BIODIVERSITY ASSESSMENT FINAL REPORT
ANGLO EASTERN PLANTATION
NEGERI TERENGGANU

REPORT PREPARED BY:

MOHD HAIROL MAT ZIN & AIDA GHANI

December 2019 (Version 1.1)

ABOUT ASSESSOR

Mohd Hairol Bin Mat Zin, the Bird Naturalist, has conducting bird studies for seven years. He currently worked in Perak State Department of Wildlife and National Park (DWNP) of Peninsular Malaysia for 11 years and has been involved in wildlife conservation, bird identification, and wildlife inventory programs in Peninsular Malaysia by identifying bird species, bird survey, and handling wildlife camera traps in National Park for data collections. He also has participated in The International Bird Competition at Fraser Hill in 2015 (won the 5th place), 2017 (won the 2nd place, Novice category), and won the 3rd place for Advance Category in 2018. Mohd Hairol bin Mat Zin also participated in Royal Belum Scientific Expedition Year 2010, Kg Belum Lama Scientific Expedition, 2017, Royal Belum Scientific Expedition Year 2018 and the Mount Korbu Scientific Expedition, 2019, for birds and wildlife. He also performs the enforcement duties under the Wildlife Conservation Act (Act 716).

Aida Ghani is a conservation practitioner. She worked at the Zoo Taiping & Night Safari management team for two (2) years mainly focusing on Orang Utan and other wildlife ex-situ conservation activities. She has worked for more than a decade in the plantation sustainability. She possesses vast experience in oil palm including establishing manuals and guidelines prior to achieving the RSPO sustainability certification in Malaysia, Indonesia and West Africa. She carries out RSPO/ISOs internal auditing, conducting High Conservation Value (HCV) and Socio-Environmental Impact Assessments (SEIA), ground-truth for inland and peatland forest restorations and rehabilitation projects.

Contents

1.0 ASSESSMENT OVERVIEW & FINDINGS

1.1 Introduction

This section will describe the biological components of study area for species of mammals, reptiles, amphibians and avifauna. The evidence is based on data collected from field surveys and supported by interviews from the local workers, as well as published and unpublished data provided by the Terengganu State of DWNP. The main objectives of this wildlife study carried out in the identified estate area are;

- To assess the status of biodiversity in Anglo Eastern Plantation
- To evaluate and provide management and monitoring recommendations to ensure that production activities do not negatively impact biodiversity.
- To support and provide the information of wildlife for the prerequisite requirement of sustainable certification requirements.

The key guidance that any plantation has today of how one defines sustainability in agriculture is through the sustainable certification scheme and association. Biodiversity assessments should collect and collate information that includes the planted area itself and relevant wider landscape-level considerations (such as wildlife corridors). This information should cover:

- Presence of protected areas that could be significantly affected by the grower or miller;
- Conservation status (e.g. IUCN status), legal protection, population status and habitat requirements of rare, threatened, or endangered (RTE) species that could be significantly affected by the grower or miller;
- Identification of rare and threatened ecosystems and fauna that could be significantly affected by the grower or miller;

Where rare, threatened or endangered (RTE) species, are present or are affected by plantation or mill operations, appropriate measures are expected to maintain the species biodiversity and/or enhanced them. These measures will include:

- Ensuring that any legal requirements relating to the protection of the species or habitat are met;
- Avoiding damage to and deterioration of habitats, corridors are conserved, and buffer zones around rivers are created;
- Ensuring that any legal requirements relating to the protection of the species or habitat are met.

- Controlling any illegal or inappropriate hunting, fishing or collecting activities; and developing responsible measures to resolve human-wildlife conflicts (e.g., incursions by elephants).

1.2 Study Area

Table 1: Locations for assessment study at Anglo Eastern Plantation Sdn Bhd

Location	GPS	Area Size (ha)
Ladang Putera North	N 4˚16.1890', E 103˚2.5710'	1478.70
Sg Chekmek Putera North	N 4˚16.0190', E 103˚2.5220'	
Sg Terajul	N 4˚14.5120', E 103˚2.7090'	
Ladang Manyvest	N 4˚13.2400', E 103˚7.2250'	2732.00
Pondok Puncak	N 4˚14.1330', E 103˚6.2180'	
Forest boundaries	N 4˚14.1960', E 103˚7.9020'	
Ladang Putera South	N 4˚11.3070', E 103˚6.5550'	2157.30
Elektric fence access point	N 4˚11.6860', E 103˚6.2640'	
Entrance gate	N 4˚12.4640', E 103˚3.8580'	

Table 1 shows the location of biodiversity assessment studies in Anglo Estate Plantation Sdn Bhd. The shape of the terrain for all nine locations is lowland and hill between 200m to 500m above sea level. The distance of the eight location from the main road is about 15km and the Ladang Putera North is about 30km from the main road. All of these locations are adjacent to the forested area. The nearest forest reserve to the estate is the Nipah River Forest Reserve with area of 24593ha.

Manyvest estate is the largest estate with an area of 2,732 hectare of land, which is divided into four divisions A, B, C and D. Each division was replanted with oil palm trees started in 1992. and the latest in 1998. However, there are also an area that are not suitable to plant the oil palm trees because of the hilly and steep area conditions.

Putera North estate with the area of 1478.70 ha, is the farthest from the main road, compare to the other two estates. There are two rivers which is Sungai Terajul as the boundary between Putera North estate and Terajul estate, and Sungai Chekmek which located inside the Putera North estate. This river helps to sustain the soil moisture for trees surrounded between estates.

Next, the Putera South estate with the area of 2157.3 ha, which not all area is covered with oil palm. This is because the shape of the terrain is too steep and there is also a disturbance left by wild elephants during the area opening particularly at Field 98D (39 hectares). Thus, the stakeholder only allowed these uncovered oil palm areas to be planted with wild trees.

