

High Conservation Value Assessment

PUBLIC SUMMARY REPORT

PT DAMAI AGRO SEJAHTERA

Indonesia
West Kalimantan Province
Ketapang District

Date of Report	20 May 2017
Report Title	Public Summary Report of High Conservation Value Assessment, PT Damai Agro Sejahtera, Indonesia, West Kalimantan Province, Ketapang District
Lead Assessor	Nandang Mulyana
Contact Information of Lead Assessor	PT Gagas Dinamiga Aksenta Jl. Gandaria VIII/10, Kebayoran Baru Jakarta 12130, Indonesia Tel. (021) 7396518. e-mail: ndandang@aksenta.com ; aksenta@aksenta.com
ALS License	<i>Provisionally Licensed Assessor (ALS15037NM)</i>
Organization Commissioning HCV Assessment	PT Damai Agro Sejahtera (PT DAS) Wisma Bayuadji- Lt. Satu Ruang B.04A. Jl. Gandaria Tengah III/44, Kramat Pela Kebayoran Baru, Jakarta Selatan-12130 Tel./Fax: (021) 72798418
Location of Assessment	Sungai Kelik Village (Nanga Tayap Sub-District) and Laman Satong Village (Matan Hilir Utara Sub-District), Ketapang District, West Kalimantan Province, Indonesia
Assessment Period	March 10 – May 20, 2017
Size Area of Assessment	9.436,0 ha (Location Permit) / 9.444,6 ha (<i>GIS acreage</i>)
HCVMA allocation area	8.577,4 ha
Land Use Plan	Oil Palm Plantation
Certificate Scheme	RSPO (Member under Bumitama Agri Ltd group)
ALS Tier Rating	Tier 1. Licensed area is less than 50,000 ha, but there is more than 500 ha of natural forest potentially converted. Part of the assessment area is the land of former logging companies and oil palm companies. It is located in the priority areas of biodiversity and ecosystem services. Lead Assessor holds a ALS Provisional License.
Peer Review	May 5, 2017 Dr. Kunkun Jaka Gurmaya kunjgurmaya@yahoo.co.id

LIST OF ACRONYMS

ASRI	Alam Sehat Lestari (an NGO)
BKSDA	<i>Balai Konservasi Sumber Daya Alam</i> (Natural Resource Conservation Agency)
BRG	<i>Badan Rehabilitasi Gambut</i> (Peatland Rehabilitation Agency)
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DAS	<i>Daerah Aliran Sungai</i> (Watershed Area)
DEM	<i>Digital Elevation Model</i>
FFI	Fauna Flora International (an NGO)
FSC	the Forest Stewardship Council
HCV	High Conservation Value
HCVF	High Conservation Value Forest
HCVRN	High Conservation Value Resource Network
HL	<i>Hutan Lindung</i> (Protected Forest)
HP	<i>Hutan Produksi</i> (Production Forest)
HPH	<i>Hak Pengusahaan Hutan</i> (forest concession right)
HPK	<i>Hutan Produksi Konversi</i> (converted production forest)
HPT	<i>Hutan Produksi Terbatas</i> (permanent production forest)
IAR	International Animal Rescue (an NGO)
IBA	Important Bird Area
IFL	Intact Forest Landscape
IUCN	The International Union for Conservation of Nature and Natural Resources
IUP	<i>Izin Usaha Perkebunan</i> (Plantation Business Permit)
IUPHHK-HA	<i>Izin Usaha Pemanfaatan Hasil Hutan Kayu-Hutan Alam</i> (business license for forest's timber utilization)
KHG	<i>Kesatuan Hidrologi Gambut</i> (Peat Hydrological Unity)
PIPIB	<i>Peta Indikatif Penundaan Pemberian Izin Baru</i> (indicative map on postponement of new permit conferment)
PT ABP	Arthu Borneo Perkebunan, <i>Perseroan Terbatas</i> (an oil palm plantation company)
PT BGA	Bumitama Gunajaya Agro, <i>Perseroan Terbatas</i> (an oil palm plantation holding company)
PT DAS	Damai Agro Sejahtera, <i>Perseroan Terbatas</i> (an oil palm plantation company)
PT GMS	Gemilang Makmur Subur, <i>Perseroan Terbatas</i> (an oil palm plantation company)
PT GYP	Golden Youth Plantation, <i>Perseroan Terbatas</i> (an oil palm plantation company)
PT KAL	Kayung Agro Lestari, <i>Perseroan Terbatas</i> (an oil palm plantation company)
PT LSM	Ladang Sawit Mas, <i>Perseroan Terbatas</i> (an oil palm plantation company)
PT MPK	Mohairson Pawan Khatulistiwa, <i>Perseroan Terbatas</i> (a timber forest company)
PT SSL	Sawit Sejahtera Lestari, <i>Perseroan Terbatas</i> (an oil palm plantation company)
RSPO	The Roundtable on Sustainable Palm Oil
RTE	Rare, Threatened or Endangered
RTRW	<i>Rencana Tata Ruang Wilayah</i> (land use spatial planning)
SRTM	Shuttle Radar Topographic Mapping
TRMM	Tropical Rainfall Measurement Mission
UNESCO	United Nations Educational, Scientific, and Cultural Organisation
WWF	World Wildlife Fund

1. INTRODUCTION AND BACKGROUND

PT DAS is an oil palm plantation company established in January 2016. The company obtained a location permit covering 9,436 ha¹. The area designated as PT DAS location permit by the Ketapang District Government is an area utilized by PT Ketapang Mandiri and PT Golden Young Plantation² for oil palm plantation in 2004. However, there were no further information regarding the permit status of PT Ketapang Mandiri and PT Golden Young Plantation.

PT DAS was acquired by Bumitama Agri Ltd on December 22, 2016. The RSPO membership status of PT DAS has been valid since it was acquired by Bumitama Agri Ltd, which has been registered as RSPO member since 7 October 2007.

As a form of commitment to RSPO membership and sustainability policy, Bumitama Agri Ltd considers that it is necessary to apply HCV assessment, before conducting land clearing at PT DAS licensed area. Identification, management and monitoring of HCV areas is one indicator of the management of sustainable oil palm plantations based on the RSPO Principles and Criteria.

In line with the commitment of Bumitama Agri Ltd, in March 2017, Bumitama Agri Ltd commissioned PT Gagas Dinamiga Aksenta to conduct HCV assessment in the permitted location of PT DAS located in Ketapang District, West Kalimantan Province, Indonesia.

1.1. DESCRIPTION OF THE ASSESSMENT AREA

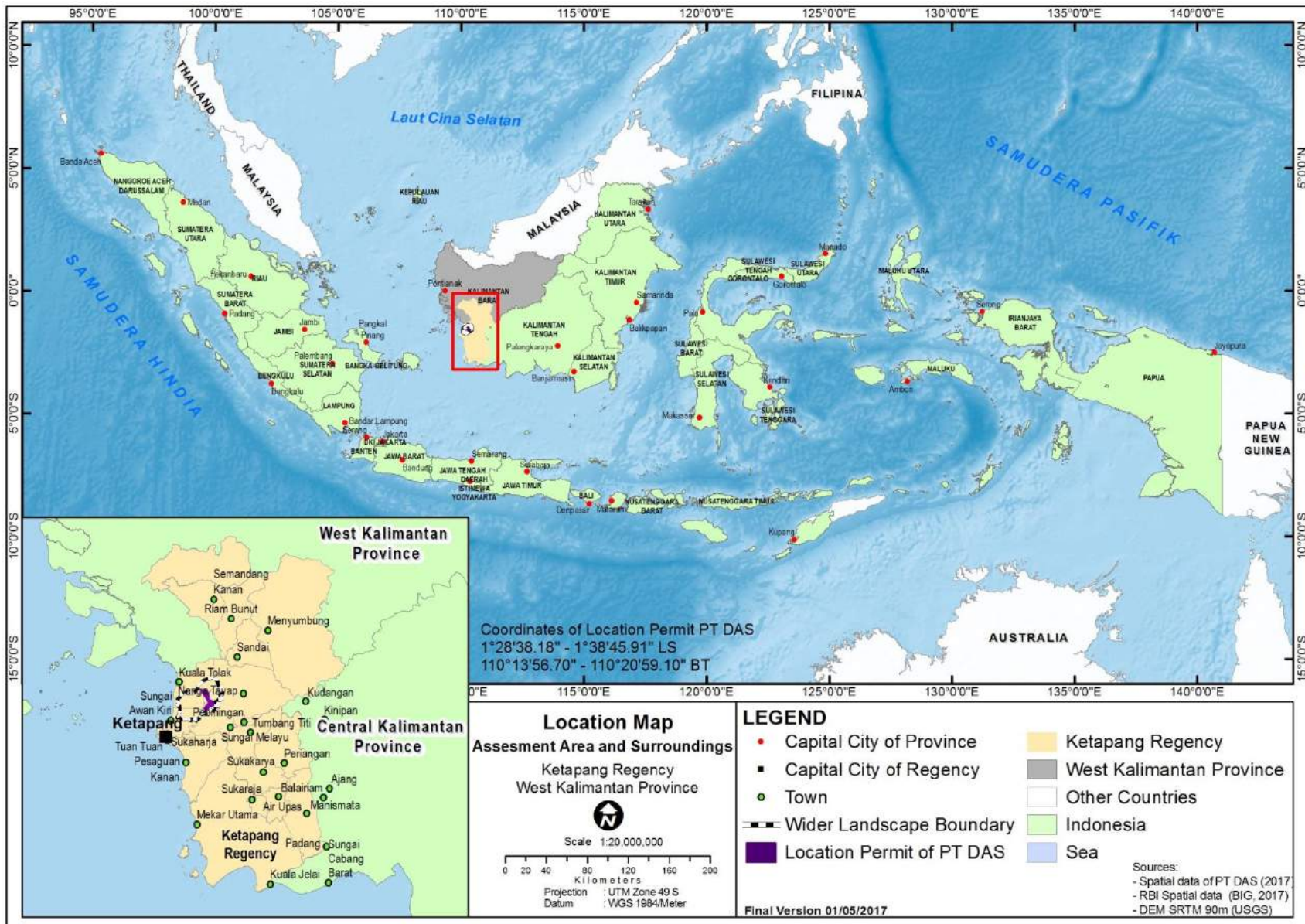
PT DAS has a total area of approximately 9,436 ha based on Location Permit, located between 110°13'56.70"-110°20'59.10"E and 1°28'38.18"-1°38'45.91"S, and administratively located in Laman Satong Village, Matan Hilir Utara Sub-District; Sungai Kelik Village, Nanga Tayap Sub-District. Both Sub-Districts are located in Ketapang District, West Kalimantan Province, Indonesia (**Map 1**).

The study area is accessible, around 1.5-3 hours from the city of Ketapang District. Local people uses land routes to access the cities with private vehicles or local taxis which available at all times. River transport (via Sungai Pawan) includes speed boats with a much shorter travel time to Ketapang, around 1.5 hours.

Based on the scale, this is a large scale project with 9,436 ha land planned to be converted to oil palm plantations. The land used to be a concession area of the company PT Marsela (HPH). The project intensity is high, as indicated by the plan to plant mono-culture species (oil palm); plantation products will be transported by heavy vehicles, therefore permanent roads are necessary.

¹ PT DAS Location Permit based on Decree of Regent of Ketapang Regency Number 27/PEM/2016, January 8, 2016

² Results of initial consultations with community of Nek Doyan Sub-village, Sepahan Sub-village and Muara Kayong Sub-village



Map 1 Situation map of the assessment area and its surroundings

1.2. THE HCV ASSESSMENT TEAM

The HCV assessment team (Aksenta) consisted of 8 people (Table 1).

Table 1 Aksenta HCV assessment team composition.

Name	ALS Licence	Role	Expertise
Nandang Mulyana nandang@aksenta.com	Provisional ALS15037NM	Lead Assessor. Socio-cultural team leader.	Researchers in socio-economic and environmental fields, experts in the fields of economic valuation, economic analysis and business planning, analysis of environmental damage in a social context
Pupung F.Nurwata pupung@aksenta.com	N/A	HCV 1,2,3 (Biodiversity) team leader	Researchers and practitioners in the field of wildlife, experts in taxonomy and ecology of wildlife, wildlife management, habitat and population assessment, and wildlife conflict mitigation.
Yanto Ardiyanto yanto@aksenta.com	N/A	Ecosystem services (HCV4) expert	Researchers and practitioners in the field of hydrology, experts in water and soil conservation, spatial analysis and remote sensing, water management systems.
Teuku Ade Fachlevi adhe@aksenta.com	N/A	Socio-cultural (HCV5 & HCV6) team member	Researcher in socio-economic and environmental fields. Experts in the fields of economic valuation, economic analysis and business planning, able to analysis environmental damage,
Anwar Muzakir anwar@aksenta.com	N/A	Botanist; biodiversity team member	Researchers and practitioners in plant taxonomy, Ecosystem and population assessment
Reza Abdillah reza@aksenta.com	N/A	GIS & Remote sensing Specialist	Practitioners in the field of remote sensing and mapping for biology, conservation and land use issues, Land Use Change Analysis, Carbon Stock Assessment
Bias Berlio Pradyatma bias@aksenta.com	N/A	Botanist; biodiversity team member	Researchers and practitioners in plant taxonomy, Ecosystem and population assessment
Ryan Karida Pratama ryan@aksenta.com	N/A	GIS & Remote sensing Specialist	Practitioners in the field of remote sensing and mapping for biology, conservation and land use issues, Land Use Change Analysis, Carbon Stock Assessment

2. METHODS

Overall assessment was implemented based on the HCV Assessment Manual (HCVRN, 2017) with guidance from other documents developed by the HCV Resource Network i.e. Common Guidance for the Identification of High Conservation Value (Brown et al., 2017) and Common Guidance for the management and monitoring of High Conservation Values (2014).

2.1. Data Collection

Secondary Data Collection

Secondary data is obtained through desktop study based on several data sources such as satellite images, books, journals, reports, statistical data, and websites (Table 2). Secondary data is used for initial analysis aiming to obtain an overview of the conditions of biodiversity, ecosystem, environment, social, and cultural in the assessment area.

Table 2 Data and secondary information sources.

No	Data and Information Sources
Basic Data and Information	
1	Map of Satellite imagery (Citra Landsat 8, USGS, 6 March, 2017 and USGS, 22 March 2017)
2	Map of Satellite imagery (Citra Landsat 5, USGS, 3 April 2004)
3	Location map of PT DAS concession (IUP Map PT DAS)
4	Map of watershed borders (<i>Peta Batas Daerah Aliran Sungai</i> , BPDAS West Kalimantan)
5	Map of Regional Planning (<i>Peta RTRW</i> West Kalimantan year 2014-2034)
6	Landsystem Map 1:250.000 (RePPPProt, 1990)
7	Pawan River Watershed Map (Appendix of Presidential Decree No. 12 year 2012)
Further Data and Information	
8	DEM Shuttle Radar Topography Mission, 30 meter (USGS, 2004)
9	Map of Ecosystem of Kalimantan (WWF, 2006)
10	Map of Protected Areas (<i>Peta Kawasan Lindung</i> , Ministry of Environment and Forestry)
11	Map of Moratorium (<i>Peta Indikatif Penundaan Pemberian Izin Baru</i> , revised 11, Ministry of Environment and Forestry, 2016)
12	Map of Soil Type (RePPPProt, 1986)
13	Map of altitude (processing result based on SRTM data)
14	Map of slope class (processing result based on DEM SRTM data)
15	Intact Forest Landscape Map (downloaded at: http://www.intactforest.org)
16	Land Cover Map, Landsat Imagery Analysis March 6, 2017
17	Map of orangutan distribution in Kalimantan (Singleton 2004; Banes et.al., 2016)
18	Report of HCV assessment of PT DAS (Bioref, 2016 unpublished)
19	Report of HCV Assessment of PT GMS, the closed area to PT DAS concession (Aksenta, 2015)
20	Tropical Rainfall Measuring Mission Data (TRMM 3B42 product)
21	Report of <i>Social Impact Assessment</i> PT Ladang Sawit Mas (Sonokeling, 2013)
22	Document of ANDAL PT DAS (2016)
23	Statistic of Ketapang District in Figure (BPS Ketapang District, 2016)
24	Statistic of Matan Hilir Utara Sub-District in Figure (BPS Ketapang District, 2016)
25	Ethnologue and Language of the Word (http://www.ethnologue.com/map/ID_k__)
26	Ethnic Distribution maps in Kalimantan, retrieved at http://www.ethnolog.com .
27	Ramsar Sites in Indonesia (http://www Ramsar.org)
28	Endemic Bird Area Factsheet: Kalimantan (BirdLife International, 2015)
29	Important Bird Areas: Key Sites for Conservation (Birdlife International, 2015)
30	Appendices I, II and III CITES, valid from 2 January 2017 (CITES, 2017)
31	IUCN Red List of Threatened Species. www.iucnredlist.org

Primary Data Collection

Primary data obtained from field activities (scoping studies and full assessments), collection of primary data using the rapid assessment techniques approach, and using a combination of several data collection methods in each type of HCV such as ground truthing, field observations, field visits and consultation with the community local and stakeholders.

A combined purposive sampling and snowball sampling approach were applied to determine the sample number and location on primary data collection. The data collection generates qualitative data with geographic references (spatial data).

