#### HCV 1.2 Threatened and Endangered Species

HCV 1.2 is defined as: Any species categorised as either Critically Endangered (CR), Endangered (EN) or Vulnerable (VU) on the IUCN Red List, Appendix I of CITES or listed as protected under Malaysian legislation (federal or state), is HCV 1.2.

## Findings

# Flora

584 species of flora was identified and described during the survey (see Appendix 2 for full list of species). Out of these, 7<sup>5</sup> species are listed as Vulnerable, 4 species as Endangered and 9 as Critically Endangered; 35 of these 584 species are further protected by Sabah Forestry Enactment 1968 and 16 under the Wildlife Conservation Enactment 1997 (Table 3; Reuben N. and John S., 2015). These HCVs can be found in the locations shown in Figure 11.



Figure 11 Permanent sample plots where critically endangered (CR), endangered (EN) and vulnerable (VU) plants species were found.

<sup>&</sup>lt;sup>5</sup> The Malaysian Plant Red List takes precedence over the Global IUCN Red List

Table 3 List of threatened and endangered species, including those protected by state forestry and wildlife laws. IUCN Red List: CR=Critically endangered; EN=Endangered; VU=Vulnerable; NT=Near threatened; LC=Least concern; NE=Not Evaluated. IUCN Conservation status without brackets follows the global assessment; conservation status in brackets () is based on the Malaysian Plant Red List; conservation status in brackets () and \* is based on regional assessment for the Sabah endemic dipterocarp. Blank denotes no data. Adapted from Reuben N. and John S.(2015)

Family	Species	IUCN	SFD Prohibited	SWCE
Anacardiaceae	Dracontomelon dao	NE	Yes	No
Anacardiaceae	Mangifera foetida	LC	Yes	No
Anacardiaceae	Mangifera griffithii	NE	Yes	No
Anacardiaceae	Mangifera macrocarpa	VU	Yes	No
Anacardiaceae	Mangifera swintonioides	NE	Yes	No
Burseraceae	Dacryodes rostrata	LC	Yes	No
Burseraceae	Santiria laevigata	LC	Yes	No
Dipterocarpaceae	Anisoptera costata	EN (VU)	No	No
Dipterocarpaceae	Anisoptera reticulate	CR	No	No
Dipterocarpaceae	Dipterocarpus validus	CR	No	No
Dipterocarpaceae	Parashorea malaanonan	CR	No	No
Dipterocarpaceae	Shorea acuminatissima	CR	No	No
Dipterocarpaceae	Shorea agamii	EN	No	No
Dipterocarpaceae	Shorea almon	CR	No	No
Dipterocarpaceae	Shorea andulensis	EN	No	No
Dipterocarpaceae	Shorea argentifolia	EN	No	No
Dipterocarpaceae	Shorea seminis	CR	No	No
Dipterocarpaceae	Shorea symingtonii	CR	No	No
Dipterocarpaceae	Shorea smithiana	CR	No	No
Dipterocarpaceae	Shorea superba	CR	No	No
Dipterocarpaceae	Vatica maritime	EN	No	No
Fabaceae	Koompassia malaccensis	LC	Yes	No
Malvaceae	Durio acutifolius	VU	Yes	No
Malvaceae	Durio lanceolatus	NE	Yes	No
Malvaceae	Durio testudinarius	NE	Yes	No
Moraceae	Artocarpus dadah	NE	Yes	No
Moraceae	Artocarpus kemando	NE	Yes	No
Nepenthaceae	Nepenthes ampullaria	NE	No	Yes
Nepenthaceae	Nepenthes gracilis	NE	No	Yes
Nepenthaceae	Nepenthes mirabilis	NE	No	Yes
Nepenthaceae	Nepenthes rafflesiana	NE	No	Yes
Orchidaceae	Acriposis liliifolia	NE	No	Yes
	Bromheadia			
Orchidaceae	finlaysoniana	NE	No	Yes
Orchidaceae	Bulbophyllum lepidum	NE	No	Yes
Orchidaceae	Claderia viridiflora	NE	No	Yes
Orchidaceae	Dendrobium pinifolium	NE	No	Yes
Orchidaceae	Eria longirepens	NE	No	Yes
Orchidaceae	Liparis lacerate	NE	No	Yes
Phyllanthaceae	Baccaurea cf. sumatrana		Yes	No
Phyllanthaceae	Baccaurea lanceolata	NE	Yes	No

