Roundtable on Sustainable Palm Oil

New Planting Procedure

Summary of Assessement Reports and

Management Plans

PT. BIMA AGRI SAWIT

Kutai Timur District, East Kalimantan - Indonesia

Prepared by :

PT. Bima Agri Sawit, October 2020

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Chapter 1

1. Overview and background (Introduction)

This Integrated High Conservation Value-High Carbon Stock Approach Assessment (hereinafter referred to as "Integrated HCV-HCSA Assessment" or the "Assessment") in PT Bima Agri Sawit ("PT BAS") concession aims to meet requirements under the Roundtable on Sustainable Palm Oil ("RSPO") certification scheme, identify and map the presence of HCV and HCS areas, identify pressures against or threats to High Conservation Value ("HCV") and High Carbon Stock ("HCS") area sustainability, and make recommendation on HCV and HCS protection, management and monitoring. This Assessment employs the following guides: (i) HCV-HCS assessment report template (December 2018); (ii) Guidance for using the HCV-HCS assessment report template (December 2018); and (iii) HCV-HCS Assessment Manual (November 2017), in addition to the following as the main reference: (i) HCSA Toolkit v2.0 (May 2017); (ii) Common Guidance for the Identification of HCVs (October 2013, amended in 2017); (iii) Common Guidance for the Management and Monitoring of HCVs (September 2014, amended in 2018); (iv) Implementation Guide for the Social Requirements of the High Carbon Stock Approach (March 2020); (v) HCV Toolkit Indonesia 2008; and (vi) Advice Note 01-03 HCV-HCSA (2019-2020).

1.1. Project status, scale and intensity

This Assessment area (Management Unit or "MU") includes PT BAS Rights to Cultivation ("HGU") concession, as well as community lands under, or to enter, the partnership with the company. Community lands under the partnership are those of Permata Jaya Multipurpose Cooperative ("PJ Cooperative") and Dharma Mulia Palma Cooperative ("DMP Cooperative"). As for community lands planned to enter partnership with the company, these are managed by Rantau Pakis Smallholder Group ("Rantau Pakis SG"). Because the context of this Assessment is development or expansion plan, some parts of the Assessment area fall under greenfield category. Plantation development is planned to commence in 2020 upon meeting all land clearing requirements. Other than agronomic aspects and company commitment to sustainability, the development plan also takes into account environmental permit aspects and certification scheme requirements. PT BAS MU operational scale and intensity include several areas by the legal statuses, i.e. The HGU concession covers an area of 5,222 ha, 4,157 ha of which has already been planted (Decree letter of National Land Agency No. 14-HGU-BPN RI-2008), The PJ Cooperative plantation area is 657 ha, 553.6 ha of which has already been planted (The determination of the Plasma area for the Permata Jaya Cooperative in Partnership East Kutai Regent Decree No 525.26/K.361/HK/VI/2018 & Memorandum of Understanding among PT BAS and Permata Jaya Cooperative No 003/BAS-PJ/MOU/06/2017), The area of the DMP Cooperative plantation is 915.5 ha, 629.8 ha has already been planted (The determination of the Plasma area for the Dharma Mulia Palma Cooperative in Partnership with PT BAS East Kutai Regent Decree No 525.26/K.570/HK/IX/2019 & Addendum Memorandum of Understanding among PT BAS and Dharma Mulia Palma Cooperative No 001/BAS-DMP/ADD/10/2016), and Rantau Pakis SG area is 855 ha, which entirely remains unplanted (Memorandum of Understanding among PT BAS and Rantau Pakis Farmer Group No 001/MOU/BAS/XII/2017). Currently there is a planting area at PT. BAS covering an area of 5,340.4 ha. The unplanted areas are planned for new development, but not all will be cleared into oil palm plantation. Development plan will refer to plantation spatial plan based on this HCV-HCSA Assessment.

1.2. Information on the assessment-requesting organization

PT BAS is a subsidiary to PT Dharma Satya Nusantara, Tbk. (DSN Group), which is a company operating in oil palm industry and timber product business. Before DSN Group took over PT BAS in December 2018, the company was previously a subsidiary to Bima Palma Group which is nonRSPO member. However, as its effort

to sustainably manage its plantations, PT BAS has carried out an HCV identification assessment in 2014 by a team led by an RSPO-approved assessor. Neither complaints nor campaigns have been made against PT BAS by any stakeholder.