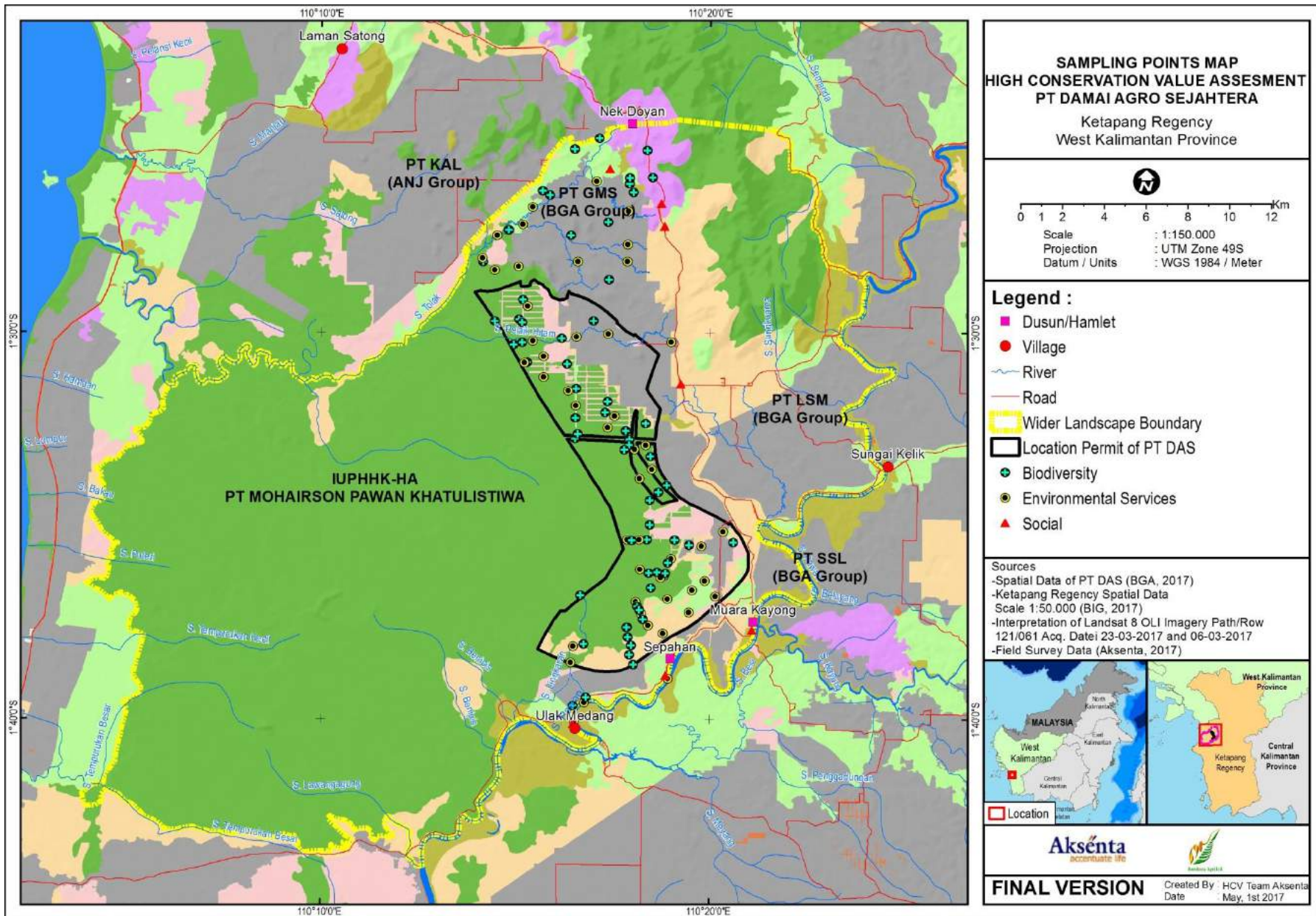
Sampling points for the identification of HCV 1-6 were determined using purposive sampling method based on land cover condition. The number of sampling in this assessment are 120 points, consisting of 51 points in the secondary forest area, 3 points in the old shrub area, and 18 points in the young shrub area, 9 points in the bush area, 11 in the oil palm plantation area, 2 in the rubber plantation area, 6 in open land areas, 5 points in residential areas, and 15 points in water bodies (sampling point see Map 2). The sampling points for the flora and fauna survey were 62 points, while the sampling points for ecosystem service surveys were 50 points, and the sampling points for social surveys were 8 points (including residential/sub-village areas). The snowball sampling method referred to the additional information from the informant/respondent which matches the assessment criteria.

Especially for social HCV assessments (HCV 5-6), settlements are chosen based on predetermined criteria, namely: (i) villages/sub-villages that have administrative areas in the assessment area, and (ii) affected villages/sub-villages from the company's operations. The number of informants/ respondents interviewed in this assessment were 91 people from 3 villages in 4 sub-villages. Three social data collection methods were applied during the assessment, i.e. semi-structured interviews, focus group discussions, and participatory mapping (Table 3).

Table 3 Community surveyed by HCV Social team and data collection methods.

Sub-district	Village	Sub-Village	Semi structure Interview	Focus Group Discussion	Participatory Mapping
Nanga Tayap	Sungai Kelik	Muara Kayong	✓	✓	✓
		Sepahan	✓	✓	✓
Matan Hilir Utara	Laman Satong	Nek Doyan	✓	✓	✓
Muara Pawan*	Ulak Medang	Ulak Medang	✓	✗	✓

* outside PT DAS permit location area, boundary conflict is occurred with Sepahan sub-village and Muara Kayong sub-village; Notes: ✓ = applied; ✗ = not applied



Map 2 Survey location of biodiversity, ecosystem services, and social data collection in PT DAS and surrounding areas.

The collected data were grouped based on HCV types and were represented as spatial data (geographical reference). Furthermore, the primary and secondary data were analysed descriptively to strengthen the justification of each type of HCV. In order to show the HCV area (location, area, and land cover), each HCV type were mapped using the UTM system. Visual interpretation method was applied specifically to interpret land cover, by examining the color differences of satellite imagery and verified through ground truthing.

2.2. Timeline

This HCV assessment was carried out from March 10 to May 30, 2017. The assessment process includes pre-assessment, field surveys, stakeholder consultation, data analysis and reporting (Table 4).

Table 4 Steps and timeline for completion of the HCV assessment

Date	Step Description
10 – 20 March, 2017	Compilation of secondary information (desktop study)
20 – 22 March, 2017	Compilation information and initial visit to the assessment area (scoping study)
23 – 30 March, 2017	Full assessment: Biodiversity, ecosystem and environment survey, socio-culture survey, local stakeholder consultations.
31 March – 2 April, 2017	Data Analysis
3 April, 2016	Final Stakeholders consultation
10 April – 30 May, 2017	Reporting

3. RESULT

3.1. Regional and National Context

The assessment area is located in Borneo, a large island rich in biodiversity. There were 267 species of Dipterocarp, 155 of which were endemic. Borneo was the centre of the world's Dipterocarp. There are 225 species of terrestrial mammals with 44 species are endemic (Payne et al., 2000); 639 bird species, with 358 species and 37 endemic species (MacKinnon et al., 2000), 166 species of snakes (Stuebing, 1991), between 140-150 species of amphibians (Inger and Stuebing, 1997), 394 species of freshwater fish with 149 endemic species (MacKinnon et al., 1996) inhabit the island. Some unique species of island inhabitants are orangutans (*Pongo pygmaeus*), proboscis monkey (*Nasalis larvatus*), gibbons (*Hylobates albibarbis* and *H. muelleri*), clouded leopards (*Neofelis diardi*), red cats (*Pardofelis badia*), ibis karau (*Pseudibis davisoni*), and storks storm (*Ciconia stormi*).

In addition to the conservation area established by the government, several international organizations have identified key areas for biodiversity in Kalimantan. The position of the assessment area for several internationally recognized biodiversity key areas are:

1. Important Bird and Biodiversity Areas (IBAs). The closest IBAs are Gunung Palung ID 047 (IBA 157: 'Bornean Mountains') which is ± 18 km away to the north.

2. Ramsar Site. There are two Ramsar Sites in Kalimantan, namely Lake Sentarum National Park which is located ± 300 km northeast, and Tanjung Puting National Park is located ± 250 km southeast.

3. Endemic Bird Areas (EBA); EBA Kalimantan covering the mountains in the territory of three countries: Indonesia, Malaysia and Brunei. The assessment location is located outside the EBA.

4. The Heart of Borneo (HoB). This area includes the Intact Forest Landscape, and the largest EBA in Sundaland. HoB is located ± 250 km northeast of the assessment area.

5. Ecoregions; referring to the WWF Ecoregion map (2009), the assessment area is in the Lowland Forests Borneo region and Bornean Peat Swamp Forests.

The area of Ketapang District covers 3.6 million ha consist of 92% land surface and 8% of water. About 8.6% (284,506 ha) of the area is peatland. which covers 16.9% of the total peatland area in West Kalimantan Province (ranked 3rd).

The peatland management in Ketapang District is a priority in West Kalimantan Province. In 2016, the government³ set a target of peat restoration in protected areas around 28,318 ha, about 4,871 ha (17%) is in the Ketapang District. The target area for restoration of licensed cultivation areas is 64,077 ha, about 5,315 ha (31%) is located in Ketapang District. The target area for restoration of unlicensed cultivation areas is 27,239 ha, about 5,315 ha (20%) is located in Ketapang District.

In national scale, the peatland restoration area covers 2.49 million ha and lies in seven provinces, i.e. Jambi, Riau, South Sumatra, West Kalimantan, Central Kalimantan, East Kalimantan, and Papua. According to Presidential Decree No. 32/1990, the national peatland protection aims to control the region hydrology which functions as water anchor and flood prevention as well as protecting unique ecosystems in the region. The target of peat restoration in West Kalimantan is only 4.8% of the National peatland restoration plan.

3.2. Landscape Context

Wider landscape boundaries is obtained from the scoping study. The landscape boundaries based on the scale and intensity of PT DAS operational activities toward the 6 types of HCV definition. The wider landscape in this assessment is 73,473.4 ha (Map 3 & 4) with the explanation as follows:

- PT DAS operational have the potential to create human-orangutan conflict, because the plantation is directly adjacent to orangutan habitat (peat swamp forest to the west of the MU)
- The operational of PT DAS have the potential to reduce the function of orangutan corridor to the north of the company's area
- The operational activities of the management unit are in the peat hydrological area (KHG) so that it can potentially affect the peat swamp hydrological system
- The operational activities of PT DAS have the potential to eliminate public access to the use of natural resources, especially in the field of freshwater fisheries. The

³ Decree of Head of Peat Restoration Agency number 05/BRG/KPTS /2016 regarding the determination of indicative maps of peat restoration

results of the initial visit revealed that there were fishing communities in the rivers in the peat swamp

- PT DAS operational activities have the potential to cause peatland fires. This is based on the results of observations during scoping study, where in the southern part of the assessment area there have been several land fires
- Peat forest area between the Tolak River and Pawan River as an important water catchment area
- Some local communities have direct interaction with PT DAS areas in form of natural resource utilization and land tenure, and its potential negative impacts from the operational of the company.

3.2.1. Biodiversity Context

The closest protected area from the assessment area is Gunung Tarak Protection Forest (HL), which has a direct border to the north-east, then Gunung Palung National Park (TN) which is located 18 km away to the north of the assessment area. Space between the national park area and the assessment area in the form of oil palm plantations.

The assessment area is part of the KHG Pawan River - Sungai Tolak and part of the Sungai Putri essential ecosystem area (KEE). This KEE is one of the important habitats for orangutans outside the conservation area.

RTE species with its natural range comprise the assessment area i.e. Bornean orangutans (*Pongo pygmaeus*), pangolin (*Manis javanica*); proboscis monkey (*Nasalis larvatus*), kelawit gibbon (*Hylobates albibarbis*), flat-head cat (*Prionailurus planiceps*), thorn tortoise (*Heosemys spinosa*), and biuku (*Orlitia borneensis*), *Shorea balangeran*, *Shorea pachyphylla*, *Shorea platycarpa*, *Shorea teysmanniana*, *Shorea albida*, and *Shorea uliginosa*.

The interpretation of Landsat 8 satellite images on March 22, 2017 and ground truthing shows that land cover in the wider landscape is dominated by secondary forest (50,822.6 ha), oil palm (10,011.4 ha), and shrubs (6,187.1 ha). The land cover in the PT DAS area is mostly secondary forest (4,906.6 ha), oil palm (1,730.7 ha) and open land (1,256.9 ha) (Map 3 & 4).

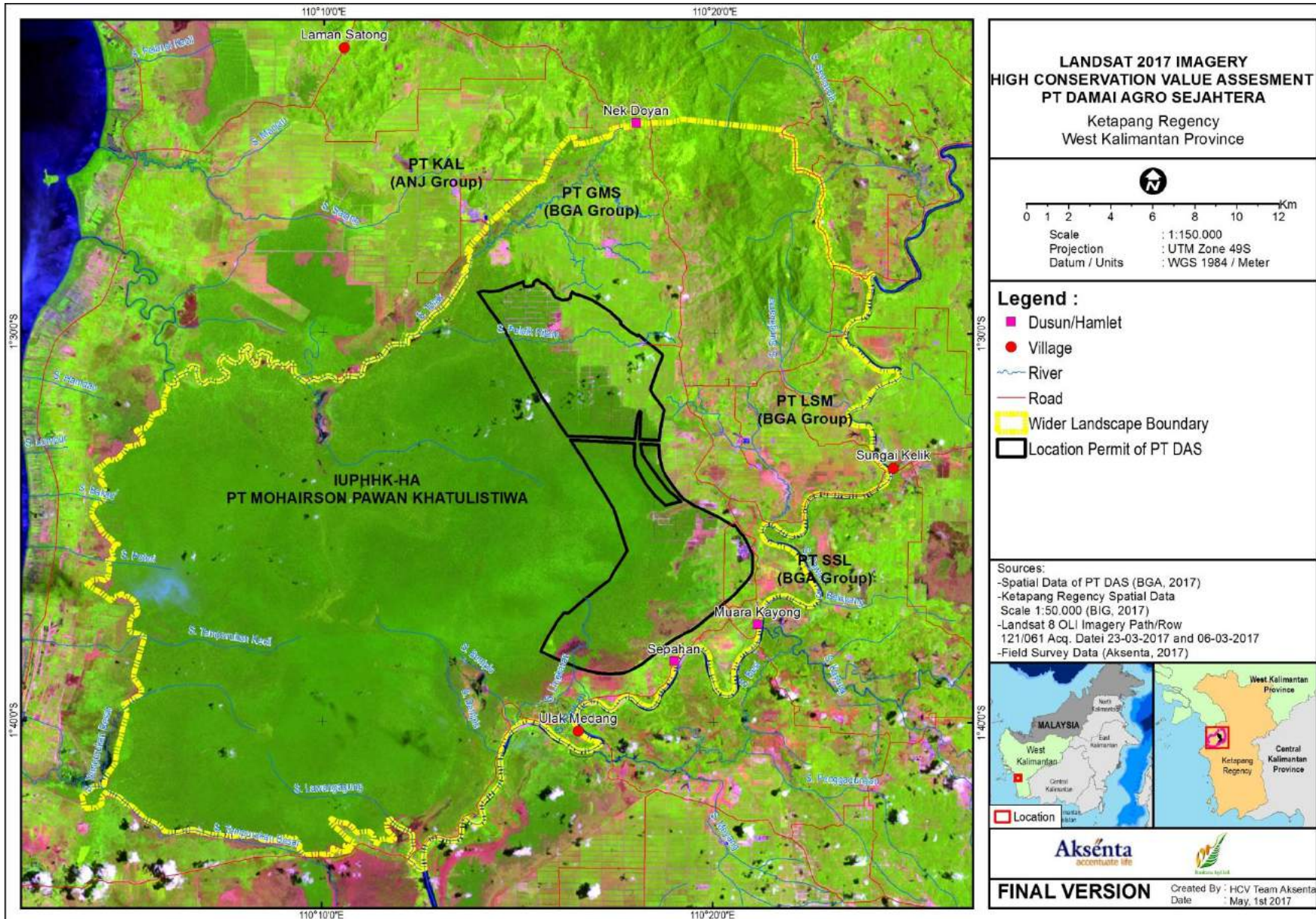
The field survey successfully detected (directly or indirectly⁴) 29 species of mammals, 95 species of birds, 20 species of reptiles and 191 species of plants. Of the 335 fauna and flora species, there are 31 endemic species and 4 species with Critically Endangered status, 5 Endangered species, 17 Vulnerable species, 5 species listed in Appendix I-CITES, and 41 protected species (Table 5).