Phyllanthaceae	Baccaurea macrocarpa	NE	Yes	No
Phyllanthaceae	Baccaurea odoratissima	VU	Yes	No
Phyllanthaceae	Baccaurea parviflora	NE	Yes	No
Phyllanthaceae	Baccaurea sumatrana	NE	Yes	No
Phyllanthaceae	Baccaurea tetrandra	NE	Yes	No
Phyllanthaceae	Baccaurea trigonocarpa	NE	Yes	No
Rhizophoraceae	Bruguiera parviflora	LC	Yes	No
Rhizophoraceae	Ceriops decandra	CR	Yes	No
Rhizophoraceae	Ceriops tagal	LC	Yes	No
Rhizophoraceae	Rhizophora apiculata	LC	Yes	No
Rhizophoraceae	Rhizophora mucronata	LC	Yes	No
	Scyphiphora			
Rubiaceae	hydrophyllacea	LC	Yes	No
	Maclurodendron			
Rutaceae	pubescens	VU	No	No
Sapindaceae	Dimocarpus longan	NT	Yes	No
Sapindaceae	Nephelium deadaleum	NE	Yes	No
	Nephelium ramboutan-			
Sapindaceae	ake	NE	Yes	No
Sapindaceae	Nephelium uncinata	NE	Yes	No
Thymelaeaceae	Gonystylus affinis	NE	Yes	No
Thymelaeaceae	Gonystylus bancanus	VU	Yes	No
Thymelaeaceae	Gonystylus forbesi	NE	Yes	No
Thymelaeaceae	Gonystylus nervosus	VU	Yes	No
Vitaceae	Tetrstigma diepenhorstii	NE	No	Yes
Zingiberaceae	Alpinia acquatica	NE	No	Yes
Zingiberaceae	Alpinia havilandii	NE	No	Yes
Zingiberaceae	Etlingera fimbriobractosta	NE	No	Vos
	Jimbilobracleata			162
Zingiberaceae	Globba pendula	NE	NO	Yes

## Fauna – Mammals

10 out of 20 terrestrial mammals species which were detected in Trusan Sugut FR are considered critically endangered, endangered or vulnerable (Table 4; see Appendix 3 for full list). All of these 10 species are provided different levels of protection under the Sabah Wildlife Conservation Enactment 1997. Figure 12 shows where these HCVs were detected in Trusan Sugut FR.

Table 4 Terrestrial species detected with the camera traps. Schedule 1 – Totally protected species; Schedule 2 – Protected species for which hunting license is required and collection is limited; Schedule 3 – Protected species for which hunting license is required. \* denotes species endemic to Borneo.

		Conservation / Legal Status		
Common Name	Species	IUCN <sup>6</sup>	Sabah Wildlife Conservation Enactment 1997	
	Mammals			
Orang-utan*	Pongo pygmaeus	Critically Endangered	Schedule 1	
Banteng	Bos javanicus	Endangered	Schedule 1	
Clouded leopard	Neofelis diardi	Vulnerable	Schedule 1	
Malayan sun bear	Helarctos malayanus	Vulnerable	Schedule 1	
Leopard cat <sup>7</sup>	Prionailurus bengalensis	Least Concern	Schedule 1	
Bay cat* <sup>8</sup>	Catopuma badia	Endangered	Schedule 2	
Pig-tailed macaque	Macaca nemestrina	Vulnerable	Schedule 2	
Oriental small-clawed otter	Aonyx cinerea	Vulnerable	Schedule 2	
Banded palm civet	Hemigalus derbyanus	Vulnerable	Schedule 2	
Bearded pig	Sus barbatus	Vulnerable	Schedule 3	
Sambar deer	Rusa unicolor	Vulnerable	Schedule 3	

<sup>&</sup>lt;sup>6</sup> As of September 2016

<sup>&</sup>lt;sup>7</sup> This species was captured in a camera trap deployed later than the ones mentioned in the table

<sup>&</sup>lt;sup>8</sup> This species was captured in a camera trap deployed later than the ones mentioned in the table.



