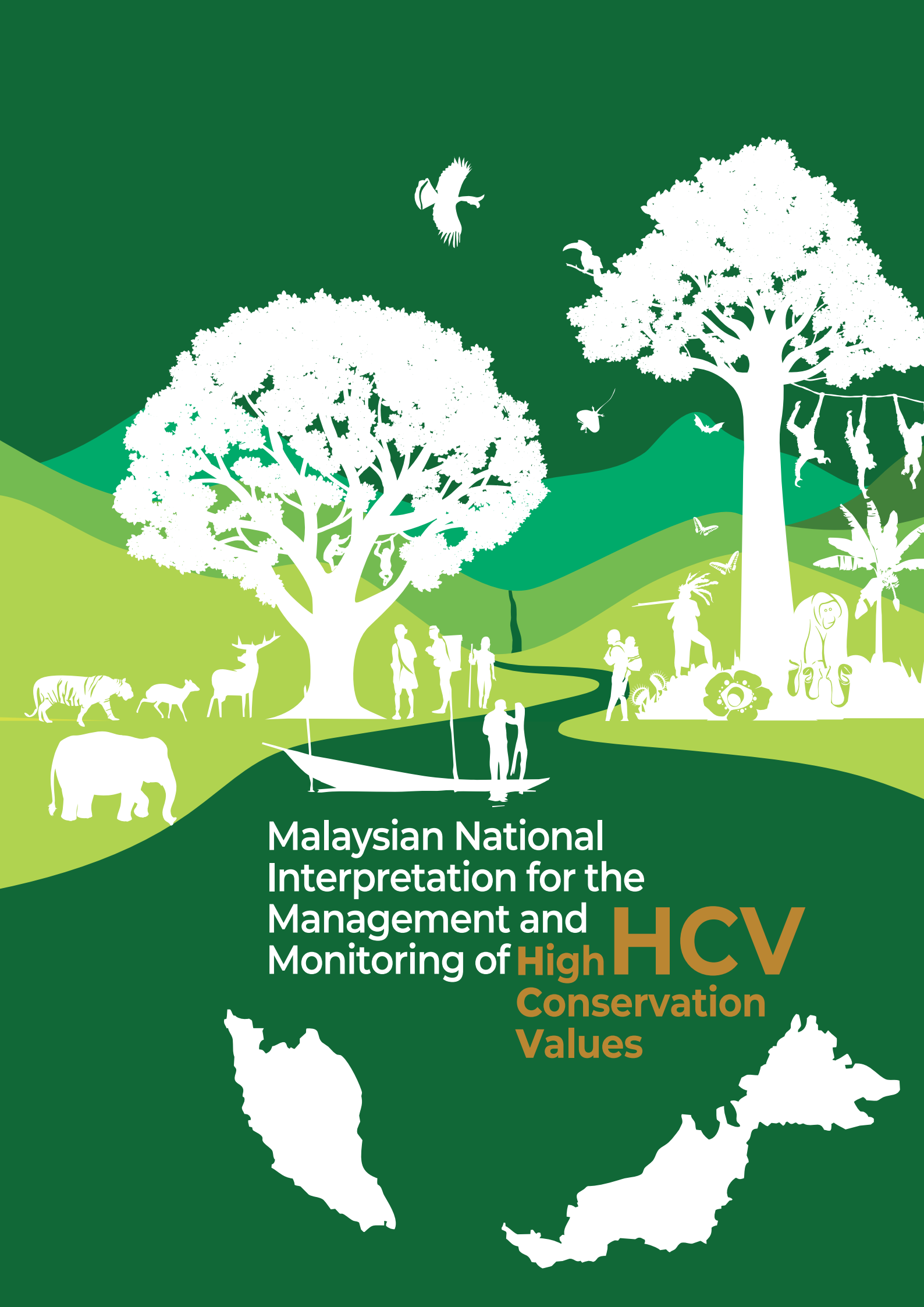

Malaysian National Interpretation for the Management and Monitoring of High Conservation Values HCV

Malaysian National Interpretation for the Management and Monitoring of **High Conservation Values**

This document is the Malaysian National Interpretation of the *Common Guidance for the Management and Monitoring of High Conservation Values (HCVs)* which was originally produced by the HCV Resource Network (HCV RN), now known as the HCV Network (HCVN). It supersedes the High Conservation Value Forest (HCVF) Toolkit for Malaysia published by WWF-Malaysia in 2009.

The production of this National Interpretation document was spearheaded by the HCV Malaysia Toolkit Steering Committee with inputs from the Technical Working Group and technical guidance from the HCVN.

As this document is based on the HCVN's *Common Guidance for the Management and Monitoring of HCVs*, some sections of the text borrow heavily from the Common Guidance document with permission from the HCVN.

The HCV Malaysia Toolkit Steering Committee comprises the Forest Stewardship Council® (FSC®) Malaysia, the Malaysian Palm Oil Association (MPOA), the Malaysian Timber Certification Council (MTCC), the Roundtable for Sustainable Palm Oil (RSPO) and WWF-Malaysia.

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The Technical Working Group (TWG) of the HCV Malaysia Toolkit Steering Committee comprises the following organisations: Acacia Forest Industries Sdn. Bhd., Asrama Raya Sdn. Bhd., BQAS Certification (M) Sdn. Bhd., BSI Group, Dayak Oil Palm Planters Association (DOPPA), DQS CFS Certification (M) Sdn. Bhd., Federal Land Development Authority (FELDA), FGV Holdings Berhad, Forest Research Institute of Malaysia (FRIM), FORMADAT Sabah (Forum Masyarakat Adat Dataran Tinggi Borneo), Forestry Department Peninsular Malaysia, Genting Plantations Berhad, Global Environment Centre (GEC), GP Pusaka Sdn. Bhd., Institute of Biodiversity and Environmental Conservation (IBEC) UNIMAS, IOI Corporation Berhad, Johor National Park Corporation, Kiwiheng Environmental Consultants Sdn. Bhd., Kuala Lumpur Kepong (KLK) Berhad, Kulim (Malaysia) Berhad, LESTARI (UKM), Malaysian Nature Society (MNS), Preferred by Nature (previously NEPCon), Perak State Parks Corporation, Persatuan Dayak Sarawak (PEDAS), Platinum Shauffmanz Veritas Sdn. Bhd., Borneo Conservation Trust, Sabah Forestry Department, Sabah Forest Industries Sdn. Bhd., Sabah Softwoods Berhad, Sabah Timber Industries Association, Sarawak Dayak Iban Association (SADIA), Sarawak Forestry Corporation (SFC), Sarawak Oil Palm Plantation Owners Association (SOPPOA), Sarawak Timber Association (STA), Sarawak Timber Industry Development Corporation (STIDC), Sime Darby Plantation Berhad, Southeast Asia Rainforest Research Partnership (SEARRP), SIRIM QAS International, East Malaysia Planters Association (EMPA), Tuv Nord (Malaysia) Sdn. Bhd., University of Nottingham Malaysia, Wild Asia, Wildlife Conservation Society (WCS) Malaysia, Wilmar International Limited, WWF-Malaysia, Yayasan Sime Darby.

The HCV Malaysia Toolkit Steering Committee would like to thank all involved in the national interpretation process including the TWG, participants of the stakeholder consultations, Proforest and the HCVN.

As the development of this toolkit involved a multi-stakeholder consultation process, the outputs are not meant to belong to any individual party and should be freely available to all practitioners of the HCV approach.

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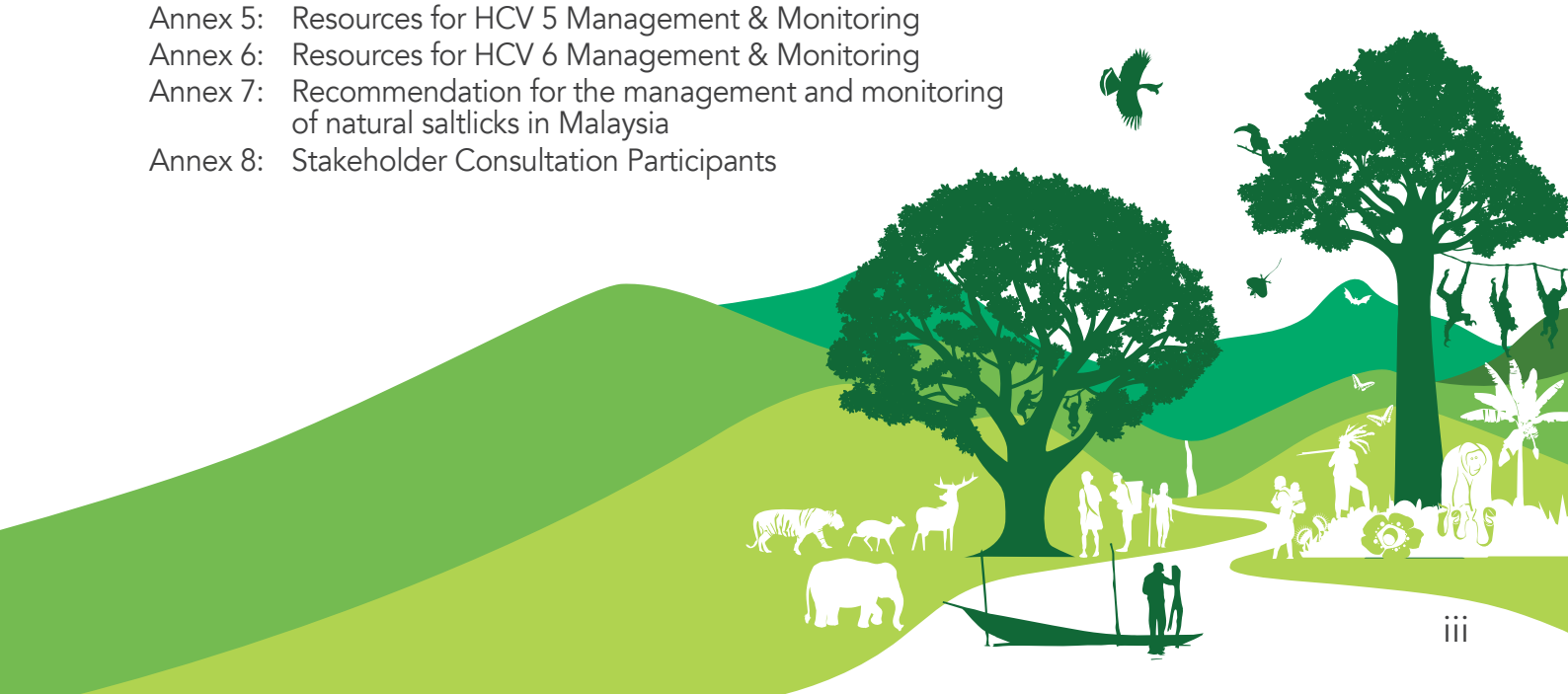


Acronyms and abbreviations

a.s.l.	Above sea level
BMP	Best Management Practice
BRIMAS	Borneo Resources Institute
CFS	Central Forest Spine (Peninsular Malaysia)
CG	Common Guidance documents by the HCVN
CITES	Convention on International Trade in Endangered Species of Wild Fauna & Flora
COAC	Center for Orang Asli Concerns
CR	Critically Endangered (IUCN)
DD	Data Deficient (IUCN)
DID	Department of Irrigation and Drainage
DOSM	Department of Statistics Malaysia
DTCP	Department of Town and Country Planning
DWNP	Department of Wildlife and National Parks (Peninsular Malaysia)/Jabatan *Perlindungan Hidupan Liar dan Taman Negara (PERHILITAN)*
EN	Endangered (IUCN)
EPD	Environment Protection Department (Sabah)
ESA	Environmentally Sensitive Area
FDRS	Fire Danger Rating System
FMU	Forest Management Unit
FPIC	Free, Prior and Informed Consent
FRA	Forest Resource Assessment
FSC®	Forest Stewardship Council®
FRIM	Forest Research Institute Malaysia
GEC	Global Environment Centre
GIS	Geographical Information System
HCV	High Conservation Value
HCVA	High Conservation Value Area
HCVMA	High Conservation Value Management Area
HCVN	High Conservation Value Network
HCVNI	High Conservation Value National Interpretation
HCVRN	High Conservation Value Resource Network, now HCVN (see above)
HEC	Human-Elephant Conflict
HoB	Heart of Borneo
IBA	Important Bird and Biodiversity Area
IFL	Intact Forest Landscape
IUCN	International Union for the Conservation of Nature
JAKOA	*Jabatan Kemajuan Orang Asli* (Department for Orang Asli Development)
JOAS	*Jaringan Orang Asal Se-Malaysia* (Indigenous Peoples Network of Malaysia)
JUPEM	*Jabatan Ukur dan Pemetaan* (Department of Survey and Mapping)
KDCA	Kadazan Dusun Cultural Association
KPI	Key Performance Indicators.
MPOA	Malaysian Palm Oil Association
MTCC	Malaysian Timber Certification Council
MTCS	Malaysian Timber Certification Scheme
MU	Management Unit
MyBIS	Malaysia Biodiversity Information System
MYNI	Malaysian National Interpretation

NCR	Native Customary Rights
NCZPP	National Coastal Zone Physical Plan
NECAP	National Elephant Conservation Action Plan
NFI	National Forest Inventory
NI	National Interpretation
NPBD	National Policy on Biological Diversity
NQWS	National Water Quality Standard
NREB	Natural Resources & Environment Board (Sarawak)
NSPSF	North Selangor Peat Swamp Forest
NT	Near Threatened (IUCN)
NTCAP	National Tiger Conservation Action Plan
NTFP	Non-Timber Forest Product; Non-Timber Forest Produce (in the case of Sabah)
P&C	Principles & Criteria
REDD	Reduction of Emission from Deforestation and Forest Degradation
RIL	Reduced Impact Logging
RSPO	Roundtable on Sustainable Palm Oil
RTE	Rare, Threatened and Endangered
SADIA	Sarawak Dayak Iban Association
SC	HCV Malaysia Toolkit Steering Committee
SFM	Sustainable Forest Management
SFMLA	Sustainable Forest Management License Agreement
SIA	Social Impact Assessment
SMART	*Specific, Measurable, Achievable, Realistic, and Time-bound*
SMART	Spatial Monitoring and Reporting System
SOP	Standard Operating Procedure
TEK	Traditional Ecological Knowledge
TRCRC	Tropical Rainforest Conservation & Research Centre
UAV	Unmanned Aerial Vehicle
VU	Vulnerable (IUCN)
WCS	Wildlife Conservation Society

Glossary

Biologicial diversity/ Biodiversity	The variety of life on Earth including all plants, animals, micro-organisms, the ecosystems to which they belong, and the diversity within species, between species, and of ecosystems. Biodiversity also refers to the complex relationships among living things, and between living things and their environment.
Conservation areas	Areas that have been identified by credible sources as harbouring significant biodiversity or being important important for maintaining ecosystem services. In the Malaysian context, conservation areas include legally constituted (gazetted) protected areas according to the Protected Areas Master List but also proposed protected areas, Important Bird and Biodiversity Areas, Ramsar sites and Environmentally Sensitive Areas Rank 1.
Ecological type	See definition for ecosystem below.
Ecosystem	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. In the context of this document, ecosystem is used interchangeably with "ecological type" to describe a geographic area which has plant and animal communities within a defined, and thus mappable, geophysical area. This can contain many habitats for many different entities, e.g. lowland forest.
Ecosystem services	Benefits people obtain from ecosystems, including provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious and other non-material benefits.
Free, Prior, and Informed Consent (FPIC)	The right of indigenous peoples and local communities to give or withhold consent to any project that may affect their lands, livelihoods and environment. This consent should be given or withheld freely, and through communities' own freely chosen representatives such as their customary or other institutions. It should be sought prior to commencement of activities and respecting the time requirements of indigenous consultation processes. Communities must have access to and be provided with comprehensive and impartial information on the project, including: the nature and purpose of the project; its scale, location, reversibility and scope; all possible economic, social, cultural and environmental impacts, including potential risks and benefits; and an assurance that the costs and benefits of alternative development options can be considered by the community with, or offered by, any other parties who wish to do so, with whom the community is free to engage. It is an iterative process of collective consultation, the demonstration of good faith in negotiations, transparent and mutually respectful dialogue, and broad and equitable participation.
Habitat	An ecological or environmental area that is inhabited by a particular species of animal, plant, or other type of organism. The term typically refers to the zone in which the organism lives and where it can find food, shelter, protection and mates for reproduction. It is the natural environment in which an organism lives, or the physical environment that surrounds a species population. In the context of this document, habitat is used to describe the range and conditions where a particular species or type of plant or animal are limited to. Habitats can range across many different ecosystems, e.g. habitat of an elephant.

Hyperendemic	A plant or animal species whose distribution is highly restricted to a certain place.
Intensity	A measure of the force, severity or strength of a production activity or other occurrence affecting the nature of the activity's impacts.
Local community	Communities of any size that are in or adjacent to the Management Unit, and also those that are close enough to have a significant impact on the economy or the environmental values of the Management Unit or to have their economies, rights or environments significantly affected by the management activities or the biophysical aspects of the Management Unit.
Niche	The total sum of the adaptations of an individual, a population, or a species of which conforms to its particular environment. This includes the organism's abilities to interface with, use, and exploit its environment. In simpler terms it is what a microbe, fungus, plant or animal does in an ecological community.
Orang Asal	A collective term used for indigenous peoples in Malaysia.
Organisation	A person or entity (family, community, cooperative, government, corporation, concession holder, etc.) who is responsible for the management and monitoring of HCVs.
Precautionary approach	The precautionary approach requires that when the available information indicates that management activities pose a threat of severe or irreversible damage to the environment or a threat to human welfare, the Organisation will take explicit and effective measures to prevent the damage and avoid the risks to welfare, even when the scientific information is incomplete or inconclusive, and when the vulnerability and sensitivity of environmental values are uncertain.
Refugia	Areas in which a population of organisms can survive through a period of unfavourable conditions (singular = refugium).
Riparian area/zone	An ecological concept used to describe the land adjacent to streams and rivers which is a unique transitional area between aquatic and terrestrial habitats.
River/riparian buffer	A vegetated area next to a river which partially protects the river from the impact of adjacent land uses.
River/riparian reserve	An area next to a river that has been gazetted for protection purposes under a relevant national or state law.
Risk	The probability of an unacceptable negative (environmental or social) impact arising from an activity in the MU combined with its seriousness in terms of consequences.
Saltlick	Any mineral spring or ground containing or bearing salt or any other mineral, the consumption of which is conducive to the health or wellbeing of wildlife.
Scale	A measure of the extent to which a production activity or event affects an environmental or social value or a Management Unit (MU), in time or space. An activity with a small spatial scale occurs over a small area, and an activity that occurs infrequently (i.e. at long intervals) has a 'small temporal scale'.

Species	The scientific definition according to the Biological Species Concept is: Groups of actually or potentially interbreeding natural populations, which are reproductively isolated from other such groups. However, there are many partial exceptions to this rule in particular taxa. Operationally, the term species is a generally agreed fundamental taxonomic unit, based on morphological or genetic similarity, that once described and accepted is associated with a unique scientific name. (source: Millennium Ecosystem Assessment: Ecosystems and Human Well-being, Volume 1, Current State and Trends).
Species diversity	Biodiversity at the species level, often combining aspects of species richness, their relative abundance, and their dissimilarity.
Wetlands	Areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.

List of case studies

Background to this document

The High Conservation Value (HCV) approach was first developed in 1997 and incorporated in the Principles & Criteria (P&Cs) of the Forest Stewardship Council (FSC) in 1998 for identifying and managing environmental and social values in forest landscapes. A three-part High Conservation Value Toolkit (the 'Global Toolkit') was produced in 2003 by Proforest.

The HCV Network (HCVN, formerly known as the High Conservation Value Resource Network) was established in 2005 and in the subsequent years, the HCVN and FSC worked together to revise the HCV definitions. In order to promote a common interpretation of the HCV definitions and thus a more consistent application across different natural resource sectors or geographies, the global HCV definitions were amended as part of the revision of the FSC P&C (2012).

In the intervening years, the HCV approach had evolved with greater emphasis given to values rather than areas, and its scope expanded beyond forests ecosystems. At the global level, HCV is now widely used in certification standards (forestry and agriculture systems) and more generally for resource use and conservation planning.

Although Malaysian national policies do not describe conservation values along the lines of the HCV approach, it should be noted that the HCV approach is not an externally imposed concept. Over the years, there has been a progressive recognition of values that need to be conserved for the benefit of the country and its people. The importance of protecting forests and wildlife has been recognised as far back as the early 1900s as evidenced by laws on forest and wildlife protection. The protected areas that have been established and the lists of protected species included in the wildlife legislations of Peninsular Malaysia, Sabah and Sarawak are examples of the country's recognition of rare, threatened and endangered species (HCV 1). Awareness about impacts from agriculture and other development activities on ecosystem services (HCV 4) led to the formulation of environmental laws in the 1970s and subsequent national policy documents such as the National Physical Plan, which includes the concept of Environmentally Sensitive Areas. Malaysia's ratification of the Convention on Biological Diversity and the adoption of the National Policy on Biological Diversity in the 1990s are a manifestation of concern over the protection of HCVs 1-3.

At the global level, there has been a consultative process since 2012 led by then the HCVN to develop a new set of practical user manuals for HCV practitioners. The first document produced under this initiative was the Common Guidance for the Identification of HCVs (Brown *et al.*, 2013) to clarify the use of HCV to other ecosystems and to provide guidance on the updated HCV definitions, as well as examples from practical field experience. This was followed by the Common Guidance for the Management and Monitoring of HCVs (Brown & Senior, 2014).

In Malaysia, a guidance document called "High Conservation Value Forest (HCVF) Toolkit for Malaysia: A national guide for identifying, managing and monitoring High Conservation Value Forests" was published in 2009 based on the earlier Global Toolkit in an initiative led by WWF-Malaysia. As its name suggests, the toolkit was mainly aimed for use by the forestry sector and for forest ecosystems. Since then, there has been an increased demand for the application of the HCV approach within the palm oil certification context. Significant developments have also happened at the national level with regard to laws and policies related to natural resources management e.g. the formulation of the National Physical Plan and the Central Forest Spine Master Plan in Peninsular Malaysia; the replacement of the Protection of Wild Life Act 1972 with the Wildlife Conservation Act 2010 in Peninsular Malaysia; progress in the implementation of the Heart of Borneo initiative in Sabah and Sarawak; and more recently the launch of the National Policy on Biological Diversity 2016-2025 and the Sabah Structure Plan 2016-2033.

As such, there was an urgent need to develop a new Malaysian HCV toolkit which would be applicable to various terrestrial ecosystems (including non-forested ecosystems) in Malaysia, and which would be aligned to the HCVN Common Guidance documents.

In 2015, a Steering Committee (SC) and a Technical Working Group (TWG) was formed to develop the HCV

Malaysia toolkit. The first document in the toolkit was published in 2018, i.e. the Malaysian National Interpretation for the Identification of High Conservation Values.

The SC and the TWG were reconvened in 2020 for the production of the second guidance document published under the banner of the HCV Malaysia toolkit. The SC for the HCV Malaysia Toolkit in 2020-2021 comprised the Forest Stewardship Council® (FSC®) Malaysia, Malaysian Timber Certification Council (MTCC), Malaysian Palm Oil Association (MPOA), Roundtable on Sustainable Palm Oil (RSPO) and WWF-Malaysia.

The TWG is a group of subject matter specialists and relevant stakeholders which provide advice and technical inputs for the development of the HCV Malaysia toolkit. The TWG is structured in accordance with the three geographical regions in Malaysia, namely Sabah, Sarawak, and Peninsular Malaysia, as these three regions vary substantially in legal frameworks, pace of economic development and environmental conditions.[1] In each geographic region efforts were made towards ensuring adequate representation from the different key stakeholder groups. In addition to inputs from the TWG, stakeholder consultations were held to obtain inputs on the draft document from a wider set of stakeholders in Malaysia. A stakeholder consultation period of 30 days was conducted from 15 September to 14 October 2020 during which three regional stakeholder consultation online sessions were conducted for Sabah, Sarawak and Peninsular Malaysia on 23 September, 5 October and 7 October respectively. A second stakeholder consultation period was conducted for 30 days from 7 December 2020 to 6 January 2021 during which national stakeholder consultation online sessions were held on 8-10 December 2020. Annex 8 provides a list of the stakeholder consultation workshops and the organisations that participated in the workshops.

How to use this document

This National Interpretation (NI) document is not a stand-alone document and should be used together with the Malaysian National Interpretation for the Identification of High Conservation Values (2018), and the HCVN Common Guidance for the Management and Monitoring of High Conservation Values (Brown & Senior, 2014). Where there is lack of guidance on any particular item, please refer to the relevant section(s) in the Common Guidance (CG). Where there is a conflict or discrepancy, the global HCV guidance and definitions take precedence over national interpretations. However, where the NI goes beyond the CG, it is NOT a conflict or discrepancy, including instances where the NI requirements may be more stringent than those of the CG.

This NI document is intended primarily for HCV assessors, resource managers, and auditors. As in the case of the CG, it is not a binding document, but rather a guide to "best practice". Further details on requirements relating to managing and monitoring HCVs should be sought from the relevant certification scheme.

The introduction sections of this document provide the context for how the HCV approach should be used, and why national interpretations of the HCVN Common Guidance are needed. The main sections provide detailed guidance on national interpretation of how HCVs should be managed and monitored, particularly the interpretation of key terms and concepts; reference documents related to management and monitoring of HCVs; and illustrative case studies and examples.

This guidance is mainly aimed at **larger commodity producers** who are aiming to achieve and or maintain certification status for a range of commodities (including timber and palm oil). While it is well acknowledged that a significant proportion of agricultural commodities is produced by smallholders, they do not have access to the same level of technical expertise and financial resources as large companies. Therefore, some of the guidance

[1] Malaysia is a federation of 13 states of which 11 are located in Peninsular Malaysia while two states, namely Sabah and Sarawak, are located on Borneo island. Due to historical reasons and the Federal Constitution, Sabah and Sarawak have more autonomy over their natural resources compared to the Peninsular Malaysia states. In addition, there are also regional differences in terms of socio-cultural context. Therefore, the applicable national and state laws and policies need to be taken into account when identifying, managing and monitoring HCVs. Throughout this document, due recognition is given to these regional differences and, where relevant, the laws, policies and data sources that are specific to each region are clearly stated.

in this document will be beyond the reach of many small producers. The HCVN is currently producing additional guidance documents and developing simplified approaches for smallholders and national interpretations for these documents may be produced in future.

The management and monitoring examples, text boxes and case studies included in this guidance are not authoritative guides on how HCVs should be managed and monitored, but instead are meant to provide some examples of implementation on the ground. The Organisation should use their own discretion in deciding which aspects of the examples provided are suitable in the context of HCV management and monitoring within their MU.

1. Introduction

HCV national interpretations (HCVNIs) are documents that adapt the general definitions of the six HCV categories and the management and monitoring of these values to a country context. HCVNIs are important for two reasons:

1. Generic values include terms like significant, critical and concentration, which need to be qualified and quantified according to the local context.
2. Appropriate management of an HCV depends on the level of threat or risk to the value, which can vary dramatically between countries.

The Malaysian National Interpretation for the Identification of High Conservation Values was published in 2018, while this document is the Malaysian National Interpretation for the Management and Monitoring of High Conservation Values and is the second document in the HCV Malaysia Toolkit.

This national interpretation on the management and monitoring of HCVs is targeted at the production of palm oil and forestry commodities. This document is to be used in conjunction with other relevant HCVN-endorsed guidance documents and sector-specific standards or requirements. Practitioners should also seek guidance specific to the sector and/or certification scheme in which they are operating.

This section provides an overview of the High Conservation Value (HCV) approach which aims to maintain and/or enhance six defined values and the steps in the HCV process including identification, management and monitoring.

1.1 The High Conservation Value Approach

An HCV is a biological, ecological, social or cultural value of outstanding significance or critical importance. The six categories of HCVs, as defined through consultative processes led by the FSC and HCVN are outlined below.

The Six High Conservation Values

HCV 1 Species diversity Concentrations of biological diversity including endemic species, and rare, threatened, or endangered species, that are significant at global, regional or national levels.

HCV 2 Landscape-level ecosystems and mosaics Intact forest landscapes and large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.

HCV 3 Ecosystems and habitats Rare, threatened, or endangered ecosystems, habitats or refugia.

HCV 4 Ecosystem services Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.

HCV 5 Community needs Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc.), identified through engagement with these communities or indigenous peoples.

HCV 6 Cultural values Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples.

Source: Brown *et al.* (2013) and HCVN

The HCVs are elaborated further in the HCVN Common Guidance for the Identification of HCVs and the Malaysian National Interpretation for the Identification of HCVs.

Application of the aforementioned HCV definitions in practice requires a certain set of interpretations and underlying assumptions that we refer to as the HCV approach. Most notably, this includes:

- Use of the precautionary approach
- Understanding of wider landscape context
- Understanding of how to interpret "significant" and "critical" when identifying HCVs

For the purpose of this guidance document, it is assumed that the implementation of the HCV approach is within management units (MUs) that have previously been identified as suitable for production activities based on Malaysian government planning processes. However, it should be noted that the HCV approach requires that other safeguards such as respect for legality and tenure rights are also in place.

The aim of managing and monitoring activities is to maintain or enhance the HCVs found in the MU and its surrounding areas.

Throughout this document, both production activities and management activities are used to indicate the day-to-day operations of the management Organisation[2] (e.g. as relates to agriculture or forestry).

Box 1: What does it mean to maintain and enhance HCVs?

The overall aim of HCV management is to maintain and, where possible, enhance significant and critical environmental and social values as part of responsible management. In this case "maintain" is always a minimum requirement, while "enhance" is encouraged.

To **maintain** an HCV, the HCV must be conserved over a long period of time. This can be through various conservation measures such as strict protection and mitigating threats e.g. through adaptive management (updating an HCV management and monitoring plan based on changes in threats). The main idea is that the quality (what makes a value significant or critical) and extent of the HCV does not degrade or reduce over time.

To **enhance** an HCV, the Organisation is expected to take measures to improve the quality of existing HCVs. While maintenance of HCVs is a minimum requirement, enhancing HCVs is optional. A Malaysian example of enhancing HCVs is the improved protection and management of the Ulu Segama-Malua (USM) FMU in Sabah resulting in the stabilisation of its orangutan population. This FMU, with a size of 242,884ha, is part of a forest complex that has the largest unfragmented population of wild orangutans (c. 4,500 individuals) in Malaysia (Ancrenaz *et al*. 2010; Ancrenaz *et al.*, 2005). Due to a long history of logging, a significant proportion of the FMU has been degraded. Recognising the importance of the area for orangutan conservation, the Sabah State government banned logging for a 10-year period at the end of 2007 (Mansourian *et al.*, 2020). In 2011, the Sabah Forestry Department (the Organisation managing the FMU) obtained FSC certification for USM as a protection forest, to ensure that it complies with a high standard of forest management. Restoration activities were conducted in degraded areas within the FMU by WWF-Malaysia, the Sabah Foundation, Sime Darby Foundation and others, with funding from various sources. Orangutan surveys conducted in 2002, 2006-2007 and 2014-2017 showed that the orangutan population has remained stable with around 2300-2600 individuals throughout this period of time (Ancrenaz *et al.*, 2010; Simon *et al.*, 2019).

An Organisation is also expected to restore HCVs and other values that have been degraded by negative

[2] Following the HCVN Common Guidance for the Management and Monitoring of HCVs, this document will use the term Organisation to mean the person or entity (family, community, cooperative, government, corporation, concession holder, etc.) who is responsible for the management and monitoring of HCVs.

impacts caused by the production activities. However, the Organisation is not necessarily obliged to restore HCVs that were affected by factors beyond its control, for example by natural disasters; by impacts on aquatic systems due to hydrological changes outside the MU; by climate change[3] ; by previous organisations; or by the legally authorised activities of third parties (such as public infrastructure, mining, hunting, or settlement).

1.2 Steps in the HCV process

The three key stages in implementing the HCV approach are:

- **Identification** of the HCVs through assessments and stakeholder consultation
- Development and implementation of **management** strategies and prescriptions for the HCVs' maintenance and/or enhancement
- **Monitoring** and **adaptive management** (where needed) sufficient to ensure the long term conservation of the HCVs.

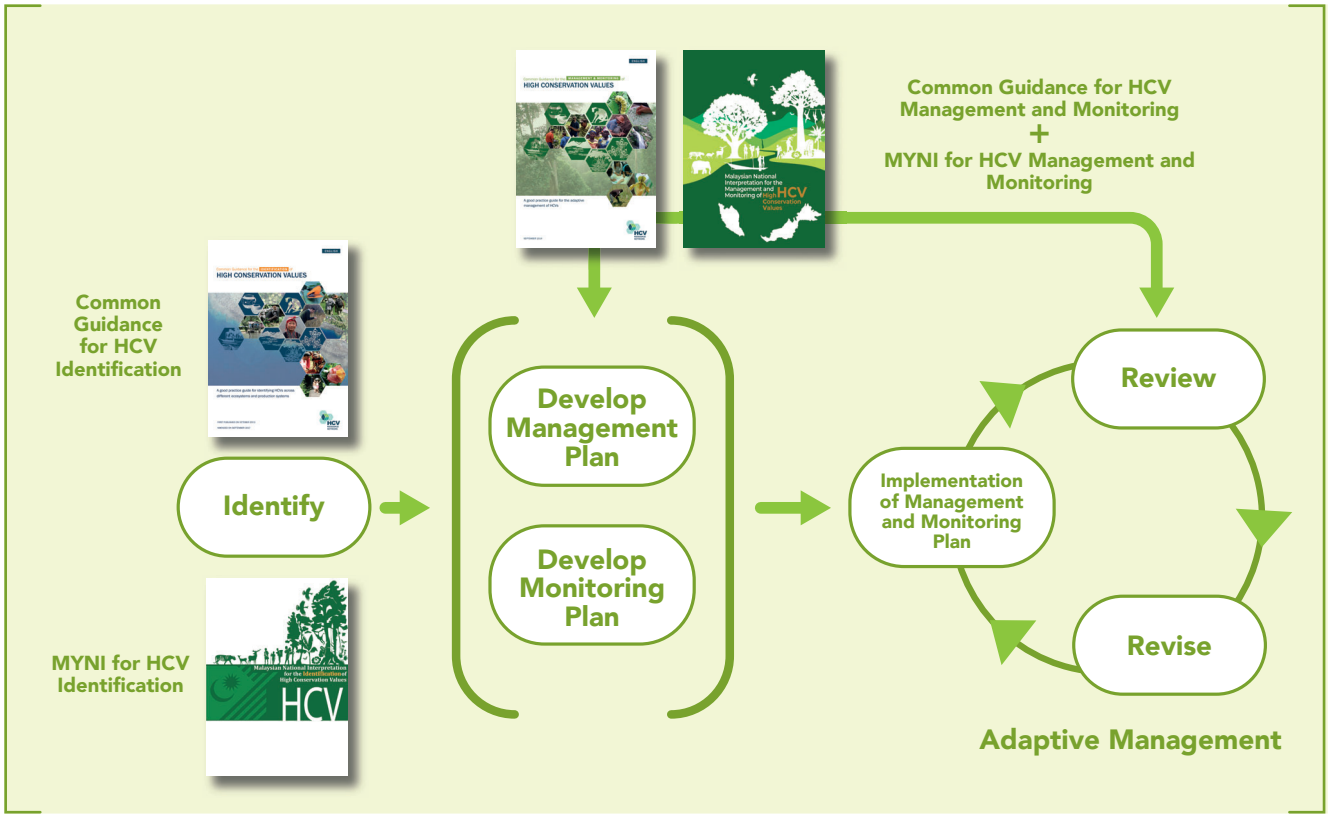


Fig.1: A schematic outline of the HCV approach including the guidance documents that should be consulted at the different stages of the process. Source: Adapted from Brown & Senior (2014).

The Organisation will have the ultimate responsibility to manage and monitor HCVs in their MUs. Where the Organisation lacks in-house expertise on management planning, outside expertise should be sought. Please refer to Figure 2 in the Common Guidance for the Management and Monitoring of HCVs (Brown & Senior, 2014) for the schematic of the HCV identification, management and monitoring stages including main outputs and responsibilities of assessors and managers.

[3] Impacts of climate change on HCVs include increased heat and drought/declined rainfalls that in turn have increased wildfires and shifted wildlife populations and habitats.

A key output of the HCV assessment is the identification[4] of HCVs that are present or potentially present within the MU and the areas where the HCVs are located i.e. HCV Areas. The HCV assessment report should identify threats to the HCVs, provide an explanation of the requirements necessary to maintain the HCVs and provide management and monitoring recommendations.

The HCV assessment report should contain information on the location, status, and condition of the HCVs and social context; information on areas of habitat, key resources, and critical areas that support the values; key threats including social conflicts (if any); and recommendations on management and monitoring these values.[5]

The Organisation will use the management and monitoring recommendations in the HCV assessment report as a starting point for developing its operational management and monitoring plans.

Part 2 of this document will address HCV management in terms of management plan components and management strategies and prescriptions. Part 3 addresses monitoring, including considerations for the monitoring plan and a selection of monitoring methods. Finally, Part 4 discusses how to use monitoring results to improve management effectiveness over time. A precautionary approach (see Box 2) should be invoked for both HCV identification and adaptive management. See also Case Study 1 below for an example of the precautionary approach in practice.

Box 2: Precautionary approach

During the HCV assessment, when there are credible and reasonable indications that an HCV is present, the Organisation should assume that it is present and should take the appropriate decisions for management and monitoring.

The HCV Network follows the FSC approach, as follows: "The precautionary approach requires that when the available information indicates that management activities pose a threat of severe or irreversible damage to the environment or a threat to human welfare, the Organisation will take explicit and effective measures to prevent the damage and avoid the risks to welfare, even when the scientific information is incomplete or inconclusive, and when the vulnerability and sensitivity of environmental values are uncertain" (FSC, 2012).

In a scenario where an HCV assessment has already been done for an MU, the production operations are already on-going and the HCV management and monitoring plan is being implemented, if a previously undocumented HCV is detected during routine monitoring (e.g. a rare or threatened species of frog), the Organisation should assume that the HCV is present and the management and monitoring plan should be adapted correspondingly. This finding should then be incorporated into the updated HCV management and monitoring plan. However, in the case where a previously identified HCV is believed to no longer occur within an MU, following the precautionary principle, the MU should be managed as if the HCV still occurs until a qualified subject matter expert or HCV lead assessor can confirm that the HCV is absent.

Case Study 1: Precautionary approach in the management of a hot spring saltlick in Kedah, Peninsular Malaysia

Location: Kampung Tanjung Luas, Kupang, Kedah

Description: The hot spring saltlick (< 2m radius) emerges out of a small rocky streambed emitting a sulphur smell. The saltlick is surrounded by forest and there are signs of elephants along with animal trails leading towards the saltlick from many directions.

[4] For more information on HCV identification, refer to HCVN Common Guidance for HCV Identification and the MYNI for the Identification of HCVs.
[5] For more details on the content of HCV assessment reports, please refer to the relevant HCV assessment manual and assessment report template by HCVN.