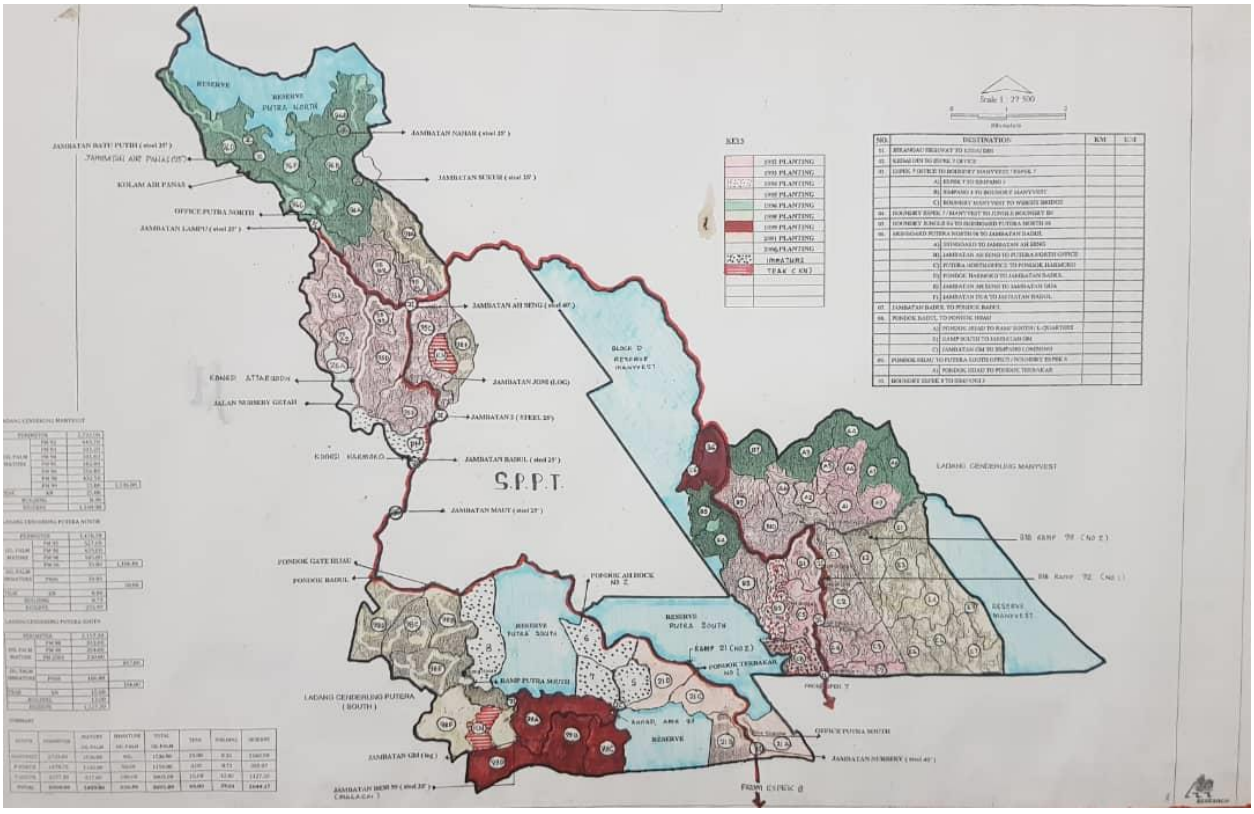

Figure 1: The locations of biodiversity assessment study

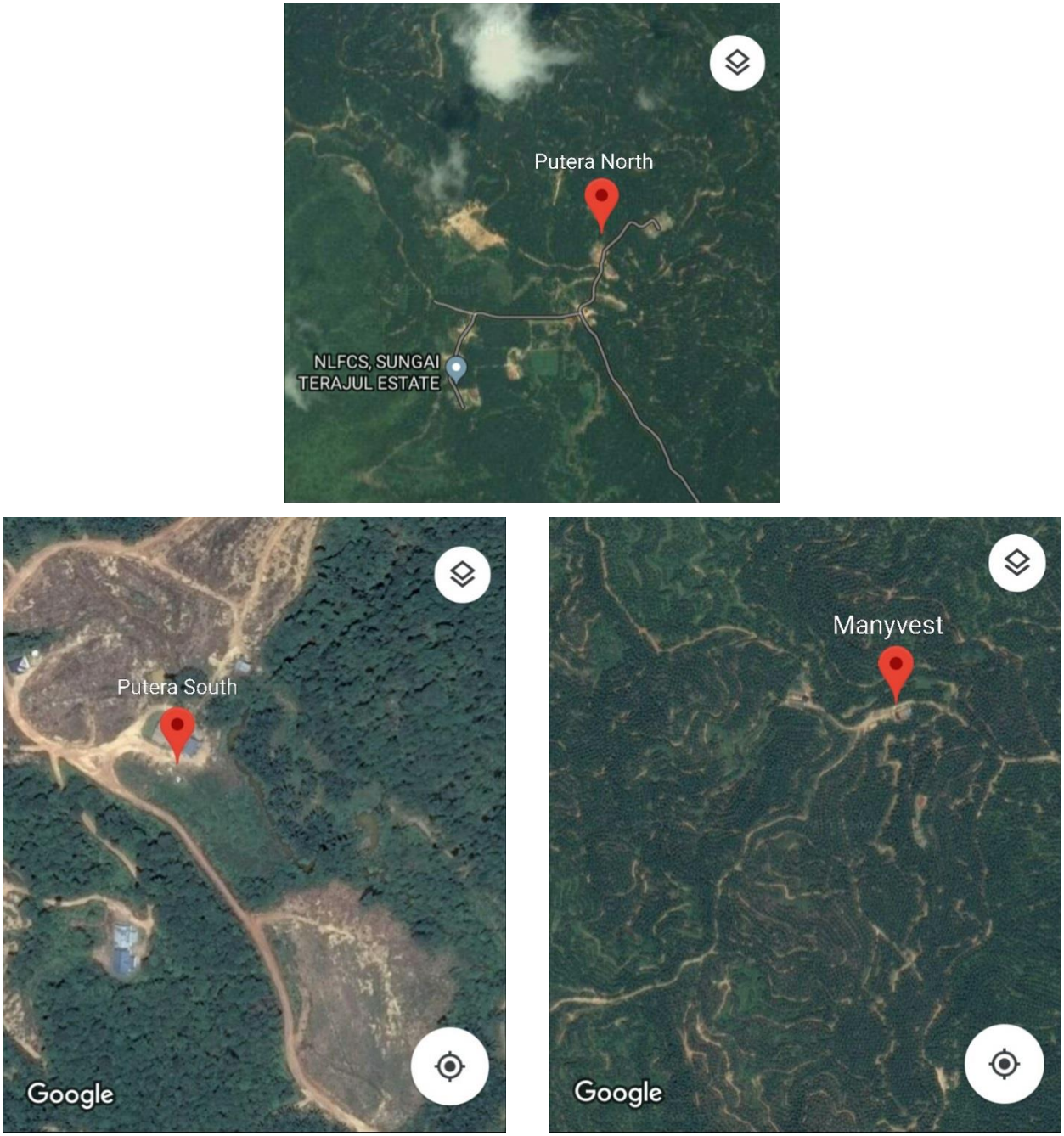

Figure 2: Satellite views of Manyvest estate, Putera North estate, and Putera South estate.

1.3 Timeline and Methodology

The complete biodiversity assessment comprises of the following steps:

- Team formation and briefing on project scope
- Compilation of secondary and primary data, including preliminary stakeholders' consultation

- Fieldwork and primary data collection – physical inspection, site observation & stakeholders
- Data analysis and interpretation
- Preparation of full report, revision and finalise (Final)

Table 2: Assessment timeline

No.	Phase	Date	Activities
1	Preliminary data gathering	November 2019	• Desktop Study • Visit notification and logistic
2	Fieldwork / site verification	30/11/2019 to 2/12/2019	• Anglo Eastern Plantation Estates survey / site visit
3	Data Analysis and discussion	December 2019	• Analysis of ground survey data • Compiling information and findings • Interpretation and discussion among biodiversity team
4	Reporting and review	Dec 2019	• Report Writing • Data verification and draft review • Finalise and distribution

The study is conducted by using a random (consideration of site accessibility and safety precaution) technique sampling in transect line method. The identifications of fauna species (mammals, reptiles and amphibian's species) was done by observations and sound identifications. Along the selected path area, each individual wildlife which passing through the views is recorded and the flora species surrounded are also been recorded. During the preparation stage, the assessment team has collected as much data as possible to make a preliminary judgement. Collection and discussion of available information are categorized as per table below:

Table 3: Sources of information/reference used

Key Data	Information Sources
Habitat and biodiversity information	• Map of known ecosystem (i.e. forest type) • IUCN Red List of threatened Species – www.iucnredlist.org • Appendices I, II, III (CITES 2018)

Key Data	Information Sources
	• Line transect sampling, Point Count Sampling, & Opportunistic Sampling • Internal and external stakeholder consultation
Ecosystem services information	• Schematic reconnaissance soil map of Malaysia, by Department of Agriculture • Topographic maps (contour, slope) • Estate GPS maps • Internal and external stakeholders' consultation

1.4 Results