Table 5 Species diversity detected in assessment area and its conservation status

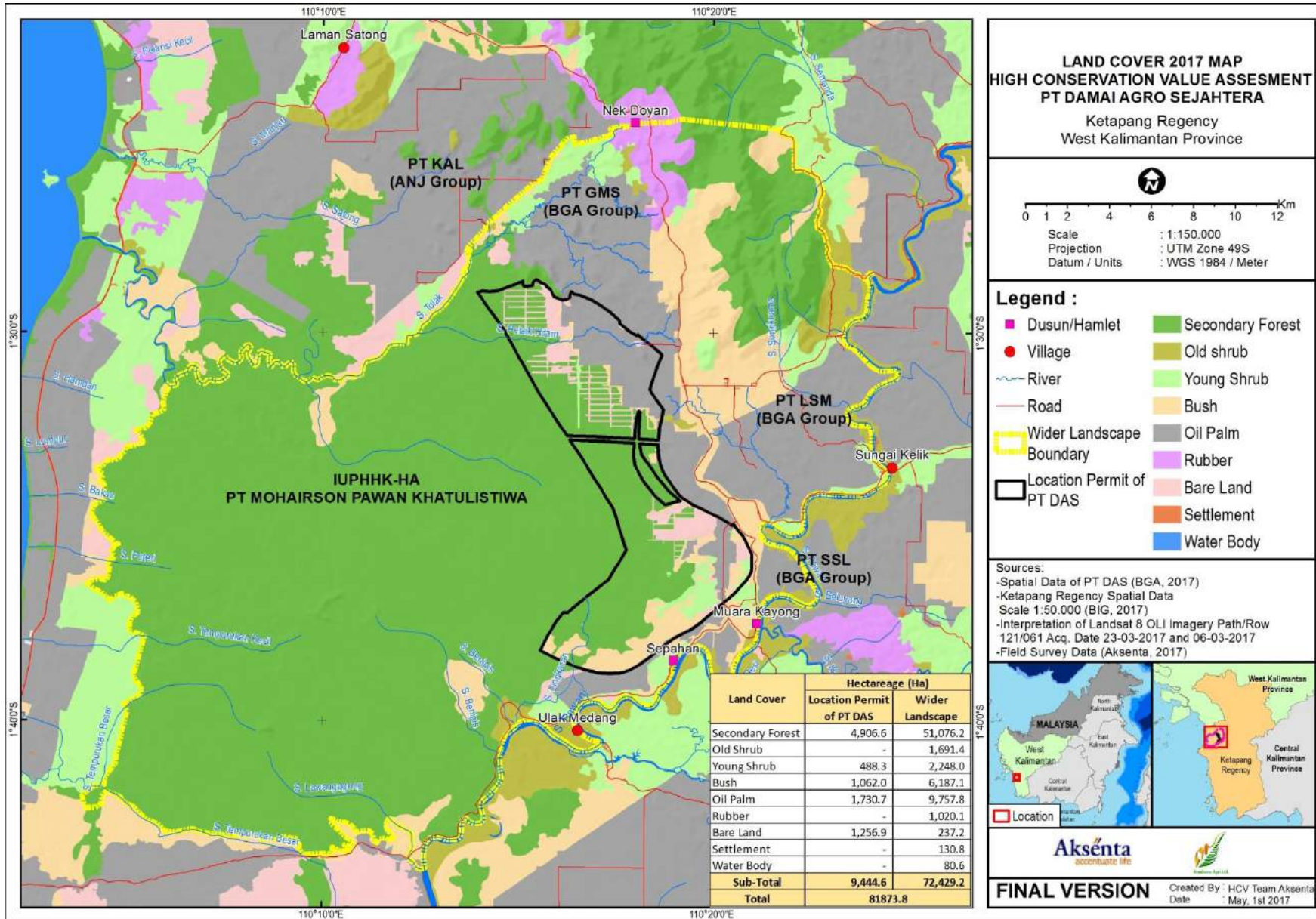
Group	Species Number	Endemic	IUCN			CITES App. I	Protected
			CR	EN	VU		
Mammals	29	5	2	1	6	4	12
Bird	95	2	0	0	0	0	21
Reptile	20	1	0	2	2	1	3
Plant	191	23	2	3	6	0	5
	335	31	4	6	14	5	41

Note: *Endemic to Kalimantan island; IUCN Status: CR=Critically Endangered, EN=Endangered, VU=Vulnerable, CITES: App. I=enlisted in Appendix I; Protected based on Law No 5 year 1990, Government Regulation no 7 year 1999 and Government Regulation No 8 year 1999; Regulation Of The Minister Of Agriculture No 54/Kpts/Um/2/1972, Minister of Forestry Decree No. 261/Kpts-IV/1990)

⁴ Based on the results of interviews with local stakeholders and experts, and according to the literature



Map 3 Landsat 8 OLI satellite imagery (in 2017), at the time of HCV assessment.



Map 4 Land cover of the assessment area in 2017, at the time of HCV assessment.

Eight adult orangutans were found directly in forested areas, and sixteen (16) orangutan nest tree were located. Other endemic or RTE species detected directly (visual and/or auidial) are *Hylobates albibarbis*, *Pityriasis gymnocephala*, *Varanus borneensis*, *Heosemys spinosa*, *Cuora amboinensis*, and 23 species of plants (Map 5). Based on local information, there are possibly several other important species i.e. *Nycticebus menagensis*, *Tarsius bancanus*, *Macaca nemestrina*, *Helarctos malayanus* and *Aonyx cinereus* (Table 6).

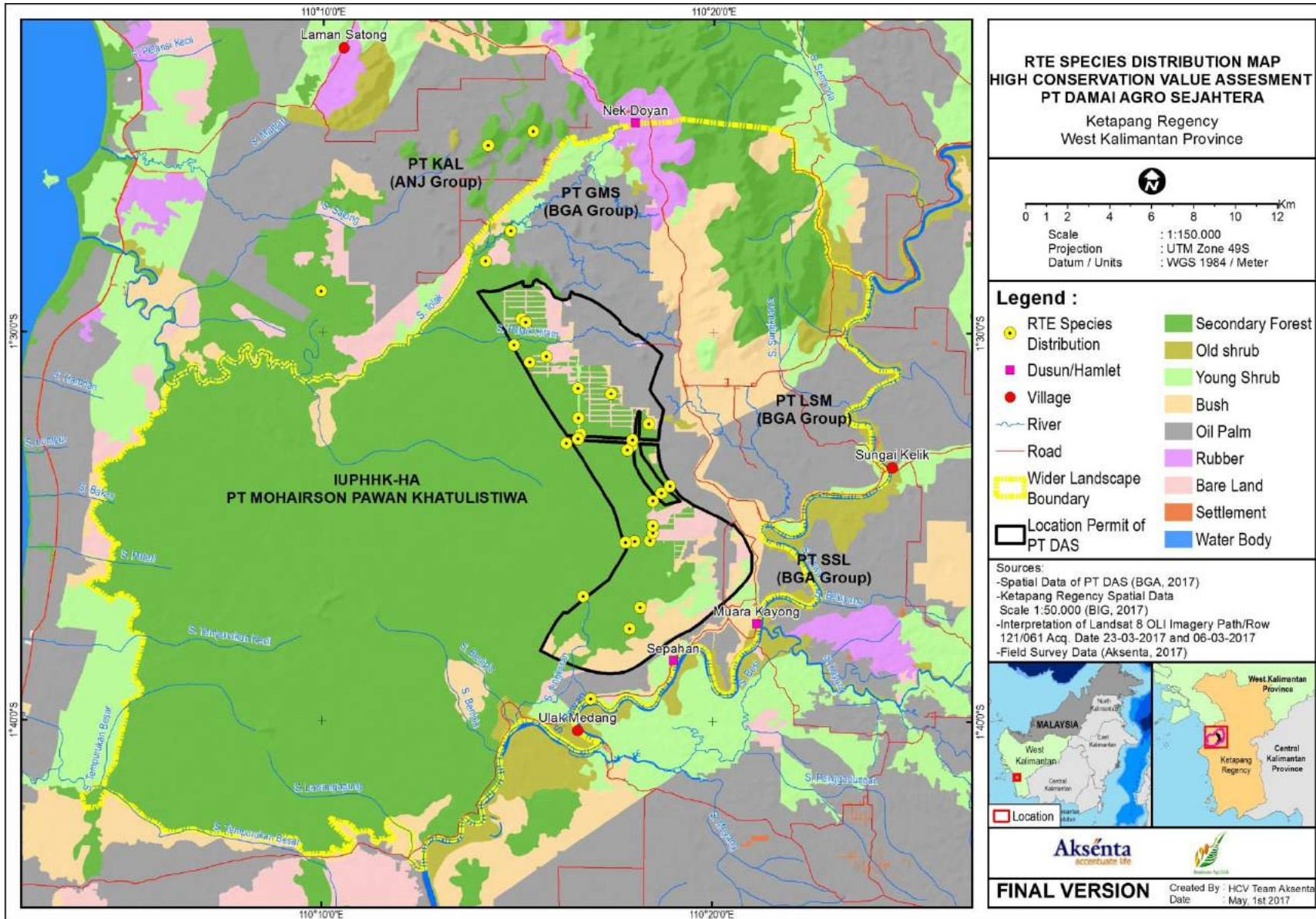
Table 6 List of Endemic, RTE Species in assessment area.

No	Latin Name	English/Local Name	Status				Type data*
			Range	IUCN	CITES	UU	
Mammals							
1	<i>Pongo pygmaeus</i>	Bornean Orangutan	E	CR	I	D	Ob, Tr
2	<i>Hylobates albibarbis</i>	Bornean White-bearded Gibbon	E	EN	I	D	Ob
3	<i>Presbytis rubicunda</i>	Maroon Leaf Monkey	E	LC	II	D	Li
4	<i>Macaca nemestrina</i>	Pig-tailed Macaque	<	VU	II	-	Ob
5	<i>Nycticebus menagensis</i>	Bornean Slow Lories	E	VU	I	D	Li
6	<i>Tarsius bancanus</i>	Horsfield's Tarsius	<	VU	II	D	Li
7	<i>Helarctos malayanus</i>	Sun Bear	<	VU	I	D	Tr
8	<i>Arctitis binturong</i>	Binturong	<	VU	-	-	Li
9	<i>Manis javanica</i>	Sunda Pangolin	<	CR	II	D	Li
10	<i>Sus barbatus</i>	Bearded Pig	E	VU	-	-	Li
Birds							
11	<i>Pityriasis gymnocephala</i>	Bornean Bristlehead	E	NT	-	-	Ob
12	<i>Lonchura fuscans</i>	Dusky Munia	E	-	-	-	Ob
Reptile							
13	<i>Tomistoma schlegelii</i>	False Garial	<	EN	I	D	Li
14	<i>Varanus borneensis</i>	Earless Monitor Lizard	E	LC	II	D	Ob
15	<i>Heosemys spinosa</i>	Spiny Turtle	<	EN	-	-	Ob
16	<i>Cuora amboinensis</i>	Southeast Asian Box Turtle	<>	VU	II	-	Ob
17	<i>Siebrencociella crassicolis</i>	Black Terrapin	<	VU	II	-	Li
Flora							
18	<i>Combretocarpus rotundatus</i>	Prepat/ Jadam paya	<	VU	-	-	Ob
19	<i>Anisoptera marginata</i>	Mersawa paya	<	EN	-	-	Ob
20	<i>Dipterocarpus coriaceus</i>	Keruing paya	E*	CR	-	-	Ob
21	<i>Dryobalanops fusca</i>	Ampadu	E	CR	-	-	Ob
22	<i>Hopea griffithii</i>	Merawan	<	EN	-	-	Ob
23	<i>Shorea albida</i>	Alan, Lampung	E	EN	-	-	Ob
24	<i>Shorea uliginosa</i>	Meranti lang	<	VU	-	-	Ob
25	<i>Aquilaria microcarpa</i>	engkaras, karas	<	VU	II	-	Ob
26	<i>Gonystylus affinis</i>	Banit, Bidaru	<	NE	II	-	Ob
27	<i>Gonystylus bancanus</i>	Ramin	<	VU	II	-	Ob
28	<i>Nepenthes fusca</i>	Kantungsemar	E	VU	II	D	Ob
29	<i>Nepenthes bicalcarata</i>	Kantungsemar	E	VU	II	D	Ob
30	<i>Albizia rosulata</i>	Jaring hantu	E	LC	-	-	Ob
31	<i>Fordia splendidissima</i>	Krat rusa	E	LC	-	-	Ob
32	<i>Alseodaphne borneensis</i>	Medang	E	LC	-	-	Ob
33	<i>Aporosa granularis</i>	Janggau, Kayu masam	E	LC	-	-	Ob

No	Latin Name	English/Local Name	Status				Type data*
			Range	IUCN	CITES	UU	
34	<i>Ficus midotis</i>	Kayu arah	E	LC	-	-	Ob
35	<i>Horsfieldia laticostata</i>	Piasau piasau	E	LC	-	-	Ob
36	<i>Ardisia macrocalyx</i>	Marpingam	E	LC	-	-	Ob
37	<i>Ardisia pyrsocoma</i>	Obah	E	LC	-	-	Ob
38	<i>Syzygium caudatilimum</i>	Jambu-jambu, Obah	E	LC	-	-	Ob
39	<i>Mussaenda lanuginosa</i>	Siwurungan	E	LC	-	-	Ob
40	<i>Neonauclea gigantea</i>	Tintap.	E	LC	-	-	Ob
41	<i>Aristolochia naviculilimba</i>	Canar bunga	E	LC	-	-	Ob
42	<i>Ellipanthus beccarii</i>	Kadarai	E	LC	-	-	Ob
43	<i>Daemonorops mirabilis</i>	Rotan	E	LC	-	-	Ob
44	<i>Dyera lowii</i>	Jelutung paya	E*	LC	-	-	Ob
45	<i>Dipterocarpus confertus</i>	Meranti batu	E*	LC	-	-	Ob
47	<i>Archidendron borneense</i>	Jiring paya	E*	LC	-	-	Ob
48	<i>Knema latifolia</i>	Darah-darah	E*	LC	-	-	Ob

Source: Field survey Aksenta, March-April 2017

Notes: * Data type: Ob = Observed; Tr = trace; Li = local information, Range: distribution range; E=Endemic Borneo; <= found in Sumatera and Malaysia Peninsular; <= has distribution in eastward of Borneo, e.g. Sulawesi, Philipina, Lesser Sunda. IUCN Status: CR=Critically Endangered; EN=Endangered; VU=Vulnerable, CITES=Appendix I and II; - = not listed. UU-D=protected under Indonesian law (Law No. 5 tahun 1990, Government Regulation No. 7 year 1999, and Government Regulation No. 8 year 1999, Minister of Agriculture Regulation No 54/Kpts/Um/2/1972, Minister of Forestry Decree No. 261/Kpts-IV/1990); - = not protected.



Map 5 RTE species (including Orangutan nest tree) encounter location in PT DAS landscape area.

3.2.2. Physical Context

The average annual rainfall (CH)⁵ in the study area is about 3200-3300 mm the number of rainy days 130-140. The CH distribution pattern includes equatorial pattern and two rain peaks: March-April and November-December. The dry period occurs in July - September. The average CH in the wet period (rainy season) increased by 22.2% from normal condition, and in the dry period (dry season) reduced by 22.1%.

In general, the land topography is classified as very flat (slopes less than 3%) with elevations range between 30-50 m above sea level. The land elevation of mineral soil is relatively higher than the peat soil. The majority area were covered by freshwater topogen peat (tropohemist, tropofibrist, troposaprist). The depth of peat varies, with the deepest reaches more than 5 m. The remaining area has mineral soils for instance order inceptisol with parent clay material comes from the rear swamp of the Pawan River meander and order oxisol comes from incised old volcanic hills.

Based on the map of land system⁶, there are seven land systems in the landscape assessment i.e. Gambut (GBT), Honja (HJA), Sebagau (SBG), Klaru (KLR), Telawi (TWI), Rangankau (RGK), and Mendawai (MDW). In the management unit area there are four types of land systems i.e. MDW, GBT, SBG, and HJA. The GBT land system is dominant in the north-west, MDW is dominant in the central and south, HJA is in the north along with PT GAS, and SBG is in the east corner of the assessment area. The landform system of GBT, MDW, and KLR are swamp areas. The SBG landform is the belt of Pawan River meander with very flat topography and alluvium riverine lithology. The HJA landform is a metamorphic plain with a rather hilly topography, while the RKU is a sedimentary plain with an undulating-rolling topography. The TWI landform is a ridge system area around Bukit Tarak.

Hydrologically, the assessment area is in the downstream area of the Pawan-Tolak Watershed. The upstream part of the Pawan watershed consists of Gunung Raya area (1165 m asl), Mount Rabainanggung (1508 m asl), and Batu Putih Mountain (1000 m asl). The river that flows in the northern part of the assessment area is the Pelaik Hitam River (Tolak Stream) and in the southern part flows the Lingkaran River (Pawan Stream). The Pelaik Hitam River upstream is in the western part of Mount Tarak, while the Lingkaran River flows from PT MPK's IUPHHK-HA area.

3.2.3. Socio-Cultural Context

Villages which interact and directly affected by PT DAS activities Sungai Kelik Village, Nanga Tayap Sub-District; Laman Satong Village, Matan Hilir North District; and Ulak Medang Village, Muara Pawan District. The demographic conditions of the villages area detailed in Table 7.

Table 7 The demographic condition of villages which affected directly by PT DAS activities.

Village	Size (km ²)	Population	Density (person/km ²)
Sungai Kelik	160,18	3.759	23
Laman Satong	326,28	2.843	9
Ulak Medang	161,28	614	4

Source: Central Agency on Statistics (BPS), 2017⁷

Notes: The area coverage based on BPS is not definitive, however it has been confirmed with the local people

⁵ TRMM daily data 1998 - 2015 (17 years)

⁶ RePPPProT (Regional Physical Planning Programme for Transmigration), 1985. Review of phase IB results. Ministry of Transmigration, Jakarta.

⁷ Muara Pawan Sub-District in Digit, Nanga Tayap Sub-District in Digit, and Matan Hilir Utara Sub-District in Digit.

There are three sub-villages⁸ which become the objects of social assessment, namely Muara Kayong and Sepahan Sub-villages in Sungai Kelik Village, and Nek Doyan Sub-village in Laman Satong Village. The number of households in the three sub-villages are 1,037 households with population of 4,035 people. Muara Kayong is a sub-village with the highest number of population (Table 8). Ulak Medang Village was excluded from the object of assessment because it might trigger a conflict between the village / sub-village boundary with Sungai Kelik Village, as indicated by community leaders from both villages.

Table 8 The demographic of sub-villages in the assessment area

Village	Sub-village	Number of house hold (KK)	Population
Sungai Kelik	Muara Kayong	352	1.745
	Sepahan	320	1.090
Laman Satong	Dusun Nek Doyan	365	1.200

Source: Initial Consultation with the authorities of subvillages, 2017

Note: the area coverage is not definitive, there are conflicts on the subvillage border

The majority of local people have multiple livelihoods (more than one source). The main livelihood is to become employees of oil palm plantation companies, farmers, loggers and traders. The second livelihood is fish collectors and farm labor. Fish collectors is no longer the main source of livelihood, because fish catches cannot fulfil their daily needs. The Pawan River, swamps and ditches (including oil palm plantation trenches) are the places where people find fish. This situation illustrates that basically local communities are no longer fully dependent on natural resources, especially forests.