Natural hot spring saltlicks are becoming rare due to land conversion and development for public baths. This particular hot spring is also being used by a Malay local healer in that area who has been collecting the mineral water for various traditional medicines and this practice has been carried out since his forefathers' time. The community use of the mineral water and cultural knowledge of traditional medicine is directly dependent on the availability of and accessibility to the hot spring saltlick. Given the above, it is likely that HCV 1 (species diversity), HCV 5 (community use) and HCV 6 (cultural values) are present at the site.

Dried elephant dung observed at the saltlick

Threat: The local healer mentioned that there were plans by the Baling District Office to build hot spring chalets with a public hot water bath, akin to the famous Kolam Air Panas Ulu Legong which is also in the Baling district. This threatens the existence of the saltlick in its natural condition. Additionally, the surrounding area has been converted from forest to a rubber plantation under a Federal Land Consolidation and Rehabilitation (FELCRA) scheme. Expansion of the FELCRA plantation into the saltlick area is another direct threat to the hot spring saltlick.

Possible conflict between HCVs: There are no known studies about this saltlick and the impact of its usage by the local healer on the saltlick and the wildlife visiting it. The initial impression from the field team is that the local healer did not find the wildlife present in that area to be disturbing his use of the saltlick. However, he also did not seem concerned about the proposal to develop the saltlick into a visitor attraction. About 100m from the hot spring saltlick, there is an orchard owned by one of the villagers with old fruit trees, and there are no signs of recent orchard expansion. Although there were no human-wildlife conflict cases reported from this area (Sagtia Siwan *et al.*, 2019), it should be noted that the local healer and the orchard owner have their interest in the area which may or may not have an impact on wildlife in the near vicinity.

Management & monitoring: there are no active organisations managing the hot spring saltlick. However, the active use of the saltlick by the local traditional healer is a form of informal management as it would be expected that he would try to protect the saltlick from being destroyed. It is not clear if the interest of the local community extends beyond having continued access to the saltlick to also include wildlife protection.

Management recommendations: It is recommended that an HCV assessment be conducted to verify the existence of HCVs at the saltlick. Until such assessment is conducted, on the basis of the precautionary approach, it is advisable that this saltlick is managed as an HCV site by the relevant authority or co-managed by the local community. Potential immediate actions that can be taken as part of the precautionary principle include:

i. Erection of a signboard by the Department of Wildlife and National Parks (DWNP) to highlight that saltlicks are protected under the Wildlife Conservation Act 2010.
ii. Confirm the land status of the saltlick with the Baling District and Land Office and/or the Kedah State Forestry Department.

References: Sagtia Siwan, E., Mohd Ani, N.F., Cheong, K.M.C., & Abidin, S. Z. 2019. *Connectivity Assessment of Ecological Corridor between Ulu Muda Forest Complex and Bintang Hijau Forest Complex*. Petaling Jaya, Malaysia: WF-Malaysia.

Contributor & photo credits: Elangkumaran Sagtia Siwan, WWF-Malaysia.

An area where one or more HCVs are present is an HCV Area or HCVA while an area within the Management Unit or in the wider landscape (see Box 3 below) for which appropriate management decisions must be taken and implemented in order to maintain or enhance an HCV is called an HCV Management Area or HCVMA. Please refer to section 1.2.2 and Box 1 of the MYNI for Identification of HCVs (i.e. not this document) for a more detailed explanation of HCVA and HCVMA.

Box 3: Responsibility for HCV management in the wider landscape

The Organisation is primarily responsible for HCV management within its MU. However, some HCV management areas are designed to maintain an HCV both inside the MU and in the MU's area of influence in the wider landscape (e.g. HCV 4: water quality downstream from the MU or wildlife corridors between the MU and the surrounding forest landscape or conservation areas in the case of HCV 1 maintenance). At the same time, maintaining HCVs in the MU can be dependent on management areas and prescriptions outside the MU (e.g. maintaining populations of wide-ranging HCV 1 species). HCV management areas may be much larger than the precise location of the HCVA. Where possible, the impacts of multiple land use around a MU should be monitored, especially if the impact is upstream where direct control by the Organisation is not possible. One approach is to sample the water quality before entering the MU and at the point of leaving the MU to confirm if river pollution is happening from within the MU or elsewhere.

For these reasons, Organisations are responsible for:

- **engaging with neighbouring land managers** (e.g. oil palm plantations or logging concessionaires) and affected stakeholders to improve coordination of management and initiatives across the wider landscape.

- **avoiding damage** to HCVs **within their MUs**
- **taking into account what** is happening outside the MU and engaging with neighbours **to solve problems whenever possible.**

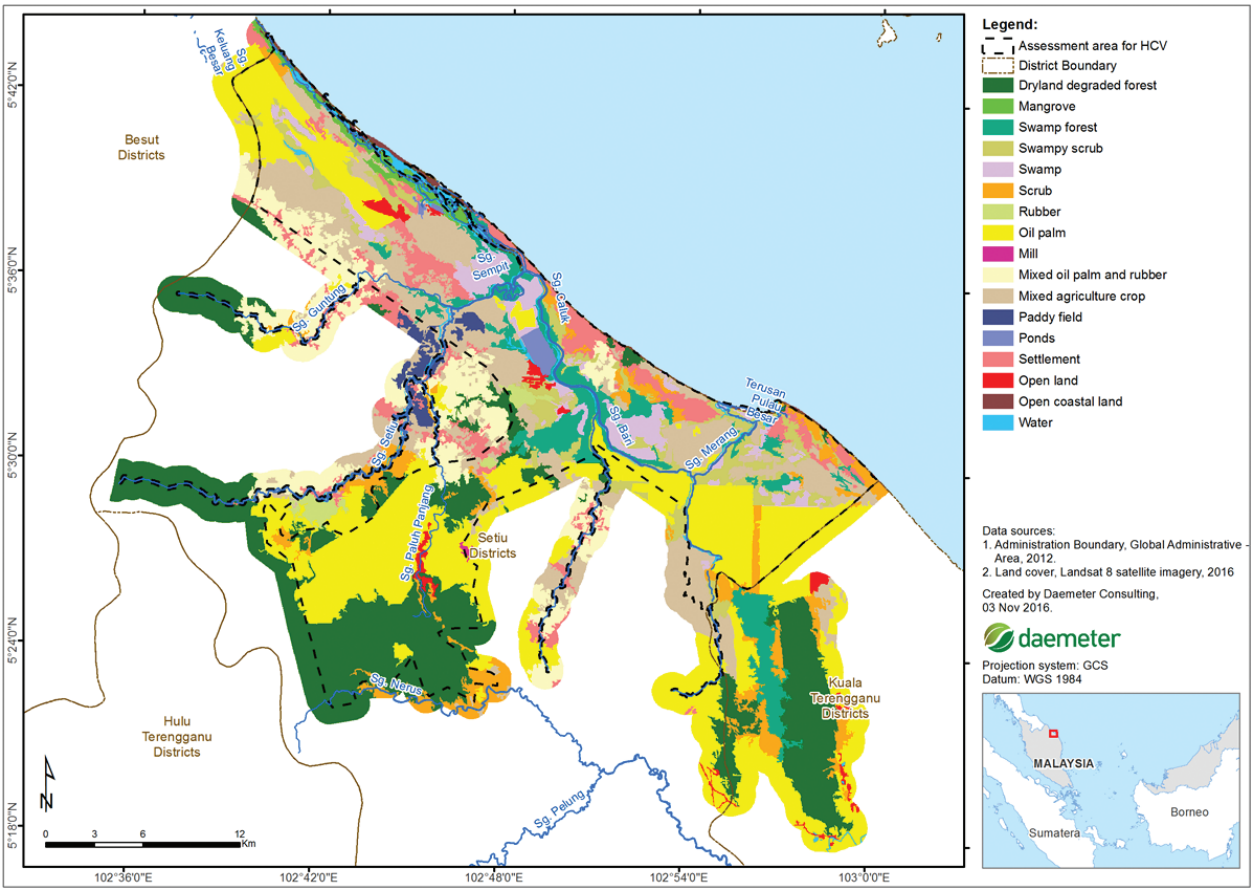
This can increase the likelihood of maintaining HCVs in the wider landscape. In cases where engagement with neighbouring stakeholders does not stop damage to an HCV outside the MU, the Organisation would need to consider the feasibility of increasing the resources devoted to HCV maintenance inside the MU to counteract this.

Case Study 2 below provides an example of how the HCV approach has been taken into consideration in the wider landscape.

Case Study 2: Setiu Wetlands: Integrating the protection and sustainable management of biodiversity and ecosystem services in wider land use planning processes, Peninsular Malaysia

Setiu Wetlands, the largest wetlands on the east coast of Peninsular Malaysia is a unique, diverse and sensitive ecosystem. Located to the north-east of Terengganu, the wetlands comprise at least nine interconnected ecosystems, including the sea, lagoons, rivers, mangroves, mud flats, coastal forests, beaches, islands and estuaries. The wetlands are significant, both in terms of biodiversity and the ecosystem services they provide.

The Setiu Wetlands HCV assessment conducted between 2016 and 2017 covered a 47,244ha area, including the lagoon, beach, and *Melaleuca* forests, rivers and coastal strip, but excluding the coastal water area. The area for this assessment is shown in the map below.

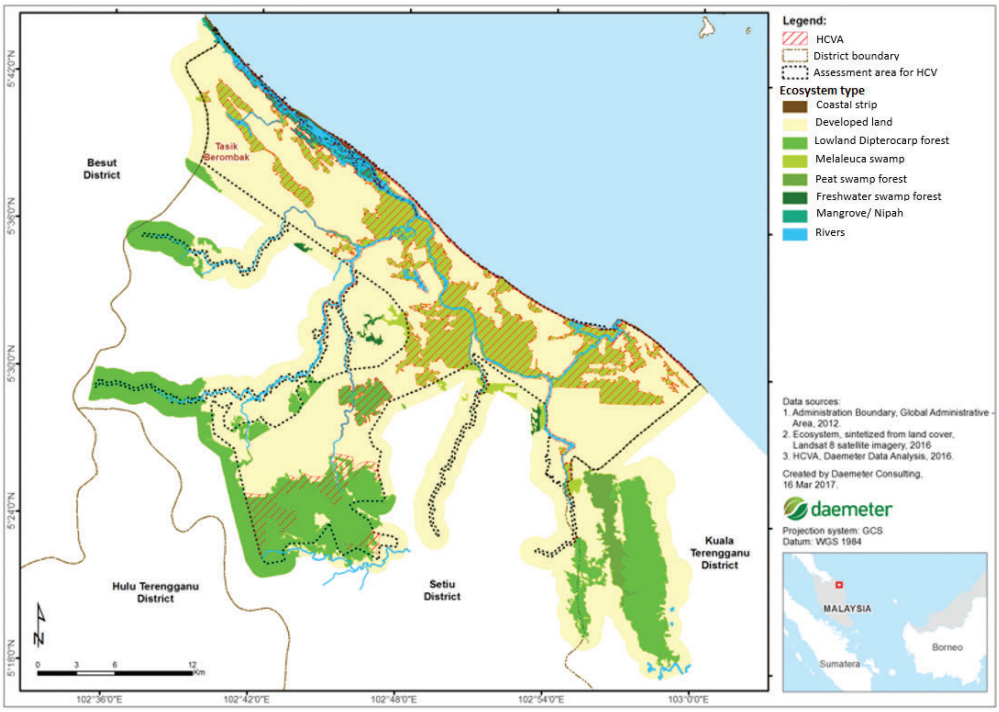


Map showing land cover over the HCV assessment area (dashed line) as well as forested area to the southeast of the assessment area.

Only 32% or about 15,000ha of the total assessment area was proposed as the High Conservation Value Management Area (HCVMA). The HCVMA area covers river buffers, coastal areas, the Setiu lagoon, gelam forest, freshwater forest and lowland dipterocarp forest (state land and private land). Five HCV classes exist in the assessment area including HCV 1: Species diversity; HCV 3: Ecosystems and habitats; HCV 4: Ecosystem services; HCV 5: Community needs; and HCV 6: Cultural values. HCV 2: Landscape-level ecosystems and mosaics, however, does not exist in Setiu Wetlands.

Aerial view of the Setiu lagoon, river mouth and coastal beaches. The river deepening and construction of an artificial river mouth to facilitate navigation for fishing vessels pose a threat to the wetlands ecosystem and the associated biodiversity. Photo credit: Mohamad Fadzil/WWF-Malaysia

The Setiu Wetlands provide numerous ecosystem services and functions both to people and nature. About 17% of the Setiu catchment is wetland areas. Tasik Berombak, located in the mid-stream of Setiu district, receives water from Bukit Bintang and its water drains into the lagoon. The Setiu river basin is made up of several tributaries including the Setiu, Chalok, Bari and Merang rivers. The rivers are important both for biodiversity and ecosystem services. The painted terrapin (*Batagur borneoensis*) and river terrapin (*Batagur affinis*) inhabit the Setiu River. Both terrapins are categorised as Critically Endangered (CR) by the IUCN Red List of Threatened Species while the green turtle (*Chelonia mydas*) is categorised as Endangered (EN).



Map showing the proposed HCVMA

A rare mangrove tree species known as *Bruguiera hainessii* can also be found in Setiu and is listed as Critically Endangered (CR) in the IUCN Red List. Most of the local communities in Setiu are highly dependent on the natural resources for their livelihoods.

Currently, a total of 1,596ha of the wetlands, covering the mangroves along the coast of Setiu and Tasik Berombak, have been incorporated into the Setiu Wetlands State Park. This State Park is managed by the Terengganu State Parks Management Council, which is responsible for matters pertaining to the protection, conservation, utilisation, enforcement and management of the State Park. WWF-Malaysia has been involved substantially in recommending the areas (particularly the HCVMA) for protection and sustainable management and utilisation of the wetlands resources. Various empowerment programmes have been undertaken to encourage protection to enhance and improve the communities' livelihoods and maintaining the importance and encouraging protection and sustainable management of the wetlands.

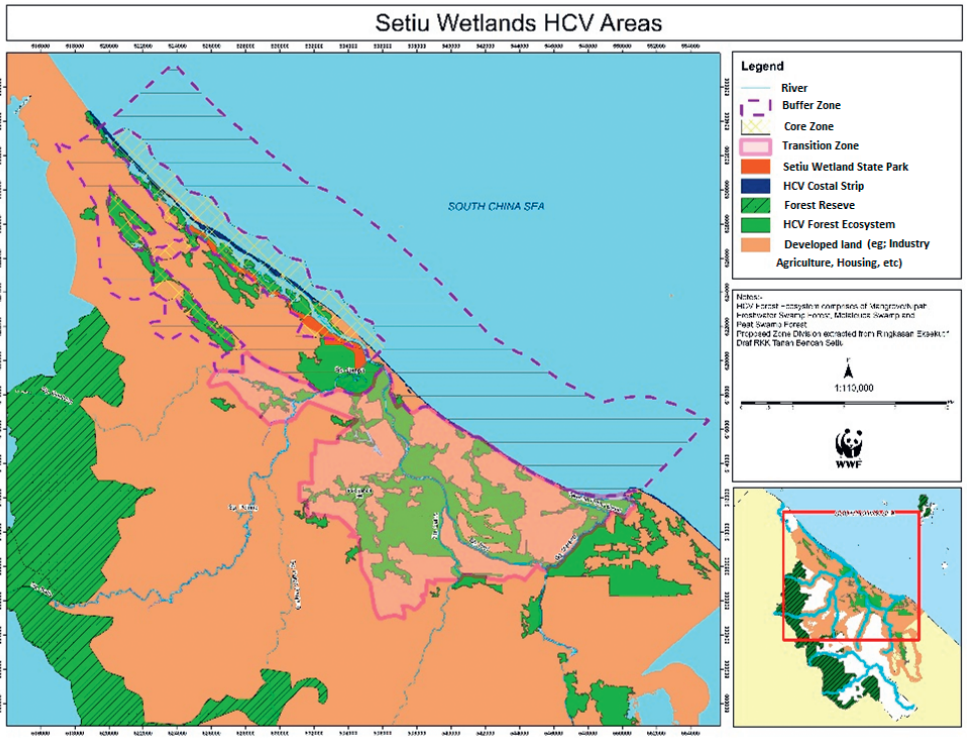
The efforts undertaken have shown significant and positive results, particularly for the identified HCVMA. As such:

1. HCV has been accepted as part of the criteria for determining areas as Environmentally Sensitive Areas (ESA) in the physical planning. In Setiu Wetlands, where the Special Area Plan (SAP) was undertaken in 2018/2019, a total of 10,271.87ha of the HCV areas has been included in the SAP. Under the SAP three different management zones have been identified, which allow only certain activities to be conducted to control and protect the wetlands. The zones are:
   i. The core zone = 5,329ha (restricted for low impact ecotourism, research and education purposes).
   ii. The buffer zone = 27,480ha (encompasses local communities' residential areas, the coastal area i.e. within 3 nautical miles from low tide level), extending along 37.23 km from Jeti Merang to Tanjung Kanan coast.
   iii. The transition zone = 14,376ha (encompasses local communities' residential areas, mangrove and gelam forests, and land use development and activities that include aquaculture, agriculture, mining and tourism).

2. HCV has become an acceptable reference and serves as an argument to strengthen the justification and recommendation to protect and sustain the ecosystem services and functions of the wetlands areas.

3. The concept, importance and relevance of the HCV assessment and its findings have been socialised with various stakeholders at the district, state and national levels. This enabled the proposed HCVMA to be emphasised in physical planning processes such as the Special Area Plan, Local Area Plan, State Structure Plan and National Physical Plan. Related recommendations have also been submitted to increase interest in the HCVMA in Setiu at the national level covering the National Coastal Zone Physical Plan and Central Forest Spine review studies. Examples of the key recommendations provided pertaining to the HCV areas include the following:
   a) Protection and gazettal of river reserves and riparian corridors for ecological protection and flood mitigation purposes.
   b) Protection of key nesting beaches for painted terrapins and green turtles.
   c) Protection of the remaining peat swamp forest under state land status as permanent forest reserve.
   d) Recommendation for sustainable practices in aquaculture and agricultural activities and better land use management.

4 In 2018, a total of 432.4ha of the Setiu Wetlands have been gazetted as the Setiu Wetlands State Park in Terengganu. The area encompasses 367.07ha of the proposed HCVMA identified by the assessment. In 2020, under the second phase of the gazettal, the Setiu Wetlands State Park was extended to include Tasik Berombak, making the total gazetted area of the State Park to 1,596ha which represents nearly 11% of the total proposed HCVMA (15,082ha) in Setiu Wetlands.



Map showing areas under the Setiu State Park and SAP zones

Mangrove forest (left) and gelam forest (right) are the major ecosystems in the Setiu Wetlands. Gelam forest is identified as a threatened ecosystem (HCV 3) that needs to be protected. Photo credits: Chik Maslinda Omar/WWF-Malaysia and Nur Syahirah Wahab/WWF-Malaysia respectively.

Handicraft-making using Kerchut (*Lepironia articulata*), a wild sedge that grows in and near gelam swamps, is one of the cultural values (HCV 6) for the locals in Setiu. Photo credit: Nur Syahirah Wahab/WWF-Malaysia

References:

WWF Malaysia. 2017. *Setiu Wetlands High Conservation Value Assessment: Full Assessment Report.*

PLANMalaysia. 2019. *Rancangan Kawasan Khas Pemeliharaan dan Pengurusan Setiu Wetlands Terengganu.*

Contributor: Freshwater Conservation Program, Peninsular Malaysia Terrestrial Program, WWF-Malaysia. Inputs and recommendations were based on WWF-Malaysia (2017).

2. HCV Management

This section is not aimed at repeating information that is already available in other guidance documents but instead is intended to provide local context or Malaysia-specific guidance where relevant.

In order to manage HCVs effectively (i.e. by ensuring that the values are maintained and, where possible, enhanced) it is necessary to formulate and implement a sound HCV management plan. As explained in the previous section, the Organisation managing the MU needs to incorporate the findings and recommendations from the HCV assessment into the specific management objectives, activities and measurable targets/KPIs (Key Performance Indicators) in the management plan for the MU.

2.1 Developing an HCV Management Plan

The HCV management plan must be sufficiently comprehensive and detailed, appropriate to the scale, intensity and risk of the production activities. Different certification schemes may also require different levels of detail in management plans.

2.1.1 Scale, intensity and risk

The HCVN Common Guidance for the Identification of HCVs has provided definitions for scale and intensity (see Box 5, pg. 13 of the Common Guidance) while the MYNI for the Identification of HCVs provides examples of what may be considered to be smaller vs. larger scale and higher vs. lower intensity of activities in the MU (see Table 2, pg. 11 of the MYNI for HCV identification). The higher the scale and intensity of activities within the MU, the higher the amount of resources required to manage and monitor the HCVs. Further guidance on scale and intensity is provided below.

When considering the scale and impact of a particular risk, the following factors should also be taken into consideration:

- The frequency of the occurrence of the threat, whether infrequent or at long intervals of time e.g. human-wildlife conflict happening during the replanting of oil palm; frequent or at short intervals of time e.g. recreational fishing activities at a river that happens during weekends; and continuing e.g. river pollution from non-point sources upstream.
- The existing natural land cover within the MU, i.e. whether it is primary forest, secondary forest, etc.
- Ecosystem type i.e. whether it is an RTE ecosystem (as identified in the MYNI for HCV identification, such as peat swamp, lowland dipterocarp forest, etc.) for which even the conversion of a relatively small area may have a huge impact if very few representatives of the RTE ecosystem remain.
- Geographical location e.g. whether an RTE species occurs in a predominantly urban area where very little of the natural habitat of the RTE species remains.
- Landscape connectivity – whether the natural ecosystems found within the management unit are isolated or located away from the wider forested landscape.
- Degree of dependency of local communities on natural resources impacted by the activities.
- The physical size of the RTE species. For hyperendemic species (e.g. begonias, freshwater fishes or limestone-dwelling snails) even disturbance within a relatively small area may have a huge impact on the species concerned.
- Stresses[6] that affect species or a group of species e.g. low reproduction rate, competition with other species, etc.
- The life cycle of the RTE species – a particular species could utilise different habitats within the MU at different life stages e.g. adult fireflies and their larvae, some fish species may have to go upstream to spawn, etc.

[6] Stresses are those attributes of a taxon that are impaired directly or indirectly by threatening processes (e.g. reduced population size, fragmentation of habitat, impaired ability to reproduce, etc.). A stress is not a threat in and of itself; rather it is a degraded condition or "symptom" of the taxon that results from a direct threat. See: https://www.iucnredlist.org/resources/classification-schemes

In other words, even if the size of the area directly impacted by the management operations is considered 'small' in relation to the total size of the management unit, the impacts may be significant if the aforementioned factors are taken into consideration.

Based on the IUCN Threat Impact Scoring System[7], with some minor modifications, the different combinations of the scale and intensity of a particular activity within the MU can be tabulated to provide an indication of the level of risk that the activity poses to HCVs (see Figure 2 below)[8]. The level of risk can further be differentiated depending on the frequency of the activity, whether it is continuing, occurs at short intervals or occurs at long intervals.

(a) Frequency - Continuing

			Intensity/Severity			
			Major	Moderate	Minor	Negligible
			3	2	1	0
Area	Large	3	6	5	4	3
	Medium	2	5	4	3	2
	Small	1	4	3	2	1
	Negligible	0	3	2	1	0

(b) Frequency - At short intervals

			Intensity/Severity			
			Major	Moderate	Minor	Negligible
			3	2	1	0
Area	Large	3	6	5	4	3
	Medium	2	5	4	3	2
	Small	1	4	3	2	1
	Negligible	0	3	2	1	0

(c) Frequency - At long intervals

			Intensity/Severity			
			Major	Moderate	Minor	Negligible
			3	2	1	0
Area	Large	3	6	5	4	3
	Medium	2	5	4	3	2
	Small	1	4	3	2	1
	Negligible	0	3	2	1	0

Risk Coding
- High Risk
- Medium Risk
- Low Risk
- Negligible/No Risk

Fig. 2: Example of how to integrate scale (area), intensity and frequency of activities within the MU and generate indicative risk levels. Source: KLK.

As an example, based on table (a), assuming an impacted area will be affected by an MU's activities on a continuing basis, if the impacted area is large and the intensity or severity of the activities is moderate, the total score of the level of risk is 5, which is rated as high risk. However, if the impacted area is large but the intensity or severity of these activities is rated as negligible, then the total score of the level of risk is 3, which is considered to be a medium risk to the impacted HCV. The findings from this risk assessment should be used by the Organisation to determine the investment of resources in management and monitoring of each identified HCV.

2.1.2 Elements of a good management plan

A good management plan should include the following elements[9]:

A. Description and location of each HCV present: Maps are needed, showing the location of HCVAs and HCVMAs within the MU and within the wider landscape where appropriate. Resources (e.g. forested areas, food sources, or ecosystem services) required to maintain the HCVs may also be found outside of the MU. For example, an RTE species such as the orangutan or Malayan tiger may be found within the MU but their habitat or feeding area may extend beyond the boundary of the MU. In such situations, the entire HCVA and HCVMA required to maintain the value should be shown in the relevant maps. Another example is where there is a critical ecosystem (i.e. HCV 3) such as a coastal mangrove forest which is found downstream from the MU but which depends on the maintenance of good quality river water flowing through the MU. Other features that should ideally be incorporated in base maps of the MU include settlements in the vicinity of the MU, boundaries of nearby conservation areas and any ecological corridors linking the MU and conservation areas. In some cases the nearby conservation areas may even be located in a neighbouring country, e.g. national parks in Brunei and in Kalimantan, Indonesia.

[7] https://www.iucnredlist.org/resources/classification-schemes
[8] The method used in Figure 2 is just one example of how the assessment of scale and intensity can be used to prioritise risks. There is no suggestion that this method must be used in all situations.
[9] Extracted from the HCVN CG for the Management and Monitoring of HCVs, and locally adapted.

B. **Establishment of baseline data:** Baseline data in the Malaysian context usually refers to the site condition of the MU before it is developed. For Prescribed Activities as defined in the relevant Order under the Environmental Quality Act 1972, the baseline data may be obtained from the Environmental Impact Assessment (EIA) required under the Order. Baseline data on socio-economic and socio-cultural aspects of local communities can be obtained from Social Impact Assessments (SIAs) which may be embedded within EIAs or exist as stand-alone reports. In some cases, the HCV assessment itself may provide the baseline data needed for formulating the management and monitoring plans. Relevant indicators for monitoring purposes (see G below and also Section 3 on HCV monitoring) should be formulated based on the knowledge of the condition at the beginning (baseline). Some of these indicators could be designated as Key Performance Indicators (KPIs) for which the desired condition after the HCV management interventions have been implemented can be set as the target for the KPIs.

C. **HCV management objectives and targets:** Specific management objectives should be set for each of the HCVs present in the MU and wider landscape (where appropriate – see point A above). The management objectives should all relate to the maintenance or, where applicable, enhancement of the HCVs. Organisations must transform management objectives into *SMART*[10] targets. Where good baseline data is available, targets may be more specific, but where less baseline information is available, managers should take a precautionary approach and focus on broader targets such as habitat conservation. HCV management objectives and targets can be considered to be longer-term KPIs. Examples of management objectives and targets are provided in sections 2.3.1 to 2.3.6 focusing on specific HCVs.

D. **Assessment of threats to HCVs:** An assessment of threats to HCVs is usually included in the HCV assessment report, and is necessary in order to formulate the management actions needed to address those threats (and therefore maintain and/or enhance the values). The key methods for assessing threats are provided in Table 1 (pg. 11) of the HCVN Common Guidance for the Management and Monitoring of HCVs while section 2.1 (pg. 10) of the same document provides an explanation on the categorisation of threats according to indirect vs. direct threats and internal vs. external threats. In the case that a threat assessment was not included in the HCV assessment report or if the threat assessment was inadequate or outdated, the Organisation may need to conduct a threat assessment during the preparation of the HCV management plan. The threat assessment should ideally involve stakeholder consultations in order to gather different perspectives and recommendations on threats and management options. It is the responsibility of the Organisation to ensure that the threat assessment is complete and especially that all internal threats have been adequately identified. A comprehensive threat assessment will provide a basis for the Organisation to decide on the resources to be allocated for HCV management and monitoring, depending on the level of risk.

E. **Consultation with stakeholders and experts:** Stakeholders and experts should be consulted during the development of the management plan, especially when the scale and intensity of production activities or external threats to HCVs are high. Consultation should aim to build consensus on the management strategies to be adopted, ensure management activities are in line with current scientific knowledge of HCVs and threats, and consider conflicts that may arise from the management of different HCVs. The stakeholders to be consulted depends on the HCVs identified during the HCV assessment, as described in the HCVN Common Guidance for Management & Monitoring (pg. 12). Table 1 provides a few examples of stakeholders relevant for different HCVs in the Malaysian context. The Organisation should keep a record of consultations and their outcomes as this will be useful for the long-term management of HCVs and as supporting evidence during certification audits.

F. **Development and implementation of effective management strategies:** The management plan should contain strategies for maintaining and/or enhancing the HCVs identified. The strategies chosen should be based on the results of stakeholder and expert consultation and the threat assessment process.

[10] *SMART* = Specific, Measurable, Achievable, Realistic, and Time-bound.

G. **Development and implementation of a monitoring plan:** The monitoring plan may be a stand-alone plan or incorporated into the HCV management plan. The monitoring plan must relate back to the management objectives and should include a mix of operational, threat and strategic monitoring where relevant (see section 3 on HCV monitoring), with relevant KPIs incorporated.

H. **Adaptive management strategies, based on monitoring results:** The management plan should also include adaptive management strategies which outline the process for using the results of monitoring to improve management as needed.

Table 1: Examples of stakeholders that could be consulted for each HCV

HCV	Key purpose of consultation	Examples of relevant stakeholders
1	Practical approaches in development of management plan for RTE plant species including habitat requirements	Forest research institutions, e.g. FRIM, Sabah Forest Centre, Sarawak Forest Research Centre, local communities (TEK)
	Practical approaches in development of management plan for RTE animal species including habitat requirements	DWNP (Peninsular Malaysia), Sabah Wildlife Department, Sarawak Forestry Corporation, local communities (TEK)
2	Management recommendations for the Central Forest Spine, primary and secondary linkages in Peninsular Malaysia	PLANMalaysia, NGOs (e.g. WWF-Malaysia, WCS, TRCRC)
	Management recommendations for the Heart of Borneo	Sabah Forestry Department, Forestry Department Sarawak
3	Inputs on peat management	Peat ecosystem experts e.g. GEC
	Inputs on limestone management	Limestone ecosystem experts e.g. FRIM
4	Management and monitoring of water supply and water catchment areas	Peninsular Malaysia: DID, relevant state water authorities e.g. LUAS (Selangor) Sabah: EPD, DID Sarawak: NREB, rural water supply department
	Local knowledge regarding ecosystem services	Local communities
5	Information on local community use of natural resources and their expectations	Local communities, social NGOs, local tour guides
6	Local culture of communities	Local communities, social NGOs (e.g. JOAS),
	Knowledge of local traditions and cultures and related current issues	Council of Custom and Traditions (in Sarawak)
	Archaeological records and other cultural information	National Heritage Department, Sabah Museum, Sarawak Museum
All	Permission/endorsement before engaging with the local community	Relevant district and Resident offices (Sarawak); JAKOA in the case of Orang Asli in Peninsular Malaysia
	Information on native customary rights (NCR) and native territory domain (NTD) land in Sarawak	Sarawak Land and Survey Department
	Explore opportunities for local community participation in the management & monitoring of HCVs	Local communities
	Inputs on the HCV management and monitoring plan	NGOs (e.g. WWF-Malaysia, MNS, WCS) and academic or research institutions

Box 4: Management of conflicting HCVs

Rhinoceros hornbill casque used in traditional costume in Sarawak.
Photo credit: Kiwiheng.

In principle, all HCVs have equal status but, in practice, there can be conflicts between different HCVs. An example of a conflict between HCV 1 and HCV 6 is the use of bird feathers in traditional costume in Sabah and Sarawak. In Sabah, the indigenous Murut people traditionally use feathers from the great Argus pheasant (a protected species under Sabah's Wildlife Conservation Enactment 1997) for decoration on their traditional costume. In Sarawak, some native peoples also use hornbill feathers and casques for their traditional costume. All hornbills are Totally Protected Species under Sarawak's Wild Life Protection Ordinance 1998. Six out of the eight hornbill species that can be found in Sabah and Sarawak are listed under the threatened categories of the IUCN Red List. In cases such as this, there is no easy solution. One possible solution would be to implement a long-term conservation initiative to provide local communities with alternative sources of materials that are more sustainable for use in their traditional costume. This would require changes to traditional practices which may need decisions to be made by native customary authorities or cultural bodies. This particular problem may be best addressed by combining awareness campaigns with even-handed enforcement by relevant authorities. Resolving conflicts such as this may take time and managers will need to adapt their response on a case-by-case basis.

2.2 Management strategies

As described in the HCVN Common Guidance for the Management and Monitoring of HCVs, specific management strategies need to be formulated and these usually consist of spatial planning, and management prescriptions for each management area. The size and shape of the management areas and the management prescriptions will depend on the HCV concerned, the threats to the value and the resources available.

See Figure 3 below for a practical example of how a combination of management areas and prescriptions can be used to maintain a specific HCV.

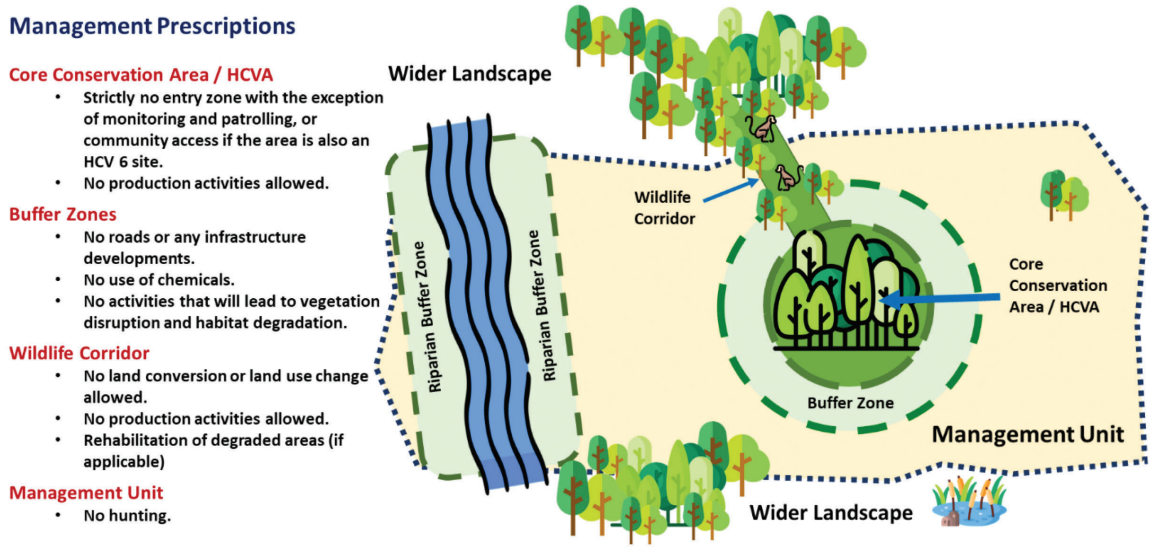


Fig. 3: Examples of management areas and prescriptions for the maintenance of an HCV 1 area in an oil palm concession or forest plantation. Credit: Lisa Lok (Proforest).

2.2.1 Management areas and prescriptions

Table 2 below describes the main types of management areas used in HCV management, and the typical management prescriptions associated with them. It is not necessary to have all the types of management areas within a particular MU – the appropriate mix of management areas depends on the HCVs present; how the various activities associated with the development will impact the specific HCVs present; and the scale, intensity and risks. In deciding on the appropriate management areas, it is recommended that the Organisation seeks inputs from relevant authorities and experts including on the location of nearby protected areas and ecological corridors, guidelines on buffer zones, key habitats of RTE species in the landscape, etc. In Table 2 below and in proceeding sections, natural forest management refers to the management of an FMU in the natural forest context, as opposed to the management of a forest plantation.

Table 2: Types of management areas and management prescriptions for HCVs in a production area

Management area/ zone	Examples of Relevant HCVs	Typical management prescriptions within MU	Wider landscape considerations
Strict protection/ No-go areas/Core conservation area/ HCVA	• HCV 1: areas with high concentrations of RTE species • HCV 2: Intact forest landscapes (IFLs) • HCV 3: ecosystems that are highly sensitive to disturbance	• For plantations: No land conversion or land use change allowed • For natural forest management: No production activities allowed.	• If the range of the RTE species extend into the wider landscape, the Organisation should engage with other relevant landowners to protect the RTE habitats (see Box 3: Responsibility for HCV management in the wider landscape).
Buffer areas/ Production area with limited use/HCVMA	• HCV 1: areas with high concentrations of RTE species, all of which are tolerant of low to medium level disturbance • HCV 2: large intact forest and ecological corridors • HCV 3: ecosystems that are tolerant of low to medium level disturbance • HCV 4: ecosystem services that are easily disrupted by human activities e.g. very steep and fragile slopes • HCV 5: in cases where community use areas (see below) are insufficient to meet community needs or where certain natural resources are found only within conservation areas and not anywhere else. • HCV 6: sacred and other cultural sites located within conservation areas.	• For plantations: No land conversion or land use change allowed • For natural forest management: Limited production activities allowed e.g. RIL, sustainable harvesting of NTFPs.	• If the range of the RTE species extend into the wider landscape, the Organisation should engage with other relevant landowners (whether private landowners or relevant government authorities) to protect the RTE habitats.
Set-aside areas required by law and buffer areas	• HCV 1-3: buffer area adjacent to/around protected areas, ESAs, RTE ecosystems, core conservation area (see above) etc.	• For natural forest management: No land conversion or land use change allowed; no logging allowed	• If there is one or more protected area or other significant conservation areas (IBAs, Ramsar sites, ESA1 areas etc.) located adjacent to the MU, a buffer area should be established at the MU boundary adjacent to the protected/conservation area

Management area/ zone	Examples of Relevant HCVs	Typical management prescriptions within MU	Wider landscape considerations
	• HCV 4: river buffers, steep areas • HCV 5: buffer area around critical community use areas (see below) • HCV 6: buffer area around sacred and other significant cultural sites	• For plantations: No new planting allowed; existing planting within buffer area to be converted back to natural ecosystem; no use of chemicals or heavy machinery. • Seek technical advice from relevant experts (research institutions, NGOs) on ecological corridor design and management. • The Organisation should engage with other land owners within the ecological corridor outside of the MU.	
Ecological/ wildlife corridors	• HCV 1: different RTE species have different needs e.g. wide-ranging and large-bodied RTE species may need contiguous corridors or sufficient width while species that can fly (birds, bats, some insects) may be able to utilise non-contiguous or stepping stone corridors. • HCV 2: where critical linkages exist between large intact forests • HCV 3: where ecological corridors are needed to maintain viability of RTE ecosystems	• For natural forest management: No land conversion or land use change allowed; no logging allowed • For plantations: No new planting allowed; existing planting within buffer area to be converted back to natural ecosystem; no use of chemicals or heavy machinery. • Seek technical advice from relevant experts (research institutions, NGOs) on ecological corridor design and management.	• The Organisation should engage with other land owners within the ecological corridor outside of the MU.
Community use areas	• HCV 5: forested areas and other natural ecosystems including rivers and other water bodies which provide basic needs of local communities (e.g. NTFPs, fish, water) • HCV 6: sacred and other cultural sites	• Water bodies of critical use to local communities must not be polluted by the Organisation's activities (e.g. sedimentation, road runoff, chemical contamination). • If local communities have no other alternative sources for their basic needs and cultural use, they should be allowed access to harvest certain NTFPs or to hunt non-protected species, provided that these activities are not prohibited by law. Where appropriate, a co-management approach should be considered. • In the case of sacred/ cultural sites, the Organisation should consult the relevant community to ensure that cultural practices are respected. Where appropriate, a co-management approach should be considered.	• Relevant management actions within the MU should be implemented even if the local communities are located outside of the MU but are dependent on resources within the MU, or are located downstream from rivers flowing through the MU that are of critical use to the local communities

The size, shape and location of natural ecosystems required to maintain or enhance HCVs will depend on the HCV concerned, but it must be sufficiently large to remain ecologically viable and/or connect with natural areas beyond the borders of the MU. Where relevant, local communities whose rights to natural resources have been recognised should not be unduly restricted from accessing those natural resources (e.g. within community use zones). In the context of sustainable forest management, the available natural ecosystem may include forest production area undergoing selective logging, while in the context of monoculture plantations, the natural ecosystem harbouring HCVs within the MU is usually confined to conservation or set aside areas.

