra* Becc. [Palmae; Rotan udang]; clustering ant-inhabited rattan to 30m tall; lowland and hill forest; distribution: Tg, Ph, Sl, Jh, Sp. Distribution of the plant species within the study area: A-C29, B-C35 & C-C35.
33. *Licuala fractiflexa* L.G. Saw [Palmae; Palas gajah]; solitary, stemless or stout stemmed palm to 3.3m tall; leaves peltate orbicular to 1.5m wide; forest understory, lowland dipterocarp forest, on undulating slopes and well drained soils; distribution: endemic to Tg, Peninsular Malaysia. Distribution of the plant species within the study area: A-C29, C32.

34. *Licuala glabra* Griff. var. *glabra* [Palmae; Palas]; stemless or stout stemmed palm to 3m tall; forest understory, lowlands and mountains; distribution: Kl, Tg, Pk, Ph, Sl, Ml, Jh. Distribution of the plant species within the study area: A-C29.
35. *Lithocarpus ewyckii* (Korth.) Rehder [Fagaceae; Mempening]; tree to 30m tall; common in the lowlands, rarer in the mountains; distribution: Kl, Tg, Pk, Ph, Sl, NS, Ml, Jh, Sp. Distribution of the plant species within the study area: A-C29.
36. *Livistona speciosa* Kurz [Palmae; Daun Sal]; fan palm to 20m tall; lower montane forest 600-1,000m; distribution: Kd, Kl, Pk, Ph, Sl. Distribution of the plant species within the study area: A-C29.
37. *Macaranga hypoleuca* (Rchb. f. & Zoll.) Mull. Arg. [Euphorbiaceae; Mahang]; tree to 30m tall; secondary forest; distribution: throughout. Distribution of the plant species within the study area: C-C35.
38. *Mapania caudata* K• k. [Cyperaceae; Serapdi]; small herb; lowland forest; distribution: Tg; rare. Distribution of the plant species within the study area: B-C35.
39. *Mesua lepidota* T. Anderson var. *lepidota* [Guttiferae; Penaga tikus]; tree to 21m tall; lowland forest; distribution: Tg, Pk, Ph, Sl, NS, Ml, Jh. Distribution of the plant species within the study area: A-C29.
40. *Oncosperma horridum* (Griff.) Scheff. [Palmae; Bayas]; ferociously spiny, clustered feather palm to 20m tall; lowland and hill forest to 500m; distribution: throughout. Distribution of the plant species within the study area: A-C29 & B-C32.
41. *Pandanus militaris* Parkinson var. militaris [Pandanaceae; Pandan]; erect, sparsely branched shrub 3-4m tall; in swamps; distribution: Tg, Sl, ?Sp. Distribution of the plant species within the study area: B-C29.
42. *Parkia speciosa* Hassk. [Leguminosae; Petai]; tree to 35m tall, sometimes bigger; lowland and hill forest to 900m, often planted; distribution: widespread. Distribution of the plant species within the study area: C-C35.
43. *Pinanga malaiana* (Mart.) Scheff. [Palmae; Pinang]; clumping feather palm occasionally to 6m tall; lowland and hill forest to 900m; distribution: widespread. Distribution of the plant species within the study area: A-C32 & B-C32.
44. *Sandoricum koetjape* (Burm. f.) Merr. [Meliaceae; Sentul]; tree to 45m tall; lowland and hill forest, often cultivated; distribution: widespread. Distribution of the plant species within the study area: Distribution of the plant species within the study area: C-C35.
45. *Santiria laevigata* Blume [Burseraceae; Kedongdong]; tree 15-30m tall; lowland to montane forest; distribution: Kd, Kl, Tg, Pn, Pk, Ph, Sl, NS, Ml, Jh, Sp. Distribution of the plant species within the study area: A-C29.

46. *Saraca cauliflora* Baker [Leguminosae; Gapis]; tree to 15m tall; lowland and hill forest, often riverine; distribution: Ml and Ph northward. Distribution of the plant species within the study area: B-C32, C35.
47. *Shorea curtisii* Dyer ex King ssp. *curtisii* [Dipterocarpaceae; Seraya]; large tree; ridges to 850m; distribution: throughout. Distribution of the plant species within the study area: A-C29.
48. *Shorea lepidota* (Korth.) Blume [Dipterocarpaceae; Meranti langgong]; large buttressed tree; lowland forest; distribution: Kd, Pn, Tg, Pk, Ph, NS, Ml, Jh. Distribution of the plant species within the study area: A-C29.
49. *Syzygium polyanthum* (Wight) Walp. var. *polyanthum* [Myrtaceae; Daun Salom]; tree to 30m tall; lowland forest; distribution: P. Langkawi & Kl to Sp. Distribution of the plant species within the study area: B-C35.
50. *Tacca integrifolia* Ker Gawl. [Taccaceae; Belimbing hutan]; herb to 1m tall; lowland and hill forest; distribution: widespread. Distribution of the plant species within the study area: B-C35 & C-C35.
51. *Thottea grandiflora* Rottb. [Aristolochiaceae; Hempedu beruang]; shrub to 2m tall; lowland and hill forest to 600m; distribution: Tg, Pk, Ph, NS, Ml, Jh, Sp. Distribution of the plant species within the study area: B-C35.
52. *Zingiber grifithii* Baker [Zingiberaceae; Tepus]; herb to 70cm tall; lowland forest; distribution: common in the south of the Peninsular. Distribution of the plant species within the study area: A-C29.

Note: The following codes are utilized for Malayan states: Ps=Perlis, Kd=Kedah, Pn=Pulau Pinang(Penang), Kl=Kelantan, Tg=Trengganu, Pk=Perak, Ph=Pahang, Sl=Selangor, NS=Negeri Sembilan, Ml=Melaka (Malacca), Jh=Johor, Sp=Singapura (Singapore)