Although the study area is meant to be developed for agriculture, the flora diversity is rather high for oil palm plantation, thus, the diversity of wildlife species was also significant and relatively predictable in this study.

1.4.1 Flora Species

Table 4 shows the flora found at the boundary of the estate and inside the estate. For this estate, there were no original tree is left in the field. Only shrubs that grows around the periphery of the estate such as grass, mahogany, ferns and others (Figure 3). There were also rivers across the fields namely Sungai Terajul, Sungai Chekmek and Sungai Ayam (located inside Putera South estate).

Table 4: List of flora recorded

Local name	Common name	Scientific name
Senduduk	Straits Rhododendron	*Melastoma malabathricum*
Senduduk Bulu	Hairy Clidemia	*Clidemia hirta*
Pokok Kapal Terbang	Siam Weed	*Chromolaena odorata*
Rumput pahit	Slender Panic Grass	*Ottochloa nodosa*
Paku Larat	Broad sword Fern	*Nepholepis biserrata*
Paku rawan / pucuk midin		*Staenochlaena spp.*
Resam	Tropical Bracken	*Dicranopteris linearis*
Paku Rawan		*Nepholepis biserrata*
Mahang	Macaranga	*Macaranga Spp*

Local name	Common name	Scientific name
Rotan	Rattan	*Calamus sp.*
Pisang Liar	Wild Banana	*Musa sp.*
Anak Sawit Liar	Volunteer oil palm seeding	*Elaeis guineensis*
Pokok Tumpang	Fig	*Ficus Spp.*

Figure 3 Flora species recorded along the estate boundary

Senduduk (*Melastoma malabathricum)*

Mahang (*Macaranga spp.)*

Boundary between remnant forest and oil palm cultivation

Boundary between remnant forest and estate

Sungai Terajul in Putera North estate boundary

Sungai Chekmek

Sungai Ayam

Tropical Bracken (*Dicranopteris linearis)*

Broad sword Fern *(Nephrolepis Bisserata)* Siam weed (*Chromolaena odorata)*

1.4.2 Fauna diversity

Terengganu is a state that rich in fauna diversity with an estimated total Reserve Forest of 539,234ha and Terengganu National Park of 77,507ha area covered. RPH 2006 – 2015 lists many endangered species that can still be found in the State Terengganu Reserve Forest. According to the DWNP, most of Malayan tiger population in Peninsular Malaysia is located in Terengganu

1.4.3 Mammals, Reptiles and Amphibians

Observation and identification were performed by our team and as the result, about fourteen (14) mammal's species, seven (7) reptile species and three (3) amphibian species (Figure 4) were recorded. The results recorded were from direct observation, sound, footprint, scratches, nest, feathers and dung. There were two large mammals spotted in the study area which are wild boar and sun bear.

Figure 4: Wildlife species and footprints that have been spotted during data collecting.