In the plantation context, even if there is little or no remaining natural forest or habitat, there are still opportunities for optimising biodiversity e.g. by applying the Small Habitat Matrix concept as proposed by Ng *et al*. (2021).

2.2.2 Policies on HCV 5 and 6 resources

The HCVN Common Guidance for the Management and Monitoring of HCVs (pg. 22) provides some guidance on HCVs 5 and 6 that may be discovered after the initial HCV assessment, i.e. during the development and operation phases and the possibility of identifying viable alternatives to HCV 5 and HCV 6 resources.

As highlighted in the HCVN Common Guidance, any decisions about HCV substitution must be taken as part of a Free, Prior Informed Consent (FPIC[11]) process, and the implementation and results must be monitored to ensure that the alternative resource is indeed equivalent to or better than the original value.

In many cases, existing HCVs, particularly with HCV 6, are not replaceable e.g. sites of historical, cultural or spiritual significance. If an Organisation causes damage to HCVs 5 and 6 during the course of the MU development or operations, it is responsible for compensating the affected communities. The mechanism and form of compensation should be determined through community engagement and following FPIC principles.

2.2.3 Community engagement

The Organisation should engage with local communities as early on in the planning process as possible and continue to do so consistently and effectively throughout the development and operation phases. Following FPIC guidance, community engagement should begin even before the HCV assessment has commenced, as community consent is needed even for the HCV assessment itself. The community engagement can help both the Organisation and the local community to gain mutual understanding of their positions and aspirations on key issues.

The purpose of the community engagement is to improve management practices and to prevent potential conflicts. In order to ensure this, a community engagement strategy needs to be formulated and incorporated into the HCV management plan. The community engagement strategy may include the formation of an in-house community engagement team and/or the appointment of external community engagement experts to provide technical support where appropriate. The community engagement strategy should include the following elements:

- Culturally and socially appropriate (i.e. respectful of traditions and local customs) using non-technical communication and the local language
- Identifying representatives, including of minority and vulnerable/marginalised groups[12]
- Using FPIC principles for consultation, negotiation and decision-making
- Establishing a mutually-recognised communications platform between the Organisation and the local community
- Sharing with the local community on the processes and workplans related to the development of the HCV management and monitoring plan

[11] See Chin (2016) for guidance on FPIC in the Malaysia context.
[12] A minority is a small group of people within a community (e.g. women, youth, the elderly, migrants, ethnic minorities, seasonal users of natural resources) while a vulnerable/marginalised group is a group facing various risks or disadvantages (e.g. those with low-income and with households with elderly residents).

- Ensuring that local people have sufficient time to digest HCV assessment results and to participate in the preparation of management and monitoring plans, where they are affected
- Ensuring that local people are adequately and reasonably compensated[13] for their time and or expertise
- Respect for indigenous/local knowledge of biodiversity (TEK) and social values.

In order to implement an effective community engagement strategy it will be necessary for HCV information (e.g. summaries of assessment reports, management plans, and monitoring plans) to be available in languages understood by affected stakeholders. In the Malaysian context the key languages would be Bahasa Malaysia and English but it may be necessary to also translate into the relevant language(s) used by the local communities e.g. Mandarin, Tamil, Orang Asli languages (Temiar, Jahai, Jakun, etc.) in Peninsular Malaysia, Kadazandusun languages in Sabah, and Iban, Bidayuh, Kelabit, etc. in Sarawak. During live consultation events, a common language understood by the majority of those present should be used. Where necessary, there should be a translator to make sure that information is accurately relayed to the local community representatives and that their inputs are properly captured.

Where possible, affected local communities should be included in management and monitoring activities e.g. through participatory community-based monitoring of HCVs. It is also important to acknowledge their participation and expertise in the HCV assessment report, the management plan, relevant stakeholder meeting minutes, etc.

For the forestry sector in Sarawak, under the Sustainable Forest Management (SFM) guidelines (the "Green Book"), there are two recognised communication platforms for conflict resolution i.e. the Community Representative Committee (CRC) and SFM Liaison Committee. These two platforms involve local communities in decision-making processes related to the FMU. Each FMU has their respective CRC and SFM Liaison Committee, engaging local communities affected by that particular FMU. CRC is established at the village level, connecting the affected local communities together, while the SFM Liaison Committee is established to create a multi-stakeholder discussion platform involving locals and representatives from forest authorities, FMU and other relevant key stakeholders including government and non-government agencies and NGOs.

In order to have an effective and transparent community engagement process there should be proper documentation including attendance lists, discussion notes and outputs, photos of activities, and other relevant information.

A copy of these records should be shared with local communities who were involved in the consultation events, and these records should be accessible by other affected community members who were not able to attend the events.

Where community engagement has been effective, it may even be possible to have community participation in the management and monitoring of HCVs, as in the example provided in Case Study 3.

Case Study 3: Implementing a conservation programme with workers and local communities in Sarawak & Sabah

In Malaysia, Wilmar has 8,469ha (11% of total planted area) of identified HCV areas within its plantations in Sabah (6,744.61ha) and Sarawak (1,725.35ha). Given its estates border Protected Areas and local villages, conservation awareness programmes are important to ensure the protection of Rare, Threatened and Endangered (RTE) species.

[13] monetarily or by other means of equal value, determined though a fair and mutually agreed manner in line with the FPIC process and through negotiated agreements.

Wildlife awareness engagement with the local communities in a long house. Photo credit: Wilmar

Wilmar has formal teams of honorary Sabah Wildlife Wardens and Sarawak Wildlife Rangers. These rangers and wardens are empowered to stop any illegal wildlife activity, and perform regular patrolling, setting up roadblocks and engaging with local communities to ensure the HCV areas are protected and managed. Currently, Wilmar has 32 Honorary Wardens in Sabah and 38 Honorary Rangers in Sarawak involving staff, workers and local communities and out of this, 10 are women (Wilmar, 2020).

Wildlife Rangers in Wilmar's Sarawak Operations. Photo credit: Wilmar

The teams' work creates opportunities to engage with local stakeholders, to jointly improve the understanding of biodiversity importance and to inculcate positive attitudes towards conservation and sustainable practices in the oil palm sector. The Wildlife Rangers Programme in Wilmar's Sarawak plantation works with long house communities on conservation awareness and understanding. The approach involves 7 local community members as rangers, to increase direct involvement in biodiversity conservation.

In 2019, the programme carried out extensive engagement in Sabah with more than 1,800 stakeholders in the districts of Sugut, Labuk and Segama with Sabah Wildlife Department (SWD), and NGOs HUTAN and Bornean Sun Bear Conservation Centre (BSBCC) (Marcus, 2019).

The talks, exhibitions and games conducted during the stakeholder engagements conveyed information on conservation and protection of RTE species such as the orangutan.

The awareness programme was also extended to Humana schools and received positive responses. Humana is an NGO in Malaysia that works with the private sector to establish private schools for children of foreign workers that otherwise do not have access to local Malaysian schools.

This highlights that HCV management incorporating stakeholder involvement and partnership is important to reduce overall risk to identified HCV areas.

Honorary Wildlife Wardens of Wilmar's Sabah Operations. Photo credit: Wilmar

References:

Marcus, M.E. 2019. *Summary Wildlife Awareness Outreach Program 2019*. Wilmar International Ltd., Sandakan, Sabah.

Wilmar. 2020. *Wilmar Sustainability Report 2019*. Wilmar International Ltd., Singapore.

Contributors: Marcie Elene Marcus Jopony, James Wong Tai Hock, Mc Millan Wilfred, Kristine Kashphil, Amir Yape, Roland Gimputu, Perpetua George & Chin Sing Yun, Wilmar.

HUMANA children participating in the Wildlife Awareness Outreach Program in Sabah. Photo credit: Wilmar

2.3 Conditions for maintaining HCV 1-6

This section focuses on the key management considerations for maintaining and/or enhancing each of the six HCV categories with examples of applicable management areas and prescriptions.

2.3.1 Maintaining HCV 1: species concentrations

Habitat size and quality
HCV 1 management areas should conserve areas that support significant concentrations of RTE or endemic species, and suitable habitats that provide food or nutrients, water, and breeding/reproductive requirements.

The appropriate spatial scale (size), shape and location of conservation areas required are dependent on the target RTE species. It should be noted that the needs for plant species differ significantly from animal species. In the case of faunal species, a sufficiently large area depends on the home range of the RTE species. For large-ranging species, such as the Asian elephant or the Malayan tiger, the MU is unlikely to be sufficiently large, and therefore it may be necessary to set aside an ecological corridor for wildlife movement. For RTE plants, if it is not possible to conserve (set aside) all the areas where the relevant species occur within the MU, expert opinion should be sought to determine the minimum viable size of the habitat that would sustain the species in the long term.

Maintaining the quality of habitat for RTE species requires a good understanding of the ecological needs of the target species. For example, tigers depends on the availability of prey species such as sambar deer, barking deer and wild boar; dispersal of some tree species depends on the presence of large mammals such as elephants and tapirs that ingest large fruits and then defecate the seeds; orangutans depend on a diversity of fruit trees and nesting trees; hornbills depend on the availability of cavities in large trees for breeding; and herbivores depend on saltlicks to help neutralise plant toxins that they ingest while feeding on plant materials.

Many large and wide-ranging animals, both herbivores and top predators, are generalist when it comes to habitats. This means they may frequently appear in degraded habitat, and the main threat they face may be hunting or retaliation killing due to human-wildlife conflict, rather than loss or fragmentation of habitats.

For both plant and animal species, translocation of the RTE species to a more secure site should only be considered as a final resort, and only after consultation with relevant stakeholders including the government agencies that have the authority over such matters. Consultation should be done with technical experts and scientists first and foremost to determine the viability of translocation and the long-term implications of translocation, if any. The translocation of wildlife should not result in an increase of human-wildlife conflicts at the release site that will have negative impacts on the safety of local communities and livelihoods.

Species associations
Some species are dependent on other species for their survival or reproduction, i.e. mutualistic and symbiotic associations. Box 5 below provides a few examples of these species associations to illustrate the need to take into consideration the ecological relationships between RTE species and other species that may not be obvious to some resource managers.

Box 5: Mutualism and Symbiosis

Mutualism is the ecological interaction between individuals of two or more species where each species has a net benefit. Examples of mutualism include:

- The relationship between tree species and large herbivores (such as elephants) that they rely upon for seed dispersal and germination.

- The interaction between carnivorous pitcher plants (*Nepenthes* spp.) that grow in nutrient-deficient substrates and small animals. A particular species of pitcher plant in Sarawak, *Nepenthes hemsleyana*, has a mutualistic interaction with the insectivorous bat *Kerivoula hardwickii* which fertilises the plant with its faeces while roosting inside the pitchers (Schöner *et al.*, 2015). The mountain treeshrew (*Tupaia montana*) and the summit rat (*Rattus baluensis*) in Sabah provide nutrients to a species of pitcher plant by defecating into the pitcher while also benefiting from feeding on the nectar provided by the plant (Greenwood *et al.*, 2011).
- Myrmecophily is the interaction of ants with other organisms including plants (Hölldobler & Wilson, 1990). In Malaysia, myrmecophily is reported for, among other species, crickets (Kistner *et al.*, 2007) and butterflies (Maschwitz *et al.*, 1985). In terms of plants, ants nest and live in the epiphytic fern genus *Lecanopteris* (Polypodiaceae). The plants obtain nutrients from ant faeces and debris left from forage through absorption by roots and inner rhizome wall (Gay, 1993).

Symbiosis is an intimate association between species in which the large majority or entire life cycle of one species occurs within or in very close association with another. A mutualism can also be a symbiosis, and many symbioses are also mutualistic, but not all symbioses are mutualisms and not all mutualisms are symbioses. Examples of symbiosis include:

- The relationship between the holoparasitic[14] *Rafflesia* (Rafflesiaceae) and its host, the climber *Tetrastigma* (Vitaceae). Every stage of its life history, with the exception of pollination and seed dispersal, is dependent on the host plant for its survival (Nais, 2001).
- An example of a non-parasitic or mutualistic symbiosis is the interaction between ectomycorrhizal (ECM) fungi and their host plants. ECM are obligate biotrophs[15] and partner preferences or specificity often create strong biotic links between plant and fungal community structure. Such plant–soil–fungus interactions has the potential to alter species richness, composition and ecosystem function significantly. Several studies have shown a link between distribution of tropical tree diversity with distribution of ECM – in the case of Malaysia, the Dipterocarpaceae are known to form associations with ECM. This association contributes to the critical role this tree family has on forest structure and dynamics (Peay *et al.*, 2010).

Although it is not possible to be aware of all species mutualisms in a given MU, the Organisation should seek advice from relevant experts when developing management plans. In the case of *Rafflesia* conservation, for example, expert knowledge would be required in order to identify *Tetrastigma* vines, without which the *Rafflesia* would not be able to survive. In some cases, the use of a precautionary approach and the protection of sufficiently large and high-quality habitat may be sufficient to maintain species associations.

Life history characteristics

Certain life history characteristics make species more vulnerable to threats e.g. being confined to treetops (i.e. arboreal habit); having low reproductive rates (e.g. orangutans, Sumatran rhinoceroses), and having a restricted diet (e.g. leaf monkeys). In the case of large mammals, e.g. elephants and tigers, immature males will disperse from their natal group in order to find new territories or new groups to join. In landscapes where large contiguous forested areas are becoming increasingly fragmented, the presence of natural corridors could help the wildlife to disperse safely from one area to another.

With regard to the size of ecological or wildlife corridors, although existing scientific literature indicates that "the wider the better" (NRE, 2009a), practical considerations usually result in wildlife corridors that are much narrower.

[14] A holoparasite is a parasitic plant that is not capable of photosynthesis and obtains all nutrients and water from a host plant.
[15] Obligate biotrophs are organisms that extract nutrients only from living plant tissues and cannot survive without nutrients from their hosts.

For some RTE species in Malaysia, specific conservation action plans have been formulated and they should be consulted in formulating the relevant HCV 1 managing and monitoring plan. Table 3 below provides a summary of currently available species action plans for the different regions in Malaysia.

Table 3: Malaysian species action plans currently available

Pen. Malaysia	Sabah	Malaysia
• National Tiger Action Plan 2008-2020 • National Elephant Conservation Action Plan (NECAP) • Conservation Action Plan for *Begonia herveyana* • Species Action Plan for the Conservation of Raffles' Banded Langur (*Presbytis femoralis*) in Malaysia and Singapore • Conservation Action Plan for the Threatened Agarwood Species *Aquilaria malaccensis* (Thymelaeaceae) in Peninsular Malaysia	• Bornean Elephant Action Plan for Sabah 2020-2029 • Bornean Banteng Action Plan for Sabah 2019-2028 • Orangutan Action Plan 2011-2015 • Sunda Clouded Leopard Action Plan for Sabah 2019-2028 • Proboscis Monkey Action Plan for Sabah 2019-2028	• Helmeted Hornbill (*Rhinoplax vigil*): Status Review, Range-wide Conservation Strategy and Action Plan (2018-2027)

Table 4 below provides an example of management objectives and strategies for maintaining HCV 1.[16]

Table 4: Example of management objectives and strategies for the maintenance of orangutans (HCV 1) in an oil palm plantation in Sabah

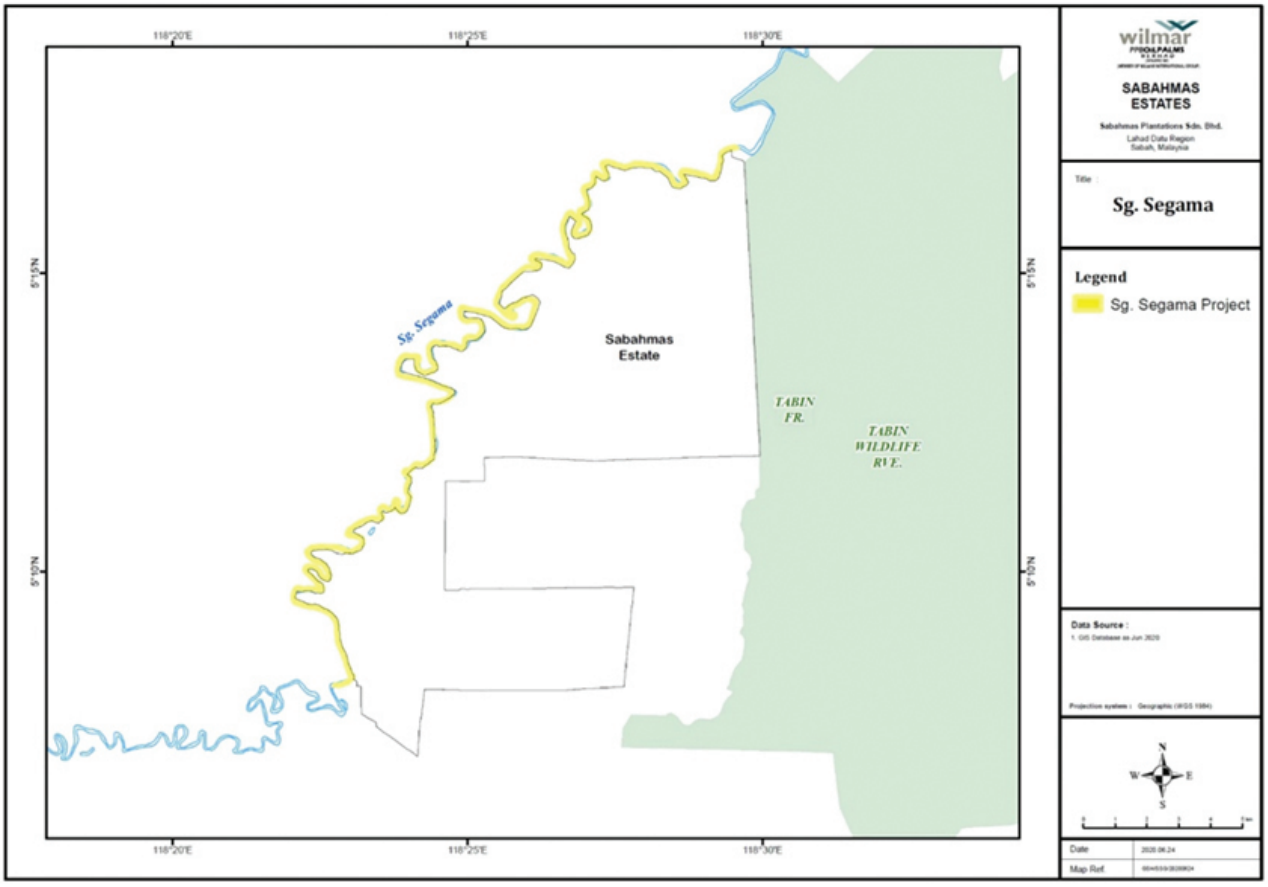
Example of HCV 1 management objectives	Example of HCV 1 Management Strategies	
	Area	Prescriptions
• Original population of orangutans (based on baseline data) is maintained within the MU • The sites and resources on which orangutans depend are maintained, including critical temporal resources such as sites for roosting, breeding, hibernation, shelter and migration	HCVA, wildlife corridor, buffer areas	• Maintain forest cover and natural ecosystems • Maintain a corridor of a minimum width between the HCVA/saltlick in the MU and the larger forest landscape/nearby protected area • Conduct restoration activities (e.g. planting of orangutan food trees) where appropriate
	Throughout the MU	• Control access into the plantation and forested areas (roadblocks, checks at entry point, close old routes) • Conduct patrols to prevent hunting, encroachment, etc. • Planting of fruit trees to enhance food sources for orangutans • Develop SOP and conduct training for staff on human-wildlife conflict mitigation • Install signage about prohibited activities (e.g. hunting, fishing, lighting of fires) within the MU
		• Establish an honorary wildlife warden/ranger programme involving local communities. • Build capacity of local community to establish a forest tree nursery to sell seedlings for restoration activities.

[16] The basic format of the table for this and other subsequent HCVs can be adapted and improved upon according to the needs of the particular MU.

Case Study 4 and Case Study 5 below provide two examples of HCV 1 management and monitoring.

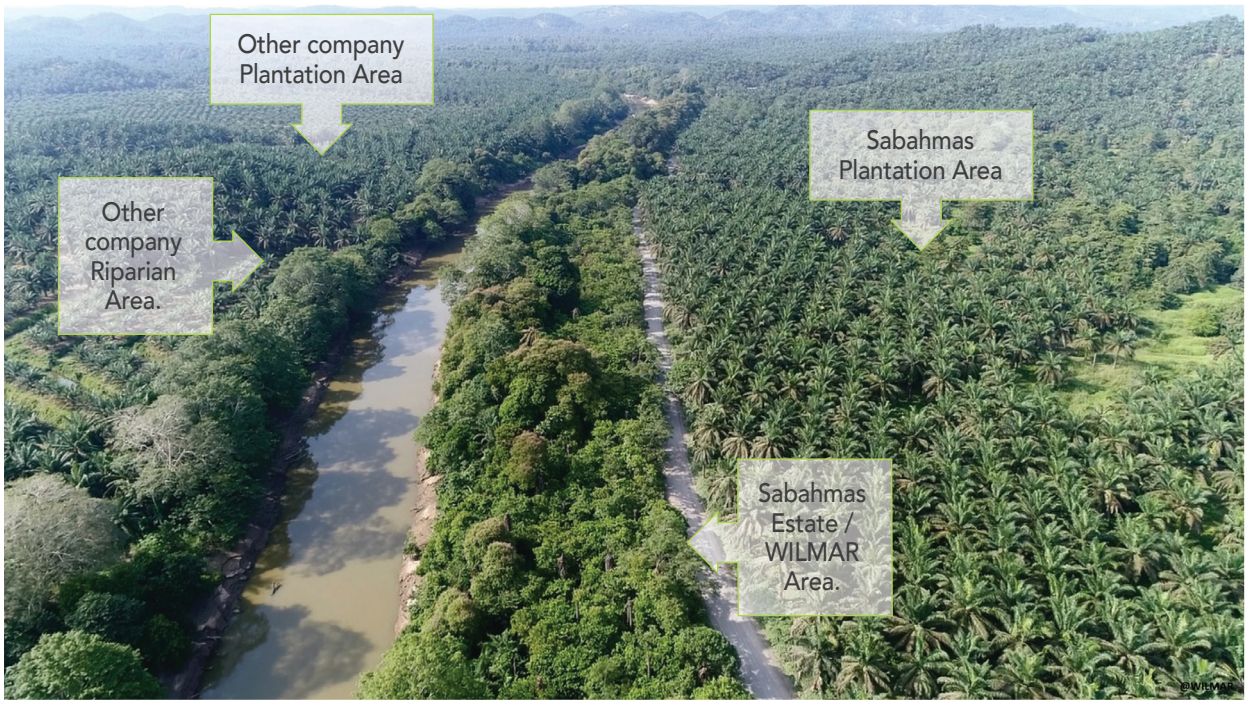
Case Study 4: Maintaining a viable habitat for wildlife at Sabahmas Estate, Lahad Datu, Sabah (HCV 1)

In 2009, Wilmar's Sabahmas Estate, with a total area of 10,477ha of which 5.2% are conservation areas, began a project to restore and rehabilitate a 50-metre zone in a 47km stretch of riparian area along the Segama River. This decision was made to enable the continued management of HCV 1, HCV 2 and HCV 4 that had been identified within the riparian reserve areas in Sabahmas estate. Adjacent to Tabin Wildlife Sanctuary, the riparian reserves provide habitat and function as a wildlife corridor, notably for the proboscis monkey, *Nasalis larvatus*, a Totally Protected Species under the Sabah Wildlife Conservation Enactment 1997, and globally an Endangered Species (IUCN, 2020).



Map showing the Sabahmas riparian HCV areas i.e. the site of the Sg. Segama project. Source: Wilmar

Forty seven (47) km of riparian areas along the Segama river were restored, with the original 20m buffer extended to 50m. This increased the riparian buffer from 94 to 381 hectares including state land area. Approximately 68,000 tree seedlings from 19 species were planted in 2009-2014, these included Bangkal (*Nauclea subdita*), Bayor (*Pterospermum elongatum*), Selung Apid (*Mallotus multicus*), Pulai (*Alstonia angustiloba*) and Tangkol (*Ficus racemosa*).



Riparian areas along the Segama River. Photo credit: Wilmar

Upon completion of restoration, the Primate Monitoring Project (PMP) was initiated in 2015. The PMP's role is to study the population distribution of the proboscis monkey and silvered langur, *Trachypithecus cristatus*, along the Segama River. Studies have shown that there is a pattern linking population stability to the restoration of riparian reserves (Ancrenaz & Oram, 2019).

Silvered langur (left) and male proboscis monkey (right) spotted along the riparian area of Sabahmas Estate.
Photo credits: Wilmar

Results indicate that the population has remained stable for the past 5 years since monitoring and 10 years after the restoration work was completed (Oram, 2019). The population of the silvered langur has also increased although they are sensitive to habitat degradation. This highlights that restoration efforts in riparian reserves in oil palm estates create wildlife corridors that help to sustain wildlife populations.

References:
Ancrenaz, M., & F. Oram, F. 2019. *Scientific Summary Statement of the Proboscis Monkey Monitoring Programme (2015-2019) of the Riparian Restoration Area on the Wilmar Sabahmas Estate, Sabah, Malaysia*. Lahad Datu.

IUCN. 2020. The *IUCN Red List of Threatened Species.* Retrieved from https://www.iucnredlist.org/.

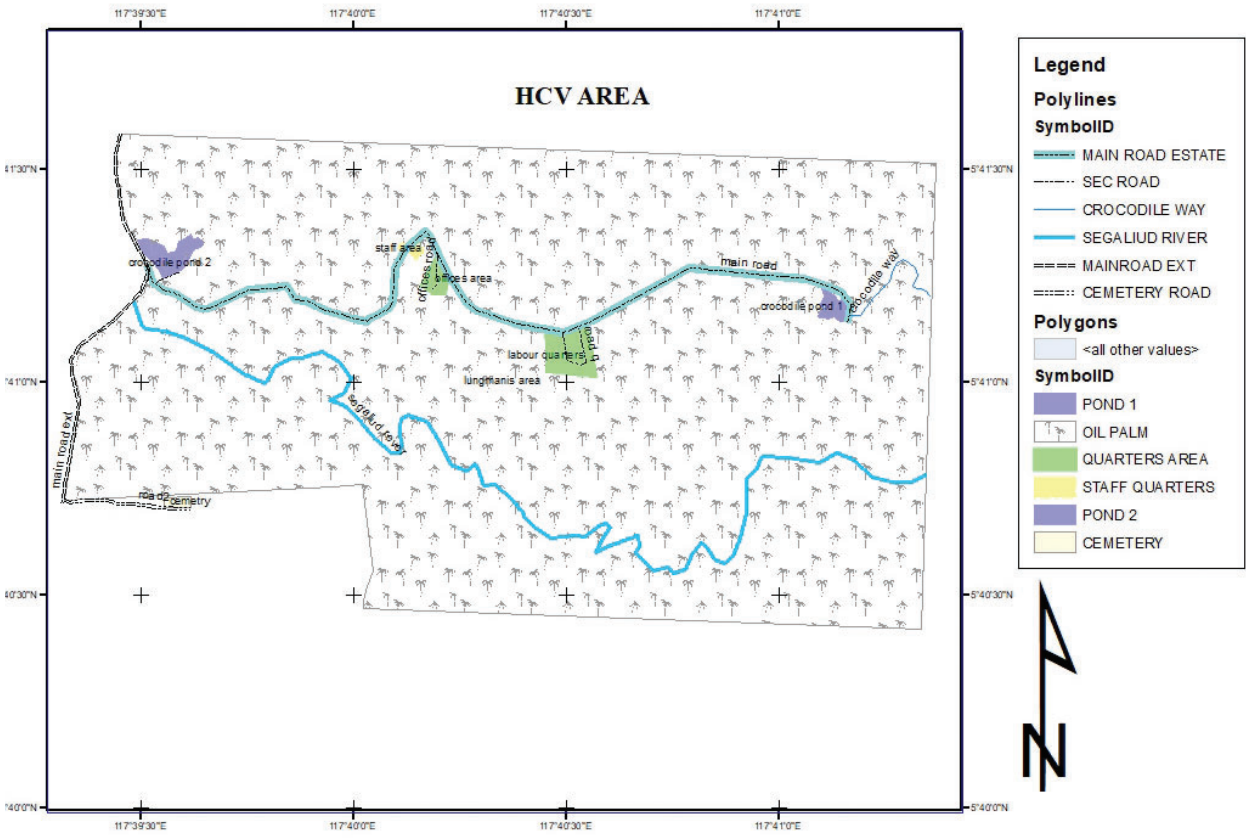
Oram, F. 2019. *Review of Primate Monitoring in the Restored Riparian Conservation Area at Wilmar Sabahmas Estates. HUTAN-Kinabatangan Orangutan Conservation Programme (KOCP)/PONGO Alliance Site Visit 20-22 May 2019*. HUTAN/Pongo Alliance, Lahad Datu.

Contributors: Marcie Elene Marcus Jopony, Simon Geh, Frederick Chok Choon Loi, William Paten, Suzana Barahim, Kristine Kashphil, Ginny Ng Siew Ling, Perpetua George & Chin Sing Yun, Wilmar.

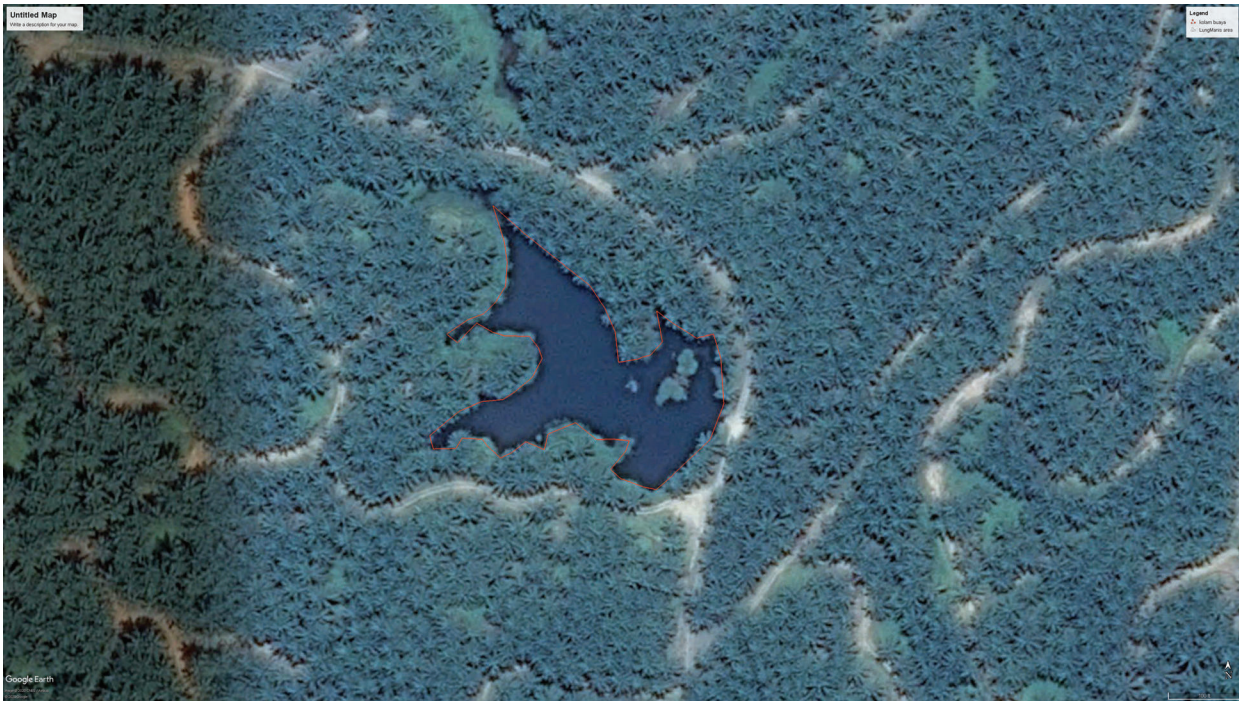
Case Study 5: Protecting crocodile habitats in an oil palm plantation in Sabah (HCV 1)

Background

Kam Cheong Plantation Sdn. Bhd. (KCPSB), a privately owned estate covering 669.36ha, is located in Lungmanis, Sabah. It was established in 1991 and is fully planted. The estate was certified under the Malaysian Sustainable Palm Oil (MSPO) certification scheme in 2019.



Map of part of the Kam Cheong Plantation showing location of waterways. Source: Kam Cheong Plantation



Pond 1 as observed from a Google map image. Source: Kam Cheong Plantation

Geographically, the plantation is surrounded by forest reserves and other oil palm plantations. There are two ponds (one of which is 2.9ha in size and the other is 1.35ha) within the estate that were formed when water accumulated in depressions. In addition to rainwater, the ponds also receive water from underground springs. The plantation management decided to retain the ponds as they serve as a freshwater source as well as flood retention ponds during rainy seasons.

The ponds are located roughly 500 m from the Segaliud River and not directly connected to the river. However, excess water spilling out of the ponds has created natural water channels from pond 1 and pond

A crocodile spotted using a drone at Pond 1. Photo credit: Kam Cheong Plantation

2 into the Segaliud River. There is no water gate to actively control the movement of water between the ponds and the water channels. About 10 years ago, crocodiles began inhabiting the ponds. The crocodiles have been observed nesting in the ponds every two years and the estimated number of crocodiles there is around 40 individuals, mostly young crocodiles. The water channels are referred to as "crocodile ways" by the estate workers, indicating that these water channels are being used by crocodiles to move between the ponds and the river.

There have not been any HCV assessment or other biodiversity studies conducted at the estate, but the high concentration of crocodiles indicate that HCV 1 is present and that the ponds are HCV 1 areas. The crocodile species has yet to be confirmed but is likely to be the estuarine crocodile (*Crocodylus porosus*) which is listed as a Protected animal under Schedule 2 of the Sabah Wildlife Conservation Enactment 1997.

Current management

Over the years since the crocodiles started inhabiting the ponds, KCPSB has taken number of measures to protect the crocodiles and avoid human-wildlife conflict while still using the ponds for its plantation operations. These management activities include:

1. Maintaining the ponds as a habitat for wild crocodiles – no hunting or capture of the crocodiles is allowed.
2. Conducting awareness activities for the plantation workers and stakeholders about the need to protect the crocodiles and safety precautions to be taken.
3. Installed signboards at the pond about prohibited activities.
4. Built a wire fence around the ponds to prevent human encroachment into the ponds without limiting crocodile movements (as the crocodiles can go under the fence).
5. Monthly monitoring to ensure that there is no hunting or capturing of the crocodiles.

So far there have been no human-wildlife incidents recorded even though there have been recorded cases of the crocodiles walking on the road.

A crocodile spotted using a drone in Pond 2. Photo credit: Kam Cheong Plantation

Contributors: Paul Chin Chee Foh (General Manager), Falix Jus (Estate Manager) & Faidil Jalil (Safety officer), KCPSB

2.3.2 Maintaining HCV 2: Large landscape and ecosystem values

HCV 2 management should take into consideration the wider landscape surrounding the MU. For example, the MU may be adjacent to or located near to protected areas or large landscapes e.g. the Heart of Borneo landscape in Sabah and Sarawak, and the Central Forest Spine in Peninsular Malaysia.

Large size and connectivity

The management aim for conserving HCV 2 is to maintain large ecosystems, and the viable species populations that they support. In some cases, MUs may be large enough to maintain HCV 2 areas on their own, whilst in smaller MUs, maintaining HCV 2 will rely on retaining connectivity (e.g. wildlife corridors and riparian corridors) with areas in the wider landscape. Supporting high concentrations of RTE and the maintenance of natural ecosystem processes, such as pollination, can depend on maintaining connectivity.

In a plantation setting, this generally means maintaining corridors of natural vegetation within the MU to connect conservation areas within the MU or with ecosystems outside (see Case Study 6). These ecological corridors must be wide enough to allow the effective movement of animals and plant dispersal.

The size of ecological corridors depends on the RTE species present and in the case of large mammals such as elephants, natural corridors alone (which could be narrow) may not be sufficient to avoid human-wildlife conflicts. In such cases, it may be necessary to have other management interventions in place to minimise human-wildlife conflicts, such as the use of electrical fences, the creation of buffer zones within the plantation area, control of access (to prevent poaching or habitat encroachment), and training of plantation staff on human-wildlife conflict mitigation, including safety measures for workers.

There is increasing evidence that some RTE species e.g. orangutans, may be able to persist in plantation areas provided sufficient food and other resources (e.g. nesting trees in the case of orangutans) are available (see for example Sherman *et al.*, 2020, from which the following illustration is derived).