Up to 2018, DSN Group already had plantations, 108,400 ha out of which were already planted. This includes nucleus (> 84,300 ha) and plasma plantations (24,000 ha). The group owns 13 estates, most of which are located in East Kalimantan Province while the others are in Central and West Kalimantan Provinces. Other than plantation, the group also owns nine mills with total production capacity of 510 tonnes/hour, in addition to a kernel crushing plants processing Palm Kernel (PK) into Palm Kernel Oil (PKO) with capacity of 200 tonne/day or 60,000 ton/year. As of 4 December 2012, the group has become an RSPO member (membership No. 1-0135-12-000-00).

PT BAS already holds Indonesian Sustainable Palm Oil (ISPO) Certificate No. IN.9/AJA-ISPO issued on 27 July 2018 valid until 26 July 2023 and is preparing for RSPO certification. This HCVHCSA Assessment is carried out to meet one of the requirements under RSPO certification scheme.

1.3. Assessment Location

The Assessment area is located in two different villages, i.e. Baay and Karangan Seberang. However, its scope also includes other two villages around the assessment area, i.e. Karangan Dalam and Karangan Hilir Villages. The four villages are situated in Karangan Sub-District, East Kutai District, East Kalimantan Province, particularly at 1°22'27.43"-1 °13'48.11"N 117°34'28.53"-117° 39'29.63"E (Figure 1). Total area of the Integrated HCV-HCSA Assessment for PT BAS is 7,663.1 ha (GIS acreage) that includes PT BAS HGU concession (5,235.2 ha – legal area is 5,222 ha) and community lands (2,427.9 ha – cooperative and smallholder group lands).

1.4. National and local contexts

In the context of national policy concerning new permit issuance moratorium, the Assessment area is entirely located outside primary forest moratorium areas and peatland moratorium based on Indicative Map of New Permit Granting Moratorium (PIPPIB Map 15th revision). In the context of local policy, as per East Kalimantan 2015-2035 Provincial Spatial Plan Map, the Assessment area is situated on plantation areas. Plantation areas account for 24% of East Kutai District total area and, at sub-district level, 22% of Karangan Sub-District area.

The Assessment area is located at Sangkulirang-Mangkalihat peninsula which is one of the karst distribution areas in Kalimantan. However, based on East Kalimantan Governor Regulation No. 67/2012,1 it is known that the area is outside karst landscape. Karst areas, including prehistoric caves, are distributed around the Assessment area. Study about cave paintings in Kalimantan indicates that hand-patterned cave paintings in Sangkulirang-Mangkalihat karst area originate from at least 10,000 years ago (Fage et al., 2010). This karst area is also a national cultural reserve and listed in UNESCO's proposed world heritage. The Assessment area is located in a biogeographic zone of Borneo containing biodiversity wealth. The island itself is one of the islands with globally high biodiversity and belongs to Sundaland biodiversity hotspot that becomes a conservation priority at global level with 15,000 endemic plant species (5% of the global population) and 701 endemic vertebrate species (2.6%) which is the second highest in the world just after Andes Mountains tropical zone (Myers, et al., 2000). See Sub-Section 5.1.2 in public summary HCV HCS PT BAS for detail on the ecological and biological aspects in the MU area and its surroundings.

1.5. Area of New Planting and Development Plan

PT. Bima Agri Sawit (PT BAS) is located in Karangan Sub District, Kutai Timur District East Kalimantan Province. PT BAS has operational areas with Land Permit No. 325/02.188.45/HK/X/2005 dated 24 October 2005, for 6,476 Ha published by Bupati Kutai Timut and the Decree of the Regent of Kutai Timur No: 525.26/208/EKO.1-

XI/2016 concerning Plantation Business Permit (IUP) covering an area of 5,222 ha.

Administratively, oil palm plantation PT BAS has two (2) village area, i.e Baay & Karangan Seberang on Karangan Sub District, Kutai Timur District, East Kalimantan. PT BAS geographically situated at 1°22' 27,43" – 1°13' 48,11" N dan 117°34' 28,53" – 117°39' 29,63" E.