White-thighed Surili

Long-tailed Macaca

allosciurus notatus

Wild boar

Wild boar footprint

Otter footprint

Tapir footprint

Water Monitor Lizard

Elephant dung

Elephant dung

Resource: Field observation

Table 5: Wildlife species recorded and status

No.	Famili	Nama Tempatan	Nama Scientific	Status dalam AKTA 716	Status dalam IUCN (2017) Red List
1	Suidae	Babi hutan	*Sus scrofa*	P	LC
2.	Tapiridae	Tapir	*Tapirus indicus*	TP	EN
3.		Kijang	*Muntiacus muntjac*	P	LC
4.	Ursidae	Beruang	*Helarctos malayanus*	TP	VU
5.	Elephantidae	Gajah	*Elephas maximus*	TP	EN
6.	Felidae	Kucing Batu	*Prionailurus bengalensis*	TP	LC
7.	Mustelidae	Memerang Licin	*Lutra perspillata*	TP	EN
8.	Cercopithecidae	Beruk	*Macaca nemestrina*	P	VU
9.	Cercopithecidae	Lotong	*Presbytis siamensis*	TP	NT
10.	Cercopithecidae	Kera	*Macaca fascicularis*	P	LC
11.	Viverridae	Musang Pulut	*Paradoxurus hermaphroditus*	P	LC
12.	Manidae	Tenggiling	*Manis javanica*	TP	CR
13.	Sciuridae	Tupai pinang	*Callosciurus notatus*	P	LC
14.	Tupaiidae	Tupai tanah	*Tupaia tana*	TP	LC
15.	Varanidae	Biawak Air	*Varanus salvator*	P	LC
16.	Varanidae	Biawak Tikus	*Varanus nebulosus*	TP	LC
17	Elapidae	Tedung selar	*Ophiophagus hannah*	P	VU

No.	Famili	Nama Tempatan	Nama Scientific	Status dalam AKTA 716	Status dalam IUCN (2017) Red List
18	Elapidae	Tedung senduk	*Naja kaouthia*	P	LC
19.	Pythonidae	Ular sawa batik	*Python reticulatus*	P	LC
20.	Scincidae	Mengkarung Biasa	*Eutropis multifasciata*	NP	LC
21.	Agamidae	Sesumpah	*Callotes versicolor*	NP	LC
22.	Dicroglossidae	Katak Minyak	*Fejevarya limnocharis*	NP	LC
23.	Ranidae	Katak pisang	*Odorrana hosii*	NP	LC
24.	Bufonidae	Kodok	*Duttaphrynus melanostictus*	NP	LC

Note:

Status – Protection status under Wildlife Conservation Act 2010, ***TP****- Totally Protected,* ***P****-Protected dan* ***NP****- Not Protected*

IUCN Red List Categories 2017: EX *– Extinct ,* ***EW*** *- Extinct in the Wild,* ***CR*** *- Critically Endangered ,* ***EN*** *– Endangered,* ***VU*** *– Vulnerable,* ***LR/cd*** *- Lower Risk/conservation dependent,* ***NT*** *- Near Threatened (includes LR/nt - Lower Risk/near threatened),* ***DD*** *- Data Deficient,* ***LC*** *- Least Concern (includes LR/lc - Lower Risk, least concern)*

From table 4 above, the status of wildlife is as follows:

EN – Endangered 3 species

VU – Vulnerable 3 species

LC – Least Concern 16 species

NT - **Nearly Threatened 1 species**

CR - Critically Endangered 1 species

1.4.4 Avifauna

There were two methods used in conducting avifauna study for data collection - direct observation and indirect observation. For direct observation, the equipment used were binoculars, cameras, and bird reference books. For indirect observation, the sound of bird whistles, bird feathers and bird nests has been recorded.

Figure 5

The photos that were captured in study area

Lang Berjambul (Crested serpent Eagle)

Ruak-Ruak (White-breasted Waterhand)

Tekukur (Spotted Dove)

Hantu Kuning (Buffy Fish-owl)

Merbuk Aman (Peaceful Dove)

Tiong Mas (Hill Myna)

Sualo Batu (Pasific Swallow)

Pekaka Belukar (White-throated Kingfisher)

Cenuk (Chestnut-breasted Malkoha)

Helang (Changeable Hawk Eagle)

Pucung Kecil (Little Heron)

Enggang batal birah (Black Hornbill)

Pergam Gunung (Mountain imperial Pegion)

Punai Gading (Pink-necked Green Pegion)

Punai Daun (Little Green Pegion)

Serindit (Blue-crowned Hanging Parrot)

But-but besar (Greater Coucal)

Enggang Kelingking (Oriental Pied Hornbill)

Merbah Siam (Black-headed Bulbul)

Merbah Mata Putih (Cream-vented Bulbul)

For overall, about 87 species number of avifauna that were successfully recorded. While for the family classifications, there were 34 families (Table 5) have been recorded. And based on Act 716 of the Peninsular Malaysia Conservation Act 2010, in this study, there were 67 species of avifauna were fully protected species, 11 were protected species and 9 species were excluded from the Act.

Table 6: Bird Species recorded in Anglo Estate Plantation

NO	FAMILI	NAMA SAINTIFIK	NAMA TEMPATAN	NAMA INGGERIS	Akta 716	Manyvest	Putera North	Putera South	IUCN 2016
1	***PHASIANIDAE***	*Gallus*	Ayam Hutan	Red Junglefowl	P	/	/	/	LC
2		*Lophura erythrophthalma*	Merah Mata	Crestless Fireback	TP			/	VU
3		*Argusianus argus*	Kuang Raya	Great Argus	TP	/	/	/	NT
4	***ARDEIDAE***	*Butorides striatus*	Pucung Keladi	Little Heron/Little Green Heron/Green-backed Heron (Striated Heron)	TP	/	/	/	LC
5		*Ardeola speciose*	Pucung Jawa	Javan Pond-heron/Javanese Pond Heron	TP	/	/	/	LC
6		*Bubulcus ibis*	Bangau Kendi	Cattle Egret	TP	/	/	/	LC
7		*Ardea purpurea*	Pucung Serandau	Purple Heron	TP	/	/	/	LC