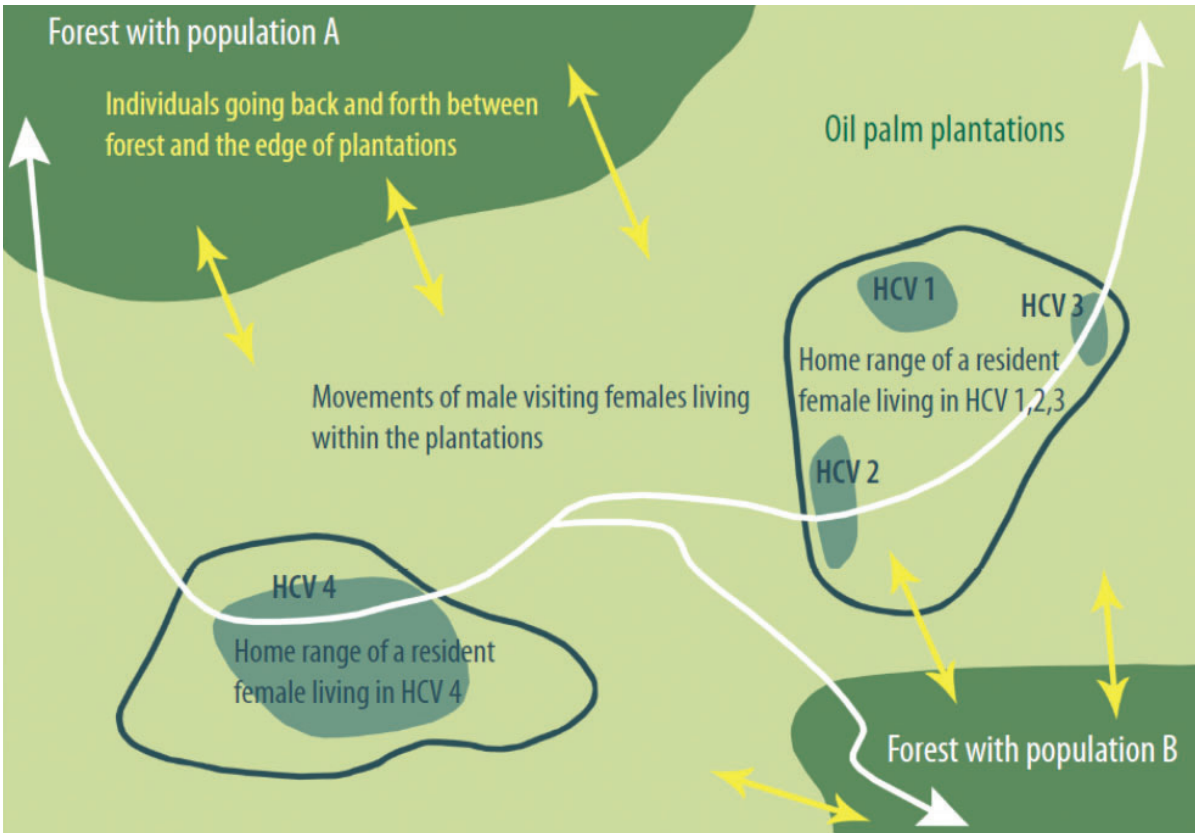


Fig. 4: Movement patterns of orangutans in mosaic landscapes. Source: Sherman et al. (2020).

The concept of human and wildlife coexistence in a plantation setting may also be applicable in the case of wild elephants. Wild elephants are attracted to young oil palm shoots within new planting or replanting areas. New studies and field trials have indicated that it may be a better option to create wildlife corridors or safe passages for elephants and these passages could either be temporary (i.e. only exist in immature planting areas) or permanent.

In cases where the MU is located close to international borders, connectivity to conservation areas within the neighbouring country (Thailand, Brunei and Indonesia) should also be taken into consideration. If an MU shares a boundary with a protected area in a neighbouring country, the Organisation should be aware that the conservation areas (including HCVAs) within its boundaries form part of a larger conservation landscape, and as such, appropriate management measures e.g. maintenance of ecological corridors and buffer zones.

Species composition and vegetation structure

An ecosystem may still qualify as HCV 2 even if a few key species are missing or there are some impacts from human disturbance, as long as its characteristic vegetation structures and ecological processes are retained. For example, the Sumatran and Javan rhinoceroses are no longer found in most of their historical range, but in large areas of contiguous forest in the Heart of Borneo and Central Forest Spine some of the ecological functions of the rhinoceros (e.g. dispersal of large fruits) may still be carried out by other large mammals e.g. Asian elephants, Malayan tapir and apes.

An example of management areas and prescriptions for HCV 2 in the context of an FMU under natural forest management is provided in Table 5.

Table 5: Example of management objectives and strategies for the maintenance of HCV 2 in an FMU in Peninsular Malaysia

Example of HCV 2 management objectives	Example of HCV 2 Management Strategies	
	Area	Prescriptions
• The significant ecosystems and mosaics and their functionality maintained or enhanced in line with the CFS master plan. • The large size of the forest landscape and connectivity are maintained in line with the CFS master plan. • Connectivity between the FMU and nearby protected areas/larger forest landscape is maintained. • The forested area is not further fragmented. • No RTE species are lost because of management activities.	Conservation areas – Significant ecosystems (e.g. dipterocarp forest), saltlicks	• No logging allowed • No clearing of forest
	Buffer areas	• Only RIL allowed
	Degraded areas (e.g. old logging tracks and log landing yards)	• Reforestation/enrichment planting
	Throughout the FMU	• Demarcate the FMU and internal boundaries • Conduct patrols to prevent hunting, encroachment, etc. • Close old logging tracks • Install signage about prohibited activities (e.g. hunting, fishing, lighting of fires) within the FMU
	Wider landscape	• Engage with local communities and other land owners, where possible, to address threats to HCV 2, e.g. on human-wildlife conflict mitigation • Work with relevant partners to conduct awareness and capacity building programmes for empowering the local community to co-monitor threats to HCV 2. • Initiate a community forest programme where feasible

Another example is provided below in the context of wildlife corridors identified as HCV 2 and human-elephant conflict (HEC) as a proxy to measure the effectiveness of the management prescriptions, within a landscape

dominated by oil palm plantations. In developing the management prescriptions, there needs to be further analyses carried out to understand the extent of the elephant ranges in the landscape and specific behaviour of elephants that may not have been fully captured as part of the HCV assessment. A key step is to define and map the home range, i.e roaming area and the specific locations of critical resources needed by the elephants both within the MU and in the wider landscape, as well as the frequency and/or seasonality of the elephants' visits to these identified sites. These resources include, and are not limited to, food sources such as monocots, and water resources. There is also a need to determine whether the elephants are all in the same herd with specific migratory routes (if any) or lost/rogue individuals, before determining the range.

Such investigations need to be coordinated by the wildlife department and/or research agencies. As the migratory routes and movement patterns of elephants are dynamic, the mapping exercise should be conducted periodically, with the recommended frequency of review incorporated into the management and monitoring plan. The formation of a working group, consisting of key stakeholders with assigned roles and responsibilities, is especially relevant, as this group can also provide oversight on the implementation and review of the HCV 2 management plan.

A key objective of the HCV 2 management plan is to minimise HEC through maintaining and/or enhancing the corridors within the wider landscape. Some elephant researchers are calling for a paradigm shift in favour of elephant-human co-existence where elephants are allowed safe passage to food and water sources (including saltlicks) rather than blocking their paths using physical barriers e.g. electrical fencing, etc. This is in contrast with the current approach of preventing the entry of elephants into oil palm plantations and/or requesting the wildlife department to remove or relocate the elephants as they are considered to be crop pests. Blocking elephant migratory routes may force elephants to reroute through other parts of the landscape, potentially resulting in HEC incidents in other MUs' or community lands. This issue further emphasises the need for an active working group within the landscape to define both MU-level and landscape-level objectives to be managed individually and collectively.

Due to the dynamic nature of the elephant ranges, an adaptive management approach needs to be implemented including regularly reviewing the HCV 2 management plan and the more specific HEC management plan. For example, some stakeholders may need to install or realign fencing or allow for elephant access along specific wildlife corridors. The HEC management plan also needs to adapt to changes in the behaviour or movement of elephants which may be influenced by land cover changes e.g. replanting of oil palm will usually attract elephants.

The key management objectives and strategies related to this example on HCV 2 and HEC are summarised in Table 6 below.

Table 6: Example of management objectives and strategies for the maintenance of HCV 2 with elephants as a proxy species in an oil palm plantation in Sabah

Example of HCV 2 management objectives	Example of HCV 2 Management Strategies	
	Area	Prescriptions
• Maintain and enhance wildlife corridors within the MU to ensure functional ecological connectivity to the wider landscape.	Conservation (HCV 2) areas	• No clearing of forest allowed • No agricultural activities allowed • Demarcate the HCV 2 areas • Install signage on the location of the HCV 2 area and prohibited activities
	Buffer areas	• Implement best management practices for fertiliser application and pest control (e.g. Integrated Pest Management) to mitigate toxic run-off into water sources • Demarcate buffer areas including riparian buffers • Install signage about the location of the buffer area and prohibited activities

Example of HCV 2 management objectives	Example of HCV 2 Management Strategies	
	Area	**Prescriptions**
	Wildlife corridors	• Demarcate and maintain a safe passage/wildlife corridor between the MU and forested areas within the wider landscape • No agricultural activities allowed • Conduct enrichment planting (where relevant) based on expert advice, i.e. where and what species to plant, etc. • Install signage about the location of the wildlife corridor and prohibited activities
	Throughout the MU	• Collect data from wildlife observations and crop damage caused by wildlife (need templates for data collection and analysis) • Analyse data and update maps and management plan accordingly • Conduct patrolling against illegal activities especially at wildlife hotspots • Develop an emergency response plan for HEC including an early warning/monitoring system for elephant sightings • Build capacity of staff/workers for mitigating human-elephant conflicts (dos and don'ts) • Implement best management practices for use of agrochemicals and their proper storage
	Wider landscape	• Form a working group (including the Wildlife Department, Forestry Department, growers/ concession holders, local communities, researchers, certification schemes, etc.) at the landscape level (elephant home range) with agreed roles and responsibilities • Conduct awareness and capacity building programmes on HEC for relevant stakeholders • Engage local communities and build their capacity in the participatory monitoring of elephants, including the establishment of an early warning/monitoring system for elephant sightings • Integrate elephant considerations in the wider landscape management plan • Establish a compensation mechanism (where feasible) for HEC impacting on local communities

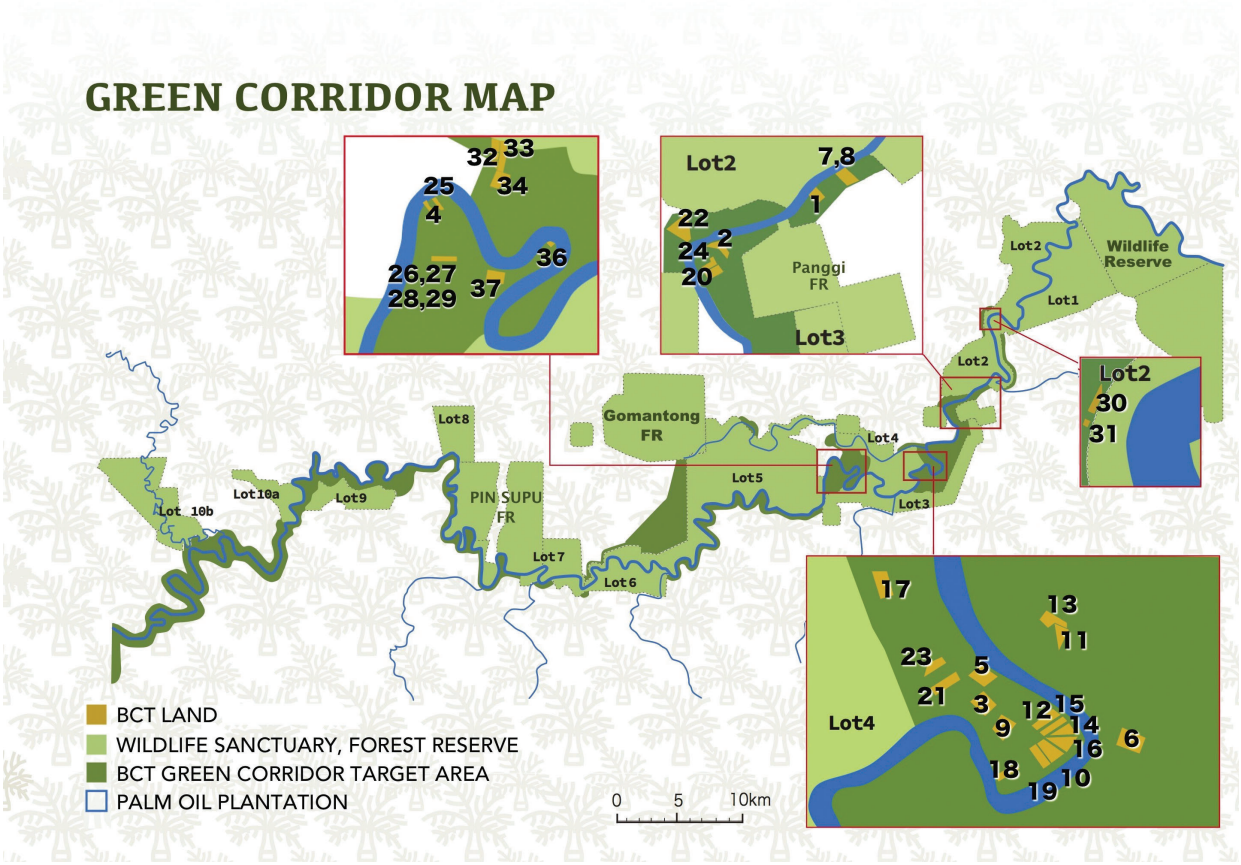
Additional guidance on managing HEC can be found in WWF-Malaysia's guidelines on better management practices for the mitigation and management of HEC (Chong & Dayang Norwana, 2005).

Case Study 6: Mega Biodiversity Corridor Conservation Project in the Lower Kinabatangan Basin (FGV PUP-BCT Project), Sabah (HCV 2)

The Sabah Mega Biodiversity Corridor Project, located in the eastern-southern part of Sabah, includes the catchment areas of the Kinabatangan and Segama Rivers covering an area of about 1.3 million ha, which represents 17 percent of the Sabah land mass. It is estimated that more than 85 percent of Sabah's flagship species reside within the Sabah Mega Biodiversity Corridor.

The Borneo Conservation Trust (BCT) is a state-mandated NGO established in 2006 and incorporated under the Sabah Trustees (Incorporation) Ordinance 1951 Cap. 148 to deal with pressing needs for the conservation of habitats and the migration routes of Borneo's most endangered wildlife located along the Kinabatangan and the Segama rivers.

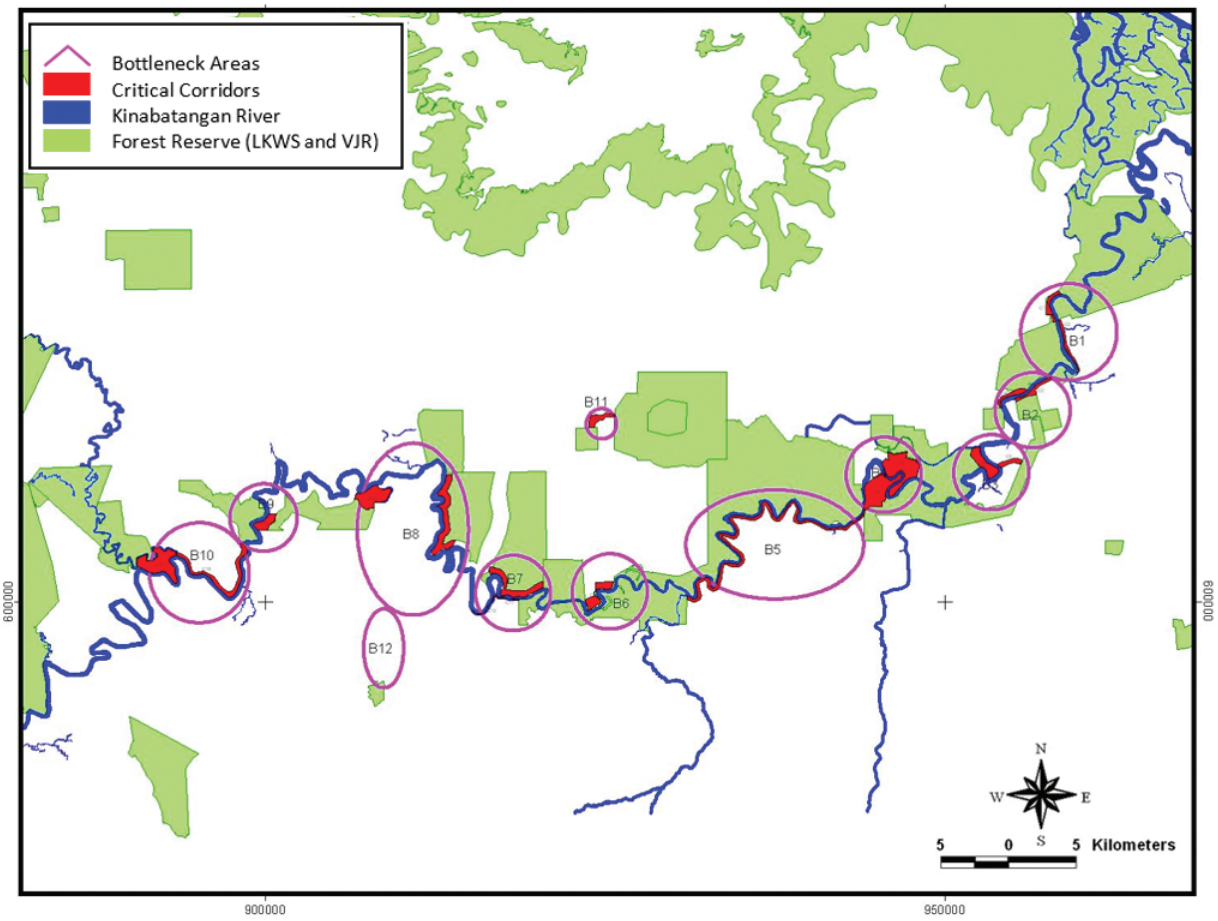
BCT works in smart partnership with the Pontian United Plantation Berhad (PUP), a subsidiary of FGV Holdings Berhad plus various stakeholders, including state government agencies and other private landowners, to manage the Kinabatangan Green Corridor; and purchase lands within and in the vicinity of the conservation corridor. The scope of management covers HCV management, HCV monitoring and the restoration of the riparian reserves.



Map showing the land lots purchased by the Borneo Conservation Trust

The Lower Kinabatangan and Segama River regions were once covered with dense rainforest. However, due to improper land use and large-scale deforestation, most of the forest areas have been converted into large-scale plantations. At the Lower Kinabatangan, the orangutan populations decline was due to forest clearing and fragmentation, especially in the 1980s. The remaining forested areas have continued to be the last sanctuary of the Bornean elephant, orangutan and many other animals, but there are bottlenecks where the ecological links are narrow or fragmented.

To stop the decline of Sabah's flagship species and therefore reduce human-elephant conflicts, it is imperative that the Mega Biodiversity Corridor is managed naturally, re-established and restored. Currently, about 15,000-20,000ha of lands have been identified and are in the process of being secured. Restoration of disturbed riverine areas had been carried out to support the challenging tasks of re-connecting the fragmented forest habitat. To date, the FGV PUP-BCT Project has successfully planted 11,000 trees. BCT has managed to purchase 38 lots of land within the identified HCV areas (as long-term elephant migratory routes), amounting to 93.3 hectares secured for wildlife corridors and biodiversity conservation.



Map showing the Mega Biodiversity Corridor including key bottleneck areas

Conservation measures taken include:

- Encouraging forested areas to be preserved as part of the plantation biodiversity area
- Removal of obstacles (fences and drainage) that impede or influence elephant migratory routes
- Restoration of ecological functions of riverine/forest ecosystems within the oil palm plantation ecosystem.

Successful reforestation within the riparian areas of FGV PUP

The FGV PUP-BCT Project has highlighted the important roles oil palm companies could play towards improving forest connectivity and preventing further forest degradation and habitat loss due to forest conversion. The realisation of the project has enhanced the livelihoods of the local communities through BCT's direct purchases of wild fruit and tree seedlings from their nurseries; community workshops and seminars. Regular monitoring and patrolling of boundaries and riparian areas continue to be carried out by local wildlife honorary wardens. Public awareness has been enhanced through smart networking with relevant agencies while, the importance of biodiversity and conservation was highlighted.

The Borneo Conservation Trust (BCT) team showing a new signboard installed near the project area

Contributors: Datuk Dr Laurentius Ambu (Chairman) & Josephine Maluda (Executive Secretary), BCT

2.3.3 Maintaining HCV 3: Rare, threatened or endangered habitats or ecosystems

For HCV 3 ecosystems, the Organisation is required to maintain the characteristic ecological processes and any unique attributes of RTE sites. In many cases, the extent of ecosystems is clearly delimited by topography (e.g. montane ecosystems), geology (e.g. limestone outcrops) or soil type (e.g. peat swamp forest) and this can guide the size of management areas. The MYNI for Identification of HCVs provide a list of HCV 3 ecosystems in Malaysia and should be referred to in determining the presence of HCV 3 ecosystems within the MU.

HCV 3 ecosystems that are highly localised and only occur in certain specialised conditions are likely to be isolated or naturally fragmented, and highly vulnerable to ecosystem disturbance. For example, peat swamp forests in Malaysia are formed on very wet, waterlogged areas where dead vegetation is accumulated as peat.

These areas are threatened by agriculture practices such as the draining of waterlogged areas involving canals, and also natural and man-made fires. Peatland management includes management of the water table to prevent excessive drainage and conducting awareness programmes on fire prevention. In many cases HCV 3 habitats or ecosystems will require complete protection in a conservation area as the management response.

In other cases, habitats and ecosystems occur as highly fragmented remnants of a previously more extensive ecosystem, which has been reduced through long periods of human activities, or climate change (e.g. Pleistocene relicts). The ecosystem functions of these areas may have been severely compromised but there could still be significant biodiversity contained within them. For example, the lowland dipterocarp forest of Peninsular Malaysia covers only about 37% of its historical range with about 10% of its original extent occurring within protected areas as of 2006, (Suksuwan & Zuraidah, 2015) but this ecosystem type still harbours a significant proportion of Malaysia's biodiversity.

In preparing an HCV management plan where HCV 3 fragments exist, the key aim should be to protect the remaining fragments, address threats to their degradation or destruction, and (where applicable) restore the functionality of the ecosystem.

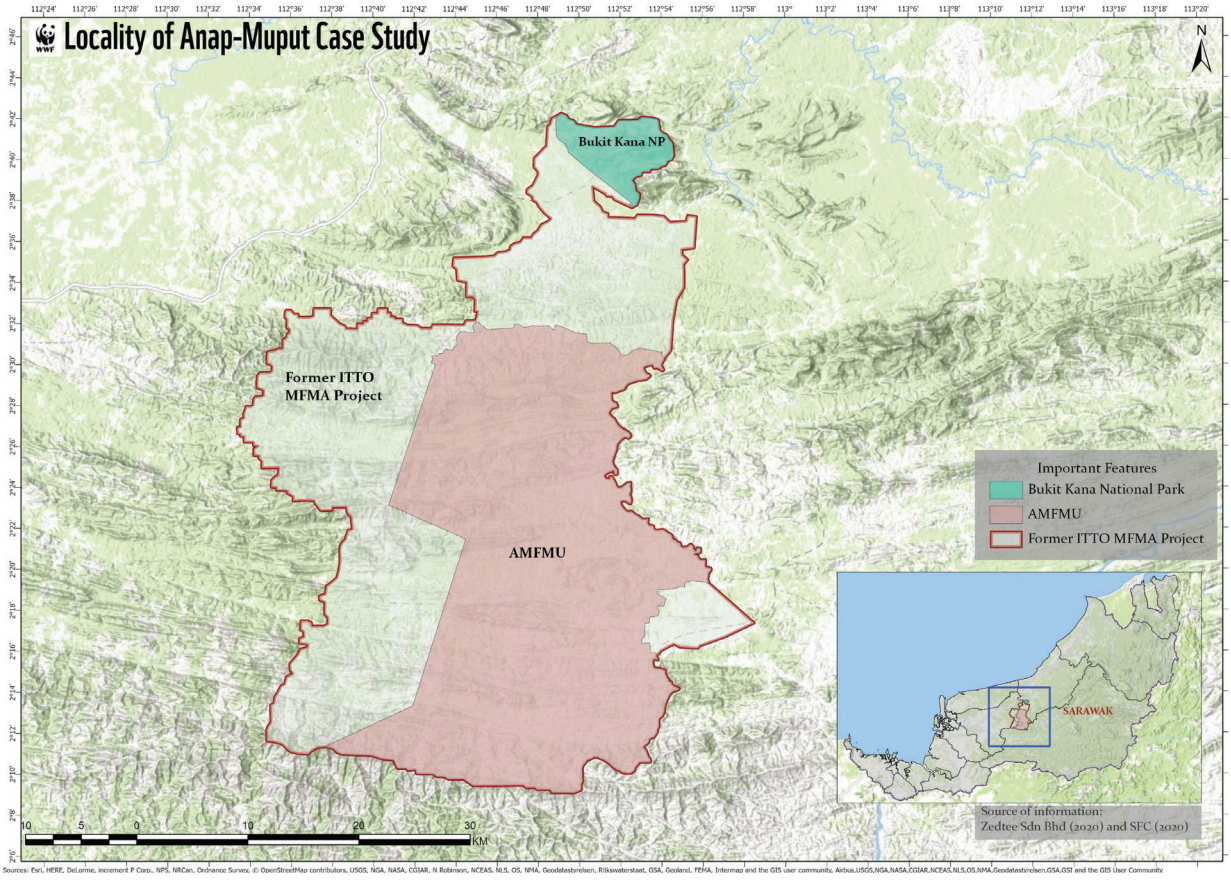
An example of HCV 3 management areas and prescriptions is provided in Table 7.

Table 7: Example of management objectives and strategies for the maintenance of peat swamp forest (HCV 3) in an existing oil palm plantation

Example of HCV 3 management objectives	Example of HCV 3 Management Strategies	
	Area	**Prescriptions**
• Original extent of the peat swamp forest is maintained throughout the lifespan of plantation. • The hydrology of the peat swamp forest is maintained. • Degraded peatland is rehabilitated where possible.	Intact peat swamp forest (HCVA)	• No land clearing and operational activities within HCVA • No construction of drainage canals
	HCVA buffer area	• No use of chemicals and heavy machinery • No construction of drainage canals
	Degraded peat areas within HCVA/set aside areas	• Hydrological restoration e.g. canal blocking • Fire prevention • Rehabilitate x hectare (s) of degraded peat per year
	All peat areas (HCVMA)	• Maintain water table according to relevant BMPs • Conduct hydrology assessment periodically • Establish water table checking station and conduct water level checks periodically • Conduct mapping of fire risk areas • Implement fire monitoring system including installation of Fire Danger Rating System signboards and fire monitoring stations • Develop SOP for rapid response in fire prone areas. • No landfill/dumping of waste
	Throughout the MU	• Regular patrolling to avoid encroachment • Put signage at HCVA boundary and boundary marking to demarcate the HCV areas • Install signage about prohibited activities (e.g. hunting, fishing, lighting of fires) within the MU • Strictly enforce a "no burning" policy
	Wider landscape	• Engage with local communities and other land owners, where possible, to address threats to HCV 3, e.g. on fire awareness and prevention

Case Study 7 below provides an example of how a protected area was established outside of an FMU in order to better manage a threatened mixed dipterocarp forest in central Sarawak, with the Organisation directly involved in promoting scientific studies of this ecosystem.

Case Study 7: Promoting scientific studies in the Anap Muput FMU, Sarawak (HCV 1 and HCV 3)



Map of Anap Muput Case Study locality. Source: WWF Malaysia

Anap-Muput Forest Management Unit (AMFMU), covering an area of 83,535ha, is located in central Sarawak. AMFMU is mainly covered by lowland and hill mixed dipterocarp forests and is surrounded on all sides by forest plantations. Elevations range from less than 100m to over 900m above sea level. A total of 61% of the forested area is under Terrain Class III and Terrain Class IV[17]. The central region of Sarawak is a major hotspot for dipterocarp diversity as it is an overlap of three distinct phytogeographical provinces for dipterocarps (Teo *et al.*, 2013; Ashton, 2004) but dipterocarp forests in central Sarawak are still under-represented in the protected area system of the State (Teo *et al.*, 2013). Due to changes in land use and forest degradation in Sarawak (Hon & Shibata, 2013a), relatively intact and undisturbed mixed dipterocarp forests are becoming increasingly threatened.

The three main objectives of forest management in AMFMU are: to have optimum utilisation of forest resources; to efficiently operate and regulate harvest on a sustained yield basis; and to restore the forest landscape including the regeneration of the forest and productive use of idle land for sustainable community

[17] Terrain Class III refers to mountainous land with moderate to long slopes with variable gradients but frequently steep, and the terrain is usually rough and sharply dissected. Terrain Class IV refers to steep mountainous terrain and more than half of the area has long, continuous slopes with gradients in excess of 35°

development. AMFMU became part of the International Tropical Timber Organisation's (ITTO) Model Forest Management Area in 1993 (ITTO, 1996). A series of studies conducted by ITTO provided support and recommendations for developing a sustainable forest development plan for AMFMU. This included the recommendations of having a permanent training and demonstration site for conducting good logging practices and forestry related training and research, and providing potential eco-tourism infrastructure for community forest management enterprise development. The recommendations were implemented in the Bukit Kana Management Area which is located outside of AMFMU. Part of this area, approximately 4,923ha of land that is unaffected by past logging and is outside of the AMFMU, was constituted as Bukit Kana National Park (BKNP) on 15th January 2015. A permanent multipurpose building next to the Kana Falls, previously the Bukit Kana Field Station, was converted to the Sarawak Rainforest and SFM Discovery Centre in 2009.

The Sarawak Rainforest and SFM Discovery Centre at AMFMU.
Photo credit: Zedtee Sdn Bhd

BKNP is a key protected area in the central part of Sarawak, protecting relatively intact mixed dipterocarp forest (Lepun & Heng, 2020). BKNP hosts a series of beautiful waterfalls and mountain peaks. This case study shows how an FMU is assessing HCV beyond its boundaries to include an important area under its management, and to promote scientific research. The commitment of AMFMU to SFM has resulted in the maintenance of the mixed dipterocarp forest and the rich species diversity there. This is reflected in the continuous biological studies that have been carried out since 1993. Some of the significant studies include: wildlife distributions and use of habitat and resources within AMFMU by Hon (2012), Samejima & Hon (2014), Hon & Shibata (2013b); plant studies by Koizumi (2012), Demies *et al*. (2019); above-ground biomass or plant studies that focus on high conservation value forests by Samejima *et al*. (2014), Demies & Sang (2008); livelihood and hunting by Kato & Samejima (2019); and riverine water quality and impacts of land uses by Fukushima *et al*. (2020). The FMU remains as an important site for biodiversity conservation and maintenance of ecosystem services.

Field assessment of plants.
Photo credits: Zedtee Sdn Bhd

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2.3.4 Maintaining HCV 4: Critical ecosystem services

HCV 4 is usually present in an MU if there are areas that are needed to maintain critical ecosystem services such as flood prevention, coastal protection, water filtration, erosion control, fire prevention and pollination. **The Organisation is responsible for ensuring that their operations do not disrupt essential ecosystems services inside or outside the MU**.

If an MU is upstream from communities that rely on waterways flowing through the MU for their basic needs, or upstream from critical ecosystems that depend on the maintenance of good water flows (e.g. mangrove forests), production activities should be planned with adequate river buffers covered with natural vegetation.

If an MU is in a catchment area upstream from water supply intake points or reservoirs, the remaining forest in that catchment should be maintained, i.e. no land conversion or deforestation should be allowed to happen. In the context of sustainable forest management, production activities (i.e. selective logging) should only be allowed if they conform to internationally accepted sustainability standards including the use of reduced impact logging and substantial safeguards are in place (e.g. large riparian buffers and no logging on steep slopes).

The size of buffer zones should comply with existing national or state legislations and guidelines (e.g. by DID), and relevant certification schemes (e.g. RSPO) may also have additional guidance on buffer zones (in the case of the RSPO, see Barclay *et al.*, 2017; and Lucey *et al.*, 2018).

With regard to the ecosystem services provided by rivers and riparian areas (primarily flood regulation and water purification), there is a need to clarify the different terms used in the various laws and guidelines relevant to river and riparian protection and management in Malaysia.

A **riparian area or zone** is an ecological concept used to describe the land adjacent to streams and rivers which is a unique transitional area between aquatic and terrestrial habitats (NRE, 2009b). The riparian zone has distinct plant communities which collectively can be called riparian vegetation. Riparian zones stabilise stream banks, filter sediments and nutrients, provide habitat and food for aquatic organisms, moderate temperature (if there are trees providing shade to the river) and may act as an ecological corridor. The width of a riparian zone is determined by its ecological characteristics and topography. In practical terms, the riparian zone width is often defined by the natural extent of riparian vegetation. However, in many cases, the natural riparian vegetation cover may have been lost and extensive disturbance of the riverbanks may make it challenging to determine the original width of the riparian zone.

A **river or riparian buffer** is a vegetated area next to a river which partially protects the river from the impact of adjacent land uses. Riparian buffers have become a very common conservation practice aimed at maintaining or improving water quality and reducing pollution. The width of riparian buffers is usually determined arbitrarily given the difficulty in determining the width of riparian zones.

River or riparian reserves are areas next to rivers that have been gazetted for protection purposes under various national and state laws such as the National Land Code 1965 for Peninsular Malaysia, the Selangor Waters Management Authority Enactment 1999 and the Sabah Water Resources Enactment 1998. Riparian buffers may be gazetted as river reserves, in which case the relevant law will prescribe what can or cannot be done within the gazetted river reserve. Many riparian buffer areas in Malaysia are yet to be gazetted as river reserves.

Riparian buffers that are not gazetted do not have legal protection but their management may be guided by relevant guidelines provided by the government, certification scheme or other sources. These guidelines are not legally binding but in the case of sustainability certification schemes (e.g. RSPO) may be compulsory in order for an MU to be certified.

For Peninsular Malaysia, The Guidelines for Rivers and River Reserves produced by DID (Peninsular Malaysia) specify widths of river reserves based on the width of the river (see Table 8 below). However, as pointed out by NRE (2019b), "the purpose of the guidelines is mainly for bank stabilisation; riparian zones as biodiversity habitats/corridors or water quality improvement require greater widths in general."

For Sabah, the Sabah Forestry Department requires a river reserve of 30m on each side for rivers exceeding 5m width and 5m on each side for rivers less than 5m width, **within forest reserves** in the State. Within **alienated land and state land** in Sabah, the width of the river reserve as stipulated by DID (Sabah) depends on the width of the river (see Table 8 below). Some oil palm plantations in Sabah are on alienated land and therefore would be subject to this requirement.

For Sarawak, the Sarawak River Board is responsible for the management of the gazetted rivers in Sarawak while the DID Sarawak is responsible for the hydrological management of flows in rivers and catchments, including setting the guidelines for the width of river reserve (natural river). Sarawak also follows the DID guidelines for the widths of river reserves. The State Department of Health and Sarawak Rural Water Supply Department (JBALB) are responsible for the safety of rural water supply and gravity-fed system. No commercial activity is allowed within an 8 km radius of gazetted water supply intake points.

Table 8: Existing guidelines for widths of river reserves in Peninsular Malaysia. Sarawak and Sabah

Peninsular Malaysia and Sarawak		Sabah (alienated land and state land)	
River width (m)	Width of river reserve (m)	River width (m)	Width of river reserve (m)
<5	5	<3	Min. 5
5-10	10	3-20	Min. 20
10-20	20	20-40	Min. 40
20-40	40	>40	Min. 50
>40	50		

Source: DID (2001); EPD (2012a, 2012b)

Management of HCV 4 requires a wide range of management activities. Only a sample is presented here, and in the example provided in Table 9 on the following page:

- Implement SOPs for road construction and river crossings that prevent sedimentation of waterways
- Maintaining natural vegetation on steep slopes, shorelines and riversides to mitigate against flooding and erosion
- Ensuring that operations such as timber extraction or planting do not take place during the rainy season to minimise erosion
- Controlling agrochemical use in river buffers and catchment areas of water intake points and reservoirs
- Preventing pollution in freshwater lakes and streams to maintain fish populations for local fishing communities.

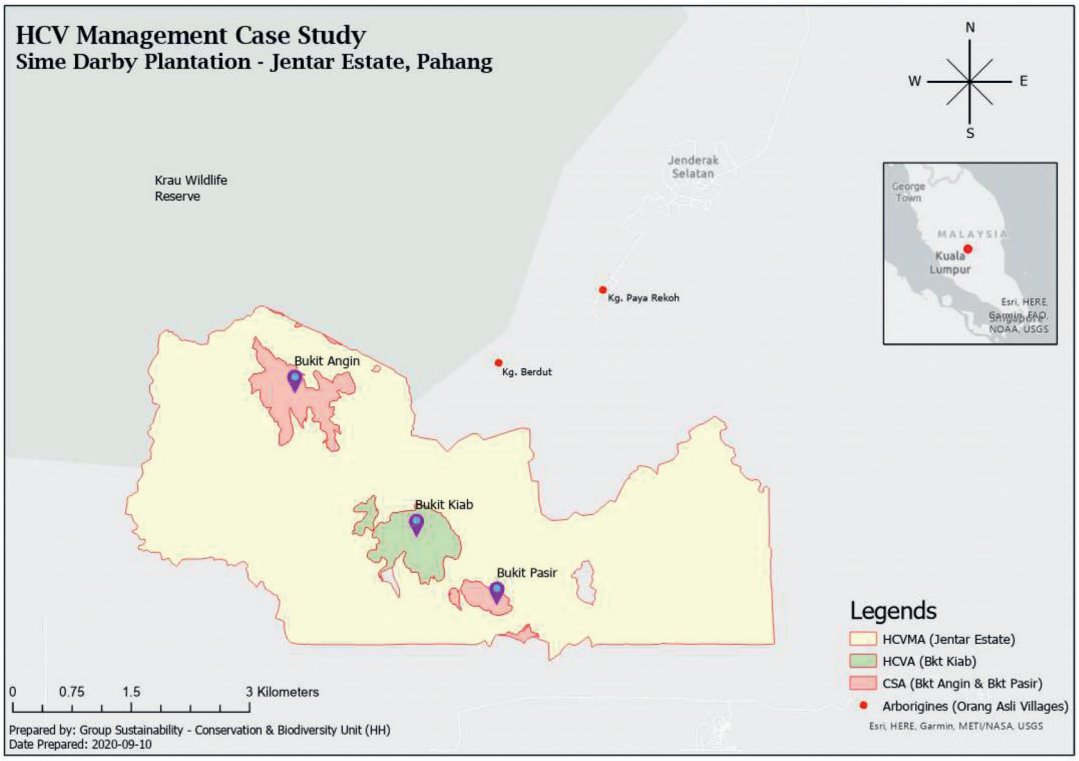
Table 9: Example of management objectives and strategies for the maintenance of water-provisioning ecosystem services (HCV 4) in a forest plantation

Example of HCV 4 management objectives	Example of HCV 4 Management Strategies	
	Area	**Prescriptions**
• Management activities do not increase the risk of damage to ecosystem services, nor their vulnerability to severe weather conditions	Water bodies (rivers, lakes, ponds, etc.) within the critical water catchment area (HCVA)	• Conduct regular patrolling of water bodies to detect signs of pollution (e.g. algal blooms due to fertiliser run-off, increased sediment load due to poor road maintenance) and invasive non-native species
	Buffer areas of water bodies within critical water catchment areas (HCVA)	• Confirm legal status of river with the relevant authorities (e.g. DID, Sarawak River Board, etc.) i.e. whether there is any river reserve gazetted within the MU, in which case the width and management of the river reserve must follow legal provisions. No land clearing/deforestation • No use of chemicals or heavy machinery • Conduct regular patrolling against threats i.e. encroachment, fishing, hunting, dumping, erosion along river buffers
	Water catchment area (HCVMA) outside of buffer areas	• Outside of buffer areas, minimise use of chemicals in plantation operations e.g. through mulching, integrated pest control, etc. • Where feasible, establish collaboration with a relevant research institution to conduct river ecology studies • Install signage about prohibited activities (e.g. hunting, fishing, dumping, lighting of fires)
	Throughout MU	• Conduct regular patrolling against threats i.e. encroachment, fishing, hunting, dumping • Install signage about prohibited activities (e.g. hunting, fishing, dumping, lighting of fires) • Implement integrated waste management including waste separation and SOPs for different types of waste
	Wider landscape	• Engage with local communities, other land owners and relevant authorities, where possible, to address threats to HCV 4, e.g. on water pollution and river buffer encroachment • Identify and mark the location of all the water sources for local gravity-fed water supply on relevant maps

Another key example of an HCV 4 ecosystem service is the prevention of erosion especially on steep slopes (see Case Study 8 below).