Infrastructure to support the socio-economic and cultural activities of the local community are available and evenly distributed in each sub-village, both accessibility, health, education facilities as well as the availability and accessibility for fuel/energy. Ketapang and Sukadana cities are accessible and there are no sub-villages that do not have accessibility. All sub-villages have health facilities like village maternity center (*Polindes*) and receive health service visits from the sub-district every once in a month. The elementary school facilities are available throughout the sub-village, while the secondary and high schools are available in the Nek Doyan Sub-village. All sub-villages have electricity from the government (PLN), and the majority of local people currently use 3 kg LPG (subsidies).

The indigenous peoples in this region are Malay who occupies Muara Kayong and Sepahan Sub-villages, and Dayak Tolak Sekayu who inhabits Nek Doyan Sub-village. The Malay community embraced Islam, and the Dayak Tolak Sekayu people embraced Christianity. In their native villages there were migrants from Java, Flores and Sumatra who came a long time ago and had become part of the local community. They live in harmony, there have never been conflicts related to ethnicity and religion.

The traditional customs of the Malay people are guided by the teachings of Islam, while the Dayak Tolak Sekayu people still refer to ancestral traditions. The traditional activities of Malay people are seen in special moments from the human life cycle, such as the birth, marriage and death phases. The traditional program of the Dayak Tolak Sekayu community is closely related to field rice farming activities, such as *turun pekakais*, *pelepas tebangan*, *pelepas api*, *pelepas tunggal*, *kumpul mencak*, *memeharu* dan *selepit benih*. Traditional ceremonies were celebrated

⁸ According to UN N. 5 of 1979 regarding village government, the definition of a sub-village is a part of the territory within a village which is part of the implementation of village government

from land preparation, land clearing, planting, maintenance, harvesting and seeds preparation. Nyapat, is a traditional ceremony for the end of the year as a form of gratitude for the Dayak Tolak Sekayu people to their ancestors and creators.

3.3. HCV Outcomes and Justification

The results of the assessment indicate situations which require HCV at PT DAS Location Permit area. There are five HCV categories detected, namely HCV 1, 2, 3, 4, and 5 in the PT DAS Location Permit area. While areas that qualify as HCV 6 are only found outside the PT DAS Location Permit. A summary of the presence of HCV in the PT DAS location permit area is as follows.

Table 9 HCV Identification Summary in PT DAS landscape area.

HCV	Definition	Summary of Description and Justification		
		Present	Potential	Absent
1	Concentrations of biological diversity including endemic species, and rare, threatened or endangered (RTE) species that are significant at global, regional or national levels	Population of endemic or RTE species, such as: Orangutan, gibbon, Spiny turtle	-	-
2	Large landscape-level ecosystems, ecosystem mosaics and Intact Forest Landscapes (IFL) 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	Part of the landscape of the Pawan River - the Tolak River Hydrological Units.	-	-
3	Rare, threatened, or endangered ecosystem, habitats or refugia	Peat Swamp Forest Ecosystem, Dipterocarp Forest	-	-
4	Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes	Hydrological regulator and management of extreme water flow events	-	-
5	Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for example for livelihoods, health, nutrition, water), identified through engagement with these communities or indigenous peoples	The river is used as an important fishing site by local communities	-	-
6	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	-	-	There is a historical and sacred site for the Tolak Sekayu Dayak Tribe of Nek Doyan Sub-village, but the site is located outside PT DAS area

HCV 1: Species Diversity (Present)

HCV 1 is the concentration of biodiversity including endemic species, and rare, threatened or endangered species (RTE) at the global, regional or national level. Based on the definition of HCV 1 (Brown et al, 2017), there are strong indication that several endemic and RTE species occurred in the PT DAS area (Table 10).

The HCV 1 area comprises whole KHG with its protection function, remaining natural habitat which play important role as biodiversity hotspot, patch of blocked secondary forest in the northern part of the PT DAS area which has the potential to be a habitat for RTE species. HCV Area 1 in the PT DAS area does not cover areas that have been planted with oil palm (north-eastern part of the management unit), and perished forest areas due to logging or fires (southern part of PT DAS area). Area of HCV 1 in PT DAS area is around 5 see Map 6.

Table 10. Situations which qualify as HCV 1.

Requirements for HCV 1	Findings
A high overall species richness, diversity or uniqueness within a defined area when compared with other sites within the same biogeographic area	✓
Populations of multiple endemic or RTE species	✓
Important populations or a great abundance of individual endemic or RTE species, representing a substantial proportion of the regional, national or global population which are needed to maintain viable populations either: Year-round (e.g. key habitat for a specific species) or; Seasonally, including migratory corridors, sites for breeding, roosting or hibernation, or refuges from disturbance	✓
Small populations of individual endemic or RTE species, in cases where the national, regional or global survival of that species is critically dependent on the area in question	✗
Sites with significant RTE species richness, or populations (including temporary concentrations) of priority species approaching those of key protected areas or other priority sites (e.g. KBAs) within the same biogeographic boundary	✓
Particularly important genetic variants, subspecies or varieties	✓

notes: ✓ = present; ✗ = not present

Protected areas: a proxy concentration of biodiversity

Protected areas as a proxy indicator for biodiversity in the wider landscape are KHG (peat hydrological unit) and riverbanks as protected areas in Indonesia. Therefore, HCV 1 is present in the assessment area.

Richness, Diversity, or Uniqueness of Biodiversity

The assessment landscape is in a forest block covering $\pm 76,000$ ha with peat forest occupying the largest proportion ($\pm 73\%$). The Orangutan population in the assessment landscape is unknown, but some researchers show that the density of orangutans in lowland forests, including peat swamp forests, is higher than in hilly dipterocarp forests. The highest orangutan density for Borneo is 2-4 individuals/km² in dipterocarp lowland forest, freshwater swamp forest, and mixed freshwater/peat swamp forest, while for hill dipterocarp forest only 0.3-0.5 individuals/km² (Morrogh-Bernard, et. al, 2003). Thus, the assessment landscape is considered to have high species uniqueness as an element of HCV 1.

Endemic Species and Restricted Range Species

There are eight endemic fauna species in assessment area: *Hylobates albibarbis*, only occupied West and Central Kalimantan (between the south of the Kapuas River and west of the Barito

River); *Pongo pygmaeus wurmbii* is limited to the south-western part of the island of Borneo; while *Presbytis rubicunda*, *Nycticebus menagensis*, *Sus barbatus*, *Varanus borneensis*, *Lonchura fuscans* and *Pityriasis gymnocephala* are widespread on the Borneo Island including Sabah, Sarawak and Brunei Darussalam. The distribution of *Lonchura fuscans* covers the entire Borneo island and its satellites.

Apart from fauna species, there are 18 endemic flora species of Borneo including: *Dryobalanops fusca*, *Shorea albida*, *Nepenthes fusca* and *Nepenthes bicalcarata*, and 5 species whose distribution is limited to Borneo and Sumatra. Restricted Range Species in very large areas such as Borneo and Sumatra are not indicators of the HCV area. The *Dryobalanops fusca* species is commonly found in sandy soil (the ecosystem of transplants of peat), in the assessment area this soil type is found in the northern part. Species *Shorea albida* and *Nepenthes bicalcarata* are commonly found in peat swamps, in the area of assessment of these species found only in areas of peat swamp forest that are still naturally covered. While *Nepenthes fusca* are scattered distributed in areas covered with forests or shrubs and are relatively easy to find throughout the island of Borneo.

Endemic fauna species, except *Lonchura fuscans*, are species that depend on the presence of forests. Forests in the assessment landscape occurred as a large and significant forest block and appear as habitat for these endemic species. The distribution and magnitude of the population of endemic species found in the assessment landscape is unknown, but given the significant habitat available, the presence of these endemic species meets the criteria of the HCV element 1. Thus in the PT DAS area HCV 1 associated with endemic species and restricted range species is all areas of natural forest.

Rare, Threatened or Endangered (RTE) Species

The assessment landscape recorded 24 RTE species, consisting of 13 fauna species and 11 flora species. The number of RTE species shows that the assessment landscape still has important species diversity. Thus, the presence of several RTE species in the assessment landscape has met the HCV 1 criteria.

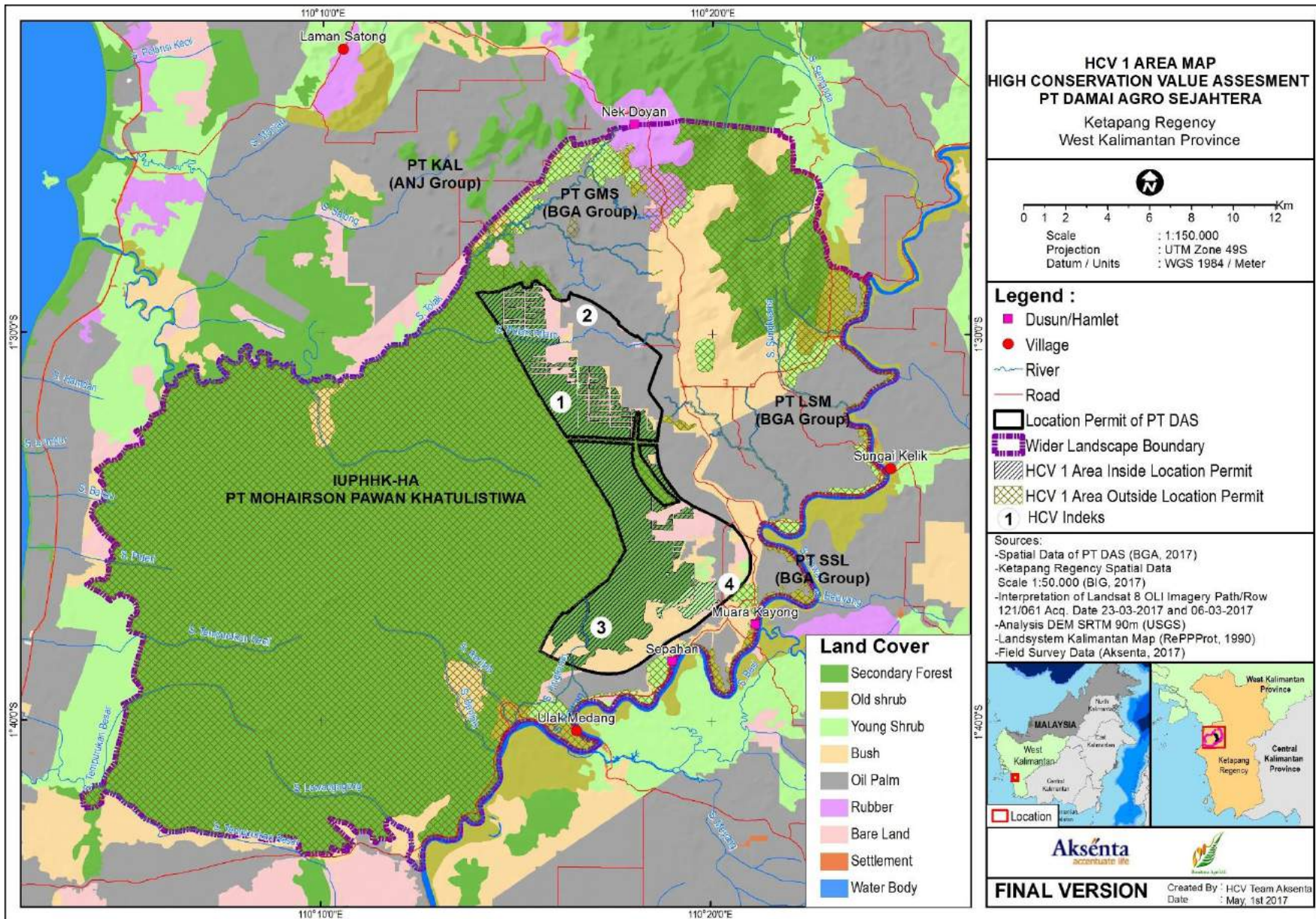
There are 41 protected species recorded in the assessment area, consisting of 12 mammal species, 21 birds, 3 reptiles and 5 plants. Of all the protected species, 6 mammal species, 1 reptile and 1 plant are RTE species; and 2 endemic mammal species. Thus, protected species that meet the criteria as HCV 1 are covered by the criteria for RTE species and are endemic.

Spatial and Temporal Concentration of Species

The assessment area does not have roosting sites or breeding sites such as bat caves or trees where bat colonies perch. Study area is also not the main route for bird migration, and there is also no stop-over migratory wader or raptors site. In the study area there was also no location for local migration of bearded pigs. Based on this situation, there is no consideration for spatial and temporal concentrations of species.

Important Genetic Variants, Subspecies or Varieties

Important sub-species variants in Kalimantan include three orangutan sub-species, namely *Pongo pygmaeus* in the north, *P.p. wurmbii* in the south (including around the assessment area), and *P.p. morio* in the northeast. Thus subspecies of important genetic varieties, namely orangutan sub species *P.p. wurmbii* is occurred in assessment area.



Map 6 HCV 1 area in PT DAS landscape area.

3.3.1. HCV 2: Landscape-level ecosystems, ecosystem mosaics and Intact Forest Landscapes (Present)

HCV 2 defines as an intact forest landscapes and large landscape ecosystems and ecosystem mosaics that are significant at the global, regional or national level, and which have an appropriate population of most natural species in natural distribution and abundance patterns (Brown et al., 2017). The result of this assessment indicates situations that qualifies as HCV 2 (Table 11).

The location areas of HCV 2 area is presented on Map 7. Areas within the Sungai Putri KEE area that have no forest cover or other natural vegetation, become HCVMA.

Table 11 Situations which qualify as HCV 2.

Requirements for HCV 2	Findings
Large areas (e.g. could be greater than 50,000ha, but this is not a rule) that are relatively far from human settlement, roads or other access. Especially if they are among the largest such areas in a particular country or region	✓
Smaller areas that provide key landscape functions such as connectivity and buffering (e.g. protected area buffer zone or a corridor linking protected areas or high quality habitat together). These smaller areas are only considered HCV 2 if they have a role in maintaining larger areas in the wider landscape	✗
Large areas that are more natural and intact than most other such areas and which provide habitats of top predators or species with large range requirements	✓

notes: ✓ = present; ✗ = not present

Large Landscape

The largest forest landscape (IFL) in Kalimantan is in the central part of the island which is the main natural landscape of the Heart of Borneo (HoB). The distance between the assessment area and the HoB is 163 km. The closest IFL to the assessment area located outside the western HoB with a distance of 72 km. The assessment area is part of the KHG Pawan River - Sungai Tolak. This KHG area is about 113,800 ha⁹. The results of spatial analysis of land cover show that around 47% (± 53,000 ha) of the area of KHG is still forest cover. The peat swamp forest area was later referred by several conservation institutions (including FFI, Greenpeace Indonesia, Wetland International Indonesia, YIARI, and supported by the government) as the Essential Ecosystems Area (KEE). KEE Sungai Putri has the widest remaining forest in Ketapang District therefore all areas with natural forest cover at KE Putri Sungai Putri qualify as HCV 2 ("Large area which is relatively far from human settlements, roads or other access").

Smaller Areas Providing Key Landscape Functions (e.g. Connectivity & Buffering)

Sungai Putri KEE is the largest remaining forest in Ketapang District with an area of ± 53,000 ha. Other areas in the same landscape that are still forested are Gunung Tarak Protection Forest (± 20,650 ha) and Gunung Palung National Park (± 90,000 ha). However, around the PT DAS location permit area there is no smaller forest area inside or adjacent to the assessment area which functions as buffer zone or corridor between forested areas mentioned above. Therefore, the criteria as HCV 2 requirements with these criteria are not met. Another area was found which served as a corridor connecting KEE Sungai Putri with the Mount Tarak Protection Forest. The area is outside the PT DAS Location Permit (in the north), which is inside the PT GMS concession. Thus, in the PT DAS Location Permit area there is no HCV 2 area with the

⁹ SK No 129/MENLHK/SETJEN/ PKL.0/2/2017, dan SK No 130/MENLHK/SETJEN/ PKL.0/2/2017

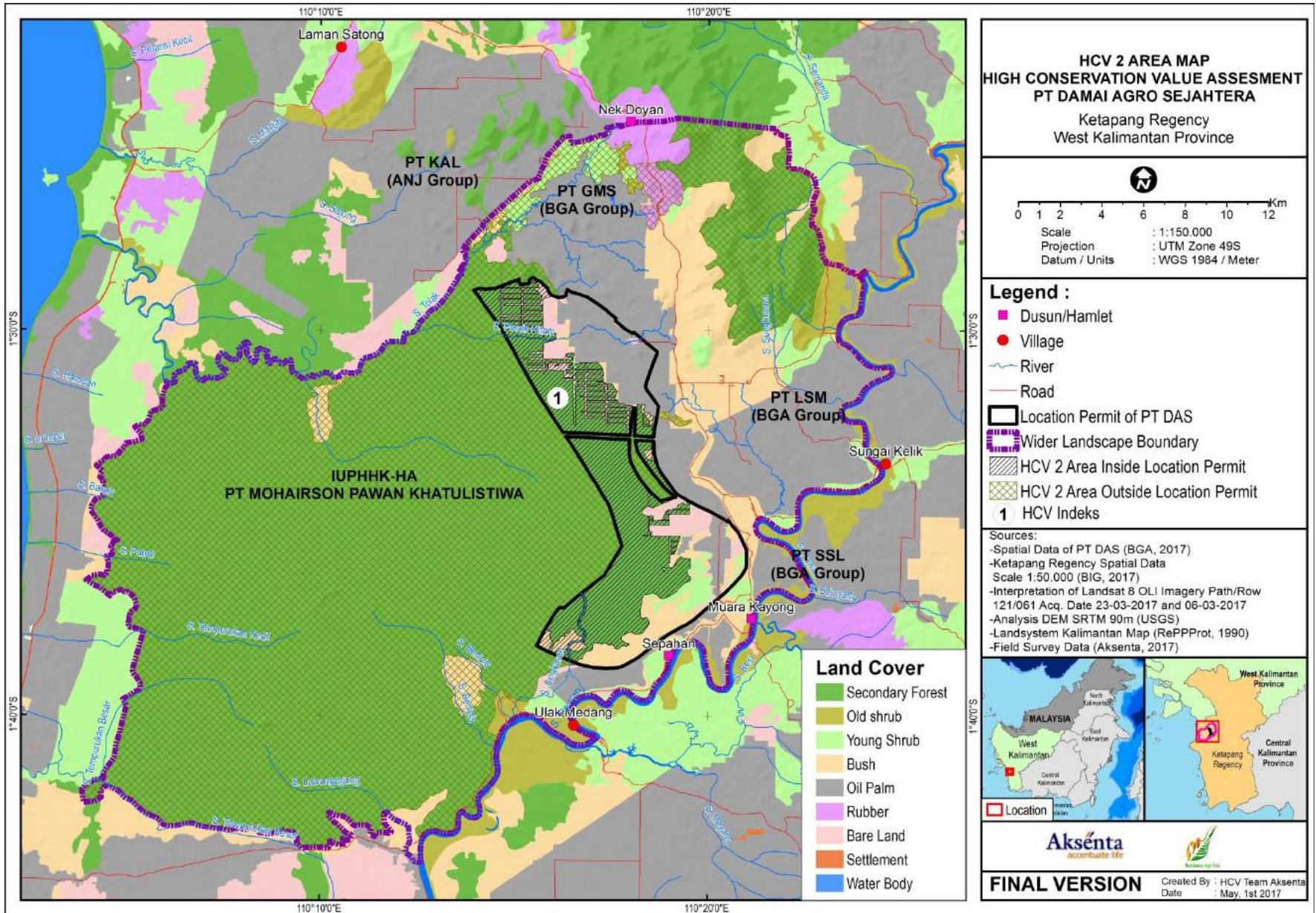
criterion "Areas of smaller size that provide key functions for the landscape such as connectivity and support".