NO	FAMILI	NAMA SAINTIFIK	NAMA TEMPATAN	NAMA INGGERIS	Akta 716	Manyvest	Putera North	Putera South	IUCN 2016
8		*Casmerodius albus Ardea alba*	Bangau Besar	Great Egret/Large Egret	TP	/	/	/	LC
9		*Egretta garzetta*	Bangau Kecil	Little Egret	TP	/	/	/	LC
10	***ACCIPITRIDAE***	*Haliaeetus leucogaster*	Lang Siput	White-bellied Sea-eagle	TP	/		/	LC
11		*Spilornis cheela*	Lang Berjambul	Crested Serpent-eagle	TP	/	/	/	LC
12		*Spizaetus cirrhatus Nisaetus limnaeetus*	Lang Hindek	Changeable Hawk-Eagle	TP	/	/	/	LC
13	***TURNICIDAE***	*Turnix suscitator*	Puyuh Tanah	Barred Buttonquail	TP	/	/	/	LC
14	***CHARADRIIDAE***	*Vanellus indicus*	Rapang Duit	Red-wattled Lapwing	TP	/	/	/	LC
15	***COLUMBIDAE***	*Columba livia*	Pergam Batu	Rock Pigeon	CO	/	/	/	LC
16		*Stigmatopelia chinensis Streptopelia chinensis*	Merbok Balam	Spotted Dove	NP	/	/	/	LC
17		*Chalcophaps indica*	Punai Tanah	Green-winged Pigeon/ Emerald Dove	P	/	/	/	LC
18		*Geopelia striata*	Merbok Aman	Peaceful Dove/Zebra Dove	NP	/	/	/	LC
19		*Treron olax*	Punai Daun	Little Green Pigeon	P	/	/	/	LC
20		*Treron vernans*	Punai Gading	Pink-necked Green Pigeon	P	/	/	/	LC
21		*Treron bicinctus*	Punai Siam	Orange-breasted Green Pigeon	TP	/	/	/	LC
22		*Ducula badia*	Pergam Gunung	Mountain Imperial Pigeon	TP	/	/	/	LC
23	***PSITTACIDAE***	*Loriculus galgulus*	Bayan Serindit	Blue-crowned Hanging Parrot	P	/	/	/	LC
24	***PSITTACIDAE***	*Psittinus cyanurus*	Bayan Puling	Blue-rumped Parrot	TP	/	/	/	NT
25	***CUCULIDAE***	*Eudynamys scolopaceus*	Sewah Tahu	Common Koel/Asian Koel	TP	/	/	/	LC

NO	FAMILI	NAMA SAINTIFIK	NAMA TEMPATAN	NAMA INGGERIS	Akta 716	Manyvest	Putera North	Putera South	IUCN 2016
26		*Phaenicophaeus diardi*	Cenok Perut Hitam	Black-bellied Malkoha	TP	/		/	NT
27		*Phaenicophaeus tristis*	Cenok Kera	Green-billed Malkoha	TP	/		/	LC
28		*Phaenicophaeus curvirostris*	Cenok Birah	Chestnut-breasted Malkoha	TP		/	/	LC
29		*Centropus sinensis*	But-but Carik Anak	Greater Coucal	TP	/	/	/	LC
30		*Centropus bengalensis*	But-but Kecil	Lesser Coucal	TP	/	/	/	LC
31	***TYTONIDAE***	*Tyto alba*	Jampok Kubur	Barn Owl	TP	/	/	/	LC
32	***STRIGIDAE***	*Ketupa ketupu*	Hantu Kuning	Buffy Fish-owl	TP			/	LC
33		*Strix seloputo*	Hantu Carik Kafan	Spotted Wood-owl	TP	/		/	LC
34	***APODIDAE***	*Hirundapus cochinchinensis*	Layang-layang Rengkong Putih	Silver back/White-vented Needtail	TP	/	/	/	LC
35		*Apus nipalensis*	Layang-layang Rumah	House Swift	TP	/	/	/	LC
36	***CORACIIDAE***	*Eurystomus orientalis*	Tiong Batu/Tiong Belacan	Dollarbird/Asian Dollarbird	TP	/	/	/	LC
37	***ALCEDINIDAE***	*Halcyon smyrnensis*	Pekaka Belukar	White-throated Kingfisher	TP	/	/	/	LC
38	***BUCEROTIDAE***	*Anthracoceros albirostris*	Enggang Belulang/Enggang Kelingking	Indian/Oriental Pied Hornbill	TP	/	/	/	LC
39		*Anthracoceros malayanus*	Enggang Gatal Birah	Black Hornbill	TP	/		/	NT
40	***MEGALAIMIDAE***	*Megalaima lineata Psilopogon lineatus*	Takor Kukup	Lineated Barbet	TP	/	/	/	LC
41	***AEGITHINIDAE***	*Aegithina tiphia*	Kunyit Kacat	Common Iora	TP	/	/	/	LC
42		*Aegithina viridissima*	Kunyit Bakau	Green Iora	TP	/	/	/	NT