Case Study 8: Management of steep slopes at Bukit Kiab, Jentar Estate, Sime Darby Plantation, Peninsular Malaysia (HCV 4)

Sime Darby Plantation's Jentar Estate is located in the Temerloh district, Pahang, and is adjacent to the Krau Wildlife Reserve (62,395ha) which is one of the most important protected areas in Peninsular Malaysia, managed by the Department of Wildlife and National Parks. The Jentar estate has a total unplanted area of 160ha including slopes with more than 25 gradient, ravine and river buffer zone. These areas included three hills, namely (i) Bukit Pasir, (ii) Bukit Angin and (iii) Bukit Kiab. Bukit Pasir and Bukit Angin were formerly planted with oil palm and were identified as a conservation set-aside area (CSA) for restoration in 2014.



Map of HCVA (Bukit Kiab) and HCVMA at Jentar estate. Prepared by Mohd Hafiz Hishammuddin (SDP)

Bukit Kiab has been identified as an HCV 4 area (HCVA) for the Jentar Estate. It is the highest (226m above sea level) of the three hills within this hilly terrain and out of these three areas, only Bukit Kiab was known externally among the local community including the Jah Hut (Orang Asli or indigenous people) of Kg. Orang Asli Paya Rekoh. The Jah Hut leader communicated that they previously used the hill as a refuge area during flooding. Since the estate has been in operation, floods have never occurred. In the context of HCV 6, the Jah Hut leader mentioned that they are no longer using the area as they are adapting to changes in lifestyle, the availability of facilities and improved accessibility.

The total area of the Bukit Kiab HCVA is 59ha of which 24ha still contains natural vegetation (forest). The natural vegetation on Bukit Kiab plays an important role in stabilising steep slopes. The HCVMA is 1,979.79ha, which is equivalent to the total area of the Jentar Estate. The management team of Sime Darby Plantation (SDP) – Jentar Estate manages the HCVA and conducts continuous engagement with multiple stakeholders. There are collaborations with internal and external parties to enhance the area. The tree planting project proposed and successfully secured a financial sponsorship amounting to RM4.1 million from Yayasan Sime Darby (YSD) between 2013 and 2018 to restore these hills.

The view of Bukit Kiab, photo taken in May 2016.
Photo credit: Nur Aida Ab Ghani

A fauna survey documented a total of eight species of mammals from four families with the short-nosed fruit bat (*Cynopterus brachyotis*) the most frequently encountered during the survey. A total of 14 bird species from 10 families were documented, with the yellow-vented bulbuls being the most common.

A total of 126 tree species, mostly from the Dipterocarpaceae family, such as Keruing (*Dipterocarpus* spp.), Meranti (*Shorea* spp.), Merawan (*Hopea* spp.) and Resak (*Vatica* spp.), have been planted and maintained within a 136ha area, including 35 that are classified as Critically Endangered (CR), 17 categorised as Endangered (EN), and eight listed as Vulnerable (VU), based on the IUCN Red List of Threatened Species. A pictorial pocket guidebook has been published containing details on the rare, threatened and endangered (RTE) species planted at the area.

The Merawan Siput Jantan (*Hopea odorata*), one of the species planted at Bukit Kiab. Photo credit: Nafiz Zainal Abidin

References:

FRIM. 2016 and 2017. *A general survey of flora at Bukit Kiab, Jentar Estate, Temerloh*. Report on activities under the Forest Research Institute of Malaysia (FRIM) and Sime Darby Collaboration, May 2016 and May 2017.

FRIM. 2018. *Fauna Assessment at Sime Darby Plantation, Temerloh, Pahang*. Report prepared by the Zoology Branch, FRIM.

SDP. 2009. *Biodiversity Baseline Assessment Report for SOU 11*. Prepared by TQEM Department, Sime Darby Plantations (SDP).

SDP. 2016. *High Conservation Value (HCV) re-assessment for Pahang Zone, SOU 10, 11 and 12*. Prepared by PSQM Department, Sime Darby Plantations (SDP).

SDP. 2019. *Jentar Estate Plant-A-Tree Pocket Guide*. A publication by Sime Darby Plantation (SDP) funded by YSD and supported by FRIM.

The fauna survey team from FRIM. Photo credit: Nur Aida Ab Ghani

Contributors: Siti Norralakmam Yahya (VP II) & Nur Aida Ab Ghani (AVP II), Group Sustainability-Conservation & Biodiversity Unit, Sime Darby Plantation.

2.3.5 Maintaining HCV 5: Community needs

As described in the MYNI for Identification of HCVs, the dependence of local communities on resources within and surrounding the MU must first be investigated during the HCV assessment. The HCV assessment report should include the identification of HCV 5 resources and sites as a result of participatory mapping conducted with local communities.

Only if there is a critical dependence on a particular resource for meeting basic needs would HCV 5 be confirmed to be present. The next step is then to formulate the management objective and strategies for maintaining or enhancing the high conservation values.

If communities rely on land or water resources inside an MU for their basic needs, the Organisation should negotiate with the communities about access and use rights to different sites and resources through a process of FPIC. The community may be using non-timber forest products (NTFPs) or there could also be farming land (whether it is shifting agriculture or permanent farms) within the MU.

There is a need to increase awareness and understanding of HCV 5, especially amongst local communities, the Organisation and certification auditors who are not familiar with HCV 5. For example, the presence of active shifting cultivation areas is one of the indicators of HCV 5. External support e.g. from NGOs or academia may be needed to build the capacity of local communities in identifying, managing and monitoring HCV 5, so that they can contribute to the decision-making process or be involved in the co-management and monitoring of HCVs.

What is considered to be an adequate level of protection for an HCV 5 site should be based on an FPIC process with the relevant local community. Appropriate management measures (e.g. proper demarcation, signage and regular patrolling) may need to be taken to ensure the area is protected from encroachment from unauthorised individuals or damage.

For example, one outcome of FPIC may be to excise community areas from the production permit area (MU), as long as there are no environmental HCVs there. Alternatively, communities may decide to receive compensation in exchange for a reduction or complete removal of user rights, or there could be a negotiated compromise for production activities and community use to co-exist. Once this is determined, the Organisation should set management objectives and targets in collaboration with affected communities.

NTFPs are a key natural resource for many rural communities. In some cases the degree of reliance of the local communities on certain NTFPs is relatively high, in which case the NTFPs may be considered to be HCV 5. Where feasible, Organisations should engage with local communities to implement sustainable harvesting of NTFPs from within the MU. As there is a risk that NTFPs may become depleted due to over-harvesting, there is a need to ensure that the harvesting does not threaten other HCVs (e.g. HCV 1 and HCV 3) while at the same time ensure an additional source of livelihood for local communities. In some cases, rather than allowing for the harvesting of NTFPs within the MU, the Organisation may choose to support the alternative sourcing of NTFPs e.g. rattan farming. Relevant NGOs, cultural organisations and experts (e.g. on handicraft) may need to be consulted in order to the increase the value of NTFP products and access markets that are beyond the normal reach of local communities.

The major types of NTFPs that are commonly collected from forests in Malaysia can be grouped as follows:

- Sap/exudate: agarwood/gaharu (*Aquilaria* spp.), damar, latex, etc.
- Materials for building/handicraft: rattan, bamboo, palm leaves, mengkuang (*Pandanus* spp.). kerchut/purun (*Lepironia articulata*), etc.
- Medicinal plants: tongkat ali (*Eurycoma longifolia*), kacip Fatimah (*Labisia pumila*), fungi, etc.
- Food: wild meat, fruits, ferns, fungi, etc.

In order to effectively manage the harvesting of NTFPs from an MU, there is a need to first determine the baseline population or at least the relative abundance, and distribution of NTFPs within the MU. Where

there is active collection of NTFPs by local communities, participatory mapping should be conducted to identify and map key areas being used by the local communities for NTFP harvesting in the MU and the within the wider landscape.

Ideally NTFP population surveys should be conducted in sampling plots, the results of which can then be extrapolated to the entire MU. However, there are many challenges in conducting population studies of NTFPs as most NTFPs occur in low abundance. If the MU consists predominantly of lowland dipterocarp forest, the sampling intensity must be high and this may make it impractical to conduct such a population survey of the particular NTFP.

In some cases, baseline data may be available from previous studies done in the MU. This may include the National Forest Inventory (NFI) conducted for major and minor forest products within forests in Peninsular Malaysia, the most recent of which is NFI 6 which is targeted to be completed in 2021. In Sarawak, information about non-timber resources is required to be collected when carrying out the Forest Resource Assessment (FRA) for FMUs, as stated in the "Green Book" for sustainable forest management. Baseline data may also be available from EIAs and/or SIAs if they have been conducted within the MU. An alternative to population surveys is to conduct a rapid biodiversity assessment to obtain baseline information on the relative abundance and distribution of NTFPs within the MU e.g. for each compartment (or cell, if a grid system is used) within the MU, the relative abundance (e.g. high, medium, low) of selected NTFPs can be recorded.

The lack of comprehensive baseline data should not prevent the Organisation from formulating a management strategy for NTFPs in line with the precautionary approach. If the collection of NTFPs is already an established practice within the MU and it is not feasible to stop the activity (e.g. due to the strong dependence of the local communities on the NTFP with no viable alternatives, or due to long-held traditional practices), the only option is to manage the harvesting of the NTFPs so that it does not severely threaten HCVs present in the MU. An adaptive management approach can be used by allowing the harvesting of the NTFPs at a relatively low level first while monitoring the impacts over a period of time. If the HCVs can be maintained, the level of harvesting could also be maintained or, if there is strong pressure from local communities, the level of harvesting may be increased gradually while impacts continue to be monitored. If there are indications that there are significant negative impacts on the HCV, this should be communicated to the local communities and used as a basis to decrease the level of NTFP harvesting.

The baseline data collected should also be used in mapping the management zones/areas within the MU for specific purposes e.g. core conservation area (HCVA), HCVMA, buffer area, community use area, etc. which is incorporated into the MU management plan and more specifically the HCV management and monitoring plan.

An example of management objectives and strategies for NTFPs that have been identified as HCV 5 is provided in Table 10. This example is a proposed approach for a workable compromise between the strict no-hunting requirements within FMUs and the dependence of local communities on wild meat in Sarawak. The example is not necessarily about a conflict between HCV 1 and HCV 5 as the targeted wildlife do not include RTE species and there could be sufficient prey for RTE predator species. In order for this example to become a reality, there is a need to first establish a multi-stakeholder platform at the FMU (involving the Organisation, local communities, SFC, research institutions, NGOs such as WWF, etc.) to implement a robust system for sustainable hunting of non-protected species by the local community. This proposed sustainable harvesting system is based on the traditional practice of taggang.[18]

[18] In Sarawak, the hunting of terrestrial wildlife can be modelled on the taggang system for river fishing where the local community establishes prohibition zones with self-administered rules on where and when fish can be harvested. The community assigns its own members to monitor the river and manage the freshwater fisheries. Currently, hunting is not allowed within certified FMUs, but if a taggang system is successfully implemented it may allow for a more sustainable management of non-protected wildlife for community needs.

Table 10: Example of management objectives and strategies for the maintenance of non-protected wildlife as a food source for local communities (HCV 5) in an FMU in Sarawak

Example of HCV 5 management objectives	Example of HCV 5 Management Strategies	
	Area	Prescriptions
Non-protected wildlife is sustainably managed as a food source for local community needs (e.g. wild boar)	Core conservation area/ HCVA	• No logging allowed • No clearing of forest
	Buffer area of HVCA	• Only RIL allowed
	Throughout the MU	• Control access into the FMU (roadblocks, implement entry permits, close old logging tracks) • Negotiate agreements with communities on the sustainable hunting system e.g. permitted hunting techniques, quotas, seasonal considerations, etc. • Conduct patrols to prevent illegal hunting, encroachment, etc. • Install signage about prohibited activities (e.g. hunting/fishing of protected species, lighting of fires) within the MU
	Wider landscape	• Conduct regular dialogues with the local communities and SFC to monitor implementation of the sustainable hunting system

Another example of HCV 5 management objectives and strategies is provided in Table 11 below which is applicable for NTFPs that have been confirmed to be HCV 5 in the context of an FMU under natural forest management.

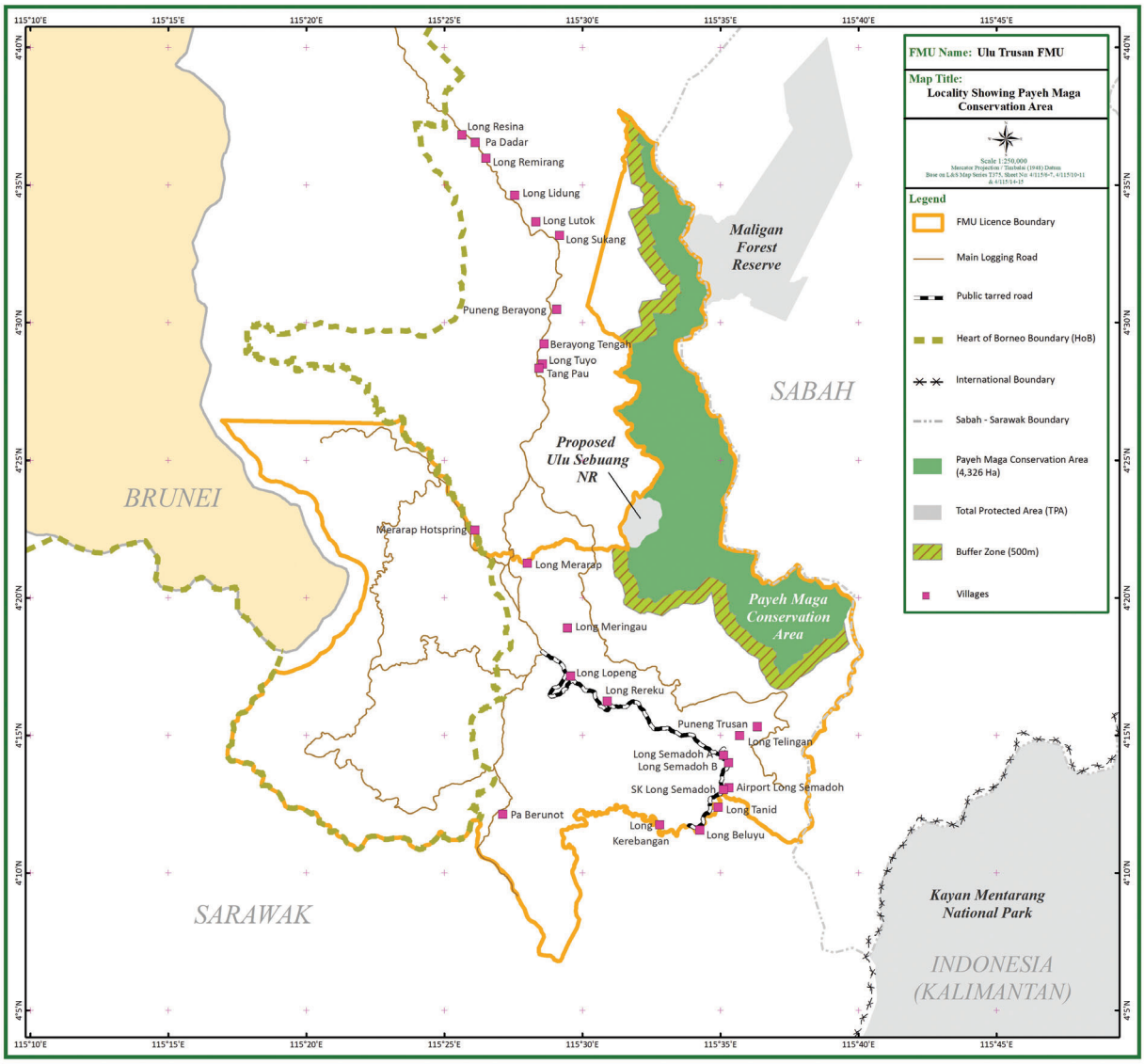
Table 11: Example of management objectives and strategies for the maintenance of Non-Timber Forest Products in the context of natural forest management

Example of HCV 5 management objectives	Example of HCV 5 Management Strategies	
	Area	Prescriptions
To provide basic livelihood needs for local communities through controlled harvesting and maintenance/ enhancement of NTFPs, while respecting local community rights as well as cultural and spiritual values	Core conservation area/ HCVA	• No NTFP collection allowed
	Buffer area of HVCA	• No NTFP collection allowed except in specific situations e.g cultural/spiritual use
	Community use area	• Collection of NTFP allowed at a sustainable/ controlled level (apply precautionary principle) • Enrichment planting/replanting to increase resource availability (e.g. rattan)
	Throughout the FMU (including production areas)	• NTFP collection allowed in non-active production areas • Patrolling against encroachment and non-authorised collection of NTFPs
	Wider landscape	• Engagement with local community to increase awareness about sustainable harvesting of NTFPs • Collaborate with local communities to conduct planting of NTFP outside of FMU e.g. within village areas • Collaborative effort with other land users to prevent encroachment and other illegal activities in the buffer area surrounding the FMU

Case Study 9 below describes a collaborative management of HCV 5 (and other HCVs) between the Organisation and the local community that provides benefits to the community from the conservation of the natural resources.

Case Study 9: Collaborative management of HCV 5 (and other HCVs) at the Payeh Maga Conservation Area, Ulu Trusan FMU, Lawas, Sarawak

Background



Map showing the location of the Ulu Trusan FMU, the Payeh Maga Conservation Area and villages.
Source: Samling

Ulu Trusan FMU is located within Lawas District of Limbang Division and managed by the Samling Group of Companies. The FMU covers a combined area of 92,751ha (Yiing *et al.*, 2018). Generally, the FMU is a logged-over lowland to hill mixed dipterocarp forest, encompassing undulating to hilly land with slopes of 20° to 35° (Terrain Class III) and steep slopes (Terrain Class IV) while other areas consist of smooth to undulating moderately steep terrain, with slopes of less than 20°. The area has elevations ranging from 300 to 1,800 m a.s.l. The natural habitats have largely been disturbed, with the present vegetation cover comprising mainly remnants of lowland to hill mixed dipterocarp forests in various stages of regeneration. Ulu Trusan FMU is located within the Trusan water catchment area.

The Payeh Maga Conservation Area was proposed to be a national park or nature reserve by the Forest Department Sarawak so that the area can be protected legally. However, due to the objection from a local from Long Semadoh, the area cannot be legally gazetted. As a compromise, it is designated as a conservation area within the Ulu Trusan FMU, and it is excluded from harvesting. In 2017, a multi-disciplinary team from the Sarawak Forestry Corporation conducted an HCV assessment at Ulu Trusan FMU (Yiing *et al.*, 2018). The flora, fauna and forest ecosystem surveys were conducted on 13-21 September 2017 while the social study was conducted on 7-18 September 2017.

Description of HCVs

The total HCV area is 37,598ha within the FMU which has a gross area of 92,751ha. The breakdown of the HCVA is as follows:

HCV	Attributes	Area (Ha)
1	Proposed Ulu Sebuang NR	666
1	Totally Protected Plant (Rafflesia)	-
1	Saltlicks	-
2	Payeh Maga Conservation Area	14,665
2	Buffer Zone for Payeh Maga Conservation Area	4,326
2	Border Zone	859
3	Kerangas Forest/MDR Forest/MD1/Terrain IV	14,053
5	Local community water catchment area	3,029
6	Burial Grounds	-
	Total	**37,598**

*MDR: Mixed Dipterocarp Forest; MD1: Mixed Dipterocarp Remnant Forest

Significant biodiversity values (HCV 1) are present in the study area and its surroundings. There were also signs of critically endangered (CR), endangered (EN), vulnerable (VU) and nearly threatened (NT) flora and fauna observed during the assessment. A total of 37 fauna and 10 flora species were found to be RTE species. There are five fauna and 28 flora species endemic to Borneo found within the study sites. Areas for critical temporal use were also present in the FMU. In another study, a total of 62 species of highland birds were recorded, of which 21 species (45% of total species recorded) were endemic species to the Borneo highlands. Overall, about 54% of bird species in the Payeh Maga Highland were classified as highland and mountain birds. Nearly 34% of the birds were endemic birds of Borneo (Zamri Rosli *et al.*,2015)

The iconic Payeh Maga Waterfall.
Photo credit: Dr Zamri Rosli, UPM

The area has HCV 2 value as it is an important link between larger forest complexes which include logging concessions, Totally Protected Areas and Forest Management Units. Ulu Trusan FMU is adjacent to Maligan VJR in Sabah and Ulu Temburong National Park in Brunei while Ulu Trusan FMU is within the Heart of Borneo (HoB) boundary.

Kerangas or heath forests present in the FMU are automatically accorded as a threatened or critical ecosystem (HCV 3).

Results of the assessment for social and cultural values suggested HCV 5 is present. There are 20 settlements found within or adjacent to the Ulu Trusan FMU. The forest areas within and surrounding Ulu Trusan FMU are fundamental to meeting their basic needs. HCV 6 is present as Ulu Trusan FMU contains areas and/or sites important to a local community's cultural, ecological or religious activity.

Payeh Maga holds perhaps the highest potential of any locality in Sarawak to become a premier birding destination. This is due to several factors like high bird diversity, endemic species and location (Lee & Yeo, 2014).

Threats

Lowland and hill dipterocarp forest cover the whole area and this type of forest is becoming rare and threatened as a result of the deforestation and degradation of its ecosystem. The Sabah-Sarawak Gas Pipeline (SSGP) passes through the FMU and the area along the pipeline is a potential cause of fire outbreak.

HCV Management

Peak of Mount Matalan. Photo credit: Dr Zamri Rosli, UPM

Logging is prohibited within river buffers, and the size of the buffer depends on the size of the river or stream.

Currently, the Long Tuyo Payeh Maga Committee (LTPMC) which comprises locals from Long Tuyo manages and monitors the eco-tourism areas within the Payeh Maga Conservation Area. Frequent maintenance is done to the trails and camps. The initial fund for the management and monitoring of the area was collected from amongst the villagers themselves. Around 20 people contributed RM50 each to build a shelter meant to be used for research, tourism, and monitoring purpose. Later on, the LTPMC received RM30,000 from the local Member of Parliament to further improve the campsite used as the monitoring and management base. The fund has since been depleted; and now LTPMC depend on an entrance fee of RM10 and overnight fee of RM40 per head to continue maintaining the area. Till today, the LTPMC still manages and monitors the area. Seven company staff members are appointed as Honorary Wildlife Rangers, five of whom are locals. They have been trained to conduct awareness programmes, inspections and enforcement of the Wildlife Protection Ordinance Enforcement 1998. They are also trained in public speaking to improve their proficiency in presentation of awareness of wildlife conservation programme to the community and workers.

References:

Lee, C.C. & S.T. Yeo. 2014. *Report on Bird Survey at Paya Maga, Lawas (Sarawak, Malaysia)*. A report prepared for the Forestry Department, Sarawak.

Yiing, L.C., L. Sir, J.H. Ripan, V. Bodos, & M. Demies. 2018. *High Conservation Value Forest Assessment Report: Ulu Trusan FMU*. A report prepared by the Sarawak Forestry Corporation Sdn. Bhd. For Samling.

Zamri Rosli, Siti Sarah, K.H. Ong, R.J.H. Kueh, G.J. Gerusu, Khairul Annuar Mohd. Suhailiee, M. Sait, G.B. Empin, Afsar Jabri, M. Ngelai, N. Girang & Latifah Teh. 2015. Assessment on composition of bird at Payeh Maga Highland Initiative Project, Long Tuyo, Lawas, Sarawak. *Proceedings on Heart of Borneo Trilateral Conference: Towards Three Countries One Conservation Vision, 13-14 April, 2015, Brunei Darussalam*.

Contributors: K.C. Ling, Frazier Parose & Ophelia Eda, Samling; Forest Department Sarawak; Long Sukang CRC; Long Tuyo CRC.

2.3.6 Maintaining HCV 6: Cultural values

As in the case of HCV 5, the Organisation needs to engage with the relevant local communities via an FPIC process to determine the management strategies for HCV 6 that are adequate and appropriate to maintain or enhance the cultural values present in the MU. The local communities may insist on the *in situ* protection of the HCV 6 site or resource, or they may be agreeable to the relocation of the site or resource, or settle for compensation in exchange for forgoing the site or resource.

In certain cases, HCV assessors may face difficulty in determining the location of burial sites or other cultural sites due to concerns from the local communities with regard to their religious or cultural beliefs. However, the root cause of these concerns could be the local community's lack of understanding about the purpose of determining the location of these cultural sites.

There is a need therefore to ensure that the local community is aware of the purpose of the HCV assessment and how it could lead to the improved management and monitoring of these cultural sites. Increased awareness and understanding by the local community may motivate them to be more willing to disclose relevant information related to cultural sites. The local community may also be more willing to share information if they are assured that the information will be kept confidential amongst those who are involved in the management and monitoring of the HCV 6 areas.

There is a possibility that information about cultural sites is only available from key members of the community e.g. a burial site may only be known by family members, while information about certain cultural sites may be kept by elders or known only to those who hunt at particular locations. Without the information of these cultural sites, the Organisation might not be able to take more precise measures to maintain or enhance the HCV 6 values within the MU.

In the case of Sarawak, the Organisation can consult the Council for Native Customs and Traditions (Majlis Adat) for advice; or get the Council's representative as a mediator between the Organisation and the local community on cultural matters, where relevant; or on archaeological matters, the Orgnisation can consult the Sarawak Museum for assistance.

An example of HCV 6 management objectives and strategies is provided in Table 12, with the Organisation being primarily responsible for the prescribed actions but working in close collaboration with the relevant local communities.

Table 12: Example of management objectives and strategies for the maintenance of a burial site (HCV 6) in an oil palm plantation

Example of HCV 6 management objectives	Example of HCV 6 Management Strategies	
	Area	Prescriptions
• The traditional burial site of a local indigenous community remains protected within a well-defined area in the oil palm plantation.	The burial site of a quarter hectare in size (HCVA)	• No operational activities allowed • Determine the boundary of the burial site in a participatory way (FPIC) together with the local community. • Clearly demarcate the boundary of the burial site using fencing, paint/markers or any other effective method. • Agree and delineate access route for community members to the site. • No entry allowed for non-relevant persons, including by the Organisation's staff/workers, unless with permission from the local community. • Conduct regular patrolling to prevent any unauthorised entry or disturbance to the site. • Install signage on prohibited activities (e.g. no trespassing, no operational activities, no hunting, no lighting of fires etc.).
	Buffer area of the burial site (HCVMA)	• No use of chemical or heavy machinery
	Throughout MU	• Control access into the plantation (roadblocks, checks at entry point, close old routes). • Conduct briefing for the workers on the existence of the burial site and how it should be managed.
	Wider landscape	• Regular dialogues and open communications with authorised representatives of the local community to mitigate and prevent any potential conflict. • Seek expert advice on cultural matters including relevant government authorities.

Some cultural values can be in unusual shapes and forms as illustrated by Case Study 10 below.

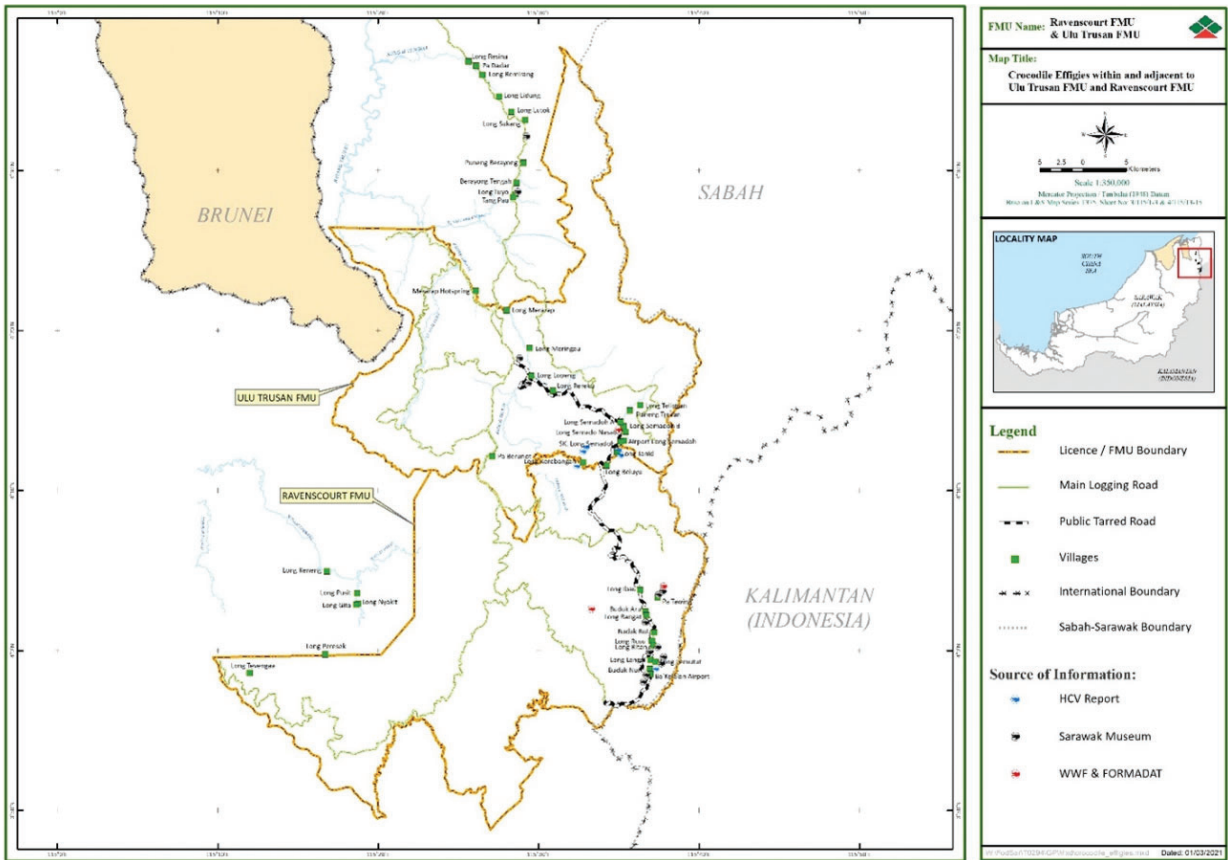
Case Study 10: Crocodile effigies management & monitoring within FMUs in Lawas, Sarawak (HCV 6)

Background

A number of crocodile effigies (buaya tanah) have been found in Samling's forest concessions in the Lawas Region of Sarawak, namely Ulu Trusan FMU and Ravenscourt FMU. Sarawak Museum has mapped all known crocodile effigies in Lawas, some of which are recorded by the FMU as HCV areas while others are pending site verification. More effigies are present in the Lawas Region, but not yet recorded by the company.

Description of HCV areas and HCVMA

The total area of 23 known effigies (i.e., the HCVA) in the Samling concessions is estimated to be 18,0641 m^2 (c. 18ha) while the HCVMA, which includes the buffer zone of 50m radius from the edge of the site, is estimated to total 722,566 m^2 (c. 72ha).



Location of the Ravenscourt and Ulu Trusan FMUs and villages. Source: Datan (2011).

Crocodile effigies at Long Kerebangan. Photo credit: SFC

Management & Monitoring

Management and monitoring efforts are mainly led by the Sarawak Museum. Some villagers also volunteered to do site maintenance e.g., weeding, cleaning, repairing etc. Sarawak Museum provided funding to the villagers to erect fences around the sites but so far, the fencing has yet to be done.

Based on the mapping and information recorded by Sarawak Museum, Samling has conducted several activities annually to maintain the effigies. The activities include:

1. **Participatory Community Monitoring** that is done annually for each FMU involved. Information is gathered from the locals regarding the condition of the sites. If there is any damage to the site as reported

by the villagers, the company will take further action i.e., investigation, mediation, disciplinary action if a company worker is involved, and awareness programmes to prevent future damage.

2. **Awareness programme** conducted by the FMU management for the local community, focusing on the importance of the sites and the FMU's recognition of them as HCVs. The FMU management also provides a brief explanation on HCV and its basic concept to the local community involved.

The local communities can visit the crocodile effigies at any time without restrictions. No approval from the company is needed because traditionally, the effigies are considered as their cultural heritage. WWF-Malaysia together with the Alliance of the Indigenous Peoples of the Highlands of Borneo (FORMADAT) have an initiative to map all agricultural, cultural, and historical sites in the Lawas Region. In the maps, the crocodile effigies are labelled in the local dialect as "Buayeh Tana" or "Buaya Tanah".

Participatory Community Monitoring; obtaining information on one of the crocodile effigies from Long Kerebangan Headman. Photo credit: Ophelia Eda

The FMU management may explore potential collaboration with the local communities to maintain the crocodile effigies as some proactive villages have already begun to restore dilapidated effigies.

Reference:

Datan, I. 2011. Traditional earthen Crocodile effigies of the Lun Bawang in Sarawak: Functions, origin, and significance. *Sarawak Museum Journal* 8(90): 23-42.

Contributors: Ling Kiang Cheng, Frazier Anak Parose & Ophelia Eda, Samling; Sarawak Forestry Corporation; Sarawak Museum; Long Semadoh CRC; Long Kerebangan CRC.

3. HCV monitoring

The HCV monitoring plan is aimed at determining whether HCV management strategies are being implemented and that management objectives are being met (i.e. are HCVs being maintained and/or enhanced?). Results from the HCV monitoring plan can provide the basis for adaptive management interventions. Over time, monitoring results in the gradual build-up of information about the MU and the HCVs present, therefore facilitating continuous improvement.

3.1 Types of monitoring

As explained in the HCVN Common Guidance for the Management and Monitoring of HCVs, an effective HCV monitoring plan should include three kinds of monitoring: operational monitoring, threat monitoring and strategic monitoring. The purpose for each type of monitoring (in the form of the key questions that should be answered during the monitoring) is as follows:

i. **Operational monitoring** – is the HCV management plan being implemented? Are the SOPs being followed?
ii. **Threats monitoring** – are the threats to HCVs being addressed (i.e. is there a reduction over time)?
iii. **Strategic/Effectiveness monitoring** – are the HCVs being maintained and/or enhanced?

More explanation on the differences between the three main types of monitoring is provided in the HCVN Common Guidance for the Management and Monitoring of HCVs.

In the case of RTE species monitoring (HCV 1), instead of conducting comprehensive biodiversity assessments regularly, Organisations can focus on selected species as indicators. The HCV assessment report should contain recommendations by the HCV assessor on which species to focus on as indicators. These species can then be monitored by the Organisation as part of the operational activities and if there is a significant change detected in the status of the RTE species, advice should be sought from relevant experts and/or government authorities on what appropriate actions should be taken as part of an adaptive management approach. Another approach is to monitor habitat quality as a proxy as in the case of the Forest Integrity Assessment (FIA)[19] which assesses the structure and naturalness of the habitat and has been scientifically evaluated in Sabah (see Box 6 below).

In the course of HCV monitoring, if illegal activities (e.g. hunting or illegal forest clearance) are detected, official reports should be made to the relevant authorities (e.g. the wildlife department, the forestry department, the police).

Table 13 below provides examples of the three types of monitoring for each HCV.

Table 13: Examples of different types of HCV monitoring

Example of HCV	Example of Operational Monitoring	Example of Strategic Monitoring	Example of Threat Monitoring
HCV 1: Malayan tiger	• Records of distance covered by monthly SMART[20] patrolling	• Survey of Malayan tiger population and prey species in the FMU and the wider landscape using camera traps, sign surveys (tracks, droppings, scratches etc.)	• Camera trap monitoring of illegal activities within the FMU • Monitoring of signs of encroachment and hunting (e.g. illegal camps, snares, bullet casings etc.) obtained during SMART patrolling (which would provide indices on threat levels)
HCV 2: Forest within the MU which is contiguous with the Heart of Borneo landscape	• Records of the acquisition of satellite images	• Regular satellite/drone monitoring of forest cover and connectivity within the MU and the wider forest landscape.	• Monitoring of fire hotspots within the MU • Monitoring of human-wildlife conflicts.

[19] https://hcvnetwork.org/library/forest-integrity-assessment-tool/
[20] Spatial Monitoring and Reporting System. See https://smartconservationtools.org/ and also Zoological Society of London (ZSL)'s HCV Threat Monitoring Protocol: https://hcvnetwork.org/library/hcv-threat-monitoring-protocol/

Example of HCV	Example of Operational Monitoring	Example of Strategic Monitoring	Example of Threat Monitoring
		• Monitoring of restoration results (if applicable) e.g. using the FIA tool to monitor forest quality over time.	• Conduct remote surveillance of forest disturbance using satellite imagery or drone surveillance for smaller areas
HCV 3: Peat swamp forest within an MU	• Records of trees planted within degraded areas of the peat swamp forest	• Annual survey of peat swamp forest restoration progress by a third party	• Conduct remote surveillance of forest disturbance using satellite imagery or drone surveillance for smaller areas • Monitoring of fire hotspots within the MU
HCV 4: Water catchment of a local village gravity-fed system	• Records of maintenance carried out on the gravity-fed system	• Conduct periodic water quality tests to monitor that parameters meet prescribed standards for the designated beneficial use of the water (based on the National Water Quality Standards by the Department of Environment and/or related standards by the Ministry of Health).	• Conduct remote surveillance of disturbance in the water catchment area using e.g. satellite imagery; drone surveillance for smaller areas. • Community monitoring of the water intake point against threats e.g. pollution
HCV 5: Fisheries resources in a natural freshwater lake within the MU	• Records of fish fries released at the lake for restocking purposes.	• Annual survey of fish caught by local communities to detect changes in abundance and diversity	• Monitoring by boat of unauthorised activities e.g. pollution, recreational fishing
HCV 6: Local community burial plot within an MU	• Records of maintenance carried out on fencing around the burial plot.	• Records of community engagement indicating satisfaction with how the burial plot is being managed	• Monitoring of access to the burial plot

3.2 Developing an HCV monitoring plan

As described in the HCVN Common Guidance for the Management and Monitoring of HCVs, a monitoring plan should include the following elements:

- Indicators for monitoring: indicators should be *SMART*[21] and directly tied to management objectives and targets. A subset of these indicators could be designated as KPIs which should be monitored more closely.
- Baseline data: ideally data on the baseline conditions should be gathered before production activities have started.
- Roles and responsibilities for monitoring: HCV monitoring can be carried out internally or in collaboration with external experts, and where relevant in consultation with local communities. Local communities should be given opportunities whenever possible to participate in monitoring the identified HCVs.
- Involvement of stakeholders and experts: monitoring of HCVs 1-3 may require specialist ecological, botanical or zoological knowledge; monitoring of HCVs 5 and 6 may require input from social NGOs.
- Monitoring techniques: the indicators chosen will determine the monitoring techniques that are appropriate for achieving the objectives of monitoring.
- Monitoring schedule and timing.
- Periodic review and analysis of monitoring data.