Larges Areas that are more Natural and Intact

Sungai Putri KEE is an important habitat for orangutans (*P. p. Wrumbii*). Based on the survey in November-December 2017 conducted by YIARI and Wetland International Indonesia, the orangutan population in KEE are around 813-1204 individuals. The orangutan population is stated as the largest population in Ketapang District, the third largest in West Kalimantan Province after Gunung Palung National Park and Betung Kerihun National Park. The orangutan population in KEE is also thought to be the largest population outside the conservation area (YIARI, 2018). The criteria for HCV 2 are therefore deemed present as a viable population of naturally occurring species in natural patterns of distribution and abundance.

Ecotone

In the PT DAS Location Permit area there is one area that may have the character of Ecotone, a transition area between two biomes or two ecosystems. The area is located in the northern part of PT DAS Location Permit area, in the transition ecosystem between Peat Swamp Forest and Mixed Dipterocarp Forest. However, this area is very thin and the form as well as the wide area has not yet confirmed. In addition, this potentially Ecotone area includes in the HCV 3 area, not as HCV 2.



Map 7. HCV 2 area in PT DAS landscape area

3.3.2. HCV 3: Ecosystems and Habitats (Present)

HCV 3 defines as an ecosystem, habitat or refugia that is rare, endangered, or critically endangered. Identification of HCV 3 in this study uses criteria based on the Common Guidance for the Identification of HCV (Brown et al., 2017). Identification of HCV 3 in the field will lead to efforts to ensure the presence or absence of undisturbed or slightly disturbed natural ecosystems. If a natural ecosystem is found, it is then referred to whether the ecosystem belongs to a rare or endangered ecosystem at the national or international level.

In the Common Guidance and Toolkit HCV Indonesia (2008) it is stated that ecosystem in Indonesia that has lost 50% or more of its original area in the bio-physiographic region is considered as HCV 3.

There are four criterias for ecosystems that meet the criteria of HCV 3, which are naturally rare; anthropogenically rare, endangered or critically endangered, and classified as threatened in national or international systems (Brown et al., 2017). The results of the field study show that the natural ecosystem criteria qualifies the HCV 3 (Table 12).

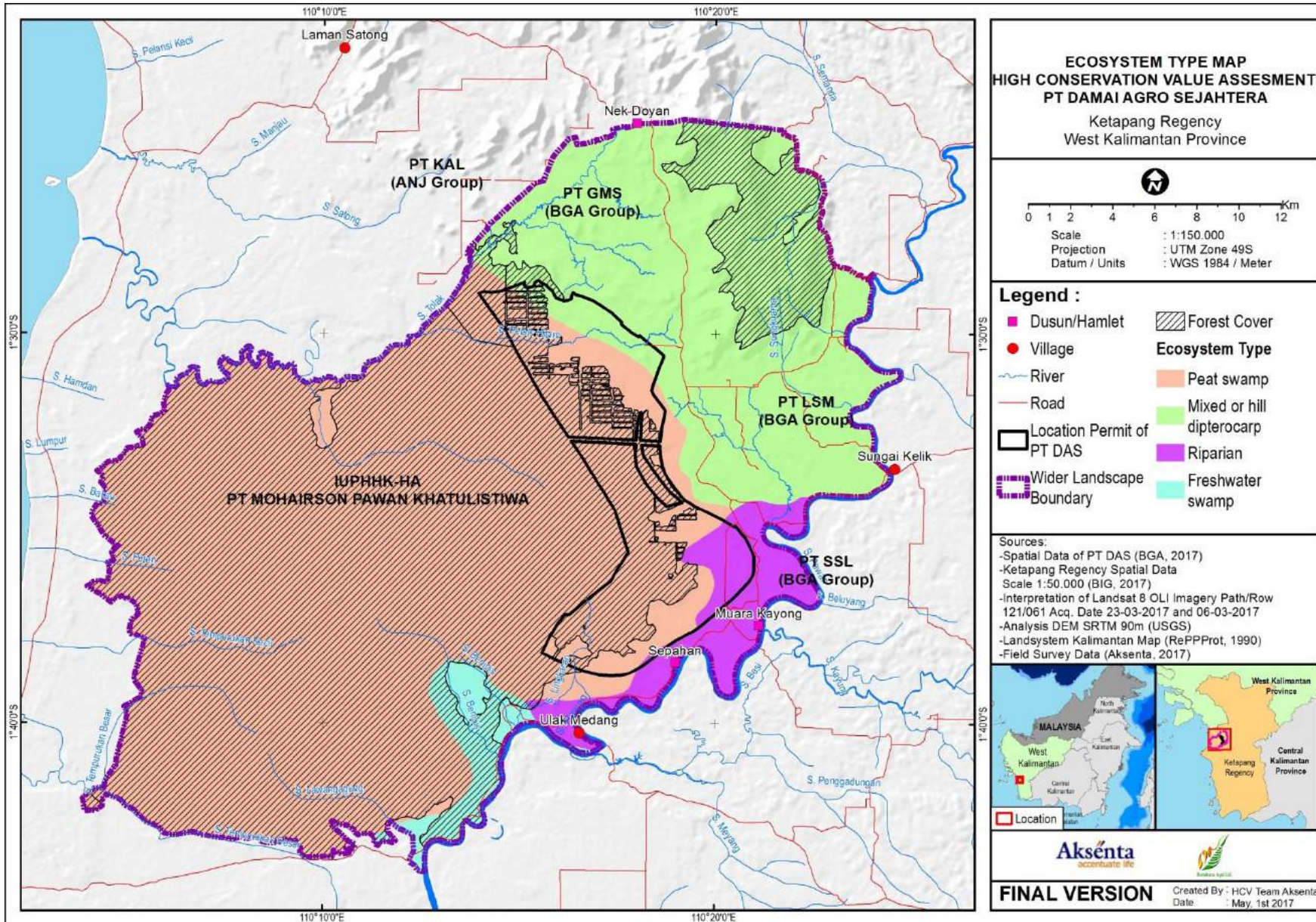
The results of the HCV 3 identification study using the Precautionary Approach (Indonesian Consortium for the Revised HCV Toolkit, 2008) show that in the PT DAS area there are several threatened ecosystems which are peat swamp forests, on the MDW land system (Mendawai) and GBT (Peat) as a peat swamp forest forest ecosystem; semi-natural scrub areas in the peat swamp, on the MDW (Mendawai) land system that has the potential to recover into the ecosystem of the Peat Swamp Forest through a natural succession process; and small forest fragments above the Honja (HJA) land system which is a mixed Dipterocarp forest ecosystem (Map 8).

Thus, it can be concluded that HCV 3 is found in the PT DAS Location Permit, in the form of a Peat Swamp Forest ecosystem and Mixed Dipterocarp forest ecosystem above igneous rock, with secondary forest cover. The largest part of this forested area is found almost along the western boundary of the PT DAS Location Permit area. The location of HCV 3 area is presented on Map 9.

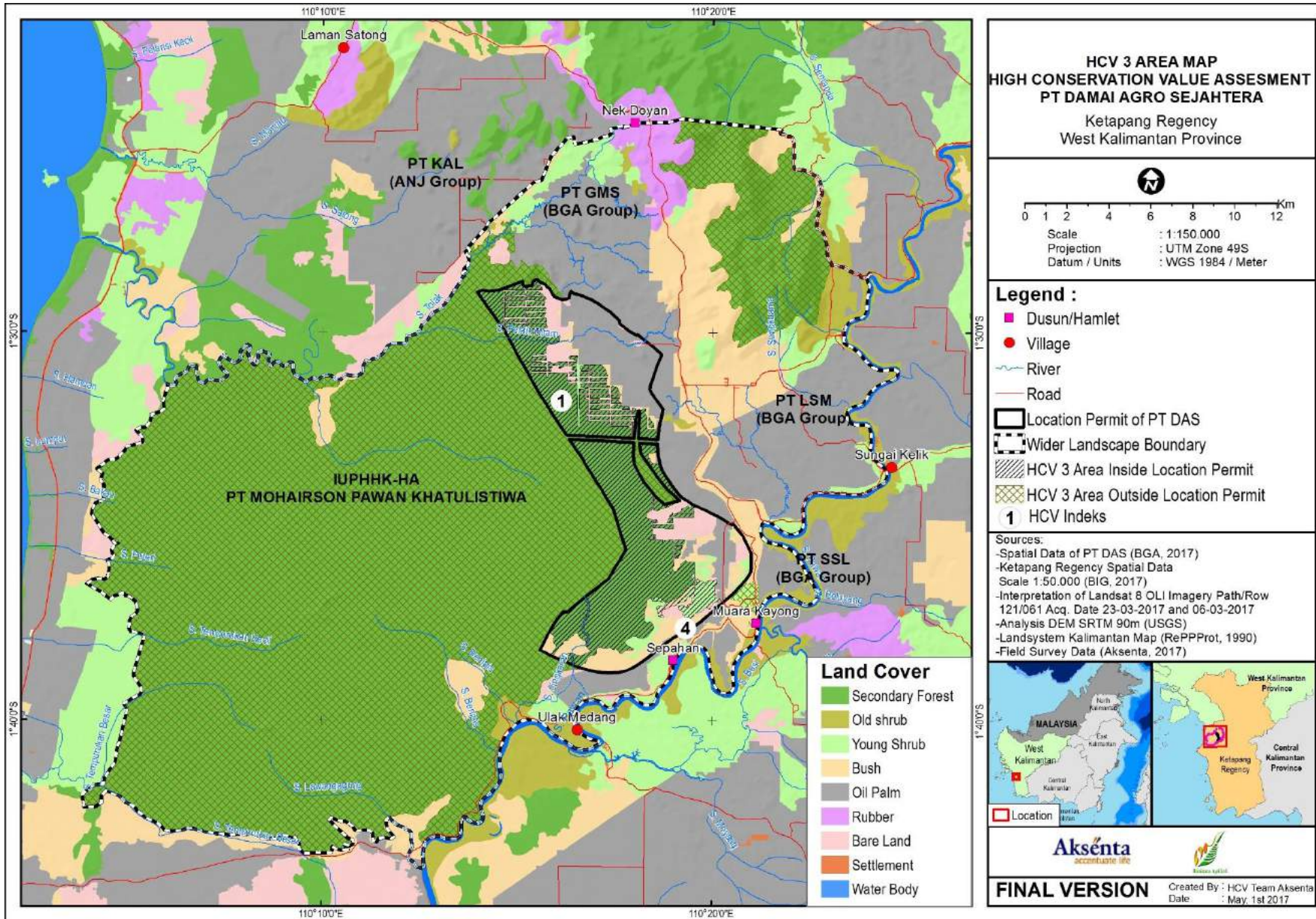
Table 12. Situations which qualify as HCV 3.

Requirements for HCV 3	Findings
Naturally rare because they depend on highly localized soil types, locations, hydrology or other climatic or physical features, such as some types of limestone karst forests, inselbergs, montane forest, or riverine forests in arid zones	✘
Anthropogenically rare, because the extent of the ecosystem has been greatly reduced by human activities compared to their historic extent, such as natural seasonally-flooded grasslands on rich soils, or fragments of primary forests in regions where almost all primary forests have been eliminated.	✓
Threatened or endangered (e.g. rapidly declining) due to current or proposed operations	✘
Classified as threatened in national or international systems	✓

notes: ✓ = present; ✘ = not present



Map 8. Ecosystem types in PT DAS landscape area.



Map 9. HCV 3 area in PT DAS landscape area.

3.3.3. HCV 4: Ecosystem Services (Present)

Based on Brown et. al., 2017, there are situations that qualify as HCV 4 (Table 13). The situation assessment involves the existence of natural indicators found in the field, for example the existence of rivers and riparian zones, wetlands (swamps, lakes), the existence of forests / caves as pollinating agent habitat, the existence of hilly land with steep slopes and good vegetation. The survey resulted Pelaik Hitam River, Lingkar River, and wetlands (peat land) are indicators in the assessment area. The existence of these indicators has six situations out of 10 situations that meet as a prerequisite as HCV4.

HCV 4 areas were found in the form of peatlands, the Lingkar River and riparian zone, and Pelaik Hitam River and riparian zone. The distribution area of HCV 4 is presented on Map 10.

Table 13 Situations which qualify as HCV 4.

Requirements for HCV 4	Findings
Managing extreme flow events, including vegetated riparian buffer zones or intact floodplains	✓
Maintaining downstream flow regimes	✓
Maintaining water quality characteristics	✓
Protection of vulnerable soils, aquifers and fisheries	✓
Provision of clean water, for example where local communities depend on natural rivers and springs for drinking water, or where natural ecosystems play an important role in stabilizing steep slopes. These two values frequently occur together and the area which provides the critical services (water provision and erosion control) may overlap partially or completely	✗
Protection against wind, and the regulation of humidity, rainfall, and other climatic elements	✓
Pollination services, for example exclusive pollination for subsistence food crops provided by native bees for small-scale farmers in the highlands of Kenya, or for commercial Durian plantations by bats in Southeast Asia. In both cases, pollinating animals depend on the presence of suitable forest habitats and cannot survive in landscapes that are purely used for agricultural activities	✗
Forests, wetlands, and other ecosystems that provide a boundary zone that protects from destructive fires that can threaten communities, infrastructure or other HCVs.	✓
Groundwater recharge zone.	✗
Grasslands providing buffering against flooding or desertification	✗

notes: ✓ = present; ✗ = not present

Managing extreme flow events, including vegetated riparian buffer zones or intact floodplains

There are several field indicator revealed during data collection related to the management of extreme water flow events and intact flood buffer i.e. water bodies (rivers, lakes, swamp) and naturally vegetated hilly terrain. The naturally vegetated hilly areas laid off outside assessment area, but there are several rivers run through the assessment area. The existence of the river channel is very important as the main drainage channel, especially during extreme rain events. The flow of the river flows water from the upstream catchment area to its mouth so that there is no flooding on the land, including as a buffer of flooding around the river flow.

Protection of vulnerable soils and aquifers

The types of soil in the assessment area are mineral and organic / peat soil. Mineral land has been planted with oil palm and is well drained (potential for low groundwater absorption). Peat land dominates the assessment area (more than 80%). The thickness of peat soil varies (0.5-5 m) and the maturity level of peat is classified as fibrist-saprist. Shallow peat land (less than 1 m) has been planted with oil palm in 2004 - 2006. Peat with a thickness of more than 2 m generally

still has good forest cover (no land clearing and drainage canals yet), except those that have been burned in the southern part. Land with peat thickness of more than 3 m is found in the central-western part of the PT DAS concession area, and around the southern moratorium area.

Peat soil is classified as vulnerable land¹⁰. Excessive drainage on peat soil might cause descending soil surface (subsidence) and drought. A dry peat land is very flammable (contains high CO₂ emissions). The shrinkage of 1 meter thick peat will cause a loss of its ability to support water up to 90 cm, equivalent to 9,000 m³ / ha (Agus and Subiksa, 2008). Peat ecosystems that are damaged will require a very long time to recover. In addition, the opening of peat land that has a sulphide material layer (pyrite / FeS₂) causes oxidation of iron compounds because air exposure (producing Fe²⁺ + / Fe³⁺ + and sulphate) will increase the acidity of peat soil (Van Breemen, 1972). The reaction with clay particles, might release aluminium compounds (Al) which are included in one of the heavy metals, Bohn (2001).

Peatlands that function as protection¹¹ are very deep peat which can store large amounts of water reserves (thickness more than 3 m). However, HCV 4 valued peatlands in the assessment area are all peatlands (peat depth > 50 cm) that are still forested and have not been disturbed by water management. As a form of caution, all shallow peat areas where most of the land cover has been opened due to very massive logging by the community, are designated as HCVMA GO AREA. The area supports the existence of HCV 4 area by preserving the surface water level, one of which is to protect the soil from heavy metal pollution such as iron (Fahmi at.al., 2012) and aluminium (Fahmi at.al., 2010)

Maintaining downstream flow regimes

There are 2 things related to the maintenance of the downstream flow regime, which is to keep water flowing in the river even in the dry season (contributing to baseflow) and reducing the maximum flow of the river, especially during the rainy season (reducing surface runoff). Most of the catchment area of the Lingkar River are peat areas (from the western part of the PT DAS area to the PT MKS concession area). Peatlands have the capacity to accommodate very large rainwater and very slow drainage (low surface runoff). This condition contributes to the Lingkar River flow during the dry season remains high.