Figure 12 Locations of orang utan, clouded leopard, banteng, sun bear and bay cat detected with camera traps.

Figure 13 shows the abundance of nests in Trusan Sugut FR, which is a proxy to orang utan density and habitat use. From the nest surveys, the population of orang utan population in Trusan Sugut was estimated to be at around 80 individuals (mean = 79.94, 95% CI: 38.82-121.09) and the density of orang utan was calculated to be at 2.08 ind/km<sup>2</sup> (95% CI: 1.01-3.15). Interestingly enough, the orang utan in Trusan Sugut FR were observed to utilise only about 44% of the total area (38.44 km<sup>2</sup>), most likely due to habitat suitability (WWF-Malaysia, 2014).

The survey of proboscis monkey yielded approximately 25 individuals from 2 harems and one group consisting of all males<sup>9</sup> (Sabah Forestry Department, *unpublished report*). Previous studies indicated that the population of proboscis monkeys within the Sugut River (located adjacent to Sugut FR) was approximately 787 individuals in 58 groups (Sha *et al.*, 2011). Proboscis monkeys are totally protected under the Wildlife Conservation Enactment 1997 and the species is considered endangered (IUCN, 2015).

<sup>&</sup>lt;sup>9</sup> This survey was conducted only along Sugut Prai River, a tributary off Sugut River within a short period of time.



Figure 13 Abundance of Orang Utan nests and proboscis monkey sightings in Trusan Sugut Forest Reserve

#### Fauna – Birds

13 bird species out of 232 that were detected in Trusan Sugut FR are considered as near-threatened, vulnerable, endangered or critically endangered (Table 5; see Appendix 3 and 5 for full list of species). The locations of these HCV 1.2 species detected are shown in Figure 14.

Table 5 Bird species found in Trusan Sugut Forest Reserve which are listed as near-threatened, vulnerable, endangered and critically endangered under the IUCN Red List. Adapted from John B. (*unpublished report*). \* these two species were detected from the camera traps deployed

		Conservation/ Legal Status		
Common Name	Species	IUCN	Sabah Wildlife Conservation Enactment (Schedule II)	
Helmeted Hornbill	Rhinoplax vigil	Critically Endangered	x	
Storm's Stork*	Ciconia stormi	Endangered	x	
Chestnut-necklaced Partridge	Arborophila charltonii	Vulnerable	x	
Lesser Adjutant	Leptoptilos javanicus	Vulnerable	x	
Chinese Egret	Egretta eulophotes	Vulnerable	x	
Wallace's Hawk Eagle	Nisaetus nanus	Vulnerable	x	

Far Eastern Curlew	Numenius madagascariensis	Vulnerable	x
Great Slaty Woodpecker	Mulleripicus pulverulentus	Vulnerable	
Blue-headed Pitta	Hydrornis baudii	Vulnerable	x
Crested Fireback*	Lophura ignita	Near threatened	x
Mangrove Pitta <sup>10</sup>	Pitta megarhyncha	Rare; Near- threatened	
Black-throated Wren Babbler <sup>11</sup>	Turdinus atrigularis	Uncommon; Near-threatened	
Black-headed Pitta <sup>12</sup>	Erythropitta ussheri	Common; Near threatened	



Figure 14 Locations of vulnerable, endangered and near threatened bird species in Trusan Sugut Forest Reserve

# Fauna - Fish

There were 28 species of fish recorded during this survey (Appendix 8). None of the fish recorded from this survey are endangered or protected by any laws.

<sup>&</sup>lt;sup>10</sup> The Mangrove Pitta, although near-threatened, is worth noting here as it is naturally a rare species and should be given extra attention.

<sup>&</sup>lt;sup>11</sup> The Black –throated Wren Babbler should be given attention as the species is only found in Borneo, and listed as uncommon and near-threatened (BirdLife International, 2012).