Table 14 on the following page provides a list of relevant techniques for monitoring HCVs in Malaysia and the main pros and cons of each technique.

[21] Specific, Measurable, Achievable, Realistic, and Time-bound.

Table 14: Relevant monitoring techniques and their pros and cons

Monitoring technique (Type of monitoring)	Relevant HCVs	Relative cost	Level of expertise needed	Pros	Cons
Monitoring patrols to detect threats to HCVs (Threat)	All	Low – if conducted by Organisation's internal team	Low	• Relatively easy to conduct • Real-time information can be obtained • Able to control and manage the consistency and frequency of patrols • Reliable information	• Labour intensive and time consuming • Lack of staff competence in identifying RTE species, etc. • Staff disciplinary issues • Safety issues faced by patrol staff (e.g. being attacked by wildlife) • Information gathered may not be high quality • May be difficult to access certain areas due to terrain or remoteness
SMART patrolling[22] **(Threat & Strategic)**	All	High	Medium to High – requires expertise in GIS and spatial analysis especially during initial set up	• Practical and effective • Monitoring outputs can be visualised immediately • Monitoring outputs are quantifiable • Data can be analysed at a landscape level	• Requires a considerable amount of training • May be difficult to access certain areas due to terrain or remoteness
Faunal and floral surveys (Strategic)	HCV 1-3	Low to Medium	Medium to High – specialist knowledge needed to conduct scientific survey	• Use of indicator species can provide timely information about trends in conservation status of key species. • Data can be used for strategic/effectiveness monitoring	• Labour intensive and time consuming • Lack of staff competence in identifying RTE species, etc. • May need to be outsourced - difficulty in securing available relevant experts (niche expertise) • Staff disciplinary issues • Safety issues faced by patrol staff (e.g. being attacked by wildlife) • May be difficult to access certain areas due to terrain or remoteness
Camera trapping for wildlife monitoring (Strategic)	HCV 1	Medium to High – one camera trap costs approximately RM1-2K; external expertise may be required for data analysis	Medium to High – expertise needed to identify suitable camera locations and to identify RTE species	• Allows for 24-hour monitoring • Able to detect land-dwelling species that are nocturnal or shy • Provides high quality visual data on wildlife	• Labour intensive and time consuming (e.g. setting up of camera, downloading of footage, etc.) • May need external expertise for data analysis or intensive training for staff • Equipment occasionally damaged by wildlife • Risk of poachers/vandals stealing equipment • In areas of high traffic (e.g. actively operating plantation) equipment may be disturbed or footage may end up containing a lot of junk data • May be difficult to access certain areas due to terrain or remoteness

[22] Spatial Monitoring and Reporting tool. See https://smartconservationtools.org/ and also ZSL's HCV Threat Monitoring Protocol: https://hcvnetwork.org/library/hcv-threat-monitoring-protocol/

Monitoring technique (Type of monitoring)	Relevant HCVs	Relative cost	Level of expertise needed	Pros	Cons
Camera trapping for threat monitoring (Threat)	All	Medium	Low to Medium	• Allows for 24-hour monitoring • Reduces risk of harm to Organisation's team who may otherwise be involved in monitoring patrols • Less labour intensive compared to monitoring patrols	• As above
Satellite monitoring (Threat & Strategic)	HCV 2 (forest cover & connectivity), HCV 3 (e.g. peat), HCV 4 (forest cover e.g. in water catchment area)	High – especially if higher resolution images need to be procured; external expertise may be needed	Cost depends on who owns the system and who analyses the data: High – if spatial analysis is done in-house Low to Medium – if internal team only does data interpretation	• Near real-time information • Can provide data at the landscape level • Data can be of very high resolution, as required and as budget permits	• Resolution may be very low due to budget constraints • Accuracy is questionable (the data has to be integrated with SMART or ground truthing) • Still many technical issues to be solved (i.e. hotspots, cloud cover)
Drone/UAV monitoring (Threat & Strategic)	All	High (but lower than satellite monitoring)	High – planning the flight path; piloting the drone; mosaic data analysis	• Can provide real-time information • Allows monitoring of areas that are difficult to access on the ground • High accuracy • Time efficient • Can avoid cloud cover • Allows visualisation from different angles and altitudes	• Dependent on the expertise of the drone pilot • Risk of equipment loss/ damage/theft • Licence needed for flying over military areas (most drones these days have geoblocking so this will be avoided) • Duration of flight limited to battery power
Forest Integrity Assessment (FIA) tool (Threat & Strategic)	HCV 1-4	Low	Low – only requires brief training before use	• Rapid assessment that can be conducted periodically to monitor changes over time • Measures overall forest habitat quality or "intactness" • Has been adapted to the Malaysian (Sabah) context • Correlates very well with vegetation quality, carbon stock and biodiversity • Scientifically tested • Data collected via smartphone and can be managed and analysed through a web dashboard and mapping features • Communities can be trained to use FIA and as part of their community forest monitoring	• Some variation between scores from different assessors at the same site, therefore it is more effective when the survey is conducted by a small team (three or more people) to generate several scores that can be averaged for a more accurate result • Additional monitoring needed for specific RTE species

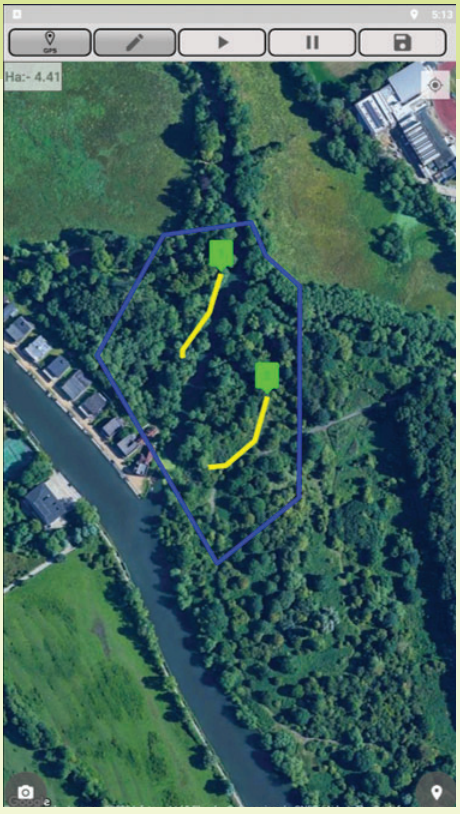
Monitoring technique (Type of monitoring)	Relevant HCVs	Relative cost	Level of expertise needed	Pros	Cons
Water quality monitoring (Threat & Strategic)	HCV 4-5	Low to Medium – depends on the method used and water quality parameters tested	Low to Medium – on-site sampling using rapid water testing kit requires little expertise but sophisticated equipment needs more expertise	• Mandatory under legal requirements – the government has set the monitoring indicators/ parameter • Rapid water testing kit is easy and fast to use	• Interpretation of results depends on the level of staff expertise or level of assessor expertise • Lab test can be time consuming (not real-time results) • Water sampling points may not reflect the overall water quality situation in the area • Results may not reflect operational activity i.e. pollution may be due to neighbouring activities and not own activities[23]
Fire monitoring: FDRS (Threat)	All	Medium	Medium to High	• Serves as an early warning system for fire prevention	• May need external expertise for data analysis
Participatory community monitoring (Threat)	All	Low to Medium	Low to Medium	• Allows for community participation and establishment of trust • Avenue for community to channel their concerns • Allows for real-time monitoring	• Information may be unreliable (requires double checking) • Quality of data may be low due to capacity and equipment issues

The FIA is recommended by the HCVN as a practical tool for monitoring forest quality and more information about it is provided in Box 6 below.

Box 6: The Forest Integrity Assessment (FIA) Tool

The FIA tool is being developed by the HCVN and scientists with the aim of simplifying forest quality monitoring and assessment while robustly measuring forest "intactness". The tool uses an accessible on-the-ground survey method, which asks the surveyor a series of questions that can be answered by visual observations of the forest along a short trail. A survey should take no more than 30 minutes to an hour and does not require any measurements, species identification, scientific expertise or equipment except for a smartphone.

Questions are broken down into 4 categories representing key features of forest quality, these are 1) landscape, 2) trees, 3) biodiversity and 4) threats. The survey is designed to include features that are likely to be observed during a 30 minute walk along a short trail in a primary rainforest. Therefore, indicators are used, such as animal signs and tree structure, rather than any requirement to record observations of rare and endangered species. The FIA tool focuses on habitat integrity and can be used to assess the overall "health" of forest HCV areas. It does not directly monitor specific HCV species but can provide vital information about whether the habitat is likely to be able to support target species. It can help to identify potential threats and habitat degradation, or monitor the effectiveness of management such as restoration or protection.

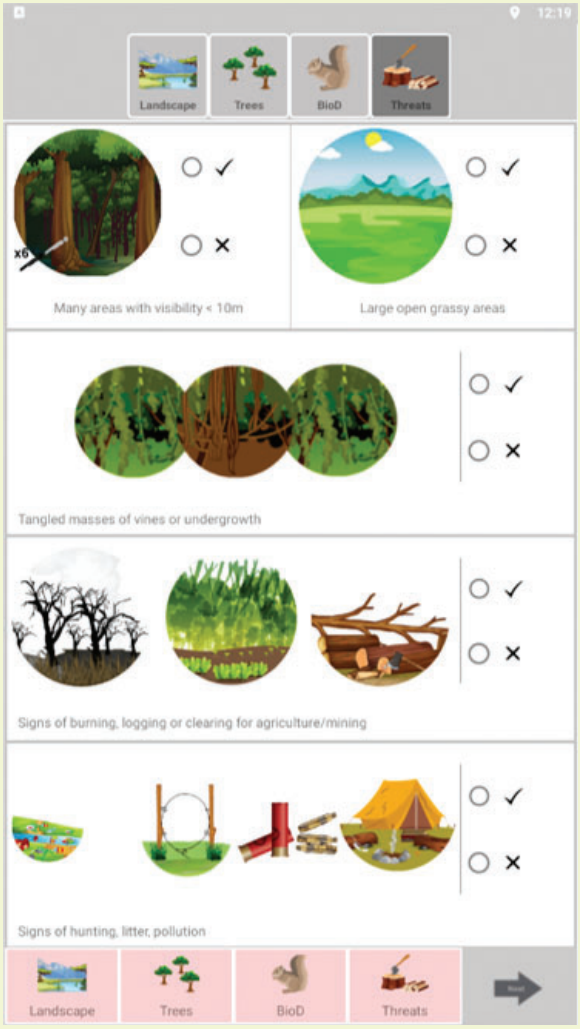


Mapping features in the FIA smartphone app

[23] This may be overcome by sampling the quality of water before it enters the MU and at the point of leaving the MU.

To test the effectiveness of the FIA tool, a scientific study was conducted by scientists at the Universities of Oxford, York and Northumbria, as well as the Southeast Asia Rainforest Research Partnership (SEARPP). Surveys were completed at 16 forest sites in Sabah, ranging in disturbance level from primary forest in the Danum Valley conservation area to small, degraded forest patches embedded within oil palm plantations. Sixty-two volunteers, who ranged widely in terms of their prior knowledge and experience of forest ecology and conservation, were enlisted to conduct the surveys. The survey scores were then statistically compared with pre-existing scientific data on forest structure, carbon stocks and biodiversity for the same sites. The scores were found to correlate strongly, indicating that the FIA survey method is robust in measuring the quality of forest, and can be used effectively, even by those with very little prior knowledge of forests (Suggitt *et al.*, 2021).

The results of this study were used to further improve the FIA tool, particularly in reducing variability in scores among surveyors. The FIA tool is currently being developed as a smartphone application with a supporting web dashboard. This will allow forest managers to map MUs and plots, collate and organise data centrally, and quickly visualise and export data and results. The tool also provides a management decision-support package to aid interpretation of results for conservation management. There is also a feature for recording observations of key focal species on an *ad hoc* basis. These records do not contribute to survey scores, but can be invaluable when used in conjunction with survey scores to inform management.



A screen shot of the FIA survey

A beta version of the smartphone application will be available for SE Asia in mid 2021 and the developers are keen to work with companies to continue to develop the tool to meet user needs.

More information on FIA can be obtained from: http://fiatool.web.ox.ac.uk

Reference:
Suggitt, A.J., K.L. Yeong, A. Lindhe, A. Agama, K.C. Hamer, G. Reynolds, J.K. Hill & J.M. Lucey. 2021. Testing the effectiveness of the forest integrity assessment: A field-based tool for estimating the condition of tropical forest. *Ecological Solutions and Evidence* 2(2): p.e12067. DOI: 10.1002/2688-8319.12067

Contributor: Dr. Jennifer Lucey, University of Oxford

Camera traps are increasingly being used for wildlife monitoring as they can be deployed in areas that would be difficult to monitor frequently by foot patrol, amongst other reasons. It may be more practical for the Organisation to collaborate with an external research institution or NGO to conduct a long-term camera trapping survey, as described in Case Study 11.

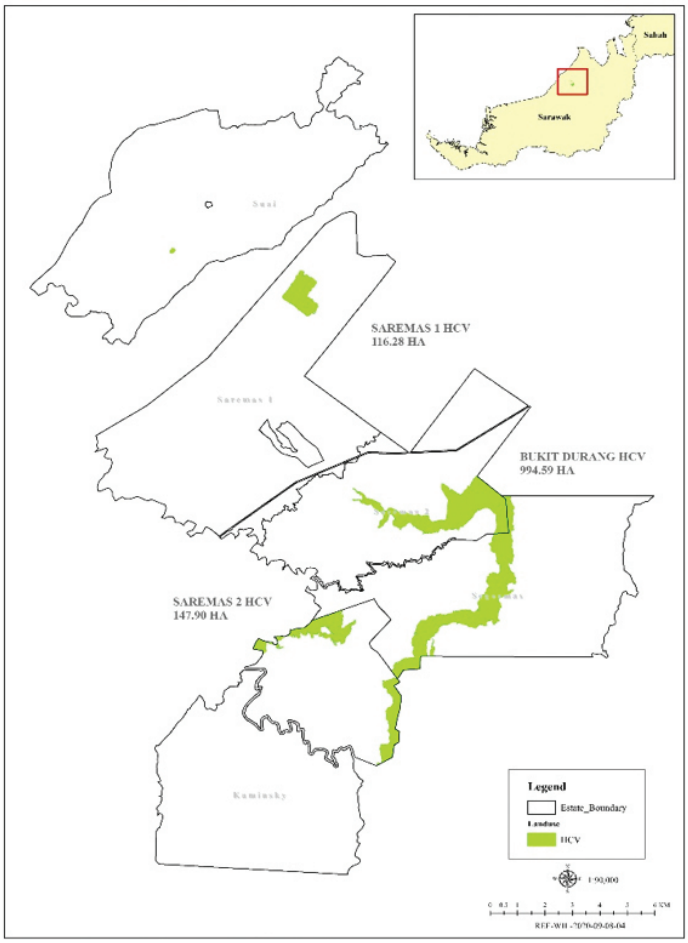
Case study 11: The use of camera traps to monitor medium to large mammals in HCVAs, Wilmar Oil Palm Plantation, Miri, Sarawak

Wilmar has a long-term collaboration with UNIMAS since 2013 to conduct biodiversity monitoring (including camera trapping for monitoring mammals) at its oil palm estates in the Miri Division in Sarawak. The biodiversity monitoring sites consist of three HCVAs that are located within the estates. These forested areas are designated as HCVAs as they contain substantial proportions of remnant native biodiversity.

Camera trapping has been extensively used in wildlife research as it is highly efficient and cost-effective for monitoring mammals (Tobler *et al.*, 2008; Rovero *et al.*, 2014), especially in the case of tropical rainforests where species can be cryptic and elusive in nature (Azlan, 2006). Three mammalian surveys via camera trapping were conducted in the Wilmar Oil Palm Plantation, Miri, Sarawak in years 2013-2014, 2014-2015 and 2018-2020.

Study sites consisted of three High Conservation Value Areas (HCVAs) that are located within the estates of Saremas 1, Saremas 2 and Segarmas. Bukit Durang is the largest HCVA measuring 989.9ha, Segarmas HCVA is 147.9ha and the smallest is Saremas 1 HCVA at 116.3ha (see accompanying map). Bukit Durang HCVA is classified as HCV 1 while Saremas 1 and Saremas 2 HCVAs are classed as HCV 4. These forests were designated as HCVAs as they contain substantial proportions of remnant native biodiversity. The HCVs are managed by Wilmar's Eco Management Unit (EMU) under the Sustainability Division and financed by the individual estates. Wilmar Oil Palm Plantation is certified by MSPO, ISCC and RSPO.

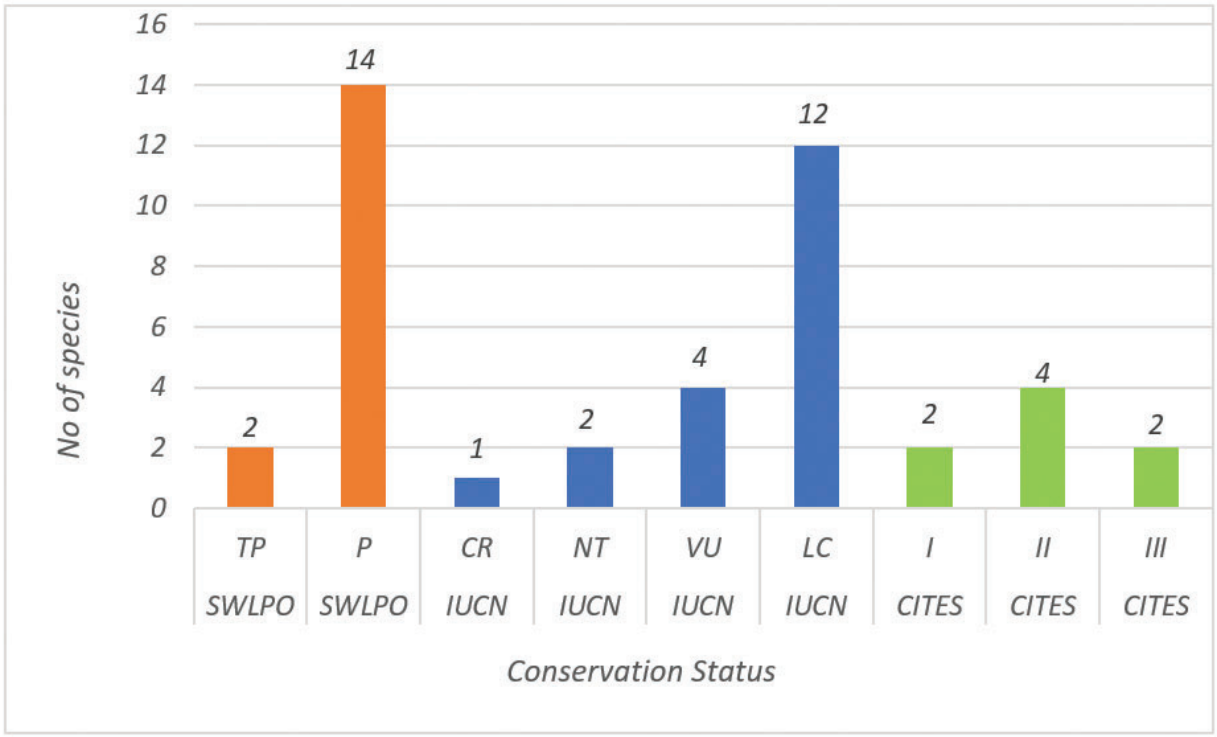
Both studies in 2013-2014 and 2014-2015 recorded a total of 20 species with a total effort of 2,372 and 3,789 camera trap photos respectively, while the current study (2018-2020) recorded an additional 5 new species bringing the total to 25 species (including 4 domestic species) with a total effort of 8,067 camera trap photos. The non-detection of the marbled cat (*Pardofelis mamorata*) during the latest study raises concerns that this species occurs in low density, which may require additional surveys using cat lures to confirm its presence. Cumulatively, a total record of 25 species were observed in the areas of Wilmar Oil Palm Plantation during the period of 2013-2020.



The Sunda pangolin (*Manis javanica*) and Sun bear (*Helarctos malayanus*) are of high conservation importance. Both are listed under the IUCN Red List of Threatened Species as Critically Endangered (Sunda pangolin) and Vulnerable (Sun bear) (IUCN, 2019).

This comparative description needs to be viewed cautiously as the camera trapping effort was not equal for the different sampling periods and therefore additional analysis is needed in order to factor in this difference. However, almost all the species previously detected appear to continue occurring in the study area with additional species recorded in

the current study, suggesting that this area is able to provide resources for the long-term persistence of the selected species. The HCV areas in Wilmar's Oil Palm plantations in Sarawak appear to sustain some species of conservation importance and therefore existing HCV management and monitoring tools should be continued.



The total number of species with conservational importance recorded in HCV areas, Sarawak. SWLPO = Sarawak Wild Life Protection Ordinance;

During the assessment, a few potential threats such as illegal extraction and intrusion, invasive feral species (e.g. cats & dogs) and rubbish pollution were also observed. Areas that were further away from the management units required more emphasis on signage and regular patrolling to curb encroachment. Various actions such as strengthening patrolling and monitoring, capacity building for HCV staff, and the Wildlife Rangers Programme are being undertaken to mitigate the threats and to improve HCV management.

Sambar deer (*Rusa unicolor*) detected in the Saremas 1 HCVA.

Sun bear (*Helarctos malayanus*) recorded in Bukit Durang HCVA

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Contributors: Dr. Jayasilan Mohd-Azlan & Lisa Lok Choy Hong, UNIMAS; Ginny Ng Siew Ling, Chin Sing Yun, Marcie Elene Marcus Jopony & James Wong Tai Hock, Wilmar.

4. Adaptive management

The monitoring plan and its results should be reviewed at least once a year to assess progress in meeting management objectives, and determine if HCVs present in the MU are being maintained and/or enhanced. During the review process, data gathered from monitoring activities should be analysed to determine which activities need to be adapted/enhanced to mitigate any negative trends. For example, data from SMART patrolling can be used to inform adaptive management, especially with regard to locations with a high concentration of threats. If the HCVs are deteriorating, adaptive management should be used to develop alternative strategies that incorporate new information coming from the monitoring process.

Management areas and prescriptions required can often be modified or refined over time, based on lessons learned from monitoring. It may be necessary to consult relevant experts to interpret the monitoring data and to get their advice on improving the monitoring plan.

Compliance monitoring in the context of certification requirements (FSC, MTCS, RSPO, etc.) also includes compliance with the HCV management plan. This form of monitoring is usually undertaken by a third-party certification body as part of the initial and annual surveillance audits. The severity of impacts resulting from operational activities within the MU is to a certain extent dependent on the degree of compliance with certification requirements and the management's SOPs. Insufficient compliance is likely to lead to higher severity of impacts. The findings of the certification audits can be used to further improve the HCV management and monitoring plan as a form of adaptive management.

Case Study 12 below provides an example of how additional consultation with the local community after the HCV assessment resulted in additional management measures by the Organisation in collaboration with the local community and other stakeholders.

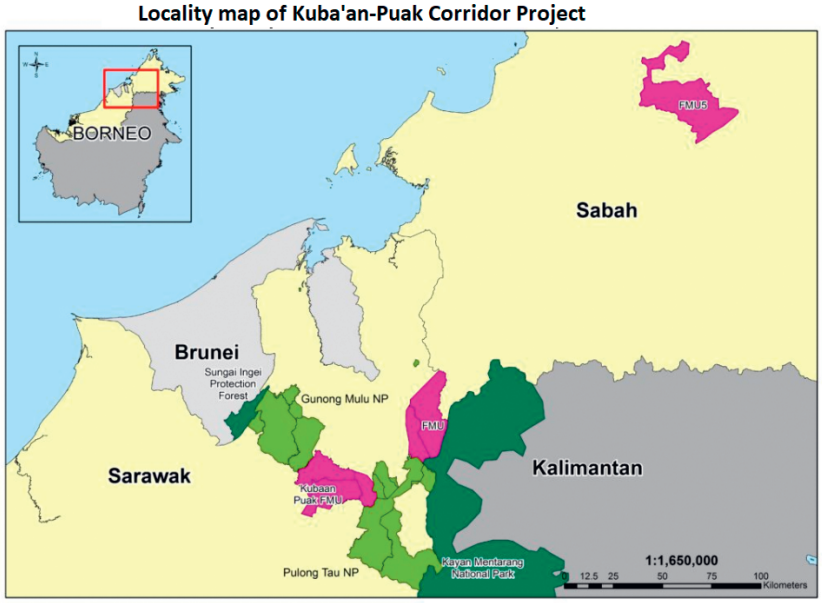
Case Study 12: Adaptive management in the participatory mapping of community needs of a Penan village in Kuba'an-Puak FMU, Sarawak

Background information about the case study

Kuba'an-Puak FMU, managed by Borlin Sdn. Bhd. (a subsidiary of Ta Ann Group), is located strategically in the middle of a large, forested landscape in Northern Sarawak, bridging Gunung Mulu, Gunung Buda and Pulong Tau National Parks. Given its strategic location, if well-managed the FMU provides a contiguous forest belt that links up the national parks. Kuba'an-Puak FMU, therefore, serves as a potential wildlife corridor for the movement of animals, and provides connectivity for plant dispersal between the fragmented protected areas to maintain biodiversity balance in a regional level forest landscape. Beyond Sarawak, these national parks are also connected to Sungai Ingei Conservation Forest in Brunei and Kayan-Mentarang National Park in North Kalimantan, Indonesia.

In 2011, the Kuba'an-Puak FMU was selected as a model site for testing the 'High Conservation Value Forest (HCVF) Toolkit for Malaysia'. The FMU's openness to the idea and managing these HCVs with local communities was key. Also, there was consent from the local communities to have this assessment done in their area.

Locality map of Kuba'an-Puak Corridor Project



The assessment was technical but in essence, was focused on gaining an understanding of the species in the area, the location of key ecosystem services, and the importance of forest to the local communities (Chan *et al.*, 2012). The assessment came up with recommendations.

After the HCV assessment was conducted, a consultation was held with the local communities by the senior management of the company present at the village, facilitated by WWF-Malaysia. During this meeting, a list of concerns from the communities was compiled and discussed for management prioritisation. The meeting report was written and agreed in the presence of all participants at Long Si'ang. This led to the recommendation of establishing a representative platform for the Kuba'an-Puak FMU communities.

The Community Representative Committee (CRC) for Kuba'an-Puak FMU was set up as a local communication platform for sharing, discussing and deciding socio-cultural issues related to Sustainable Forest Management (SFM) among local communities and it links local communities with the FMU in the decision-making process. The members of CRC consisted of the identified local communities who are recognised to be holding access rights to forests and its resources at Kuba'an-Puak FMU. The CRC is also a member of the SFM Liaison Committee for Kuba'an-Puak FMU, a multi-stakeholder communication platform chaired by the Forest Department Sarawak and linked with other key stakeholders including Sarawak Forestry Corporation, the District Office and the licence holder of the FMU, and is also a channel for dispute resolution.

Traditional jungle hut built by a Penan, using leaves and tree poles obtained from the jungle. Photo credit: WWF-Malaysia/ Alfred Keleman

WWF-Malaysia implemented the Kuba'an-Puak Corridor Project in collaboration with Forest Department Sarawak from 2015 to 2019, with the objectives of empowering local communities in decision-making processes for SFM, and promoting benefit sharing of forest resources.

The Kuba'an-Puak Corridor Project is significant to the local Penan community. On a regular basis, Penan family groups harvest sago palms to process into starch, their staple food, and collecting a wide variety of palm shoots to eat. Individuals carve trees of hardwood species into blowpipes and shave palm fronds into darts, as well as collect resin and herbs to be processed into poisoned darts. Men gather a wide variety of rattan vines for their spouses and children to weave into mats and baskets. When someone is ill, experts search far and wide for medicinal plants to treat the ailment. Individual hunters search the forest to hunt and set traps for game, which is then shared with one another.

The Kuba'an-Puak Corridor Project developed a methodology for describing the Penan's patterns of resource use of sago. The spatial distribution of sago groves was documented in order to understand the locations of temporary huts (campsites), which is determined by the availability of sago groves. The mapping included the Penan people's knowledge of the landscape, and specific locations and names of mountains, rivers and streams. Other details included landmarks such as waterfalls, saltlicks and animal wallows; areas with high concentrations of fruit groves, rattan clusters and plants with leaves used for roofing; and

Sap that flows out from carvings made on bark of Tajem tree (*Antiaris toxicaria*) contains poison which is used in blowpipe darts for hunting by Penan communities. Photo credit: WWF-Malaysia/ Jason Hon

places of cultural importance, especially burial grounds. These sites have since been identified as HCV areas, and it was recommended that they be properly managed by the Kuba'an-Puak FMU in compliance with the standards of forest management certification.

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NRE. 2009b. *Managing Biodiversity in the Landscape: Guideline for Planners, Decision-makers & Practitioners.* Ministry of Natural Resources and Environment (NRE), Putrajaya, Malaysia.

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Sherman, J., M. Ancrenaz, M. Voigt, F. Oram, T. Santika, S.A. Wich & E. Meijaard. 2020. Envisioning a Future for Bornean Orangutans: Conservation impacts of action plan implementation and recommendations for improved population outcomes. *Biodiversitas* 21(2): 465-477.

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Wyatt-Smith, J. 1963. Manual of Malayan Silviculture for Inland Forest. *Malayan Forest Records* No. 23. Vol. 1. Forest Research Institute, Kuala Lumpur.

Annex 1: Resources for HCV 1 Management & Monitoring

Reference	Availability/Notes	Application
Legislation*		
International Trade in Endangered Species Act 2008 Malaysia (INTESA)	Available for download from: https://www.mybis.gov.my/pd/109	Malaysia
National Forestry Act 1984	Available for download from: www.forestry.gov.my/index.php/en/akta-perhutanan-negara-1984	Peninsular Malaysia
National Land Code 1965	Available for download from: http://palmoilis.mpob.gov.my/akta/NLC1956DIGITAL-VER1.pdf	Peninsular Malaysia
Wildlife Conservation Act 2010	Available for download from: www.mybis.gov.my/pb/675 Incorporating lists of protected and totally protected animals in Peninsular Malaysia	Peninsular Malaysia
Forest Enactment 1968	Available for download from: https://sagc.sabah.gov.my/sites/default/files/law/ForestEnactment1968_3.pdf	Sabah
Land Ordinance (Sabah Cap. 68)	Available for download from: https://sagc.sabah.gov.my/sites/default/files/law/LandOrdinance_0.pdf and www.sabahlaw.com/landord.htm Incorporating the Land (Amendment) Enactment 2012	Sabah
Sabah Biodiversity Enactment 2000	Available for download from: www.wipo.int/edocs/lexdocs/laws/en/my/my055en.pdf	Sabah
Wildlife Conservation Enactment 1997	Available for download from: https://www.sabahlaw.com/Wildliferegulation.htm Incorporating lists of totally protected and protected animals and plants in Sabah.	Sabah
Forests Ordinance 2015	Available for download from: https://lawnet.sarawak.gov.my/lawnet_file/Ordinance/ORD_Watermark.pdf	Sarawak
Natural Resources and Environment Ordinance 1958	Available for download from: www.nreb.gov.my/page-0-615-107-tid.html	Sarawak
Sarawak Biodiversity Centre Ordinance 1997	Available for download from: https://www.sbc.org.my/sbc-news/downloads/sarawak-biodiversity-ordinance-and-regulations/archived-ordinances-regulations/638-sarawak-biodiversity-centre-ordinance-1997/file	Sarawak
Sarawak Land Code 1958	Available for download from: https://lawnet.sarawak.gov.my/lawnet_file/Ordinance/ORD_LANDCOD2020.pdf	Sarawak
Wild Life Protection Ordinance 1998	Available for download from: www.sarawakforestry.com/pdf/laws/wildlife_protection_ordinance98_chap26.pdf Incorporating lists of totally protected and protected animals and plants in Sarawak.	Sarawak
Protected area laws as listed in the Master List of Protected Areas in Malaysia	The Master List of Protected Areas in Malaysia should be available on the MyBIS website once approved: www.mybis.gov.my It may be available on request from the Ministry of Natural Resources and Environment. Tel: +603 8861129 The geospatial dataset is available on the Protected Planet website: www.protectedplanet.net	Malaysia

Reference	Availability/Notes	Application
Policy documents		
NRE. 2016. *National Policy on Biological Diversity 2016-2025*. Ministry of Natural Resources and Environment (NRE), Putrajaya, Malaysia.	Available for download from: www.mybis.gov.my/pb/590	Malaysia
NRE. 2008. *A Common Vision on Biodiversity: In Government and the Development Process – Reference document for Planners, Decision-Makers & Practitioners*. Ministry of Natural Resources and Environment (NRE), Putrajaya, Malaysia.	Available for download from: www.ketsa.gov.my/ms-my/PustakaMedia/Penerbitan/A%20Common%20Vision%20on%20Biodiversity%20-%20Synthesis.pdf	Malaysia
Saw, L.G., L.S. L. Chua & A.R. Nik. 2009. *Malaysia: National Strategy for Plant Conservation*. Ministry of Natural Resources and Environment & Forest Research Institute Malaysia (FRIM).	Available for download from: www.mybis.gov.my/pb/26	Malaysia
Chan, Y.M. & L.S.L. Chua. 2020. *Conservation Action Plan for Begonia herveyana*. Forest Research Institute Malaysia (FRIM), Kepong, Malaysia.	Available for download from: www.mybis.gov.my/pb/3999	Peninsular Malaysia
Chua, L.S.L., S.L. Lee, K.H. Lau, N.F. Zakaria, L.H. Tnah, C.T. Lee, C.H. Ng, & K.K.S. Ng. 2016. *Conservation Action Plan for the Threatened Agarwood Species Aquilaria malaccensis (Thymelaeaceae) in Peninsular Malaysia*. Forest Research Institute Malaysia (FRIM).	Available for download from: www.itto.int/files/user/cites/malaysia/Conservation%20Actin%20Plan%2020160908.pdf	Peninsular Malaysia
DTCP. 2017. *National Physical Plan-3 (NPP-3)*. Department of Town and Country Planning (DTCP), Ministry of Urban Wellbeing, Housing and Local Government, Putrajaya, Malaysia.	Available from: Department of Town and Country Planning, Peninsular Malaysia. Tel: +603-2264 6004 Available for download from: https://www.planmalaysia.gov.my/index.php/en/rancangan-fizikal-negara	Peninsular Malaysia
DTCP. 2012. *National Coastal Zone Physical Plan (NPP-CZ) Vols. 1 & 2*. Department of Town and Country Planning, Peninsular Malaysia (DTCP), Ministry of Housing and Local Government, Kuala Lumpur, Malaysia.	Available from: DTCP. Tel: +603-2264 6004; Fax: +603-2273 9680 Bahasa Malaysia version available for download from: http://myplan.planmalaysia.gov.my/www/admin/uploads_publication/rancangan-fizikal-zon-persisiran-pantai-negara-jilid-2.pdf Includes KSASSP i.e. Kawasan Sensitif Alam Sekitar Persekitaran Pantai (Coastal Zone Environmentally Sensitive Areas)	Peninsular Malaysia
DTCP. 2009. *Central Forest Spine 1: Master Plan for ecological linkages*. Department of Town and Country Planning (DTCP), Ministry of Housing and Local Government, Kuala Lumpur, Malaysia.	Available for download from: https://conservationcorridor.org/cpb/Peninsular_Malaysia_Regional_Planning_Division_2009.pdf	Peninsular Malaysia
DTCP. 2009. *Central Forest Spine 2: Master Plan for ecological linkages*. Department of Town and Country Planning, Ministry of Housing and Local Government, Kuala Lumpur, Malaysia.	Available for download from: www.planmalaysia.gov.my/index.php/en/agensi/penerbitanplanmalaysia/rancanganwilayah	Peninsular Malaysia
DWNP. 2013. *National Elephant Conservation Action Plan (NECAP): Blueprint to Save Malaysian Elephants*. Department of Wildlife & National Parks (DWNP), Kuala Lumpur, Malaysia.	Available for download from: www.wildlife.gov.my/images/stories/penerbitan/pelan/NECAP%20all.pdf	Peninsular Malaysia
DWNP. 2008. *National Tiger Conservation Action Plan (NTCAP) 2008-2020*. Department of Wildlife & National Parks (DWNP), Kuala Lumpur, Malaysia.	Available for download from: www.mybis.gov.my/pb/2850	Peninsular Malaysia

Reference	Availability/Notes	Application
Chief Conservator of Forests Circular: CF17/2017	Mempening (*Lithocarpus* spp.) and berangan (chestnuts) (*Castanopsis* spp.) are prohibited species in forest reserves under natural forest management regime effective 1.6.2017 due to their scarcity and being species good for wildlife in Sabah.	Sabah
Sabah Biodiversity Strategy 2012-2022	Available for download from: https://sabc.sabah.gov.my/content/sabah-biodiversity-strategy-2012-2022	Sabah
Sabah Forestry Department. 2009. RIL *Operation Guide Book: Code of Practice for Forest Harvesting in Sabah, Malaysia* (Third Edition). Sabah Forestry Department, Malaysia.	Available for download from: www.deramakot.sabah.gov.my/PDF/SFD%20RIL%20Manual_2009.pdf	Sabah
Sabah State Government, Universiti Malaysia Sabah and Japan International Cooperation Agency. 2012. *Sabah Biodiversity Strategy 2012-2022*. Sabah State Government, Kota Kinabalu, Malaysia.	Available for download from: https://sabc.sabah.gov.my/content/sabah-biodiversity-strategy-2012-2022	Sabah
Sabah Wildlife Department. 2010. *Sabah Orangutan Action Plan 2011-2015*. Sabah Wildlife Department, Kota Kinabalu, Malaysia.	Available for download from: www.dgfc.life/home/state-action-plans/	Sabah
Sabah Wildlife Department. 2011. *Sabah Rhinoceros Action Plan 2012-2016*. Sabah Wildlife Department, Kota Kinabalu, Malaysia.	Available for download from: www.dgfc.life/home/state-action-plans/	Sabah
Sabah Wildlife Department. 2020. *Bornean Elephant Action Plan for 2020-2029*. Sabah Wildlife Department, Kota Kinabalu, Malaysia.	Available for download from: www.asesg.org/images/BORNEAN%20ELEPHANT%20ACTION%20PLAN_2020-2029.pdf	Sabah
Sabah Wildlife Department. 2019. *Bornean Banteng Action Plan for Sabah 2019-2028*. Sabah Wildlife Department, Kota Kinabalu, Malaysia.	Available for download from: www.dgfc.life/home/state-action-plans/	Sabah
Sabah Wildlife Department. 2019. *Proboscis Monkey Action Plan for Sabah 2019-2028*. Sabah Wildlife Department, Kota Kinabalu, Malaysia.	Available for download from: www.dgfc.life/home/state-action-plans/	Sabah
Sabah Wildlife Department. 2019. *Sunda Clouded Leopard Action Plan for Sabah 2019-2028*. Sabah Wildlife Department, Kota Kinabalu, Malaysia.	Available for download from: www.dgfc.life/home/state-action-plans/	Sabah
Schedule B – Clause 1(31) of Sustainable Forest Management Licence Agreement (SFMLA)	List of tree species that forest concessionaires are prohibited to fell under the SFMLA	Sabah
Wildlife Conservation Society (WCS) and Sarawak Forest Department. 1996. *A Masterplan for Wildlife in Sarawak*. Sarawak Forest Department, Kuching, Malaysia.	For enquiries or to obtain a copy, contact the Sarawak Forestry Department at: https://forestry.sarawak.gov.my/pages.php?mod=webpage&sub=page&id=789&menu_id=107&sub_id=203	Sarawak
Papers/reports/books		
Bakewell, D., R. Azmi, F.K. Yew, F.Y. Ng, Y. Basiron & K. Sundaram (eds) 2012. *Biodiversity in Plantation Landscapes: A Practical Resource Guide for Managers and Practitioners in Oil Palm Plantations*. Wild Asia and the Malaysian Palm Oil Council (MPOC), Kuala Lumpur, Malaysia.	Available for download from: oilpalm.wildasia.org/1657/launch-biodiversity-plantation-landscapes-manual/	Malaysia
Chin, C.L.M. 2016. *WWF-Malaysia Free, Prior and Informed Consent (FPIC) Protocol: A Guide for the Malaysian Context*. Kuala Lumpur, Malaysia. WWF-Malaysia.	For enquiries or to obtain a copy, contact WWF-Malaysia at: https://www.wwf.org.my/about_wwf/contact_us/	Malaysia