Maintaining water quality characteristics

Riparian zones with good vegetation cover plays important role on maintaining river water quality characteristics. The river water quality is related to the content of pollutants derived from the results of land erosion, the application of agrochemicals on plantation/agricultural land (fertilizers, pesticides, herbicides). Riparian zones that are still well vegetated play as natural filter that filters the pollutants so they do not enter the river flow. The effectiveness of filtering pollutants depends on the type, density and height of vegetation in riparian zone.

The riparian zone of Lingkar River is relatively in good condition, there is no land clearing for oil palm plantations or other uses. For the Pelaik Hitam River, some of the river segments have changed to oil palm plantations. The function as natural buffer has gone. This area needs further management (riparian zone rehabilitation) so the use of agrochemical may not pollute the river. Meanwhile, other riparian zones of the Pelaik Hitam River segment are still in good condition, still functioning as natural buffers for various pollutants that pollute the river.

Riparian zone function approach develop by Gumber et al. (2009) was applied to determine the width of the river buffer to maintain river water quality from pollutants. The width of the river buffer for filtering pollutants ranges between 6-50 m from the edge of the river cliff. The width of the river buffer for flood intersects with the width of the river buffer for pollutant, therefore the width of the Pelaik Hitam River buffer is 15 m and the Lingkar River is 50 m.

¹⁰ Peat soil is categorized as fragile and problematic soil (P&C RSPO, 2013)

Provision of clean water

The location of the residents of Ulak Medang Sub-village, Sepaham Sub-village, and Muara Kayong Sub-village are located around the Pawan River. The residential area is not located in the estuary of the Lingkar river or the Pelaik Hitam river. The Sepahan community uses the Lingkar river only as a means of transportation and fishing grounds. The main water source is from the Pawan river (there is also ground water from the wells). River water in the assessment area is very acidic (mixed with peat water). This does not automatically make rivers in the assessment area a source of clean water.

Protection against winds, regulation of humidity, rainfall and other climatic elements

The assessment area is a very flat area, the wind speed is in the normal range. So far there has never been an event that the wind blew very hard. There is also no natural feature acts as a wind break or wind shelter, like a pine tree on the beach.

Natural ecosystem plays an important role in stabilizing the steep slopes

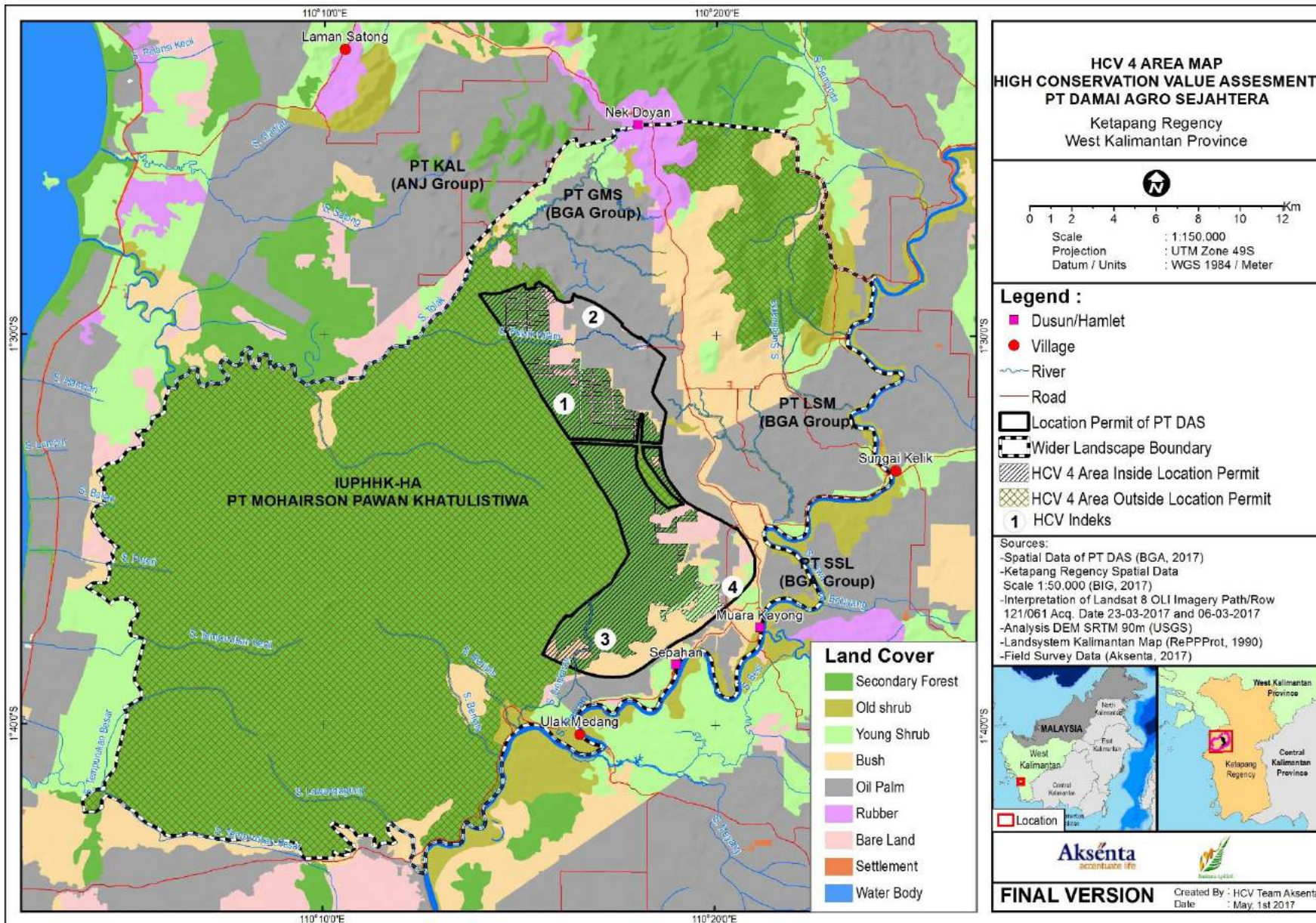
The topographic condition of the assessment area is very flat (slope is less than 3%). No land with very steep slopes (slopes of more than 25%), so there are no ecosystem services that play an important role in stabilizing steep slopes in the assessment area.

Pollination services

Based on discussions with villagers and field observation, there were no community-owned fruit gardens (*kelekak*) in the assessment area. This is because the location of PT DAS is quite far from the village settlement location and the village community does not have enough resources for gardening on peat land.

Forests, wetlands and other ecosystems which provide a protective barrier against destructive fires

There is no river body that is wide enough as a natural firebreak to avoid fires or protect from fires in the assessment area. The river around the assessment area that meets these requirements is Sungai Pawan, but is outside the assessment area.



Map 10 HCV 4 area in PT DAS landscape area.

3.3.4. HCV 5: Community needs (Present)

Based on Brown et. al., 2017, there are a number of situations that qualify as HCV 5 (Table 14). Based on the results of consultations with local communities, it was found a situation that qualified as HCV 5, namely there were several family households from Muara Kayong and Sepahan Sub-villages (Sungai Kelik Village) who still used the Pawan river and Lingkaran river as fishing grounds and water sources for sanitation. According to the local community, the majority of the people currently conducting fishing activities are only alternative livelihoods, but there are some family households who earn a living as fisherman, so the existence of these rivers is important to be protected.

HCV 5 areas were found in the form of rivers used by the community to catch fish and other freshwater species, and water sources. The river used as a fishing ground is located in the PT DAS Location Permit, the Lingkaran river, while the river used as a source of water for sanitation, Pawan river is located outside the PT DAS area. Distribution of HCV 5 in the PT DAS Location Permit area and assessment landscape is presented on Map 11.

Table 14 Situations which qualify as HCV 5.

Requirements for HCV 5	Findings
Hunting and trapping land (for game meat, skin and fur)	✘
NTFP (non-timber forest products) such as beans, berries, mushrooms, medicinal plants, rattan	✘
Fuels for household cooking, lighting and heating	✘
Fish (as essential source of proteins) and other freshwater species relied on by local communities	✓
Building materials (poles, thatching, timber)	✘
Fodder for livestock and seasonal grazing	
Water sources necessary for drinking water and sanitation	✓
Items which are bartered in exchange for other essential goods, or sold for cash which is then used to purchase essentials including medicine or clothes, or to pay for school fees	✘

notes: ✓ = present; ✘ = not present

Hunting

Hunting and trapping activities carried out by some local people are not considered as main source of livelihoods, but merely recreational activities for leisure time. There is no hunting system that is regulated by custom, there is no special area, and it is extractive in nature so that it can pose a serious threat to the existence of wildlife. There have been many alternatives to meet protein needs, such as buying meat on the market and raising livestock. Based on the results of the consultation, it was concluded that hunting and trapping activities carried out by local communities, especially the Dayak Tolak Sekayu community from Nek Doyan Sub-village did not qualify as HCV 5.

NTFP (non-timber forest products) such as beans, berries, mushrooms, medicinal plants, rattan

The results of interviews and consultations with the community revealed that local communities currently no longer use non-timber forest products (NTFPs) as their source of livelihood, because there is no more market available. The use of NTFPs for *jelutung* sap has occurred in 1980-1990s.

Fuels for household activities such as cooking, lighting and heating

The results of consultations and observations, the majority of people currently use subsidized liquefied petroleum gas (LPG). For people who still use firewood, they take it from the garden, and there is no special place as a source of firewood. The reason for using wood for fuel in households is not because of low financial capacity, but because it tends to habits and taste of food. People considered the price of 3 kg LPG is still affordable, and its availability is guaranteed throughout the year.

Fish (as the main source of protein) and other freshwater species that are used by local communities

Fishing activity is not main source of fulfilling the basic needs of the most of the local community. However, there are some people from Muara Kayong and Sepahan Sub-villages who are still dependent on fish and other freshwater species. Pawan River and the Lingkararan River are important places for fish finders, therefore its considered as HCV 5.

Building materials

According to the local community, most of the wood demand for building materials was obtained by buying from illegal logging. Timber is logged from production forest areas, protected forests, and from other places as long as there are still trees. The timber source area is not controlled or owned individually/communally/village/custom, but on the claim of investors or individuals who work with timber entrepreneurs. Therefore, the use of wood for this building material is not considered to qualify as HCV 5.

Fodder for livestock and seasonal grazing

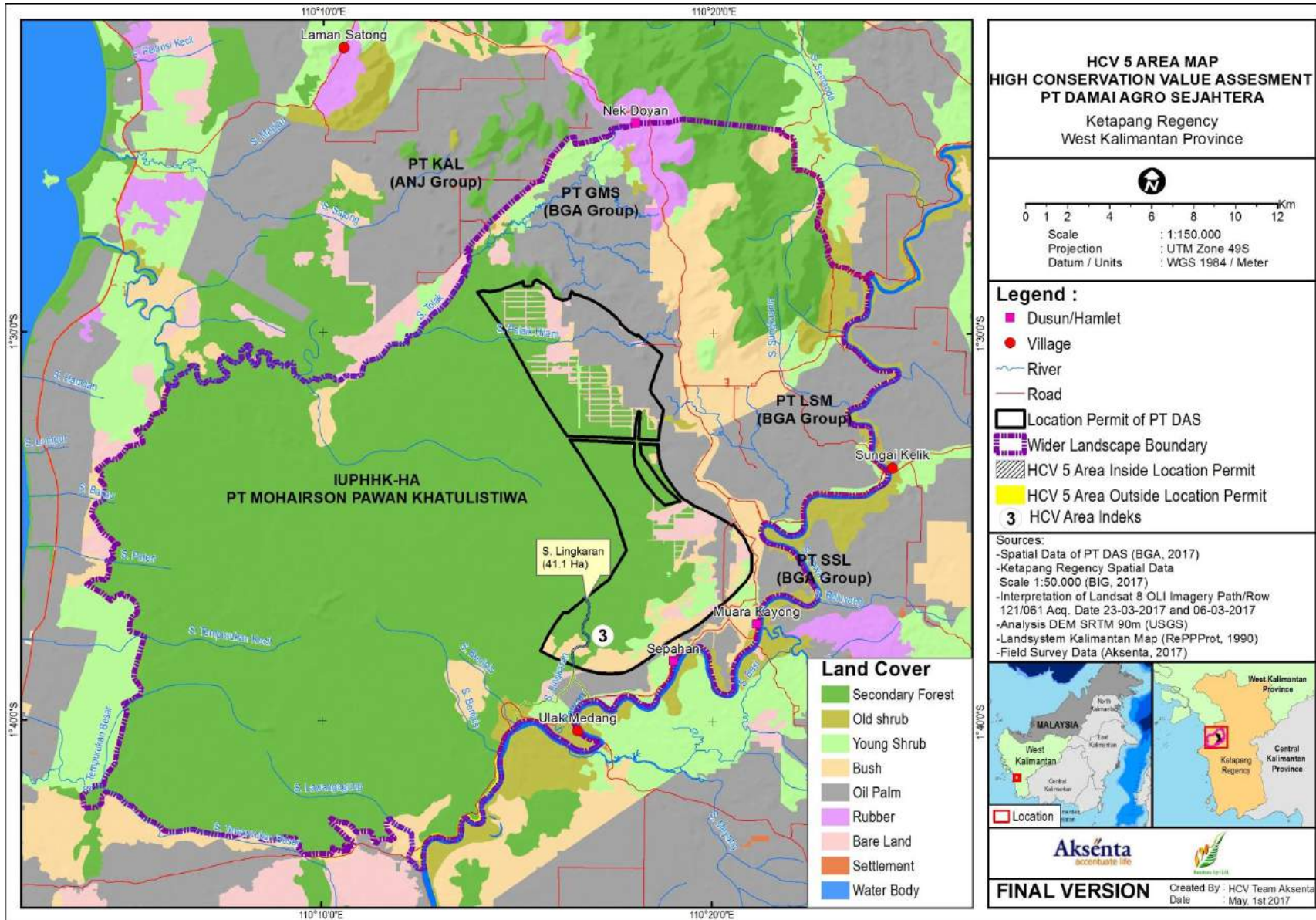
Local community is only having small scale livestock farm which would not need certain areas for razing. Then, the community does not have the habit of collecting animal feed sourced from the forest. Animal feed for chickens and pigs is usually obtained from household food waste. This situation is not considered to meet HCV 5 requirements.

Water sources necessary for drinking water and sanitation

Pawan River is used by some people for sanitation, while for drinking they use well water and bottled water (purchase). Pawan River is outside the concession, so it does not considered as HCV 5 areas inside the company's concession area.

Items which are bartered in exchange for other essential goods

At the present, the source of livelihood for the local community is relied on oil palm plantation companies, independent plantations (rubber and oil palm), agriculture, commercial logging and trading. Today, no natural items are exchanged with essential items. According to the local community, forest products such as *jelutung* sap currently have no economic value because there are no buyers for the product.



Map 11 HCV 5 area in PT DAS landscape area.

3.3.5. HCV 6: Cultural values (Present; outside MU of PT DAS)

Based on Brown et. al. (2017) there are a several situations that qualify as HCV 6 (Table 15). Based on the results of consultation with the community in the assessment area, there is a situation that qualifies as HCV 6, i.e. a site that has important historical, cultural, and religious values in the Nek Doyan Sub-village area. But the location of the site is located outside the PT DAS Location Permit area. For Sepahan and Muara Kayong Sub-villages, no situation was found that qualifies as HCV 6.

Table 15 Situations which qualify as HCV 6.

Requirements for HCV 6	Findings
Sites that are recognized by national policies and legislation have high cultural values	✘
Sites that have official assignments from national governments and / or international institutions such as UNESCO	✘
Sites with important historical and cultural values are recognized, even if not protected by legislation	✓
Religious or sacred sites, burial grounds or sites that are used as locations for holding traditional ceremonies that have an important role for local or customary communities.	✓
Plant or animal resources that have totem values or are used in traditional ceremonies	✘

notes: ✓ = present; ✘ = not present

Sites recognized as having high cultural value within national policy and legislation

National policies and legislation stipulate 15 cultural reserves in the West Kalimantan Province, and none of them are in the PT DAS location permit.