A comprehensive and participatory independent Social Impact Assessment (SIA) and Integrated High Conservation Value-High Carbon Stock Approach Assessment which internal and external stakeholders (by PT Gagas Dinamiga Aksenta) were conducted by licensed from HCVRN. For Analisis Dampak Lingkungan (AMDAL/ EIA) conducted by PT Agro Trimitra Konsultan. Based on decree of ministry of forestry, the location PT BAS is a part of land zoned for agriculture development (APL = Area Penggunaan Lain).
Based on the HCV HCS Assessment in the PT BAS concession, the existing HCV HCS were identified, namely HCV 1, HCV2, HCV 3, HCV 4, HCV 5, HCV 6, HCS Forest and Local People Lands. Whereas peat areas was not found. So the total identified HCV HCS area is 1,596.8 ha. The details of the HCV area can be seen in Table 24 Recapitulation of size of conservation and management areas in the assessment area (page 88)

PT BAS to open new area for oil plantation by 2021-2022. Based on HCV, SIA, and FPIC that potentially area for new planting PT BAS are 742.39 Ha. New planting area consists of nucleus and plasma as mentioned in Table 1 and Figure 2 :

Table 1 New Planting PT BAS on 2021-2022

No	Plantation	Planted	New Planting Plan			Total
			2021	2022	Sub Total	
1	Nucleus	4,157.00	221.06	124.63	345.69	4,502.69
2	Smallholder	1,183.40	116.20	280.50	396.70	1,580.10
	Total	5,340.40	337.26	405.13	742.39	6,081.79