Reference	Availability/Notes	Application
Chong, D.K.F. & A.A.B. Dayang Norwana. 2005. *Guidelines on the Better Management Practices for the Mitigation and Management of Human-Elephant Conflict in and around Oil-Palm Plantations in Indonesia and Malaysia, Final Draft*. WWF-Malaysia, Petaling Jaya.	Available for download from: https://wwf.panda.org/wwf_news/?98200/Guidelines-to-better-manage-Human-Elephant-Conflicts-in-Indonesian-and-Malaysian-oil-palm-plantations	Malaysia
Colchester, M., S. Chao, P. Anderson & H. Jonas. 2015. *Free, Prior and Consent Guide for RSPO members*. Roundtable on Sustainable Palm Oil (RSPO), Kuala Lumpur, Malaysia.	Available for download from: https://www.rspo.org/articles/download/d57294a05493ff6	Malaysia
Jain, A., J.G.H. Lee, N. Chao, C. Lees, R. Orenstein, B.C. Strange, S.C.L. Chng, W. Marthy, C.A. Yeap, Y.Y. Hadiprakarsa & M. Rao (eds.). 2018. *Helmeted Hornbill (Rhinoplax vigil): Status Review, Range-wide Conservation Strategy and Action Plan (2018-2027)*. IUCN Species Survival Commission Hornbill Specialist Group.	Available for download from: www.mybis.gov.my/pb/2680	Malaysia
Ang, A., V. D'Rozario, S.L. Jayasri, C.M. Lees, T.J. Li & S. Luz. 2016. *Species Action Plan for the Conservation of Raffles' Banded Langur (Presbytis femoralis) in Malaysia and Singapore*. IUCN SSC Conservation Breeding Specialist Group, Apple Valley, MN, USA.	Replace with: Available for download from: www.mybis.gov.my/pb/2177	Peninsular Malaysia
Aziz S.A., M-R. Low & G.R. Clements. 2019. *A Conservation Roadmap for Flying Foxes Pteropus spp. in Peninsular Malaysia*. Rimba, Kuala Lumpur, Malaysia.	The roadmap provides references to the limited knowledge on the population size and distribution, of flying foxes leading to challenges for its conservation. The document provides a summary of its habitat preferences and areas that are important for its conservation. Available for download from: bit.ly/flyingfoxconservationroadmap	Peninsular Malaysia
Sherman, J., M. Ancrenaz, M. Voigt, F. Oram, T. Santika, S.A. Wich & E. Meijaard. 2020. Envisioning a future for Bornean orangutans: Conservation impacts of 10 years of Bornean action plan implementation and recommendations for improved population outcomes. *Biodiversitas* 21(2): 465-477.	Available for download from: www.hutan.org.my/wp-content/uploads/Reports/Other%20reports/Envisioning%20a%20future%20for%20Ornagutans.pdf	Sarawak & Sabah
Ross, J., A.J. Hearn, H. Bernard, K. Secoy & D.W. Macdonald. 2010. *A Framework for a Wild Cat Action Plan for Sabah*. Global Canopy Programme, Oxford, UK.	Available for download from: www.researchgate.net/publication/269573488_The_Bornean_Wild_Cats_A_framework_for_a_Wild_Cat_Action_Plan_for_Sabah/link/548eff090cf2d1800d861e17/download	Sabah
Web resources		
Malaysia Biodiversity Information System (MyBIS)	www.mybis.gov.my/one/ MyBIS is the clearing house for data on Malaysia's biodiversity in line with the requirements on the Convention on Biological Diversity. The MyBIS portal includes searchable databases on animal, plant and fungal species as well as protected areas.	Malaysia
Protected Planet	Contains an interactive global protected area database including for Malaysia: www.protectedplanet.net	Malaysia
Ramsar sites: list of wetlands of international importance	www.ramsar.org/wetland/malaysia	Malaysia
UNESCO Man and Biosphere Reserves	www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/asia-and-the-pacific/	Malaysia
UNESCO World Heritage Sites	whc.unesco.org/en/statesparties/my	Malaysia

*Note: only the parent legislation is listed as each act/enactment/ordinance may have numerous subsidiary legislation (rules/orders/regulations/schedules etc.) and also amendments.

Annex 2: Resources for HCV 2 Management & Monitoring

Reference	Availability/Notes	Application
Legislation*		
National Forestry Act 1984	Available for download from: www.forestry.gov.my/index.php/en/akta-perhutanan-negara-1984	Peninsular Malaysia
National Land Code 1965	Available for download from: http://palmoilis.mpob.gov.my/akta/NLC1956DIGITAL-VER1.pdf	Peninsular Malaysia
Wildlife Conservation Act 2010	Available for download from: www.mybis.gov.my/pb/675	Peninsular Malaysia
Forest Enactment 1968	Available for download from: http://www.forest.sabah.gov.my/publications/forest-enactment-1968.html	Sabah
Wildlife Conservation Enactment 1997	Available for download: https://www.sabahlaw.com/ Wildliferegulation.htm	Sabah
Forests Ordinance 2015	Available for download from: https://lawnet.sarawak.gov.my/lawnet_file/Ordinance/ORD_Watermark.pdf	Sarawak
Wild Life Protection Ordinance 1998	Available for download from: https://www.sarawakforestry.com/pdf/laws/wildlife_protection_ordinance98_chap26.pdf	Sarawak
Policy documents		
NRE. 2016. *National Policy on Biological Diversity 2016-2025*. Ministry of Natural Resources and Environment (NRE), Putrajaya, Malaysia.	Available for download from: www.mybis.gov.my/pb/590	Malaysia
DTCP. 2017. *National Physical Plan 3 (NPP-3).* Department of Town and Country Planning, Peninsular Malaysia (DTCP), Ministry of Urban Wellbeing, Housing and Local Government, Kuala Lumpur, Malaysia.	Available from: Department of Town and Country Planning, Peninsular Malaysia Contact Tel: +603-2264 6033 Available for download from: http://myplan.planmalaysia.gov.my/www/admin/uploads_publication/rancangan-fizikal-negara-ke-3-perutusan.pdf	Peninsular Malaysia
DTCP. 2012. *National Coastal Zone Physical Plan (NPP-CZ) Vols. 1 & 2*. Department of Town and Country Planning, Peninsular Malaysia (DTCP), Ministry of Housing and Local Government, Kuala Lumpur, Malaysia.	Available from DTCP: Contact: Tel: +603-2264 6004 Fax: +603-2273 9680 Bahasa Malaysia version available for download from: http://myplan.planmalaysia.gov.my/www/admin/uploads_publication/rancangan-fizikal-zon-persisiran-pantai-negara-jilid-2.pdf Includes KSASSP i.e. Kawasan Sensitif Alam Sekitar Persekitaran Pantai (Coastal Zone Environmentally Sensitive Areas)	Peninsular Malaysia
DTCP. 2009. *Central Forest Spine 1: Master Plan for Ecological Linkages*. Department of Town and Country Planning (DTCP), Ministry of Housing and Local Government, Kuala Lumpur, Malaysia.	Available for download from: https://conservationcorridor.org/cpb/Peninsular_Malaysia_Regional_Planning_Division_2009.pdf	Peninsular Malaysia
DTCP. 2009. *Central Forest Spine 2: Master Plan for Ecological Linkages*. Department of Town and Country Planning, Ministry of Housing and Local Government, Kuala Lumpur, Malaysia.	Available for download from: www.planmalaysia.gov.my/index.php/en/agensi/penerbitanplanmalaysia/rancanganwilayah	Peninsular Malaysia
Sabah Forestry Department and WWF Malaysia. 2013. *Strategic Plan of Action for Sabah: The Heart of Borneo Initiative (2014-2020)*. Sabah Forestry Department, Malaysia.	Available for download from: www.researchgate.net/publication/259357818_Strategic_Plan_of_Action_for_Sabah_-_Heart_of_Borneo_Initiative	Sabah

Reference	Availability/Notes	Application
Sabah State Government, Universiti Malaysia Sabah and Japan International Cooperation Agency. 2012. *Sabah Biodiversity Strategy 2012-2022*. Sabah State Government, Kota Kinabalu, Malaysia.	Available for download from: sabc.sabah.gov.my/content/sabah-biodiversity-strategy-2012-2022	Sabah
Yayasan Sabah. 2014. *Imbak Canyon Conservation Area: Strategic Management Plan 2014-2023*. Yayasan Sabah, Malaysia.	Contact: Conservation and Environmental Management Division Yayasan Sabah Group 12th Floor, Menara Tun Mustapha P.O. Box 11622, 88817 Kota Kinabalu Sabah, Malaysia. Tel: (6088) 326314/326320 Fax: (6088) 326316/326315 E-mail: yscemd@gmail.com Manager Imbak Canyon Conservation Area Conservation and Environmental Management Division c/o Rakyat Berjaya Sdn. Bhd. Jalan Sekolah Cheng Min P.O. Box 1437, 90715 Sandakan Sabah, MALAYSIA. Tel: (6089) 210852 / 225836 Fax: (6089) 210852	Sabah
Yayasan Sabah. 2014. *Maliau Basin Conservation Area: Strategic Management Plan 2014-2023*. Yayasan Sabah, Malaysia.	Available for download from: https://norrnetwork.files.wordpress.com/2015/06/mbca-mp-final-august.pdf See also contact details above for Yayasan Sabah.	Sabah
Papers/reports/books		
Bakewell, D., R. Azmi, F.K. Yew, F.Y. Ng, Y. Basiron & K. Sundaram (eds) 2012. *Biodiversity in Plantation Landscapes: A Practical Resource Guide for Managers and Practitioners in Oil Palm Plantations*. Wild Asia and the Malaysian Palm Oil Council (MPOC), Kuala Lumpur, Malaysia.	Available for download from: oilpalm.wildasia.org/1657/launch-biodiversity-plantation-landscapes-manual/	Malaysia
Chin, C.L.M. 2016. *WWF-Malaysia Free, Prior and Informed Consent (FPIC) Protocol: A Guide for the Malaysian Context*. Kuala Lumpur, Malaysia. WWF-Malaysia.	For enquiries or to obtain a copy, contact WWF-Malaysia at: https://www.wwf.org.my/about_wwf/contact_us/	Malaysia
Chong, D.K.F. & A.A.B. Dayang Norwana. 2005. *Guidelines on the Better Management Practices for the Mitigation and Management of Human-Elephant Conflict in and around Oil-Palm Plantations in Indonesia and Malaysia, Final Draft*. WWF-Malaysia, Petaling Jaya.	Available for download from: https://wwf.panda.org/discover/our_focus/wildlife_practice/human_wildlife_conflict/hwc_news/?98200/Guidelines-to-better-manage-Human-Elephant-Conflicts-in-Indonesian-and-Malaysian-oil-palm-plantations	Malaysia
Colchester, M., S. Chao, P. Anderson & H. Jonas. 2015. *Free, Prior and Consent Guide for RSPO members*. Roundtable on Sustainable Palm Oil (RSPO), Kuala Lumpur, Malaysia.	Available for download from: https://www.rspo.org/articles/download/d57294a05493ff6	Malaysia
Tai, B., T. Barano, K.F. Faisal, B. Lip & S. Wulffraat. 2018. *The WWF Spatial Planning Experiences in Borneo*. WWF Heart of Borneo Programme, Malaysia.	Available for download from: wwf.panda.org/discover/knowledge_hub/where_we_work/borneo_forests/resources/?328631/The-WWF-Spatial-Planning-Experiences-in-Borneo	Sarawak & Sabah
Martin R.A., S. Kumaran & R.B. Tuzan. 2015. Pilot Malaysia-EU REDD+ projects in Sabah: Tackling climate change through sustainable forest management and community development.	Download available from: www.forest.sabah.gov.my/images/ pdf/presentation_material/MFC2014/ Session6/ PAPER%206-2%20PPT.pdf	Sabah

Reference	Availability/Notes	Application
In: *Proceedings of the 17th Malaysian Forestry Conference: "A century of forest management: Lessons learnt & the way forward"*. 11-12 November, 2014. Sabah Forestry Department, Kota Kinabalu, Malaysia.	Contains information related to Kinabalu Ecolinc (ECOLINC) and Kinabatangan Corridor of Life (K-COL) projects.	
Sabah Forestry Department. 2010. Compilation of presentations – *Regional forum on "Enhancing Forest Ecosystems Connectivity and Corridors within the Heart of Borneo in Sabah"*. 26-29 October 2009. Kota Kinabalu, Malaysia.	Available for download from: www.forest.sabah.gov.my/docs/frc/HoB.Conf/2009%20HoB%20Conference%20-%20Compilation%20of%20Presentations.pdf	Sabah
Web resources		
Global Forest Watch	www.globalforestwatch.org/	Malaysia
Intact Forest Landscapes	www.intactforests.org	Malaysia

*Note: only the parent legislation is listed as each act/enactment/ordinance may have numerous subsidiary legislation (rules/orders/regulations/schedules etc.) and also amendments.

Annex 3: Resources for HCV 3 Management & Monitoring

Reference	Availability/Notes	Application
Legislation*		
Protected area laws as listed in the Master List of Protected Areas in Malaysia	The Master List of Protected Areas in Malaysia should be available on the MyBIS website once approved: https:www.mybis.gov.my It may be available on request from the Ministry of Natural Resources and Environment. Tel: +603 8861129 The geospatial dataset is available on the Protected Planet website: https://www.protectedplanet.net	Malaysia
Policy documents		
NRE. 2011. *National Action Plan for Peatlands*. Ministry of Natural Resources and Environment (NRE), Putrajaya, Malaysia.	Available for download from: www.ketsa.gov.my/ms-my/pustakamedia/Penerbitan/National%20Action%20Plan%20for%20Peatlands.pdf	Malaysia
NRE. 2016. *National Policy on Biological Diversity 2016-2025*. Ministry of Natural Resources and Environment (NRE), Putrajaya, Malaysia.	Available for download from: www.mybis.gov.my/pb/590	Malaysia
DTCP. 2017. *National Physical Plan 3 (NPP-3)*. Department of Town and Country Planning, Peninsular Malaysia (DTCP), Ministry of Urban Wellbeing, Housing and Local Government, Kuala Lumpur, Malaysia.	Available from: Department of Town and Country Planning, Peninsular Malaysia Tel: +603-2264 6033 Available for download from: www.planmalaysia.gov.my/index.php/en/rancangan-fizikal-negara	Peninsular Malaysia
DTCP. 2012. *National Coastal Zone Physical Plan (NPP-CZ) Vols. 1 & 2*. Department of Town and Country Planning, Peninsular Malaysia (DTCP), Ministry of Housing and Local Government, Kuala Lumpur, Malaysia.	Available from DTCP: Contact: Tel: +603-2264 6004 Fax: +603-2273 9680 Bahasa Malaysia version available for download from: http://myplan.planmalaysia.gov.my/www/admin/uploads_publication/rancangan-fizikal-zon-persisiran-pantai-negara-jilid-2.pdf Includes KSASSP i.e. Kawasan Sensitif Alam Sekitar Persekitaran Pantai (Coastal Zone Environmentally Sensitive Areas)	Peninsular Malaysia
Selangor State Forestry Department. 2014. *Integrated Management Plan for North Selangor Peat Swamp Forest 2014-2023*.	The Plan aims to maintain the geographical extent and integrity of the North Selangor Peatland Forest to sustain and rehabilitate the functions of the ecosystem as provider of goods and services for the benefit of the local and global communities. Available for download: IMP NSPSF Volume 1: www.gec.org.my/view_file.cfm?fileid=3080 IMP NSPSF Volume 2: ledsgp.org/wp-content/uploads/2015/12/Integrated-Management-Plan-for-N.Selangor-Peat-Swamp-Forests-2014-2023-Volume-2.pdf	Peninsular Malaysia
PLANMalaysia. 2017. *Garispanduan Perancangan GP007-A(1): Pemuliharaan dan Pembangunan Kawasan Sensitif Alam Sekitar (KSAS)*. Jabatan Perancangan Bandar dan Desa (PLANMalaysia), Malaysia.	Available for download from: https://www.planmalaysia.gov.my/index.php/garis-panduan-perancangan/2096-18-gp007-a-1-gpp-pemuliharaan-dan-pembangunan-kawasan-sensetif-alam-sekitar-ksas/file	Peninsular Malaysia

Reference	Availability/Notes	Application
Sabah State Government, Universiti Malaysia Sabah and Japan International Cooperation Agency. 2012. *Sabah Biodiversity Strategy 2012-2022*. Sabah State Government, Kota Kinabalu, Malaysia.	Available for download from: sabc.sabah.gov.my/content/sabah-biodiversity-strategy-2012-2022	Sabah
Papers/reports/books		
Chin, C.L.M. 2016. *WWF-Malaysia Free, Prior and Informed Consent (FPIC) Protocol: A Guide for the Malaysian Context*. Kuala Lumpur, Malaysia. WWF-Malaysia.	For enquiries or to obtain a copy, contact WWF-Malaysia at: https://www.wwf.org.my/about_wwf/contact_us/	Malaysia
Colchester, M., S. Chao, P. Anderson & H. Jonas. 2015. *Free, Prior and Consent Guide for RSPO members*. Roundtable on Sustainable Palm Oil (RSPO), Kuala Lumpur, Malaysia.	Available for download from: https://www.rspo.org/articles/download/d57294a05493ff6	Malaysia
Parish, F., S.Y. Lew, M. Faizuddin, M. & W. Giesen (eds.). 2019. *RSPO Manual on Best Management Practices (BMPs) for Management and Rehabilitation on Peatlands. 2nd Edition*, Roundtable on Sustainable Palm Oil (RSPO), Kuala Lumpur, Malaysia.	Available for download from: rspo.org/resources/peat/rspo-bmp-for-management-rehabilitation-of-peatlands-volume-2-2018-	Malaysia
Wyatt-Smith, J. & B.A. Mitchell. 1995. *Manual of Malayan Silviculture for Inland Forest Vols. 1 & 2, Malayan Forest Records No. 23*. (2nd edition by Wyatt-Smith, J. & W.P. Panton). Forest Research Institute Malaysia (FRIM), Kuala Lumpur, Malaysia.	Out of print. Contains a description of the major vegetation types found in Peninsular Malaysia. Available at the FRIM library: Forest Research Institute Malaysia (FRIM), 52109 Kepong, Selangor Darul Ehsan, Malaysia Tel.: +603-62797532 www.frim.gov.my/en/services/library/	Peninsular Malaysia
Web resources		
Malaysia Biodiversity Information System (MyBIS)	https://www.mybis.gov.my/one/ MyBIS is the clearing house for data on Malaysia's biodiversity in line with the requirements on the Convention on Biological Diversity. The MyBIS portal includes searchable databases on animal, plant and fungal species as well as protected areas.	Malaysia
Protected Planet	Contains an interactive global protected area database including for Malaysia: www.protectedplanet.net	Malaysia
Other data sources		
Reports from national and state forest inventories	Comprehensive forest inventories are conducted at periodic intervals (usually once every 10 years) at the national and state levels by the Forestry Department Peninsular Malaysia and respective state forestry departments. The outputs from these inventories are not publicly available but may be requested from the relevant agencies.	Malaysia

*Note: only the parent legislation is listed as each act/enactment/ordinance may have numerous subsidiary legislation (rules/orders/regulations/schedules etc.) and also amendments.

Annex 4: Resources for HCV 4 Management & Monitoring

Reference	Availability/Notes	Application
Legislation*		
Waters Act 1920 (Revised 1989)	Available at: www.commonlii.org/my/legis/consol_act/wa19201989176/	Peninsular Malaysia
Land Conservation Act 1960	Available for download from: www.commonlii.org/my/legis/consol_act/lca19601989266/	Peninsular Malaysia
National Forestry Act 1984	Available for download from: www.forestry.gov.my/en/perhutanan-negara-1984	Peninsular Malaysia
National Land Code 1965	Available for download from: http://palmoilis.mpob.gov.my/akta/NLC1956DIGITAL-VER1.pdf	Peninsular Malaysia
Selangor Waters Management Authority Enactment 1999	Available for download from: https://www.luas.gov.my/perundangan/Enakmen%20LUAS%20(Eng).pdf	Malaysia (Selangor)
Environment Protection Enactment 2002	Available for download from: https://sagc.sabah.gov.my/sites/default/files/law/EnvironmentProtectionEnactment2002.pdf	Sabah
Forest Enactment 1968	Available for download from: https://sagc.sabah.gov.my/sites/default/files/law/ForestEnactment1968_3.pdf	Sabah
Land Ordinance (Sabah Cap. 68)	Available for download from: https://sagc.sabah.gov.my/sites/default/files/law/LandOrdinance_0.pdf Incorporating the Land (Amendment) Enactment 2012	Sabah
Sabah Water Resources Enactment 1998	Available for download from: https://sagc.sabah.gov.my/sites/default/files/law/SabahWaterResourcesEnactment1998.pdf	Sabah
Forests Ordinance 2015	Available for download from: lawnet.sarawak.gov.my/lawnet_file/Ordinance/ORD_Watermark.pdf	Sarawak
Natural Resources and Environment Ordinance 1958	Available for download from: www.nreb.gov.my/page-0-615-107-tid.html	Sarawak
Sarawak Land Code 1958	Available for download from: https://lawnet.sarawak.gov.my/lawnet_file/Ordinance/ORD_LANDCOD2020.pdf	Sarawak
Sarawak Rivers Ordinance 1993	Available for download from: lawnet.sarawak.gov.my/lawnet_file/Ordinance/ORD_CHAPT4hwm.pdf	Sarawak
Water Ordinance 1994	Available for download from: lawnet.sarawak.gov.my/lawnet_file/Ordinance/ORD_CAP.13hwm.pdf Includes the Water Supply Regulations 1995.	Sarawak
Policy documents		
NRE. 2016. *National Policy on Biological Diversity 2016-2025*. Ministry of Natural Resources and Environment (NRE), Putrajaya, Malaysia.	Available for download from: www.mybis.gov.my/pb/590	Malaysia

Reference	Availability/Notes	Application
NRE. 2012. *National Water Resources Policy*. Ministry of Natural Resources and Environment Malaysia (NRE), Putrajaya, Malaysia.	Contact: Ministry of Energy and Natural Resources (KeTSA) Wisma Sumber Asli, No.25 Persiaran Perdana Presint 4, 62574 Putrajaya, Malaysia Tel: (603) 8000 8000 Fax: (603) 8899 2672 E-mail: webmaster@ketsa.gov.my	Malaysia
Public Works Department. 2009. *National Slope Master Plan 2009-2023*. Ministry of Public Works Malaysia, Kuala Lumpur, Malaysia.	Available for download from: slopes.jkr.gov.my/images/bkc_dokumen/National_Slope_Master_Plan/NSMP(signed).pdf Includes, among other information, maps on landslide prone areas, annual rainfall patterns, rainfall stations and rain gauge stations. The Master Plan contain Sectoral Reports Vol. 2 and Vol. 3.	Malaysia
NRE. 2009. *Managing Biodiversity in the Riparian Zone: A course for planners and decision makers*. Ministry of Natural Resources and Environment (NRE), Putrajaya, Malaysia.	Contact: Ministry of Energy and Natural Resources (KeTSA) Wisma Sumber Asli, No.25 Persiaran Perdana Presint 4, 62574 Putrajaya, Malaysia Tel: (603) 8000 8000 Fax: (603) 8899 2672 E-mail: webmaster@ketsa.gov.my	Malaysia
DID. 2011. *Guideline for: the development related to river and reserve*. Department of Irrigation and Drainage (DID) Government of Malaysia.	Available for download from: www.water.gov.my/index.php/pages/view_tag/62574675645746734943596 75a3356705a4756736157356c63773d3d (Only available in Bahasa Malaysia version)	Peninsular Malaysia
DTCP. 2017. *National Physical Plan-3 (NPP-3)*. Department of Town and Country Planning (DTCP), Ministry of Urban Wellbeing, Housing and Local Government, Putrajaya, Malaysia.	Available from: Department of Town and Country Planning, Peninsular Malaysia. Tel: +603-2264 6004 Available for download from: https://www.planmalaysia.gov.my/index.php/en/rancangan-fizikal-negara	Peninsular Malaysia
DTCP. 2012. *National Coastal Zone Physical Plan (NPP-CZ) Vols. 1 & 2*. Department of Town and Country Planning, Peninsular Malaysia (DTCP), Ministry of Housing and Local Government, Kuala Lumpur, Malaysia.	Available from DTCP: Contact: Tel: +603-2264 6004 Fax: +603-2273 9680 Bahasa Malaysia version available for download from: http://myplan.planmalaysia.gov.my/www/admin/uploads_publication/rancangan-fizikal-zon-persisiran-pantai-negara-jilid-2.pdf Includes KSASSP i.e. Kawasan Sensitif Alam Sekitar Persekitaran Pantai (Coastal Zone Environmentally Sensitive Areas)	Peninsular Malaysia
DTCP. 2009. *Central Forest Spine 1: Master Plan for ecological linkages*. Department of Town and Country Planning (DTCP), Ministry of Housing and Local Government, Kuala Lumpur, Malaysia.	Available for download from: https://conservationcorridor.org/cpb/Peninsular_Malaysia_Regional_Planning_Division_2009.pdf	Peninsular Malaysia
DTCP. 2009. *Central Forest Spine 2: Master Plan for ecological linkages*. Department of Town and Country Planning, Ministry of Housing and Local Government, Malaysia.	Available for download from: www.planmalaysia.gov.my/index.php/en/agensi/penerbitanplanmalaysia/rancanganwilayah	Peninsular Malaysia
PLANMalaysia. 2017. *Garispanduan Perancangan GP007-A(1): Pemuliharaan dan Pembangunan Kawasan Sensitif Alam Sekitar (KSAS)*. Jabatan Perancangan Bandar dan Desa (PLANMalaysia), Malaysia.	Available for download from: https://www.planmalaysia.gov.my/index.php/garis-panduan-perancangan/2096-18-gp007-a-1-gpp-pemuliharaan-dan-pembangunan-kawasan-sensetif-alam-sekitar-ksas/file	Peninsular Malaysia

Reference	Availability/Notes	Application
Structure and Local Plans	The relevant structure and local plans for the various states and districts in Peninsular Malaysia are available from the Federal Town and Country Planning Department as well as the respective state offices of the department and local councils. Addresses and contacts may be obtained from: Headquarters Federal Department of Town and Country Planning, Peninsular Malaysia, Ground Floor, Tanjung Block, Jalan Cenderasari, 50646, Kuala Lumpur, Malaysia Tel: +603-2699 2111 Fax: +03-2692 9994 Website: http://www.townplan.gov.my	Peninsular Malaysia
EPD. 2012. *Environmental Impact Assessment (EIAP Guidelines for Forest Harvesting (Logging) and Forest Plantation Establishment.* Environmental Protection Department (EPD), Kota Kinabalu, Malaysia.	Available for download from: http://www.epd.sabah.gov.my/v1/images/pdf/EIA/eiaguidelines/EIA_Guidelines_Forestry.pdf?type=file	Sabah
EPD. 2012. *Environmental Impact Assessment (EIA) Guidelines for Oil Palm Plantation.* Environmental Protection Department (EPD), Kota Kinabalu, Malaysia.	Available for download from: http://www.epd.sabah.gov.my/v1/images/pdf/EIA/eiaguidelines/EIA_Guidelines_OPP.pdf?type=file	Sabah
Natural Resources Office. 2014. *Water Resources Master Plan. Final Report – Overview.* Natural Resources Office, Sabah, Malaysia.	Available for download from: https://did.sabah.gov.my/files/documents/Sabah%20Water%20Resources%20Master%20Plan.pdf	Sabah
Sabah Forestry Department. 2009. *RIL Operation Guide Book: Code of Practice for Forest Harvesting in Sabah, Malaysia* (Third Edition). Sabah Forestry Department, Malaysia.	Available for download from: www.deramakot.sabah.gov.my/PDF/SFD%20RIL%20Manual_2009.pdf	Sabah
Papers/reports/books		
Bakewell, D., R. Azmi, F.K. Yew, F.Y. Ng, Y. Basiron & K. Sundaram (eds.). 2012. *Biodiversity in Plantation Landscapes: A Practical Resource Guide for Managers and Practitioners in Oil Palm Plantations.* Wild Asia and the Malaysian Palm Oil Council (MPOC), Kuala Lumpur, Malaysia.	Available for download from: oilpalm.wildasia.org/1657/launch-biodiversity-plantation-landscapes-manual/	Malaysia
Barclay, H., C.L. Gray, S.H. Luke, A. Nainar, J.L. Snaddon, & E.C. Turner. 2017. *RSPO Manual on Best Management Practices (BMPs) for the Management and Rehabilitation of Riparian Reserves.* Roundtable on Sustainable Palm Oil (RSPO), Kuala Lumpur, Malaysia.	Available for download from: rspo.org/resources/conservation-sustainable-management-of-natural-resources/best-management-practices-for-riparian-areas	Malaysia
Bulan, R., & R.G. Maran. 2020. *Legal Analysis to assess the impact of Laws, Policies and Institutional frameworks on indigenous people and community conserved territories and areas (ICCAS) in Malaysia.* The Global Support Initiative to Indigenous Peoples and Community-Conserved Territories and Areas (ICCA-GSI), part of the International Union for the Conservation of Nature's Global Programme on Protected Areas (IUCN GPAP) and the United Nations Environment Programme's World Conservation Monitoring Centre (UNEP WCMC).	Available for download from: sgpmalaysia.org/index.cfm?&menuid=90&parentid=38	Malaysia

Reference	Availability/Notes	Application
Chin, C.L.M. 2016. *WWF-Malaysia Free, Prior and Informed Consent (FPIC) Protocol: A Guide for the Malaysian Context*. Kuala Lumpur, Malaysia. WWF-Malaysia.	For enquiries or to obtain a copy, contact WWF-Malaysia at: https://www.wwf.org.my/about_wwf/contact_us/	Malaysia
Colchester, M., S. Chao, P. Anderson & H. Jonas. 2015. *Free, Prior and Consent Guide for RSPO members*. Roundtable on Sustainable Palm Oil (RSPO), Kuala Lumpur, Malaysia.	Available for download from: https://www.rspo.org/articles/download/d57294a05493ff6	Malaysia
Parish, F., S.Y. Lew, M. Faizuddin & W. Giesen (eds.). 2019. *RSPO Manual on Best Management Practices (BMPs) for Management and Rehabilitation on Peatlands*. 2nd Edition, Roundtable on Sustainable Palm Oil (RSPO), Kuala Lumpur, Malaysia.	Available for download from: rspo.org/resources/peat/rspo-bmp-for-management-rehabilitation-of-peatlands-volume-2-2018-	Malaysia
Parish, F., J. Mathews, S.Y. Lew, M. Faizuddin & J. Lo (eds.). 2019. *RSPO Manual on Best Management Practices (BMPs) for Existing Oil Palm Cultivation on Peat*. 2nd Edition, Roundtable on Sustainable Palm Oil (RSPO), Kuala Lumpur, Malaysia.	Available for download from: rspo.org/resources/peat/rspo-bmp-for-existing-oil-palm-cultivation-on-peat-volume-1-2018-	Malaysia
Aziz S.A., M-R. Low & G.R. Clements. 2019. *A Conservation Roadmap for Flying Foxes Pteropus spp. in Peninsular Malaysia*. Rimba, Kuala Lumpur, Malaysia.	Available for download from: bit.ly/flyingfoxconservationroadmap	Peninsular Malaysia
Goh, K.S. 1974. *Hydrological Regions of Peninsular Malaysia*. Ministry of Agriculture and Rural Development, Kuala Lumpur, Malaysia.	Available for download from: www.water.gov.my/jps/resources/auto%20download%20images/587465da88eee.pdf	Peninsular Malaysia
Goh, K.S. 1974. *Surface Water Resources Map (Provisional) of Peninsular Malaysia and Explanatory Notes*. Ministry of Agriculture and Fisheries, Kuala Lumpur, Malaysia.	Available for download from: www.water.gov.my/jps/resources/auto%20download%20images/58746593ddddd.pdf	Peninsular Malaysia
Lucey, J.M., H. Barclay, C.L. Gray, S.H. Luke, A. Nainar, E.C. Turner, G. Reynolds, E.L. Slade, J.L. Snaddon, M. Struebig & R. Walsh. 2018. *Simplified Guide: Management and Rehabilitation of Riparian Reserves*. Roundtable on Sustainable Palm Oil (RSPO), Kuala Lumpur, Malaysia.	Available for download from: rspo.org/resources/conservation-sustainable-management-of-natural-resources/best-management-practices-for-riparian-areas	Malaysia
NAHRIM. 2008.*Compendium of Malaysian hydrogeological research papers and reports titles*. Ministry of Natural Resources and Environment Malaysia (NAHRIM), Selangor, Malaysia.	For enquiry on availability in library please contact NAHRIM library at: Email: mrizal@nahrim.gov.my Tel: +603 8947 6400 Extn: 6575	Malaysia
Ranhill Consulting Sdn. Bhd. 2011. *Review of the National Water (2000-2050) and Formulation of National Water Resources Policy, Final Report, August 2011*. Report prepared by Ranhill for the Department of Irrigation and Drainage, Kuala Lumpur, Malaysia.	This report consists of 20 volumes and most of the volumes can be downloaded from: gedung1nahrim.nahrim.gov.my/WebPages/Water-Resources.aspx?met=RP&smet=WR Contact: Department of Irrigation & Drainage Jalan Sultan Salahuddin, 50626 Kuala Lumpur, Malaysia. Tel: 603-2616 1500 Fax: 603-2698 7973 Email: pro@water.gov.my ; web@water.gov.my	Peninsular Malaysia

Reference	Availability/Notes	Application
Web resources		
Department of Survey and Mapping Malaysia's database of map resources	www.jupem.gov.my Map resources include unrestricted and restricted topographical maps, digital terrain model, thematic maps, etc.	Malaysia
European Digital Archive of Soil Maps (EuDASM) – Soil maps of Asia	eusoils.jrc.ec.europa.eu/ESDB_Archive/EuDASM/Asia/lists/cmy.htm	Malaysia
Other data sources		
Geology	Maps and reports of geological surveys conducted in different areas are available from the Department of Mineral and Geoscience.	Malaysia
Location of dams, water intake points and other infrastructure, abstraction rates, etc.	A list of water intake points and their catchment areas can be found in Schedule 6 of the Environmental Quality (Industrial Effluent) Regulations 2009 (P.U. (A) 434) of the Environmental Quality Act 1974. Available for download at: www.doe.gov.my/portalv1/wp-content/uploads/2015/01/Environmental_Quality_Industrial_Effluent_Regulations_2009_-_P.U.A_434-2009.pdf Data should also be obtained from the relevant water supply companies, the Water Supply Department and relevant documents (e.g. the National Physical Plan, National Water Resources Study Review 2000-2050, etc.).	Malaysia
Wastewater effluent discharge points	This is site-specific and the specific locations of the discharge points may be obtained from the project proponent/concessionaire or the Department of Environment.	Malaysia
List and maps of Permanent Reserved Forests particularly those that have been classified for soil and water catchment protection	A list of Permanent Reserved Forests gazetted for soil and water catchment protection in Peninsular Malaysia can be extracted from the Protected Areas Master List which also provides the reference number for the gazette plans (maps) which is needed when purchasing the relevant map from the Survey and Mapping Department (JUPEM). The Master List of Protected Areas in Malaysia should be available on the MyBIS website once approved: www.mybis.gov.my It may be available on request from the Ministry of Natural Resources and Environment. Tel: +603 8861129	Peninsular Malaysia
List of power stations in Malaysia Including on location, capacity, etc.	Data available at: en.wikipedia.org/wiki/List_of_power_stations_in_Malaysia#Peninsular_Malaysia A website listing the power plants in Peninsular Malaysia, including hydro and fuel powered plants with locations and power.	Peninsular Malaysia
Topographic maps 1:50,000 Peninsular Malaysia – Series No. DNMM5101.	Non-restricted version of topographic maps at a scale of 1:50,000 covering Peninsular Malaysia only. These maps are produced in full colour showing cultural features, vegetation and cultivation, hydrography, relief and annotation. Can be purchased from: Department of Survey and Mapping Malaysia Tel: +603-26170800, Fax: +603-26933618 Email: hqweb@jupem.gov.my	Peninsular Malaysia

Reference	Availability/Notes	Application
	Cultural features consist of highways and roads, railways, buildings, boundaries, etc. Relief is shown as contour lines with 100m intervals and heights in meters.	
Topographic maps 1:50,000 Peninsular Malaysia – Series No. L7030.	Restricted version of topographic maps at a scale of 1:50,000 covering Peninsular Malaysia only. These fully coloured maps depict man-made features, vegetation and cultivated areas, hydrography and relief with annotations. May be purchased from: Department of Survey and Mapping Malaysia Tel: +603-26170800, Fax: +603-26933618 Email: hqweb@jupem.gov.my Website: https://www.jupem.gov.my/page/restricted-map Relief is shown as contour lines with 20m intervals and heights in meters. Vegetation and cultivations, towns and built-up areas are shown with specified symbols. Hydrographic features are also shown.	Peninsular Malaysia
Topographic maps 1:50,000 Sabah & Sarawak – Series No. DNMM5201	Non-restricted version of topographic maps at a scale of 1:50 000 and covering Sabah and Sarawak only. These maps are produced in full colour showing cultural features, area classification, hydrography, relief and annotation. Can be purchased from: Department of Survey and Mapping Malaysia Tel: +603-26170800, Fax: +603-26933618 Email: hqweb@jupem.gov.my Website: https://www.jupem.gov.my/page/unrestricted-map	Sarawak & Sabah
Topographic maps 1:50,000 Sabah & Sarawak – Series No T738.	Cultural features consist of highways and roads, railways, building and boundaries. Relief is shown as contour lines with 100m interval and heights in meters. Restricted version of topographic maps at a scale of 1:50,000 and covering Sabah and Sarawak. These maps are produced in full colour showing cultural features, area classification, hydrography, relief and annotation. May be purchased from: Department of Survey and Mapping Malaysia Tel: +603-26170800, Fax: +603-26933618 Email: hqweb@jupem.gov.my Website: https://www.jupem.gov.my/page/restricted-map	Sarawak & Sabah
Soil map of Sarawak: Malaysia Timor. Sheet A. 1968. Land and Survey Department, Sarawak. Directorate of National Mapping Malaysia. The Soil Maps of Asia. European Digital Archive of Soil Maps – EuDASM.	Available for download from: https://esdac.jrc.ec.europa.eu/content/soil-map-sarawak-malaysia-timor-sheet-b Sourced from: Joint Research Centre European Soil Data Centre (ESDAC)	Sarawak

*Note: only the parent legislation is listed as each act/enactment/ordinance may have numerous subsidiary legislation (rules/orders/regulations/schedules etc.) and also amendments.