Sites with official designation by national government and/or an international agency like UNESCO

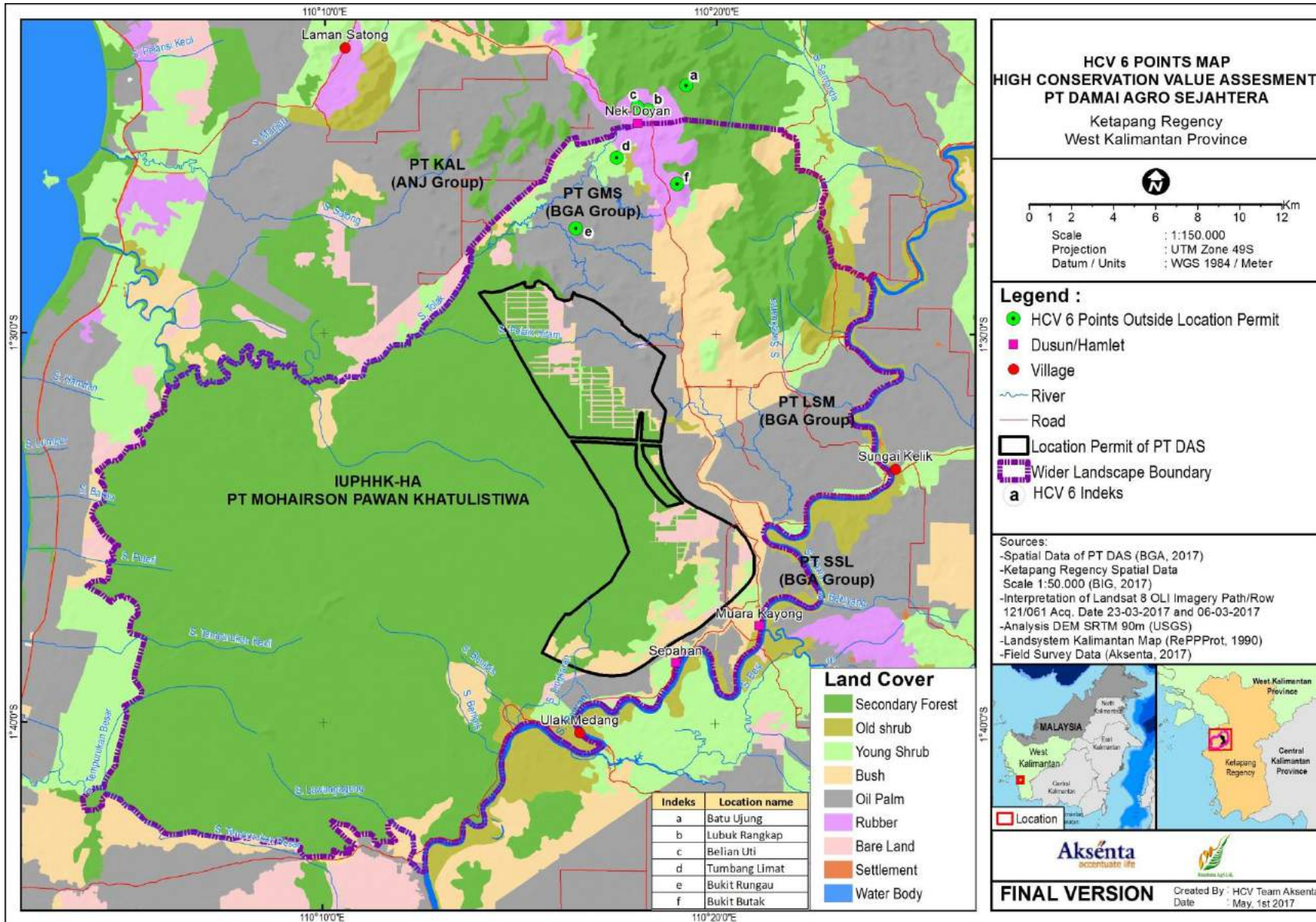
There is no site or location falls into this category. Furthermore, there is no cultural sites on the island of Borneo based on UNESCO platform, but there were three natural sites included in the temporary list, namely Betung Kerihun National Park, Sangkulirang - Mangkalihat karts area, and Derawan Islands.

Sites with recognized and important historical or cultural values, even if unprotected by legislation

Sites that have religious or sacred values are found in the Nek Doyan Sub-village used by sub-village residents (Dayak Tolak Sekayu) to practice traditional ceremonies. The sacred areas are Batu Ujung, Lubuk Rangkap, Tumbang Limat, Bukit Rungau and Bukit Butak, all of which are located outside the PT DAS location permit area (Map 12).

Plant or animal resources with totemic values or used in traditional ceremonies

The Dayak Tolak Sekayu community still practices traditional ceremonies related to shifting cultivation activities. In carrying out these traditional ceremonies, they do not use certain animal or plant resources, and the food and drinks eaten together are obtained from the results of farming, livestock and purchasing. No animal or plant resources were used as a condition for traditional ceremonies or totem values.



Map 12. HCV 6 point locations in the PT DAS landscape area.

3.4. Stakeholder Consultation

Stakeholder Consultation is carried out through interview and dialogues with representatives of local key stakeholders including indigenous and local communities, field managers, academics, NGOs, and relevant local governments. Stakeholder Consultation aims to (i) collect information regarding the social and environmental situation in the assessment area, to contribute to the HCV identification and decision making process; (ii) eliminate differences in information, where information is held by stakeholders; (iii) provide information about the potential impact of operations on HCV; (iv) identify possible approaches to avoid, mitigate or compensate for the negative impacts of operations; (v) collect various perspectives and recommendations about threats and management options; (vi) ensure transparency of the process of assessment and credibility of decisions taken.

Consultation at the preliminary assessment stage is carried out through interview and discussions to comprehend the main issues, social and environmental characteristics in the assessment location (Table 16). The assessment team visited the IAR Foundation, FFI, Palung Foundation, ASRI, BKSD, and PT DAS management units.

Table 16. Summary of public consultation results.

Date	Name	Title/Role	Organisation/ Social group	Key concerns & recommendation (with Team response)
Consultation during Scoping Study				
21 March 2017	Gail Campbell- Smith	Program Manager	IAR Foundation	<ul style="list-style-type: none"> ▪ The Assessment Area is situated in Sungai Putri landscape, peatland and important habitat of orangutan ▪ Sungai Putri block is designated as KEE by the Government, NGOs, company and community. Presence of corridor is important to connect to orangutan habitat <p><i>Team response: The HCV area includes orangutan habitat and corridors that connect all important areas of the Sungai Putri landscape</i></p>
21 March 2017	Tito	FFI staff at Ketapang Office	Flora Fauna International	<ul style="list-style-type: none"> ▪ FFI do not have a program in the assessment area. FFI concentrate on the development of Laman Satong Village Forest in Manjau Sub-village through the REDD program. <p><i>The location of Manjau Sub-village is far from the assessment area, but if there is village forest in the assessment area, it will be considered.</i></p>
22 March 2017	Ranti Naruri	Palung Foundation staff	Palung Foundation	<ul style="list-style-type: none"> ▪ People around the Sungai Putri landscape live from logging. Animal hunting rate is very high, Pangolin, Deer, Hornbill, Orangutan and other are sold to middle man in Sandai. ▪ The presence of oil palm plantation companies can be an alternative community livelihood
22 March 2017	Jonhson	Project Manager	Alam Sehat Lestari Foundation (ASRI)	<ul style="list-style-type: none"> ▪ The focus of the ASRI program is only in sub-villages around Gunung Palung National Park. ▪ Logging around Gunung Palung National Park and HL Gunung Tarak National Park has been occurring since 1989, performed by communities around the forest. ▪ There is a positive side to oil palm plantations, changing loggers to oil palm workers/farmers.
22	Agustinus	Staff	BKSDA,	<ul style="list-style-type: none"> ▪ Some RTE species occurred inside and outside

Date	Name	Title/Role	Organisation/ Social group	Key concerns & recommendation (with Team response)
March 2017	Batubara		Ketapang	<p>PT DAS area, it is important to provide wildlife corridors.</p> <ul style="list-style-type: none"> Orangutans need a large area for their movement, which is expected to be undisturbed by companies and local communities in the context of plans to develop oil palm plantations Orangutan is considered as pest, so companies and communities together hunt them down, this can threaten the Orangutan population.
Consultation during Presentation of Assessment Result				
3 April 2017	Yuan Abian	Regional Environmental Agency (BLHD) staff	Regional Environmental Agency (BLHD)	<ul style="list-style-type: none"> In the PT DAS concession there are indications of peatland as large as 1881 Ha, there are also three rivers run through it. Please confirm the existence of the river, because Ketapang district maintains 3 river areas: S Pawan, S Tolak and S Kayong, the banks are at least 100m HCV areas that have been identified so that they are given signs or stakes, so that if the management changes, the physical form of the HCV area remains The results of field verification, there are only 2 rivers, namely Pelaik Hitam river in the north and Lingkaran river in the south <p><i>Suggestions for installing a signboard will be a recommendation for this HCV report</i></p>
3 April 2017	Agustinus Batubara	BKSDA staff	BKSDA Ketapang	<ul style="list-style-type: none"> In the assessment area there are still protected animals, it is important to provide wildlife corridors. Orangutans need large areas of movement, expected to be undisturbed by companies and local communities. Orangutans are considered pests so they can threaten the orangutan population. Inviting the public and all parties not to hunt, kill and maintain orangutans. <p><i>The team conducted data collection on orangutan nests in the assessment area and reviewed important habitat and corridors for orangutans as part of the HCV area</i></p>
3 April 2017	Aryanto	Community leader	Sungai Kelik Village	<ul style="list-style-type: none"> Worried about HCV assessments such as AMDAL, the results are not publicly accessible. <p><i>The results of the HCV assessment are not permitted directly to the community. The results of the assessment can be gained at www.hcvnetwork.org if it has been uploaded to the HCVRN</i></p>
3 April 2017	Abdul Kadir	Community member	Muara Kayong Sub-village	<ul style="list-style-type: none"> Community worried that orangutan conservation takes up land for them. Orangutan must be moved to other areas outside the assessment area so that PT DAS operations can run. Community worried that HCV area will reduce the area of community partnership plantation <p><i>Coexistence between local community and orangutan is a consideration. The HCV area is expected to be a solution and can reduce wildlife conflicts. It is possible that the partnership area is reduced, but the company</i></p>

Date	Name	Title/Role	Organisation/ Social group	Key concerns & recommendation (with Team response)
				<i>can operate.</i>
3 April 2017	Eris Suanda	Sub-village Leader	Muara Kayong sub-village	<ul style="list-style-type: none"> The presence of oil palm companies has helped the economy of the residents of Muara Kayong Sub-village. However, PT DAS needs to conduct socialization regarding plantation development plans, HCV area management plans and corporate social responsibility (CSR) program plans. <p><i>Recommendation for the company so that after the HCV assessment immediately plans for HCV management and monitoring.</i></p>
3 April 2017	Ejar Suandi	Village Leader	Sungai Kelik Village	<ul style="list-style-type: none"> Appreciation for Aksenta who has communicated with the community. I hope that communication like this will continue with the management of PT DAS under the BGA.
3 April 2017	Anji	Conservation staff	PT. KAL	<ul style="list-style-type: none"> Regarding Orangutans, PT KAL conducted a survey with the IAR Foundation and recorded 140 Oranutan in the PT KAL area. How to deal with Orangutan conflicts with people/human? Regarding land fires is another important issue in this region <p><i>In emergency situation, interactions with potential conflict may have negative impact. Staff and community need to be equipped with knowledge, tools and adequate skill for interacting with orangutan.</i></p> <p><i>RSPO already recommends peatland water system management in its Best Management Practice (BMP).</i></p>

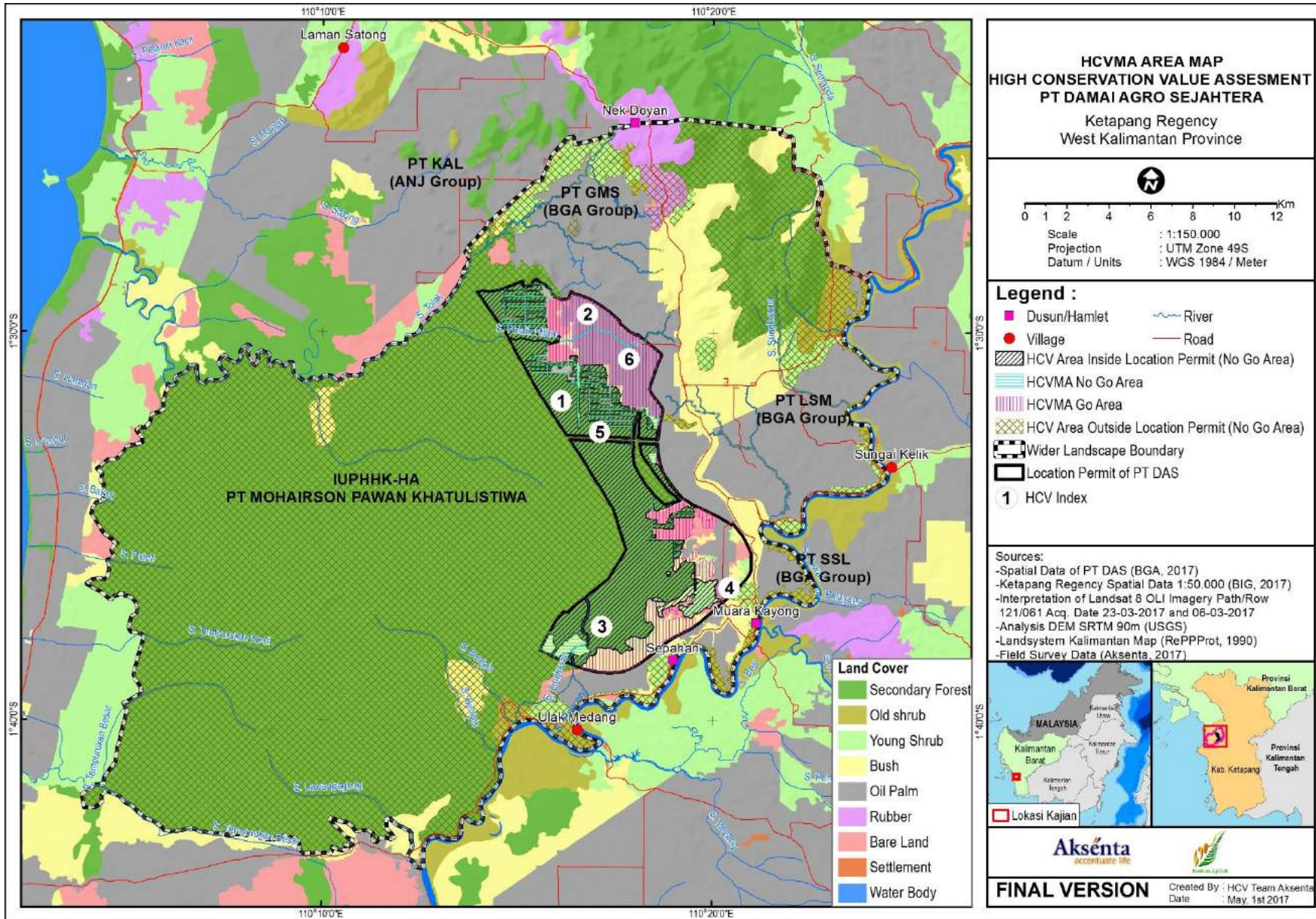
4. HCV MANAGEMENT AND MONITORING

4.1. HCV Management Area (HCVMA)

The description and location of each HCV area in the assessment area are presented in Table 17 and Map 13. The results of the assessment show that there are 4 location indices for the HCV area in the PT DAS Location Permit, including the presence of important species, peat ecosystems, rivers & riparians zone of the Pelaik Hitam River, and the river & riparian zone of the Lingkaran River.

Table 17. Description and location of HCV area and HCV Management Area.

Index	HCV Type	Location	Description/baselin condition	Indicative boundaries	Size (ha)*
1	1,2,3,4	Peat Swamp Forest and Mixed Lowland Dipterocarp Forest	<ul style="list-style-type: none"> • Areas of distribution of orangutans, part of a wider landscape of peat swamp forests • Depth varies, middle part to the western boundary is the classified as deep peat • The condition of land cover in deep peat is relatively good (forest) • The condition of land cover in shallow peat has been degraded because of massive logging by the community 	undisturbed peat land	4.867,3
2	1,2,3,4	Pelaik Hitam River and its riparian zone	<ul style="list-style-type: none"> • Some riparian zone areas have been converted into oil palm plantation, but some have not been disturbed (still natural) • The water condition has been very turbid since at the river inlet 	Buffer of 15 m	7,6
3	1,2,3,4,5	Lingkaran River and its riparian zone	<ul style="list-style-type: none"> • There is no land clearing for plantation activities • The condition of vegetation around riparian zone is still good • The upstream part experienced a lot of logging by the community • The downstream is prone to fire • Fish is an important commodity 	Buffer of 50 m	31,6
4	1,3,4	Peatland area with semi-natural vegetation cover	<ul style="list-style-type: none"> • land cover type is shrubs • Some areas have been logged by local people • There are seedlings/saplings of peat swamp forest ecosystems • No artificial drainage • Vegetation in this area can still recover by natural succession 	Shrub area with natural drainage that is still connected with peat swamp forest	252,3
5	HCVMA – No Go Area	Areas with disturbed vegetation in peat swamp forests, river banks which cross gardens, and mixed dipterocarp ecosystems. The natural condition of the area needs to be restored	<ul style="list-style-type: none"> • Some peat swamp fragments • The border of the Pelaik Hitam River which has been planted with oil palm • Mixed dipterocarp forest fragments • The land cover types are shrub, bush and open land • Some areas have been blocking by the company and some are burned land • The condition of the peat swamp forest and mixed dipterocarp forest can still recover by natural succession • Riparian zone should be revegetated 	Secondary peat swamp forest area, river border, and mixed dipterocarp forest area	703,0
6	HCVMA – Go Area	Orangutan distribution area, peat area with a depth of > 0.5 m, and Sungai Putri KEE area	<ul style="list-style-type: none"> • Land cover types: oil palm plantation, open land, shrub and bush • This area can be managed for oil palm plantation by managing water management on peatland and managing wildlife species (avoiding human-wildlife conflicts) 	Peatlands that are converted to oil palm, open land, shrubs and shrubs	2.715,6
Total Size of HCV and HCVMA (ha)					8.577,4
Size of the Location Permit of PT DAS (ha)					9.444,6
Percentage of the size of HCV and HCVMA compared to the Location Permit of PT DAS (%)					90,8



Map 13 HCV and HCVMA areas in the PT DAS and its surrounding.

4.2. Threat Assessment

A comprehensive approach developed by IUCN was applied to assess threat toward HCV and HCVMA. This approach only assesses direct threats to species, habitats or ecosystems. Threat category assessment based on IUCN threat Category (ITC) that has been verified in the field. Of the 12 categories, four threat categories were found in the operational areas of PT DAS, namely Agriculture/Plantation Activity, Pollution, biological use, and Transportation & service corridors (Table 18). From each threat there are 3 factors assessed, i.e. time (period of continuity of threat), scope (magnitude/proportion of affected area/object) and severity (rate of decline in quality due to pressure from threats).

The results of the intensity assessment of threats, are generally medium impact. Meanwhile, land clearing for oil palm plantations on shallow peatlands will relatively generate low impact. This is because only certain land is cultivated (mineral land or shallow peatland). However, it is different with logging activities which is occurred in all forested areas of PT DAS massively and the rate of deterioration due to the threat is very rapid (peatlands become bare and dry quickly). Therefore this threat is classified as high impact (Table 19).