NO	FAMILI	NAMA SAINTIFIK	NAMA TEMPATAN	NAMA INGGERIS	Akta 716	Manyvest	Putera North	Putera South	IUCN 2016
43	***CAMPEPHAGIDAE***	*Pericrocotus flammeus Pericrocotus speciosus*	Mas Belukar	Scarlet Minivet	TP	/		/	LC
44	***LANIIDAE***	*Lanius cristatus*	Tirjup Tanah	Brown-shrike	TP	/	/	/	LC
45		*Lanius schach*	Tirjup Ekor Panjang	Long-tailed Shrike	TP			/	LC
46	***ORIOLIDAE***	*Oriolus chinensis*	Dendang Selayang	Black-naped Oriole	TP	/	/	/	LC
47	***RHIPIDURIDAE***	*Rhipidura javanica*	Sambar Murai Gila	Pied Fantail	TP	/	/	/	LC
48	***CORVIDAE***	*Corvus enca*	Gagak Paruh Lampai	Slender-billed Crow	NP	/	/	/	LC
49	***HIRUNDINIDAE***	*Hirundo rustica*	Sualo Api	Barn Swallow	TP	/	/	/	LC
50		*Hirundo tahitica*	Sualo Batu	Pacific Swallow	TP	/	/	/	LC
51	***CISTICOLIDAE***	*Prinia rufescens*	Perenjak Sampah	Rufescent Prinia	TP	/	/	/	LC
52		*Prinia flaviventris*	Perenjak Padi	Yellow-bellied Prinia	TP	/	/	/	LC
53		*Orthotomus sutorius*	Perenjak Pisang	Common Tailorbird	TP	/	/	/	LC
54		*Orthotomus atrogularis*	Perenjak Belukar	Dark-necked Tailorbird	TP	/	/	/	LC
55		*Orthotomus ruficeps*	Perenjak Bukit	Ashy Tailorbird	TP	/	/	/	LC
56	***PYCNONOTIDAE***	*Pycnonotus atriceps*	Merbah Siam	Black-headed Bulbul	TP			/	LC
57		*Pycnonotus finlaysoni*	Merbah Luris Leher	Stripe-throated Bulbul	TP	/	/	/	LC
58		*Pycnonotus goiavier*	Merbah Kapur	Yellow-vented Bulbul	NP	/	/	/	LC
59		*Pycnonotus plumosus*	Merbah Belukar	Olive-winged Bulbul	TP			/	LC
60		*Pycnonotus blanfordi*	Merbah Telinga Lurus	Streak-eared Bulbul	TP			/	LC
61		*Pycnonotus simplex*	Merbah Mata Putih	Cream-vented Bulbul	TP	/		/	LC
62		*Pycnonotus brunneus*	Merbah Mata Merah	Red-eyed Bulbul	TP	/	/	/	LC

NO	FAMILI	NAMA SAINTIFIK	NAMA TEMPATAN	NAMA INGGERIS	Akta 716	Manyvest	Putera North	Putera South	IUCN 2016
63	***TIMALIIDAE***	*Macronous gularis Mixornis gularis*	Rimba Berjalur	Striped Tit-babbler/Pin-striped Tit-babbler	TP	/	/	/	LC
64	***STURNIDAE***	*Aplonis panayensis*	Perling Mata Merah	Asian Glossy Starling/Philippine Glossy Starling	NP	/	/	/	LC
65		*Gracula religiosa*	Tiong Mas	Hill Myna	P	/	/	/	LC
66		*Acridotheres tristis*	Tiong Gembala Kerbau	Common Myna	NP	/	/	/	LC
67		*Acridotheres fuscus*	Tiong Hutan	Jungle Myna	NP	/	/	/	LC
68	***MUSCICAPIDAE***	*Muscicapa dauurica Muscicapa latirostris*	Sambar Asia	Asian Brown Flycatcher	TP	/	/	/	LC
69		*Ficedula zanthopygia*	Sambar Tongkeng Kuning	Yellow-rumped Flycatcher Korean Flycatcher	TP	/	/	/	LC
70		*Eumyias thalassinus*	Sambar Ranting	Verditer Flycatcher	TP			/	LC
71		*Copsychus saularis*	Murai Kampung	Oriental Magpie Robin	P	/	/	/	LC
72		*Copsychus malabaricus*	Murai Rimba/Murai Batu	White-rumped Shama	P	/	/	/	LC
73		*Enicurus ruficapillus*	Murai Cegar	Chestnut-naped Forktail	TP			/	NT
74	***CHLOROPSEIDAE***	*Chloropsis cochinchinensis*	Daun Sayap Biru	Blue-winged Leafbird	TP	/	/	/	LC
75	***DICAEIDAE***	*Prionochilus maculatus*	Sepah Puteri Raja	Yellow-breasted Flowerpecker	TP	/	/	/	LC
76		*Dicaeum cruentatum*	Sepah Puteri Merah	Scarlet-backed Flowerpecker	TP	/	/	/	LC
77	***NECTARINIIDAE***	*Anthreptes simplex*	Kelicap Kelabu	Plain Sunbird	TP	/	/	/	LC
78		*Anthreptes malacensis*	Kelicap Mayang	Brown-throated Sunbird Plain-	TP	/	/	/	LC

NO	FAMILI	NAMA SAINTIFIK	NAMA TEMPATAN	NAMA INGGERIS	Akta 716	Manyvest	Putera North	Putera South	IUCN 2016
			Kelapa	throated Sunbird					
79		*Hypogramma hypogrammicum Arachnothera hypogrammicum*	Kelicap Rimba	Purple-naped Sunbird Purple-naped Spiderhunter	TP	/		/	LC
80		*Nectarinia jugularis Cinnyris jugularis*	Kelicap Bukit	Olive-backed Sunbird	TP	/		/	LC
81		*Arachnothera longirostra*	Kelicap Jantung	Little Spiderhunter	TP	/	/	/	LC
82	***PASSERIDAE***	*Passer montanus*	Ciak Urasia	Eurasian Tree-sparrow	NP	/	/	/	LC
83	***PLOCEIDAE***	*Ploceus philippinus*	Ciak Tempua	Baya Weaver	P	/	/	/	LC
84	***ESTRILDIDAE***	*Lonchura punctulata*	Pipit Pinang	Scaly-breasted Munia	P	/		/	LC
85		*Lonchura atricapilla*	Pipit Rawa	Chestnut Munia/Black-headed Munia?	P	/		/	LC
86	***MOTACILLIDAE***	*Motacilla flava*	Pipit Kuning	Yellow Wagtail	TP	/	/	/	LC
87		*Anthus rufulus*	Ciak padang	Paddyfield Pipit Oriental Pipit	TP	/	/	/	LC

Note:

Status – Protection status under Wildlife Conservation Act 2010, **TP**- Totally Protected, **P**-Protected dan **NP**- Not Protected

IUCN Red List Categories 2017: EX – Extinct , **EW** - Extinct in the Wild, **CR** - Critically Endangered , **EN** – Endangered, **VU** – Vulnerable, **LR/cd** - Lower Risk/conservation dependent, **NT** - Near Threatened (includes LR/nt - Lower Risk/near threatened), **DD** - Data Deficient, **LC** - Least Concern (includes LR/lc - Lower Risk, least concern)

From the Table 5 above, the status of avifauna recorded as follow:

EN – Endangered 0 species

NT - Near Threatened 6 species

VU – Vulnerable 1 species

LC – Least Consem 80 species

2.0 MANAGEMENT IMPLICATIONS

2.1 Mammals, reptiles and amphibians

2.1.1 Effects

During a few years of deforestation and replanting, it will result in the loss of less active species such as reptiles, amphibians and slow-moving mammals as well as many invertebrate (non-recurrent) species.