Annex 5: Resources for HCV 5 Management & Monitoring

Reference	Availability/Notes	Application
Legislation*		
Access to Biological Resources and Benefit Sharing Act 2017	Available for download from: www.cljlaw.com/files/bills/pdf/2017/MY_FS_BIL_2017_24.pdf	Malaysia
Aboriginal Peoples Act 1954	Available for download from: www.commonlii.org/my/legis/consol_act/apa19541974255/	Peninsular Malaysia
National Forestry Act 1984	Available for download from: www.forestry.gov.my/index.php/en/akta-perhutanan-negara-1984	Peninsular Malaysia
Forest Enactment 1968	Available for download from: https://sagc.sabah.gov.my/sites/default/files/law/ForestEnactment1968_3.pdf	Sabah
Land Ordinance 1930 (Sabah Cap. 68)	Available for download from: https://sagc.sabah.gov.my/sites/default/files/law/LandOrdinance_0.pdf and www.sabahlaw.com/landord.htm Incorporating the Land (Amendment) Enactment 2012	Sabah
Native Courts Enactment 1992	Available for download from: https://sagc.sabah.gov.my/sites/default/files/law/NativeCourts1992%28PracticeAndProcedure1995%29.pdf	Sabah
Sabah Biodiversity Enactment 2000	Available for download from: http://www.wipo.int/edocs/lexdocs/laws/en/my/my055en.pdf	Sabah
Sarawak Biodiversity Centre Ordinance 1997	Available for download from: https://www.sbc.org.my/sbc-news/downloads/sarawak-biodiversity-ordinance-and-regulations/archived-ordinances-regulations/638-sarawak-biodiversity-centre-ordinance-1997/file A key subsidiary legislation is the Sarawak Biodiversity Regulations 2016 which includes sections on access to biological resources for research and development and benefit sharing agreement for research. www.sbc.org.my/sbc-news/announcement/730-sarawak-biodiversity-regulations-2016	Sarawak
Sarawak Rivers Ordinance 1993	Available for download from: lawnet.sarawak.gov.my/lawnet_file/Ordinance/ORD_CHAPT4hwm.pdf	Sarawak
Natural Resources and Environment Ordinance 1958	Available for download from: www.nreb.gov.my/page-0-615-107-tid.html	Sarawak
Policy documents		
NRE. 2016. *National Policy on Biological Diversity 2016-2025*. Ministry of Natural Resources and Environment (NRE), Putrajaya, Malaysia.	Available for download from: www.mybis.gov.my/pb/590	Malaysia
Papers/reports/books		
AIPP. 2014. *Training manual for indigenous peoples on Free, Prior and Informed Consent (FPIC)*. Asia Indigenous Peoples Pact (AIPP), Chiang Mai, Thailand.	Available for download from: https://aippnet.org/wp-content/uploads/2020/02/10.-FPIC_Manual-Small.pdf	Malaysia

Reference	Availability/Notes	Application
Barclay, H., C.L. Gray, S.H. Luke, A. Nainar, J.L. Snaddon, & E.C. Turner. 2017. *RSPO Manual on Best Management Practices (BMPs) for the Management and Rehabilitation of Riparian Reserves.* Roundtable on Sustainable Palm Oil (RSPO), Kuala Lumpur, Malaysia.	Available for download from: rspo.org/resources/conservation-sustainable-management-of-natural-resources/best-management-practices-for-riparian-areas	Malaysia
Bulan, R., & R.G. Maran. 2020. *Legal Analysis to assess the impact of Laws, Policies and Institutional frameworks on indigenous people and community conserved territories and areas (ICCAS) in Malaysia.* The Global Support Initiative to Indigenous Peoples and Community-Conserved Territories and Areas (ICCA-GSI), part of the International Union for the Conservation of Nature's Global Programme on Protected Areas (IUCN GPAP) and the United Nations Environment Programme's World Conservation Monitoring Centre (UNEP WCMC).	Available for download from: sgpmalaysia.org/index.cfm?&menuid=90&parentid=38	Malaysia
Chin, C.L.M. 2016. *WWF-Malaysia Free, Prior and Informed Consent (FPIC) Protocol: A Guide for the Malaysian Context.* Kuala Lumpur, Malaysia. WWF-Malaysia.	For enquiries or to obtain a copy, contact WWF-Malaysia at: https://www.wwf.org.my/about_wwf/contact_us/	Malaysia
Colchester, M., S. Chao, P. Anderson & H. Jonas. 2015. *Free, Prior and Informed Consent (FPIC): Guide for RSPO members.* Roundtable on Sustainable Palm Oil (RSPO), Kuala Lumpur, Malaysia.	Available for download from: https://www.rspo.org/articles/download/d57294a05493ff6	Malaysia
Lucey, J.M., H. Barclay, C.L. Gray, S.H. Luke, A. Nainar, E.C. Turner, G. Reynolds, E.L. Slade, J.L. Snaddon, M. Struebig & R. Walsh. 2018. *Simplified Guide: Management and Rehabilitation of Riparian Reserves.* Roundtable on Sustainable Palm Oil (RSPO), Kuala Lumpur, Malaysia.	Available for download from: rspo.org/resources/conservation-sustainable-management-of-natural-resources/best-management-practices-for-riparian-areas	Malaysia
Nicholas, C. & J. Lasimbang (eds.). 2004. *Deliberations at the National Roundtable on Biodiversity and indigenous knowledge systems in Malaysia.* Center for Orang Asli Concerns (COAC) for Jaringan Orang Asli SeMalaysia (JOAS), Subang Jaya, Malaysia.	Available for download or purchase from: www.coac.org.my/main.php?%20section=publications&article_id=57	Malaysia
Rubis, J. 2018. *Indigenous Peoples Experiences on Free, Prior and Informed Consent: A Collection of Case Studies (Malaysia).* Part of a UN-REDD Programme series on Lessons Learnt & Recommendations on FPIC.	Available for download from: https://www.unredd.net/documents/fpic-repository-1/lessoms-learned-recommendations-1/16890-indigenous-peoples-experiences-on-free-prior-and-informed-consent-a-collection-of-case-studies-malaysia.html	Malaysia
Kardooni, R., Fatimah Binti Kari, Siti Rohani Binti Yahaya & Siti Hajar Yusup. 2014. Traditional knowledge of Orang Asli on forests in Peninsular Malaysia. *Indian Journal of Traditional Knowledge* 13(2): 283-291.	Available for download from: www.semanticscholar.org/paper/Traditional-knowledge-of-orang-asli-on-forests-in-Kardooni-Kari/2b319d47dac58d79a641ea00b215acdd31c77c8d	Peninsular Malaysia
Tarmiji Masron, M. Fujimaki, & Norhasimah Ismail. 2013. Orang Asli in Peninsular Malaysia: Population, Spatial Distribution and Socio-Economic Condition. *Ritsumeikan Journal of Social Sciences and Humanities* 6: 75-115.	Available for download from: www.ritsumei.ac.jp/acd/re/k-rsc/hss/book/pdf/vol06_07.pdf	Peninsular Malaysia
Ab. Halim, A., N. Othman, S.R. Ismail, J.A. Jawan & N.N. Ibrahim. 2012. Indigenous Knowledge and Biodiversity Conservation in Sabah. *Int. Journal of Social Science and Humanity Vol.* 2(2): 159-163.	Available for download from: www.ijssh.org/papers/88-CH016.pdf	Sabah

Reference	Availability/Notes	Application
A final draft of Environmental & Social Safeguard (ESS) Standards for REDD+ in Sabah (2017)	Contact: Sabah Forestry Department Locked Bag 68, 90009 Sandakan, Sabah, Malaysia. Tel: +60 89242500 Website: www.forest.sabah.gov.my/	Sabah
Web resource		
Department of Statistics Malaysia (DOSM), official portal	www.dosm.gov.my	Malaysia
Malaysia's open data portal	www.data.gov.my/	Malaysia
Basic data/statistics on Orang Asli	Contains a wide range of datasets including on socio-economics, national statistics, etc. www.coac.org.my/main.php?section=about&article_id=4 Compiled by the Center for Orang Asli Concerns (COAC)	Peninsular Malaysia
Other data sources		
Data on indigenous communities	Data on, for example, the location of villages, cultural practices, etc. may be obtained from the relevant government agencies and NGOs. Government agencies: • Jabatan Kemajuan Orang Asli/Department of Orang Asli Development (JAKOA): www.jakoa.gov.my • Majlis Adat Istiadat Sarawak/Council for Native Customs and Traditions: http://www.nativecustoms.sarawak.gov.my/ • Majlis Hal Ehwal Anak Negeri Sabah • Sabah Cultural Board: http://www.sabah.gov.my/lks/v2/index.php?q=content/introduction-0 NGOs: • Borneo Resources Institute (BRIMAS): http://brimas.www1.50megs.com/ • Center for Orang Asli Concerns (COAC): www.coac.org.my • Kadazan Dusun Cultural Association (KDCA) : http://www.kdca.org.my/ • PACOS Trust: https://pacostrust.com/ • Sarawak Dayak Iban Association (SADIA): https://sarawakdayakibanassoc.wordpress.com/ The Indigenous Peoples Network of Malaysia or Jaringan Orang Asal Se-Malaysia (JOAS) is the umbrella network for 21 community-based non-governmental organisations. JOAS: http://orangasal.blogspot.my/	Malaysia

*Note: only the parent legislation is listed as each act/enactment/ordinance may have numerous subsidiary legislation (rules/orders/regulations/schedules etc.) and also amendments.

Annex 6: Resources for HCV 6 Management & Monitoring

Reference	Availability/Notes	Application
Legislation*		
Access to Biological Resources and Benefit Sharing Act 2017	Available for download from: www.mybis.gov.my/pb/3567	Malaysia
National Heritage Act 2005	Available for download from: www.gtwhi.com.my/images/stories/files/NATIONAL%20HERITAGE%20ACT%202005.pdf	Malaysia
National Forestry Act 1984	Available for download from: www.forestry.gov.my/index.php/en/akta-perhutanan-negara-1984	Peninsular Malaysia
National Land Code 1965	Available for download from: http://palmoilis.mpob.gov.my/akta/NLC1956DIGITAL-VER1.pdf	Peninsular Malaysia
Wildlife Conservation Act 2010	Available for download from: www.mybis.gov.my/pb/675 Incorporating lists of protected and totally protected animals in Peninsular Malaysia	Peninsular Malaysia
Forest Enactment 1968	Available for download from: www.forest.sabah.gov.my/publications/forest-enactment-1968.html	Sabah
Land Ordinance 1930 (Sabah Cap. 68)	Available for download from: https://sagc.sabah.gov.my/sites/default/files/law/LandOrdinance_0.pdf and www.sabahlaw.com/landord.htm Incorporating the Land (Amendment) Enactment 2012	Sabah
Native Courts Enactment 1992	Available for download from: https://sagc.sabah.gov.my/sites/default/files/law/NativeCourts1992%28PracticeAndProcedure1995%29.pdf	Sabah
Sabah Biodiversity Enactment 2000	Available for download from: www.wipo.int/edocs/lexdocs/laws/en/my/my055en.pdf	Sabah
State Heritage Enactment 1997	Available for download from: sagc.sabah.gov.my/sites/default/files/law/StateHeritageEnct2017.pdf	Sabah
Wildlife Conservation Enactment 1997	Available for download available from: www.sabahlaw.com/Wildliferegulation.htm Incorporating lists of totally protected and protected animals and plants in Sabah.	Sabah
Forests Ordinance 2015	Available for download from: lawnet.sarawak.gov.my/lawnet_file/Ordinance/ORD_Watermark.pdf	Sarawak
Native Customs (Declaration) Ordinance 1996	Available for download from: https://lawnet.sarawak.gov.my/lawnet_file/Ordinance/ORD_CAP.%2022%20watermark.pdf	Sarawak
Native Courts Enactment 1992	Available for download from: sagc.sabah.gov.my/sites/default/files/law/NativeCourtsEnactment1992.pdf Including subsidiary legislation such as: • Adat Bidayuh Order 1994 • Adat Iban Order 1993 • Dayak Adat Law Second Division 1963 This law supersedes the Native Courts Ordinance 1958 which has been repealed.	Sarawak

Reference	Availability/Notes	Application
Natural Resources and Environment Ordinance 1958	Available for download from: www.nreb.gov.my/page-0-615-107-tid.html	Sarawak
Sarawak Cultural Heritage Ordinance 1993	Available for download from: lawnet.sarawak.gov.my/lawnet_file/Ordinance/ORD_CAP6hwm.pdf	Sarawak
Sarawak Biodiversity Centre Ordinance 1997	Available for download from: https://www.sbc.org.my/sbc-news/downloads/sarawak-biodiversity-ordinance-and-regulations/archived-ordinances-regulations/638-sarawak-biodiversity-centre-ordinance-1997	Sarawak
Sarawak Land Code 1958	Available for download from: https://lawnet.sarawak.gov.my/lawnet_file/Ordinance/ORD_LANDCOD2020.pdf	Sarawak
Wild Life Protection Ordinance 1998	Available for download available from: www.sarawakforestry.com/pdf/laws/wildlife_protection_ordinance98_chap26.pdf Incorporating lists of totally protected and protected animals and plants in Sarawak.	Sarawak
Policy documents		
MOTAC. 2016. *National Ecotourism Plan 2016-2025* (3 volumes). Ministry of Tourism and Culture Malaysia (MOTAC), Putrajaya, Malaysia.	Available for download from: www.motac.gov.my/en/download/category/86-pelan-eko-pelancongan-kebangsaan-2016-2025	Malaysia
NRE. 2016. *National Policy on Biological Diversity 2016-2025*. Ministry of Natural Resources and Environment (NRE), Putrajaya, Malaysia.	Available for download from: www.mybis.gov.my/pb/590	Malaysia
Published papers/reports		
Bulan, R., & R.G. Maran. 2020. *Legal Analysis to assess the impact of Laws, Policies and Institutional frameworks on indigenous people and community conserved territories and areas (ICCAS) in Malaysia.* The Global Support Initiative to Indigenous Peoples and Community-Conserved Territories and Areas (ICCA-GSI), part of the International Union for the Conservation of Nature's Global Programme on Protected Areas (IUCN GPAP) and the United Nations Environment Programme's World Conservation Monitoring Centre (UNEP WCMC).	Available for download from: sgpmalaysia.org/index.cfm?&menuid=90&parentid=38	Malaysia
Chin, C.L.M. 2016. *WWF-Malaysia Free, Prior and Informed Consent (FPIC) Protocol: A Guide for the Malaysian Context.* Kuala Lumpur, Malaysia. WWF-Malaysia.	For enquiries or to obtain a copy, contact WWF-Malaysia at: https://www.wwf.org.my/about_wwf/contact_us/	Malaysia
Colchester, M., S. Chao, P. Anderson & H. Jonas. 2015. *Free, Prior and Informed Consent (FPIC): Guide for RSPO members.* Roundtable on Sustainable Palm Oil (RSPO), Kuala Lumpur, Malaysia.	Available for download from: https://www.rspo.org/articles/download/d57294a05493ff6	Malaysia
Lasimbang, A. 2004. *Community Mapping in Malaysia: The use of Community Maps in Resources Management and Protecting Rights over Indigenous Peoples' Territory.* Paper presented at the Regional Community Mapping Network Workshop, Nov. 8-10, 2004, Quezon City, Philippines.	Available for download from: www.iapad.org/wp-content/uploads/2015/07/pacos.pdf	Malaysia

Reference	Availability/Notes	Application
Rubis, J. 2018. *Indigenous Peoples' Experiences on Free, Prior and Informed Consent: A Collection of Case Studies (Malaysia).* Part of a UN-REDD Programme series on Lessons Learnt & Recommendations on FPIC.	Available for download from: www.unredd.net/documents/fpic-repository-1/lessoms-learned-recommendations-1/16890-indigenous-peoples-experiences-on-free-prior-and-informed-consent-a-collection-of-case-studies-malaysia.html	Malaysia
Web resources		
List of National Heritage Sites in Malaysia	www.heritage.gov.my/index.php/muat-turun/category/16-penerbitan	Malaysia
List of UNESCO World Heritage Sites in Malaysia	whc.unesco.org/en/statesparties/my Refer also to the Tentative List (sites nominated by state parties as World Heritage Sites but yet to be inscribed as such)	Malaysia
Other Data Sources		
Data on traditional customs, cultural practices, etc.	Government agencies: • Jabatan Kemajuan Orang Asli/Department of Orang Asli Development (JAKOA): www.jakoa.gov.my • Majlis Adat Istiadat Sarawak/Council for Native Customs and Traditions: nativecustoms.sarawak.gov.my/ • Majlis Hal Ehwal Anak Negeri Sabah • Sabah Cultural Board: www.sabah.gov.my/lks/v2/index.php?q=content/introduction-0 NGOs: • Borneo Resources Institute (BRIMAS): brimas.www1.50megs.com/ • Center for Orang Asli Concerns (COAC): www.coac.org.my • Kadazan Dusun Cultural Association (KDCA): www.kdca.org.my/ • PACOS Trust: pacostrust.com/ • Sarawak Dayak Iban Association (SADIA): sarawakdayakibanassoc.wordpress.com/ The Indigenous Peoples Network of Malaysia or Jaringan Orang Asal Se-Malaysia (JOAS) is the umbrella network for 21 community-based non-governmental organisations that have indigenous peoples' issues as the focus. JOAS: orangasal.blogspot.my/	Malaysia

Annex 7: Recommendation for the management and monitoring of natural saltlicks in Malaysia

In Malaysia, a 'saltlick' is defined under the respective wildlife legislation for Peninsular Malaysia (PM) and Sabah as shown in Table A below.

Table A: Definitions of 'saltlick' in relevant wildlife laws in Malaysia

Legislation	PM: Wildlife Conservation Act 2010	Sabah: Wildlife Conservation Enactment 1997	Sarawak Wildlife Protection Ordinance 1998
Definition	Any mineral spring or ground containing or bearing salt or any other mineral, the consumption of which is conducive to the health or wellbeing of wildlife.	Includes a mineral spring or any ground containing salt or another mineral sought by animals as part of their diet.	Not defined in the Ordinance but its importance is recognised in the Master Plan for Wildlife in Sarawak (1996) and the Green Book for Sustainable Forest Management (2019).

In general, saltlicks exist in two different forms, spring saltlicks and dry-land saltlicks, and (more specific to Sabah) there are also mud volcanoes that function as saltlicks (Matsubayashi and Lagan, 2014). There is a great diversity in the physical form of the saltlicks, from large and obvious sites to smaller and less conspicuous ones (see photo montage below).

A photo montage showing the diversity of natural saltlicks. Photo credits: clockwise from top left: Mohd-Azlan Jayasilan, Shariff Mohamad, Lau Ching Fong, Lau Ching Fong.

Saltlicks are utilised by a wide range of wildlife such as elephants, sambar deer, gaur, barking deer and wild boar as a supplement to their nutrient-poor plant diet (Matsubayashi *et al.*, 2006; Robbins, 1993), as well as primates, birds and rodents (Hon *et al.*, 2020; Matsubayashi *et al.*, 2006). There is also a possibility that the saltlick may have other values e.g. RTE plants (HCV 1), and the mineral water may be used for medicinal purposes by local communities (HCV 5 – see case study on the precautionary approach in the management of a hot spring saltlick in Kedah). Recognising the importance of sustaining populations of multiple RTE species, saltlicks are recognised as an essential resource for the survival of HCV 1 species under the Malaysian National Interpretation for the Identification of HCVs.

Saltlicks are usually found distributed in lowland dipterocarp/hill dipterocarp forests of elevations lower than 1,000m above sea level, and are threatened by development and logging. The intensity of use and frequency of visits by wildlife to the saltlicks also make them a target for hunters.

The legislation and guidelines pertaining to saltlicks differ between the three main regions in Malaysia i.e. Peninsular Malaysia, Sabah and Sarawak. The context and management approaches also differ between the natural forest management and plantation settings.

In both natural forest management and plantation settings, a common issue is about how to deal with hunting of wildlife in the vicinity of the saltlick and physical disturbance to the saltlick. In the case of natural forest management, hunting within FMUs is generally not allowed, particularly by the Organisation's staff/workers and commercial hunters, and similarly no-hunting provisions are also applicable to plantations under various certification schemes. Consideration should be given to subsistence hunting by indigenous communities within FMUs, in which case more specific guidelines on the hunting practices in the vicinity of the saltlicks may be needed.

The following management and monitoring recommendations are for saltlicks found within a particular MU, with specific guidance where applicable for natural forest management and plantation contexts. It is assumed that during the HCV assessment all known saltlicks have been identified and designated as HCV 1 areas in the HCV assessment report.

Within natural forest management areas:

In the natural forest management context, the main consideration is about where and what kind of logging operations can be conducted in the vicinity of the saltlick. The key objective would be to avoid any kind of physical damage to the saltlick (HCVA) and to minimise disturbance within the buffer area (HCVMA) around the saltlick. The HCV management interventions could include a logging ban in the core area or HCVA and reduced impact logging (RIL) in the buffer area (HCVMA).[24]

Within plantations:

In the case of plantations, there is a need to first establish whether the saltlick is still functioning as a resource for wildlife given that the saltlick may be isolated from forested areas and may have been significantly disturbed. Consultation with relevant wildlife experts, including from the wildlife department, is needed to determine the functionality of the saltlick before any management interventions can be formulated. If there is strong evidence that the saltlick is no longer being used by wildlife, the size of the buffer area could be greatly reduced. Based on the feedback from the regional stakeholder consultations conducted during the MYNI process, there was a consensus that even a non-functional saltlick (from a wildlife utilisation point of view), should be maintained as there is a possibility that wildlife may return if conditions change (e.g. if there is reforestation of the area) and also given the intrinsic value of the saltlick itself as a unique natural feature. There is also a possibility that the saltlick may have other values, e.g. the mineral water may be used for medicinal purposes by local communities (HCV 5) or it may have cultural significance (HCV 6).

In the case of active saltlicks within an undeveloped MU targeted for new planting, relevant studies should be conducted to understand the pattern of movement of wildlife utilising the saltlick so that adequate core conservation (HCVA), buffer areas (HCVMA) and wildlife corridors can be incorporated into the plantation design.

For existing plantations, if an active saltlick within the MU is still active and there is still wildlife visitation, the potential of human-wildlife conflict is high. The conventional approach is to install electrical fencing along the

[24] In the case of saltlick management, the buffer area around the HCVA can be considered to be the HCV Management Area (HCVMA)

MU boundary, but elephants have been known to be persistent and damage the electrical fence repeatedly, leading to high maintenance costs. Elephants that are unable to access the saltlick within the MU may also end up damaging crops in nearby plantations or even smallholder farms which in turn may lead to conflicts between the Organisation and the local community. New studies and field trials have indicated that it may be a better option to create wildlife corridors or safe passages for elephants to access the saltlick as this may help reduce human-wildlife conflict.

In ensuring that the saltlicks are conserved for the maintenance of HCV 1, the management recommendations are presented in Table B below. These recommendations are based on existing legislation, certification guidelines and findings of scientific research, and specific to Peninsular Malaysia, Sabah and Sarawak.

Table B: Management recommendations for saltlicks in Malaysia

Aspects of management & monitoring	Peninsular Malaysia	Sabah	Sarawak
Size of HCVA[25] **(core conservation area)**	The size of the HCVA is guided by the relevant provisions in the Wildlife Conservation Act 2010 i.e. a radius of 400m around the saltlick.[26]	50m radius around the saltlick according to Sabah FMU guidelines.	100m radius around the saltlick according to the Sarawak RIL guidelines and the Sarawak Green Book.[27]
Size of HCVMA (buffer area)	To be determined by the HCV assessor in consultation with relevant experts and managers.[28]	The size of the HCVMA is guided by the relevant provisions in the Sabah Wildlife Conservation Enactment 1997 i.e. a radius of 500m around the saltlick.[29]	To be determined by the HCV assessor in consultation with experts.
HCVA management	• No physical disturbance of saltlick • **For natural forest management:** No land clearing; Only RIL allowed • **For new planting:** if saltlick is active, where feasible, a wildlife corridor should be established between the saltlick and the nearest forest • **For existing planting:** if saltlick is active, where feasible, a wildlife corridor may be established between the saltlick and the nearest forest; no use of chemicals; no use of heavy machinery • No hunting allowed • No livestock allowed	• No physical disturbance of saltlick • **For natural forest management:** No land clearing; Only RIL allowed • **For new planting:** if saltlick is active, where feasible, a wildlife corridor should be established between the saltlick and the nearest forest • **For existing planting:** if saltlick is active, where feasible, a wildlife corridor may be established between the saltlick and the nearest forest; no use of chemicals; no use of heavy machinery • No hunting allowed • No livestock allowed	• No physical disturbance of saltlick • **For natural forest management:** No land clearing; Only RIL allowed • **For new planting:** if saltlick is active, where feasible, a wildlife corridor should be established between the saltlick and the nearest forest • **For existing planting:** if saltlick is active, where feasible, a wildlife corridor may be established between the saltlick and the nearest forest; no use of chemicals; no use of heavy machinery • No hunting allowed • No livestock allowed

[25] Radius could be measured from the centrepoint or the perimeter of the saltlick, depending on its specific characteristics, and should be done in consultation with relevant experts and managers based on the site.

[26] Section 81 of WCA 2010 prohibits any person from: (a) hunting any wildlife within 400 m of a saltlick; (b) being in possession of any hunting weapon within 400 m of a saltlick; or (c) waiting in any place, building any platform or shelter or setting or placing any trap, poison, etc. for the purpose of hunting any wildlife within 400 m of a saltlick or within any access road to a saltlick. Section 85 (1) of the same Act prohibits any person from disturbing (a) any saltlick; or (b) the land in the immediate vicinity of any saltlick, "which land if disturbed would render the salt lick unattractive or unsafe to any wildlife". However, Section 85 (3) states that this section shall not apply to (a) the Federal Government; or (b) any State Government, "acting, as the case may require, in pursuance of any rural development scheme, urban development scheme, forestry management scheme or industrial undertaking."

[27] The Manuals, Procedures and Guidelines for Forest Management Certification in Sarawak (Natural Forest) 2019 (i.e. the Green Book) provides guidelines to establish and protect keystone mineral resources such as salt springs, saltlick and mud volcanoes. The recommendations/action required states that keystone mineral resources should be identified and mapped, and that there should be "No logging activities within 100m radius (buffer zone) from the edge of each saltlick area. No roads shall be constructed and no hunting is allowed thins this area." The recommendations in the Green Book refer to the Forest Department Sarawak guidelines on Reduced Impact Logging (RIL) for ground-based harvesting system which states the need for a "buffer zone of 100 metres wide around the perimeter of critical resources and sites" and saltlick is classified as a critical resource and site.

[28] A radius of 2km from the saltlick is recommended by WWF-Malaysia based on the study by Rayan *et al.* (2013).

[29] Section 33 of the Wildlife Conservation Enactment 1997 states that no unauthorised person shall… "(g) for the purposes of hunting, approach or build any platform or hide within five hundred metres of any salt lick or mud wallow".

Aspects of management & monitoring	Peninsular Malaysia	Sabah	Sarawak
HCVMA management	• **For natural forest management:** No land clearing; Only RIL allowed • **For new planting:** if saltlick is active, where feasible, a wildlife corridor should be established between the saltlick and the nearest forest • **For existing planting:** if saltlick is active, where feasible, a wildlife corridor may be established between the saltlick and the nearest forest; no use of chemicals; no use of heavy machinery • No hunting allowed • No livestock allowed	• **For natural forest management:** No land clearing; Only RIL allowed • **For new planting:** if saltlick is active, where feasible, a wildlife corridor should be established between the saltlick and the nearest forest • **For existing planting:** if saltlick is active, where feasible, a wildlife corridor may be established between the saltlick and the nearest forest; no use of chemicals; no use of heavy machinery • No hunting allowed • No livestock allowed	• **For natural forest management:** No land clearing; Only RIL allowed • **For new planting:** if saltlick is active, where feasible, a wildlife corridor should be established between the saltlick and the nearest forest • **For existing planting:** if saltlick is active, where feasible, a wildlife corridor may be established between the saltlick and the nearest forest; no use of chemicals; no use of heavy machinery • No hunting allowed • No livestock allowed
MU-wide management	• **For natural forest management:** All feeder roads or secondary roads should be decommissioned after logging activities • Monitoring and patrolling against hunting and encroachment	• **For natural forest management:** All feeder roads or secondary roads should be decommissioned after logging activities • Monitoring and patrolling against hunting and encroachment	• **For natural forest management:** All feeder roads or secondary roads should be decommissioned after logging activities • Monitoring and patrolling against hunting and encroachment

Monitoring recommendations for saltlicks are presented in Table C below and are organised according to the three main types of monitoring i.e. threat monitoring, strategic/effectiveness monitoring and operational monitoring.

Table C: Monitoring recommendations for saltlicks in Malaysia

Type of monitoring	Monitoring recommendations
Threat monitoring	• Regular monitoring patrols using tools such as the Spatial Monitoring and Reporting Tool (SMART) to record threats such as the presence of hunting or trapping activities, vegetation disturbance, soil disturbance human activities (e.g. camping), etc. • Where feasible, available technology should be used e.g. live-feed camera traps, closed-circuit television (CCTV) to facilitate immediate actions if prohibited activities are detected.
Strategic monitoring	• Annual monitoring to assess the effectiveness of the measures in the HCVA and HCVMA and the functionality of the saltlick. • Proxies for effectiveness include species richness, frequency of visits and relative abundance of the wildlife utilising the saltlick. • At a minimum, keep records of species detected at or near the saltlick based on secondary signs such as tracks and dung. • Document physical changes to the saltlick and surrounding environments, e.g. siltation, flooding, prolonged drying up of saltlick. etc. • When a potential new saltlick is discovered, documentation of wildlife visitation as well as water quality and mineral testing should be carried out to ensure that the saltlicks are still active, i.e. that they still contain minerals which are readily utilised by herbivores. Experts in this field should be consulted whenever required.
Operational monitoring	• Records on the number of monitoring patrols conducted per year. • Records on training activities conducted per year for staff e.g. on species identification. • Annual monitoring of expenditure on HCV management and monitoring. • Periodic review of threat and strategic monitoring records.

References:

Hon, J., S. Shibata & H. Samejima. 2020. Species Composition and use of Natural Saltlicks by Wildlife Inside a Production Forest Environment in Central Sarawak. In: Ishikawa, N. & R. Soda (eds.). 2020. *Anthropogenic Tropical Forests, Advances in Asian Human-Environmental Research*, Springer Nature, Singapore. https://doi.org/10.1007/978-981-13-7513-2_9

Matsubayashi, H. & P. Lagan. 2014. *Natural salt-licks and mammals in Deramakot: their importance and why they should be conserved*. Sabah Forestry Department, Sandakan, Sabah, Malaysia.

Matsubayashi, H., P. Lagan, N. Majalap, J. Tangah, A.S. Jum Rafiah, & K. Kitayama. 2006. Importance of Natural licks for the mammals in Bornean Inland tropical rain forests. *Ecological Research* 22(5): 713-847.

Rayan, M. D., S. Mohamad, C. Wong, E.S. Siwan, L.C. Fong, M. Hamirul & A. Mohamed. 2013. *Conservation status of tigers and their prey in the Belum-Temengor Forest Complex*. WWF-Malaysia Report, Petaling Jaya, Malaysia.

Robbins, G.T. 1993. *Wildlife Feeding and Nutrition*. Academic Press, San Diego, California, USA.

Annex 8: Stakeholder Consultation Participants

A. Technical Working Group Kick-off Meeting, 20th February 2020, Petaling Jaya

No.	Organisation
1.	Dayak Oil Palm Planters Association (DOPPA)
2.	FGV Holdings Berhad
3.	Genting Plantations Berhad
4.	Kuala Lumpur Kepong (KLK) Berhad
5.	Malaysia Palm Oil Board (MPOB
6.	Malaysian Nature Society (MNS)
7.	NEPCon (now known as Preferred by Nature)
8.	Sarawak Forestry Corporation
9.	Sarawak Oil Palm Plantation Owners Association (SOPPOA)
10.	Sime Darby Plantation Berhad
11.	Wild Asia
12.	Wildlife Conservation Society (WCS) Malaysia
13.	WWF-Malaysia
14.	Wilmar International Limited

B. Regional Stakeholder Consultation: Sabah online session (via Zoom), 23rd September 2020

No.	Organisation
1.	Borneo Conservation Trust
2.	Bornion Timber Sdn. Bhd.
3.	East Malaysia Planters Association (EMPA)
4.	Forest Solutions Malaysia Sdn. Bhd.
5.	Kiwiheng Environmental Consultants Sdn. Bhd.
6.	Malaysian Nature Society (Sabah branch)
7.	Pacos Trust
8.	Sabah Forest Industries Sdn. Bhd.
9.	Sabah Forestry Department
10.	Sabah Timber Industries Association
11.	Sapulut Forest Development Sdn. Bhd.
12.	TSH Plantations Sdn. Bhd.
13.	WWF-Malaysia

C. Regional Stakeholder Consultation: Sarawak online session (via Zoom), 5th October 2020

No.	Organisation
1.	Billion Venture Sdn. Bhd.
2.	GP Pusaka Sdn. Bhd.
3.	Jaya Tiasa Holdings Berhad
4.	Malaysian Nature Society (Kuching branch)
5.	Malaysia Palm Oil Board (MPOB)
6.	Mewah Oils Sdn. Bhd.
7.	Samling Group
8.	Sarawak Forestry Corporation
9.	Sarawak Timber Association
10.	Shin Yang Sdn. Bhd.
11.	Subur Tiasa Holdings Berhad
12.	Ta Ann Group
13.	Universiti Malaysia Sarawak (UNIMAS)
14.	WCS Malaysia
15.	WWF-Malaysia

D.Regional Stakeholder Consultation: Peninsular Malaysia online session (via Zoom), 7th October 2020

No.	Organisation
1.	Bunge Loders Croklaan
2.	Ecological Economic Solutions Sdn. Bhd
3.	Environmental Protection Department, Sabah
4.	ERE Consulting Group Sdn. Bhd.
5.	FGV Holdings Berhad
6.	Forest Research Institute Malaysia (FRIM)
7.	Forestry Department Peninsular Malaysia
8.	Genting Plantations Berhad
9.	Global Environment Centre (GEC)
10.	Habitat Foundation
11.	IOI Corporation Berhad
12.	Kuala Lumpur Kepong (KLK) Berhad
13.	Malaysian Environmental Consultants Sdn. Bhd. (MEC)
14.	Malaysian Nature Society
15.	Malaysian Palm Oil Board (MPOB)
16.	Malaysian Palm Oil Certification Council (MPOCC)
17.	Mewah Oils Sdn. Bhd.
18.	Ministry of Plantation Industries and Commodities (MPIC)
19.	Monash University Malaysia
20.	Perak State Parks Corporation
21.	Sabarinah & Associates
22.	Sime Darby Plantation Berhad
23.	Tuv Nord (Malaysia) Sdn. Bhd.
24.	University of Nottingham Malaysia
25.	Wild Asia
26.	Wilmar International Limited
27.	WWF-Malaysia
28.	Yayasan Sime Darby

E. National Stakeholder Consultation online sessions (via Zoom) on 8-10th December 2020, and three additional sessions on specific topics on 21st & 22nd December 2020

No.	Organisation
1.	Acacia Forest Industries Sdn. Bhd.
2.	Ambank
3.	Archilles Group
4.	Asrama Raya Sdn Bhd.
5.	Bornion Timber Sdn. Bhd.
6.	Bunge Loders Croklaan
7.	BSI Group
8.	Control Union (Malaysia) Sdn. Bhd.
9.	DQS Certification (Malaysia) Sdn. Bhd.
10.	Environmental Protection Department Sabah
11.	East Malaysia Planters' Association (EMPA)
12.	Forestry Department Peninsular Malaysia
13.	Forest Research Institute Malaysia (FRIM)
14.	FSC Malaysia
15.	Glenealy Plantations Sdn. Bhd.
16.	Global Environmental Centre (GEC)
17.	GP Pusaka Sdn. Bhd.
18.	Habitat Foundation

No.	Organisation
19.	IJM Corporation Berhad
20.	IOI Corporation Berhad
21.	Jayatiasa Holdings Sdn. Bhd.
22.	Ministry of Energy and Natural Resources (KeTSA)
23.	Kuala Lumpur Kepong Berhad (KLK)
24.	KTS Plantation Sdn. Bhd.
25.	Malaysian Conservation Alliance for Tigers (MYCAT)
26.	Malaysian Environmental Consultants Sdn. Bhd. (MEC)
27.	Malaysian Estate Owners' Association (MEOA)
28.	Malaysian Nature Society (MNS)
29.	Malaysian Timber Certification Council (MTCC)
30.	MDK Asia Sdn. Bhd.
31.	Mewah Oils Sdn. Bhd.
32.	Ministry of Urban Development & Natural Resources Sarawak (MUDeNR)
33.	Monash University Malaysia
34.	Resource Stewardship Consultants Sdn. Bhd. (RESCU)
35.	Sabah Forest Industries Sdn. Bhd. (SFI)
36.	Sabah Forestry Department
37.	Sabah Timber Industries Association (STIA)
38.	Samling Group
39.	Sapulut Forest Development Sdn. Bhd.
40.	Sarawak Dayak Iban Association (SADIA)
41.	Sarawak Forestry Corporation (SFC)
42.	Sarawak Timber Association (STA)
43.	Sawit Kinabalu Group
44.	Shin Yang Group
45.	Sime Darby Plantation Berhad
46.	Ta Ann Group
47.	TAY Rubber
48.	Tuv Nord (Malaysia) Sdn. Bhd.
49.	Universiti Malaysia Sarawak (UNIMAS)
50.	Wildlife Conservation Society (WCS) Malaysia
51.	Wild Asia
52.	Wilmar International Limited
53.	WWF-Malaysia