<sup>&</sup>lt;sup>12</sup> The Black-headed Pitta should be given attention as this species is confined to primary and secondary forests of Sabah, and although common in its range, is considered near threatened as the population is in decline (BirdLife International, 2012)

#### Management recommendations for flora

Since this is a protection forest (Class I) there should not be any threats towards the HCVs found in Trusan Sugut FR. However, constant monitoring should be in place so that these HCVs are not threatened by fires/ poachers.

It is worth mentioning that fire has been identified as a threat to Trusan Sugut FR as most of the reserve has been logged and is categorised as secondary growth vegetation (Reuben N & John S., 2015). Furthermore, the location of the forest reserve surrounded by settlements and agricultural land further increases the threat of fire to Trusan Sugut FR. In 1998 during the El Nino event, drought-related fire events devastated 190,000 ha of forest reserves in Sabah, including Trusan Sugut FR (Sabah Forestry Department, 2015). In 2015 during the dry period, there was a big forest fire in Sugut Forest Reserve (north of Sg. Sugut) (M. Salutan, SFD, pers. comm.) and the fire nearly spread into Trusan Sugut FR if not for Sg. Sugut that separates the two forest reserves. Therefore, a comprehensive Standard Operating Procedures (SOP), such as those outlined in the Forest Fire Management Plan for Sugut Conservation Area (Sabah Forestry Department, 2015) should be adhered to at all times to address the threat of fire in case it happens.

Degraded parts of the forest reserve are suggested to be rehabilitated to improve the diversity and structure of the forest; the management is encouraged to plant endangered local species where suitable (refer to Reuben N. and John S., 2015; restoration proposal by WWF-Malaysia, 2016; Section 5, Trusan Sugut FMP). Patrolling should be carried out to monitor for illegal logging (see section 4, Trusan Sugut FMP).

#### Management recommendations for fauna

Similar to the management recommendation for flora, the HCVs found within Trusan Sugut FR should be totally protected. However, frequent patrolling should be in place to prevent/ minimise hunting within Trusan Sugut FR. A comprehensive enforcement plan prepared by WWF-Malaysia (2015, *unpublished*) will help safeguard the fauna HCVs identified, therefore it is strongly recommended to follow and implement the enforcement plan.

To improve habitat for orang utan and to increase orang utan food trees within Trusan Sugut FR, a restoration proposal (WWF-Malaysia, 2016) has been prepared to rehabiliate some of the degraded areas suitable for orang utan. Furthermore, the improved forest condition and structure will benefit other animals and improve ecosystem function and reduce the spread of fires during dry periods. Fig trees should be planted for hornbills which are present in Trusan Sugut FR, especially for helmeted hornbills which are critically endangered (see Trusan Sugut FMP, Section 5).

#### Monitoring recommendations for flora

It was suggested in the report by Reuben N. and John S. (2015) that long-term monitoring using permanent sample plots (for e.g. the existing 10 PSPs) can be useful in determining long-term population trends caused by variations in weather or unpredictable natural catastrophic events. Apart from the above, satellite imagery can be used as a tool to monitor forest cover and health over time.

Regular patrols should be carried out during drought season. Satellite imagery is useful to help detect hotspots during the drought period. Similarly, a fire observation tower helps to detect fires early so that loss can be minimised.

#### Monitoring recommendations for fauna

Patrolling should be carried out regularly to ensure that no illegal hunting or harvesting of animals and animal parts are conducted in Trusan Sugut FR. Patrolling activities should follow that of the annual workplan and enforcement plan (see section 4, Trusan Sugut FMP).

Monitoring should be carried out at a set period of time, using selected indicator species, to find out if wildlife density has increased or decreased. One example would be to monitor for selected bird species (such as those sensitive to environmental change), e.g. hornbills, at different locations throughout the whole Trusan Sugut FR using the methods prescribed in Appendix 6-8 at an interval of a two-year period. This will give an indication if the resident population of selected species is maintaining, increasing or decreasing in size.

It could be worth monitoring the proboscis monkeys as they are threatened by habitat loss and fragmentation (Sha *et al.*, 2008). Since this survey only covered Sg. Sugut Prai, it is suggested that a full survey be carried out along Sg. Sugut to obtain a better idea of the population size in and around Trusan Sugut FR. It is suggested that these species are surveyed once in every two years to monitor the population size.