Table 18 HCV and HCVMA Threat Assessment in PT DAS and its surrounds.

ITC (IUCN Threat Category)	Sub-Threat	Time	Scope	Severity	Intensity*
<i>Agriculture/ Plantation Activity</i>	The company's plan to clear land for planting new oil palm in the northern part of the PT DAS area has the potential to contaminate heavy metals such as Fe, Al, and Pb (due to the oxidation of the sulfide layer)	Future plan	Majority (2)	Very Rapid (3)	Medium Impact
	Land clearing for agriculture / plantations by communities in shallow peatland areas (the southeastern part of the PT DAS area) and the potential for heavy metal pollution such as Fe, Al, and Pb (due to oxidation of the sulfide layer)	Will repeat in a short time period	Minority (1)	Slow (1)	Low Impact
	Excessive drainage on peat canals in the PT DAS permit area	Will repeat in a short time period	Minority (1)	Slow (1)	Low Impact
<i>Pollution</i>	Corporate plantation operations (Agricultural effluent), such as application of fertilizers, pesticides, herbicides around riparian zones of the Pelaik Hitam River	Will repeat in a short time period	Whole (3)	Slow (1)	Medium Impact
<i>Biological use</i>	Illegal logging of forest timber by local people and migrants	Will repeat in a short time period	Whole (3)	Very Rapid (3)	High Impact
	Animal hunting	Will repeat in a short time period	Majority (2)	Very Rapid (3)	Medium Impact
<i>Transportation and service corridors</i>	The company's plan to build block lines, the initial stage of land clearing	Future plan	Minority (1)	Very Rapid (3)	Medium Impact
<i>Natural system Modifications</i>	Increased intensity and frequency of land fires	Will repeat in a short time period	Minority (1)	Very Rapid (3)	Medium Impact

Notes: *) No Impact if the score (scope and severity) is less than 2, Low Impact= 2-3, medium impact =4-5, high impact > 5.

Table 19 Threat assessment for each HCV and HCVMA in the location permit of PT DAS.

Index	Location Name	HCV Type	Source	Status of Threat	Risk/Threat	scope	severity	intensity				
1	Peat swamp forest and lowland forest	1,2,3,4	Land clearing for community oil palm plantations in peatland areas in the southeastern part of PT DAS	Will repeat in a short time period	<ul style="list-style-type: none"> Disappearance / destruction of a exceptional peatland ecosystem The size and quality of animal habitat decreases Fragmented habitat and lost of animal connectivity Animal conflict between human and orangutan Excessive drainage of peatland through canals Peat water level drops to critical level Peatland becomes dry and very prone to fire, especially during the dry season 	Minority (1)	Slow (1)	Low impact				
			The company's plan to clear land for planting new oil palm in the northern part of the PT DAS area on deep peat areas	Future Plan		Majority (2)	Very Rapid (3)	Medium Impact				
			Illegal logging of forests by the community	Will repeat in a short time period		Whole (3)	Very Rapid (3)	High impact				
			The company's plan to build block lines, the initial stage of land clearing in the peat area	Future Plan		Minority (1)	Very Rapid (3)	Medium Impact				
2	Pelaik Hitam River and it's Riparian zone	1,2,3,4	The company's plan to clear land for planting new oil palm in the northern part of the PT DAS area	Future plan	<ul style="list-style-type: none"> Deterioration of Pelaik Hitam riparian zone ecosystem Loss of flood buffer area around the river Decreased water quality Potential contamination of heavy metals such as Fe, Al, and Pb (due to oxidation of the sulfide layer) 	Majority (2)	Very Rapid (3)	Medium Impact				
			Illegal logging of forests by the community	Will repeat in a short time period					<ul style="list-style-type: none"> Decrease of the size and quality of animal habitat Fragmented habitat and lost of animal connectivity 	Whole (3)	Very Rapid (3)	High impact
			company plantation operations (Agricultural effluent), such as fertilizing applications, pesticides, herbicides around riparian zones of the Pelaik Hitam River	Will repeat in a short time period						<ul style="list-style-type: none"> Degradation of fresh water quality 	Whole (3)	Slow (1)
3	Lingkar River and it's Riparian zone	1,2,3,4,5	Land clearing for community oil palm plantations in downstream shallow peat areas around the west	Will repeat in a short time period	<ul style="list-style-type: none"> Deterioration of Lingkar river's riparian zone ecosystem Lost of flood buffer area around the river Decreased water quality Animal conflict between human and 	Minority (1)	Slow (1)	Low impact				

Index	Location Name	HCV Type	Source	Status of Threat	Risk/Threat	scope	severity	intensity
					<ul style="list-style-type: none"> orangutan Potential contamination of heavy metals such as Fe, Al, and Pb (due to oxidation of the sulphide layer) 			
			Illegal logging of forests by the community	Will repeat in a short time period	<ul style="list-style-type: none"> Decrease of the size and quality of animal habitat Fragmented habitat and lost of animal connectivity 	Whole (3)	Very Rapid (3)	High impact
4	Peatland with semi natural vegetation cover	1,3,4	Land burning by irresponsible parties	Will repeat in a short time period	<ul style="list-style-type: none"> Loss of vegetation cover Peatland fires 	Whole (3)	Very Rapid (3)	High Impact
			The company's plan to build blockade and drainage lines.	Will repeat in a short time period	<ul style="list-style-type: none"> Drained of peatlands Depreciation of peat substrate Potential contamination of heavy metals such as Fe, Al, and Pb (due to oxidation of the sulphide layer) 	Whole (3)	Slow (1)	Medium Impact
			Catching migratory birds in the shrub area	Will repeat in a short time period	<ul style="list-style-type: none"> Decline of migrant bird populations and other bird species 	Minority (1)	Slow (1)	Low Impact
5	Areas with disturbed vegetation in peat swamp forests, river banks which cross gardens, and mixed dipterocarp ecosystems. The natural condition of the area needs to be restored	HCVMA – No Go Area supports HCV 1, 2, 3, dan 4 (#ID 1, 2, dan 3) area	Plans for the construction of oil palm plantations (have been cleared but not yet planted with oil palm)	On going and will repeat in a short time period	<ul style="list-style-type: none"> Potential contamination of heavy metals such as Fe, Al, and Pb (due to oxidation of the sulphide layer) Excessive drainage in pea land will causes severe drought on the surface and very prone to land fires during the long dry season 	Majority (2)	Very Rapid (3)	Medium Impact
			Land burning by local people		<ul style="list-style-type: none"> Loss of vegetation cover Disruption of the succession process Damage to the peat substrate 	Minority (1)	Slow (1)	Low Impact
6	Orangutan distribution area, peat area with a depth of> 0.5 m, and Putri River KEE area	HCVMA – Go Areas supports HCV 1, 2, 3, dan 4 (#ID 1, 2, dan 3) area	Oil palm plantation operations, which include the use of fertilizers and chemical pesticides, surface water drainage, and encroachment	On going and will repeat in a short time period	<ul style="list-style-type: none"> Potential for water pollution from agrochemical applications Peatland subsidence caused by excessive drainage Animal conflict between human and orangutan 	Minority (1)	Slow (1)	Low impact

4.3. Management Recommendation

The general objective of HCV management is to maintain the HCV element; (if needed), the important value of the area can be enhanced. Maintenance of HCV elements is a minimum requirement for HCV management. The general management recommendations for the HCV area are as follows:

- 1) Prepare the HCV Management Plan immediately by considering:
 - Plantation development plan should be take into account conservation principle
 - RTE species protection consideration, especially related to the presence of orang-utans through managing core areas and connectivity between habitats
 - Strengthening communication links with other companies in vicinity to develop management and action plans for protecting HCV areas outside MU such as peatlands on the west and the Lingkaran River
- 2) Institutions and HCV management capacity building:
 - Establish a management unit to ensure the implementation of HCV management to achieve its objectives
 - Train staff or recruit new staff with enough necessary qualifications
- 3) Strengthening capacity in identification, management, monitoring and evaluation:
 - Develop detailed Management and monitoring of HCV areas SOP
 - Implementation of procedures and policies consistently
 - Compilation of new procedures and protocols
- 4) Delineating and demarcating identified HCV areas and installing proper sign board to raise public awareness regarding HCV area information
- 5) Disseminate information to internal parties (daily workers and staff) and externals (communities in the surrounding villages; government agencies; neighboring companies that have direct contact with the HCV area) regarding the existence of HCV areas and their functions.

4.1. Monitoring Recommendation of HCV Area

The objective of monitoring is to know the progress of the condition of the elements and the area of the determined HCV. In addition to monitoring HCV element indicators, monitoring of management strategies also includes:

- 1) Field implementation of management strategies, related to the effectiveness on the implementation of planned HCV management strategies (operational monitoring)
- 2) Implementation of management strategies is done poorly. Even though the planned management strategy is good, if done poorly it will not achieve the expected goals and objectives (strategic monitoring/effectiveness)
- 3) New or changing threats/conditions. Effective management strategies at one time may not always be effective forever (threat monitoring).

The results of this monitoring are the basis for evaluation to ascertain whether the implementation of the HCV area management strategy is in accordance with its goals and objectives. The direction in the HCV area management system is an adaptive management system where the management always strives to carry out continuous improvement in HCV management and monitoring. Recommendations for management and monitoring of the HCV area are presented in Table 20.

Table 20 HCV and HCVMA Management and Monitoring Recommendation in PT DAS and its surrounds.

Element HCV	Index	Purpose	Management Objectives	Management Strategy	
				Areas	Activity
HCV 1 important species (protected, rare or endangered)	1-4	<ul style="list-style-type: none"> ▪ Maintaining the existence of important species ▪ Maintain the habitat of important species as a place to find food, perch, and breed 	<ul style="list-style-type: none"> ▪ The population of fauna species does not decrease (if possible increases) ▪ Habitat of important flora species is not disturbed ▪ Habitat of important fauna species is not disturbed 	<ul style="list-style-type: none"> ▪ Lingkaran River and riparian zone ▪ Pelaik Hitam River and riparian zone ▪ Good area of peat forest 	<ul style="list-style-type: none"> ▪ Socialize the presence of HCV area to surrounding communities ▪ Formulate document monitoring documentation of important species (6 months) in the HCV area periodically ▪ Produce additional documentation related to important events in the HCV area (such as hunting of animals or meeting important fauna species) ▪ Install warning boards related to the presence of HCV areas ▪ Prohibition of hunting in the HCV area ▪ Prohibition of encroachment in forest areas and riparian zone areas ▪ Prohibiting the use of toxic materials for fishing in rivers ▪ Periodically patrol the perimeter of the HCV area ▪ Delineate and determine the boundaries of the riparian zone and forest area as important species habitat
HCV 2 Peat Forest on a wider scale as buffer area for Putri River essential ecosystem (KEE)	1-3	<ul style="list-style-type: none"> ▪ Maintain connectivity with wider peat forests outside the company's operational area ▪ Maintain the presence and good quality of peat forests and not fragmented because of threats from land fires and logging 	<ul style="list-style-type: none"> ▪ The existence of forest land connected to a wider forest area (connectivity/corridor) 	Good forest area	<ul style="list-style-type: none"> ▪ Periodically patrol the perimeter of the HCV area ▪ Prohibition of encroachment in forest areas ▪ Coordination with relevant stakeholders (NGOs, government, community) in maintaining wider forest area ▪ Analyse the landscape of wider <i>kerangas</i> forest connectivity based on regular satellite images (3 months) ▪ Supporting collaborative activities related to the concept of area management (Putri River landscape)
HCV 3 peat forest ecosystem	1-4	<ul style="list-style-type: none"> ▪ Maintain the good river flow 	<ul style="list-style-type: none"> ▪ Sedimentation from the PT DAS plantation area that enters the Pelaik Hitam river is reduced ▪ Cliff morphoerosion Pelaik Hitam River and Lingkaran River decreases ▪ Elements of river water quality (TSS / TDS, color, odor, heavy metals) ▪ River water level ▪ Inundation / flood area 	River Flow	<ul style="list-style-type: none"> ▪ Periodically collect river water samples to monitor river water quality (TSS / TDS, color, odor, heavy metal) (once every 6 months) at the location of the Pelaik Hitam River inlet and outlet and at the Lingkaran River outlet ▪ Monitoring extreme water level (with installation of water level boards) in the areas around the Lingkaran and Pelaik Hitam river grooves that are prone to flood / inundation ▪ Making plaster in river segments that are very vulnerable to river cliff landslides ▪ Normalization of the flow of the Lingkaran River, many fallen trees that cross the river
HCV 4 Ecosystem services from: • Lingkaran River and riparian zone • Pelaik Hitam River and riparian zone • Peatlands	1-4	<ul style="list-style-type: none"> ▪ Maintain the river water quality in accordance to the quality standard threshold (class 2) 	<ul style="list-style-type: none"> ▪ the presence of natural vegetation in riparian zones ▪ Type of vegetation in riparian zone (local or external input) 	Riparian zone (river buffer area)	<ul style="list-style-type: none"> ▪ The boundary of the riparian zone area. Determination of the width of the buffer boundary in the field (15 meters of the Pelaik Hitam River / 2 oil palm principal and 50 m Lingkaran River)

Element HCV	Index	Purpose	Management Objectives	Management Strategy	
				Areas	Activity
					<ul style="list-style-type: none"> Installation of warning boards related to the existence of HCV 4 Recovery of riparian zone areas that are already open with reforestation activities (woody plants and bamboo species) Prohibition of timber and land encroachment (for community gardens / fields) in riparian zone Agrochemical applications are appropriate and efficient (application restrictions) on land that has been converted as an oil palm plantation
		<ul style="list-style-type: none"> Maintain good peat water system (undisturbed) Preventing land fires on peatlands Maintain good condition of peatland cover and supporting natural succession on open peatlands Avoiding the contamination of heavy metals (Fe, Al, Pb) so that the soil becomes more acidic (very low pH) 	<ul style="list-style-type: none"> Depths of water on peatlands that are already open (there are drainage canals) not exceeding the critical limit (50-60 cm) Areas of peatland that are prone to fire The condition of peatland cover The substrate layer of peatland is sulphide material 	Peatland	<ul style="list-style-type: none"> Regular patrols to monitor logging activities Closing potential timber loggers to enter a good peat forest area Cooperating with law enforcement officials to take action against loggers in the PT DAS concession area Installation of peat water level monitoring devices on several representative points Avoid making drainage canals on peatlands that are not yet open Make water gates and install water levels in drainage canals Making fire towers Early detection of causes of fire on peatlands (especially in shallow peat areas around rivers) Make a sign board for warnings on land fire prone areas Making special institutions to handle land fire events Create an SOP to handle land fire events Identification of peat substrate which has sulphide compounds (pyrite / FeS₂) Making SOP protection against acid soils (low pH)
		<ul style="list-style-type: none"> Building mutual understanding regarding the importance of the existence of conservation area Good relationships and communication with stakeholders regarding the management of wider peat areas (KEE Sungai Putri), Rivers & riparian zones 	<ul style="list-style-type: none"> Strengthening stakeholder relations regarding harmonization of conservation activities 	Stakeholder	<ul style="list-style-type: none"> Socialization regarding the importance of river maintenance and riparian zone to staff / employees and surrounding communities Supporting collaborative activities with stakeholders (neighbouring companies, government and surrounding communities) in maintaining the river and its riparian zone and KEE Putri River Create a joint forum to facilitate coordination and cooperation
HCV 5 Lingkaran River	3	<ul style="list-style-type: none"> There is sustainability related to the availability of protein 	<ul style="list-style-type: none"> Water quality Fish stock 	Lingkaran River	<ul style="list-style-type: none"> Collaborating with sub-villages to issue regulations prohibiting fishing using stun and poisons.

Element HCV	Index	Purpose	Management Objectives	Management Strategy	
				Areas	Activity
		sources (fish) for the community			
HCVMA No Go Areas	5	<ul style="list-style-type: none"> Land restoration in the peat ecosystem, mixed dipterocarp ecosystems, and river borders 	<ul style="list-style-type: none"> Land cover 	Areas with disturbed vegetation in peat swamp forests, river banks cross gardens, and mixed dipterocarp ecosystems.	<ul style="list-style-type: none"> Protecting disturbed peatland and mixed dipterocarp forests so that natural succession occurs Provide protection on the border of the river Restoration of threatened ecosystems and river borders by planting natural plants around the area Formulate SOP for orangutan conflict mitigation with humans Disseminating information to employees and the community Documenting every orangutan encounter
HCVMA Go Areas	6	<ul style="list-style-type: none"> Plantation management by maintaining water levels, avoiding human-wildlife conflicts, and avoiding pollution 	<ul style="list-style-type: none"> Plantation operational 	Overlapping land between KEE Sungai Putri, Orangutan distribution area, and peat (> 0.5 m) with garden operational area	<ul style="list-style-type: none"> Implementation of BMP oil palm plantations on peat land (RSPO, 2013) Create an Orangutan-human conflict mitigation SOP SOP socialization to employees and the community Documenting every orangutan encounter

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<http://www.ethnologue.com/>

STATEMENT OF RESPONSIBILITY

On behalf of PT Damai Agro Sejahtera, we have accepted the HCV assessment and will implement the guidelines (management and monitoring) provided in the report.

Date : Jakarta, May 20, 2017



Name : Hidayat Aprilianto

Function : Head of Sustainability of PT Damai Agro Sejahtera (BGA Group)

On behalf of Aksenta I hereby confirm that Aksenta indeed carried out this HCV assessment that it has written a report of which the Public Summary is included here, and is that it is responsible for the findings and recommendations presented.

Date : Jakarta, May 20, 2017



Name : Nandang Mulyana

Function : Social expert, PT Gagah Dinamiga Aksenta

License : Provisionally Licensed Assessor (ALS15037NM)