There are also protected species in this study area as they are easy to move and adapt to changing habitats. Most of these species are able to adapt easily to any change. However, conservation measures need to be taken to avoid the extinctions of wildlife from happening, environmental degradation and preservation

To mitigate the long-term effects of land clearing and large agricultural activities, certain steps must be taken by management. However, not all of these methods will continue to be successful as each effect will vary depending on the geography and geographical conditions. Conservation measures must also be taken by management in order to minimize the threat of extinction and not cause any immediate extinction. The conservation process will take a long and long time to enrich the habitat so that it does not cause other issues in the future.

2.1.2 Issues

During the survey, interviews with estate workers were conducted to provide a clearer picture and understanding of the relationship between humans and biodiversity. The interviews also helped the assessment team to understand the level of awareness of the importance of conserving biodiversity resources.

Interview with Estate Worker Mr. Mohd Aslizal B. Hassan (35 years old) told us about the presence of various types of snakes. He also described the presence of large mammals such as tapirs, deer and even elephants. As an experienced conductor in this field, he helps to maintain the biodiversity of the estates.

The second interview was with Mr. Saiful Said B. Shaffie at Manyvest's estate. He described the presence of an elephant in the estate that destroy oil palm trees. The presence of the elephant

has also been notified to the Kemaman District Wildlife Authority. He said there were no cases of illegal poaching in the fields and the stakeholder always maintained the security of the estate.

At the Prince North estate, I was led by Mohd Zaki b Mt Khalid , the Assistant Estate Manager who told me about the estate area frequented by wild elephants, tapirs and even wild boars. There are also flamingo, eagles and owls in the fields. For wildlife conservation, the barn owl boxes also were built inside the estate for about 55-unit.

The next interview was held at the Prince's South Estate led by Mr. Tengku Aswandi who is also the Assistant Manager of the estate. The presence of wild elephants in this area has reduced the number of oil palm plants and this area has been left vacant. This abandoned area attracts wildlife such as forest birds and deer as well as wild boars looking for food. Suggestions for maintaining the biodiversity in the field should be considered for our future generations.

2.1.3 Steps to overcome

Loss and disruption to the fauna is caused by agriculture and open land are inevitable. However, the impact will be minimal if the conservations measures are taken by stakeholders. For example, workers and locals' people are forbidden to hunt any species of wildlife in the fields. The prohibition sign such as "NO HUNTING" or "NOT ALLOWED" sign should be changed to the new sign by converting Enactment to the **AKTA PEMULIHARAAN HIDUPAN LIAR 716/2010** and build a strategic location along the entryway to warn anyone who lives in the estate area. Prohibition signs must be placed in the clear area view with the red writing.

In addition, estates may use proper pesticides and fertilizers that are classed as an environmentally friendly as approved by the authorities. This method will not harm other wildlife, and only give harm to the pests. If it is harmful to wildlife, we hope that the estate can minimize the use pesticide, and only apply it on the red area of pests.

2.1.4 Area Clearing and Opening

The clearing of forest area should be done by starting from the estate to the forest or idle forest, so it may help wildlife to retreat or escape into the nearby forest.

2.1.5 Sign of Wildlife Hunting Prohibition

Proactive measures should be taken to avoid wildlife hunting activities from happens. Short-term and long-term management plans need to be established within the management to overcome hunting, and to conserve biodiversity resources in the estate field.

This prohibition should involve the management, staff and the general public in the estate areas. If the activity of hunting is kept continue, the stakeholder management should take actions on the person involved, or by preventing the person from entering the estate. If hunting activities are still ongoing, the stakeholder can file a complaint direct to the authorities or to the Department Wildlife and National Park hotline number.

2.2 Avifauna

2.2.1 Effects

2.2.1.1 Habitat Losses

Most bird's species build it nests inside or on top of trees whether they are shrubs, medium or large trees. There are also few bird's species that build it nests on the ground. This shows that the bird depends heavily on the trees surrounding. These trees are indispensable to birds, not only for their natural protection but also as a source for food, niche, mating and temporary places for migratory bird species.

2.2.2.2 Illegal Hunting of the Species of Birds

The threat of illegal hunting starts with individuals who are interested in bird sounds, bird keepers and for living (profit). This causes disturbance to the bird's habitat and led to the declining of bird species. The convenience of the entrance allowed hunters to easy access to the fields.

There are many species that are considered to be protected under the Wildlife Conservation Act 716/2010. Any ownership and storage of bird species must be obtained from the Terengganu State DWNP.

2.2.2.3 Disruption of Bird Species Food Resources

The use of insecticides in plants has led to a decline in bird populations, as there are also insects that feed on bird species. The insufficient insect will also be led to the bird's migrations to other places or areas. Some pesticide or insecticide that enter the river will cause aquatic life such as fish to die. If a bird such as the Raja Udang species eats the fish, it will also cause the death of the bird species.

3.0 RECOMMENDATIONS & CONCLUSION

3.1 Actions to be taken

3.1.1 Making report or complaint

If the estate worker finds the bird's nesting activity or find the bird snare located in the estate area, it is necessary to report directly to the Terengganu State of DWNP, to overcome the problem from keep continuing.

If there is wildlife such as an injured bird or a baby falling from the nest, the estate should also report to the Terengganu State of DWNP for proper action such as treatment and they will release to the new habitat.

3.1.2 Human-wildlife conflict

At present Elephants are not a significant problem for the estate however as the estates are in a transition phase with clearing and planting of new trees in future will create a conflict. Elephants like to eat felled and chipped oil palm as they like to eat the heart of the palm trunk. They will also be interested in eating the new plants especially plants that are between 1 and 5 years old. It is suggested that the estate to collect data on crop and property damage by elephants and other wildlife such as macaque and wild boars. The estates should also consider relevant options and methods to reduce crop damage such as movable electrical fencing which protects the young trees where possible.

3.2 General practices

3.2.1 Signages

The instalment of ‘No Hunting' sign is also necessary to ensure that wildlife can be rescued from extinction. Also, the estate workers have been educated by the management to control the bird lure activity and not to attract the birds in the field.

3.2.2 Use of biological control to promote natural predators

In addition, the estates may plant fruit trees or flowers to increase wildlife attraction such as bird diversity. Planting trees can also turn to be the place for workers to rest and relax. Reducing the use of insecticides can increase the insects or grasshoppers as the source of food for birds. The estates may also breed fish species to the trenches or rivers as the source of food for deer and birds.

3.3 Conclusion

All three estates have high biodiversity because of the variety of wildlife that inhabit inside this area. The presence of wildlife such as elephants, deer, tapirs, wild boars and 80 species of birds indicates that the area is less disturbed by poachers and the effects of oil palm cultivation in the area do not disturb the wildlife life cycle system. For the bird species diversity, AEP upholds 13% of a total 656 bird species recorded in Peninsula which is relatively high diverse for the oil palm plantation.

Table 7: Suggestions and recommendations to help improve biodiversity in the Anglo Eastern Plantation Estates

No	Area	Possible threats	Management & Monitoring
1	Water catchment	• Vegetation clearing • Riverbanks erosion • Litter entering river • Sedimentation • Eutrophication of aquatic environments and vegetation overgrowth due to fertilizer applications • Interruption on aquatic biological health • Degradation of catchment areas	• Education and awareness for workers about keeping the river ways clear of litter. • Monitoring of water quality parameters (where applicable). • Plant native forest trees in the buffer zone of all rivers. • If river is >5m wide, then 5m buffer zone and follows the DID guideline • Ensure no agrochemical activities are carried out at bordering the water bodies. • Provide better waste management systems for the staff living quarters. • Ensure the flood plains are clear of rubbish before and during the monsoon period. • Cover any bare soil with planting of vetiver grasses,

No	Area	Possible threats	Management & Monitoring
			groundcovers, etc. to reduce soil erosion • Monitoring by photo (with date) of riverbanks.
2	Riparian Buffer	• Land clearing • Dominance of few species • Lack of wildlife corridor connecting the wildlife from forest reserve to and from estates	• Use large rivers as wildlife corridors north to south as well as East to West • Ensure all rivers of 5m wide or more has a buffer zone of 10m or more. • Ensure all rivers of less than 5m wide has a buffer zone of 3m or more. • Tree planting of native pioneer species • Tree planting of fig trees and other forest fruiting trees to benefit wildlife. • Education as to why buffer zones are important and their impact on everyday life i.e. improved river water quality. • Photos taken every month at the same location • Camera traps deployed which take photos of passing animals.
3	Replanting	• Land clearing • Elephant Damage • Sedimentation	• Start data collection of crop and property damage by animals. • If damage is significant use moveable electric fencing around newly planted crops until 5 years old.

No	Area	Possible threats	Management & Monitoring
			• Provide education for the staff about elephants • Develop an SOP for managing and limiting crop damage by elephants and other wildlife.

4.0 ATTACHMENT

List of Offences and Penalties under Wildlife Conservation Act 2010.

This is a federal law on the protection of wildlife and birds and enforced by the Department of Wildlife and National Parks (PERHILITAN). For purposes of protection the Act lists out totally protected and protected animals that could not be hunted or kept except with permits. The Act has presented a list consisting of Totally Protected Animals, Protected Animals, Totally Protected Birds and Protected Birds. A list of protected insects has been included.

Part VII: Offences and Penalties

1. **Protected Wildlife**

No	Offence	Penalty (On Conviction)
1	Hunting, etc., protected wildlife without licence	A fine not exceeding RM50,000 or to imprisonment for a term not exceeding 2 years or to both
2	Hunting, etc., immature of protected wildlife without licence	A fine not exceeding RM100,000 or to imprisonment for a term not exceeding 5 years or to both
3	Hunting, etc., female of protected wildlife without licence	A fine not exceeding RM100,000 or to imprisonment for a term not exceeding 5 years or to both
4	Collecting bird's nest without licence	A fine not exceeding RM50,000 or to imprisonment for a term not exceeding 2 years or to both
5	Damaging, etc., nest or egg of protected wildlife	A fine not exceeding RM20,000 or to imprisonment for a term not exceeding 1 years or to both

2. **Totally Protected Wildlife**

No	Offence	Penalty (On Conviction)
1	Hunting, etc., totally protected wildlife without special permit	A fine not exceeding RM100,000 or to imprisonment for a term not exceeding 3 years or to both
2	Hunting, etc., immature of totally protected wildlife without special permit	A fine not exceeding RM200,000 or to imprisonment for a term not exceeding 10 years or to both
3	Hunting, etc., female of totally protected wildlife without special	A fine not exceeding RM300,000 or to imprisonment for a term not exceeding 10 years or to both

No	Offence	Penalty (On Conviction)
	permit	
4	Damaging, etc., nest or egg of totally protected wildlife	A fine not exceeding RM50,000 or to imprisonment for a term not exceeding 2 years or to both

Miscellaneous

1. **Provocation of wildlife**

Any person who provokes or wounds any wildlife which consequently becomes an immediate danger to human life commits an immediate danger to human life commits an offence and shall, on conviction, be liable to a fine not exceeding RM30,000 or to imprisonment for a term not exceeding 1 year or both.

Summary of species diversity (N=111) in AEP