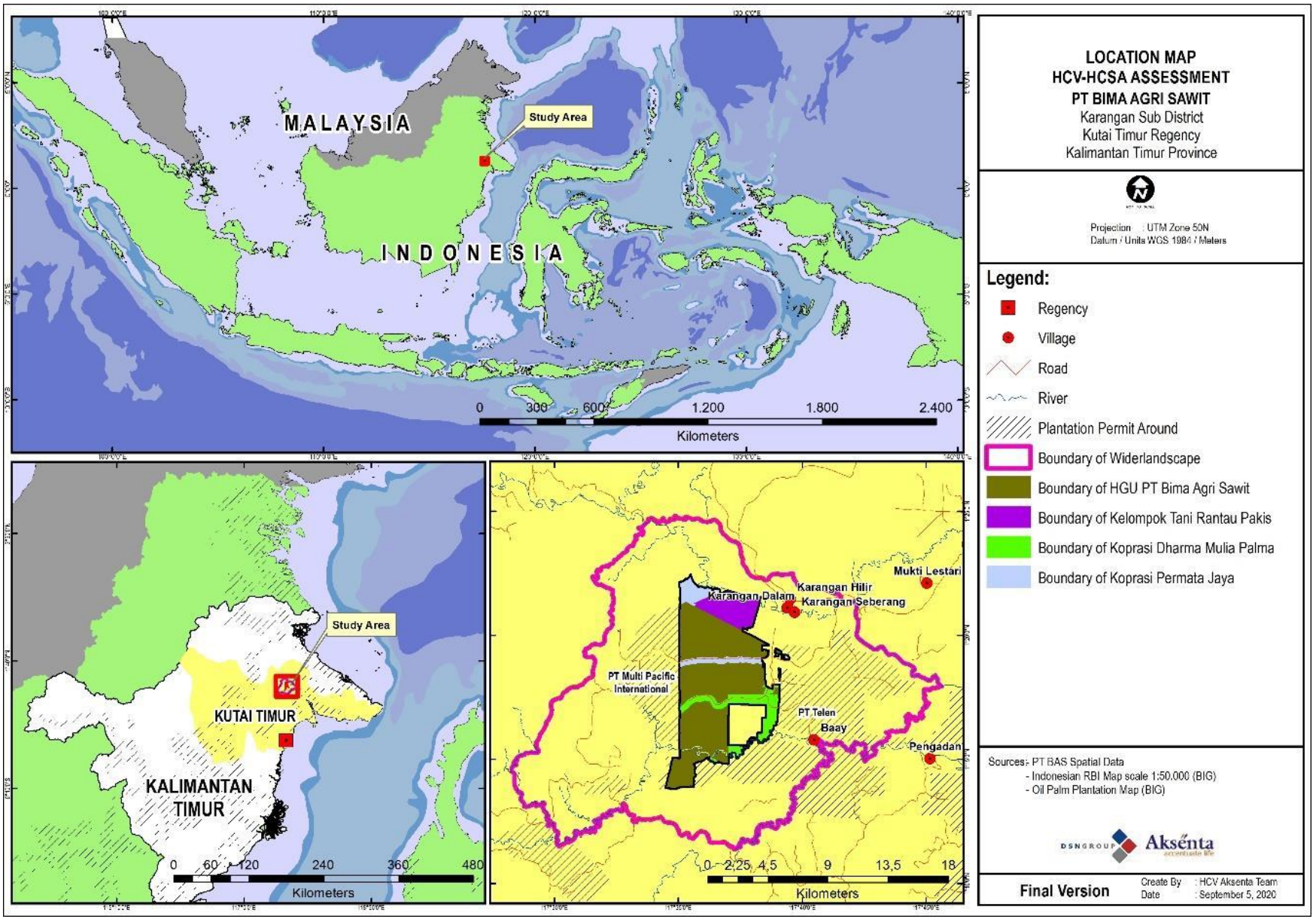


Figure 1 Location Map Level Regency & Province of PT BAS

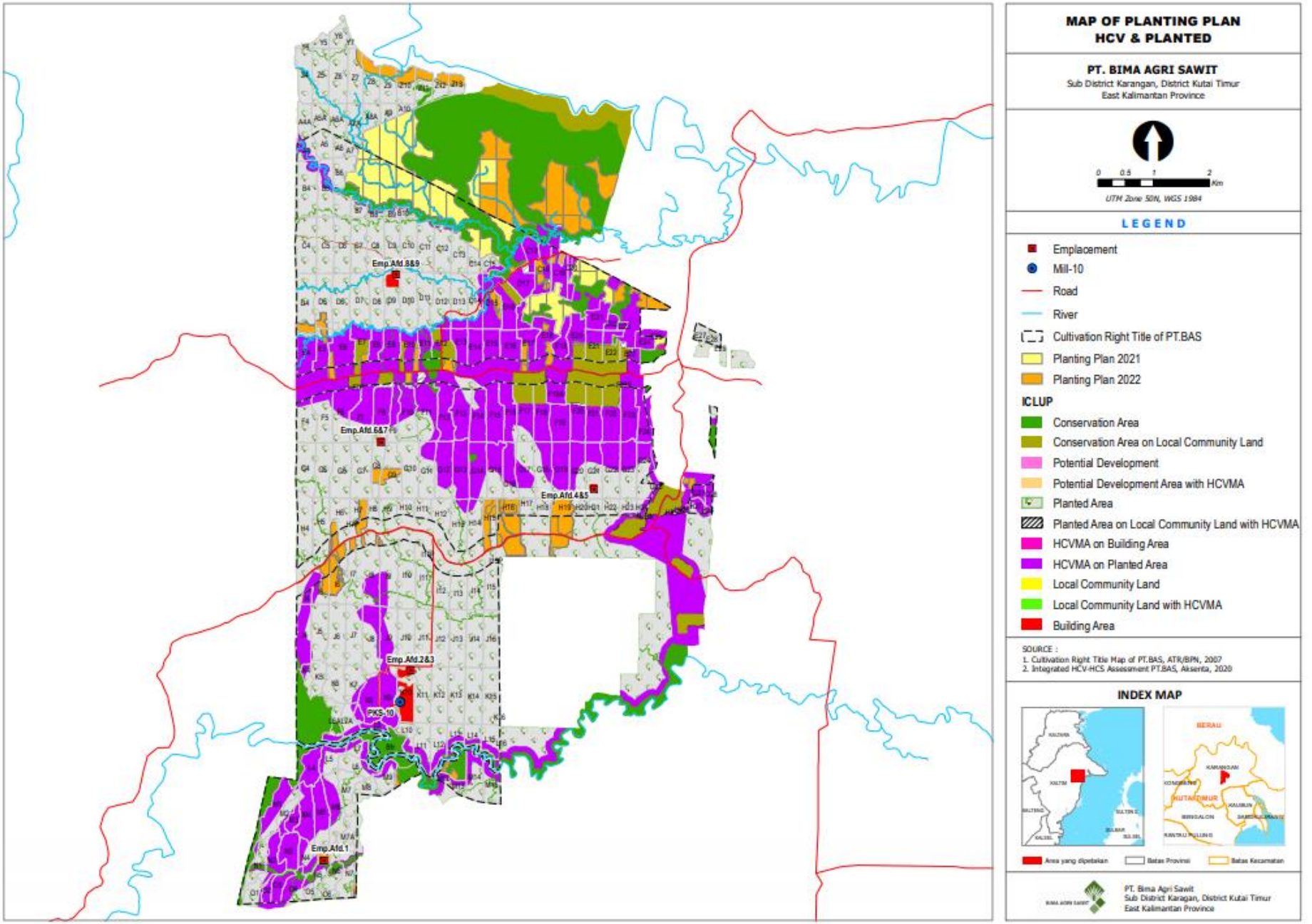


Figure 2 Area new planting and time line for new planting of PT BAS

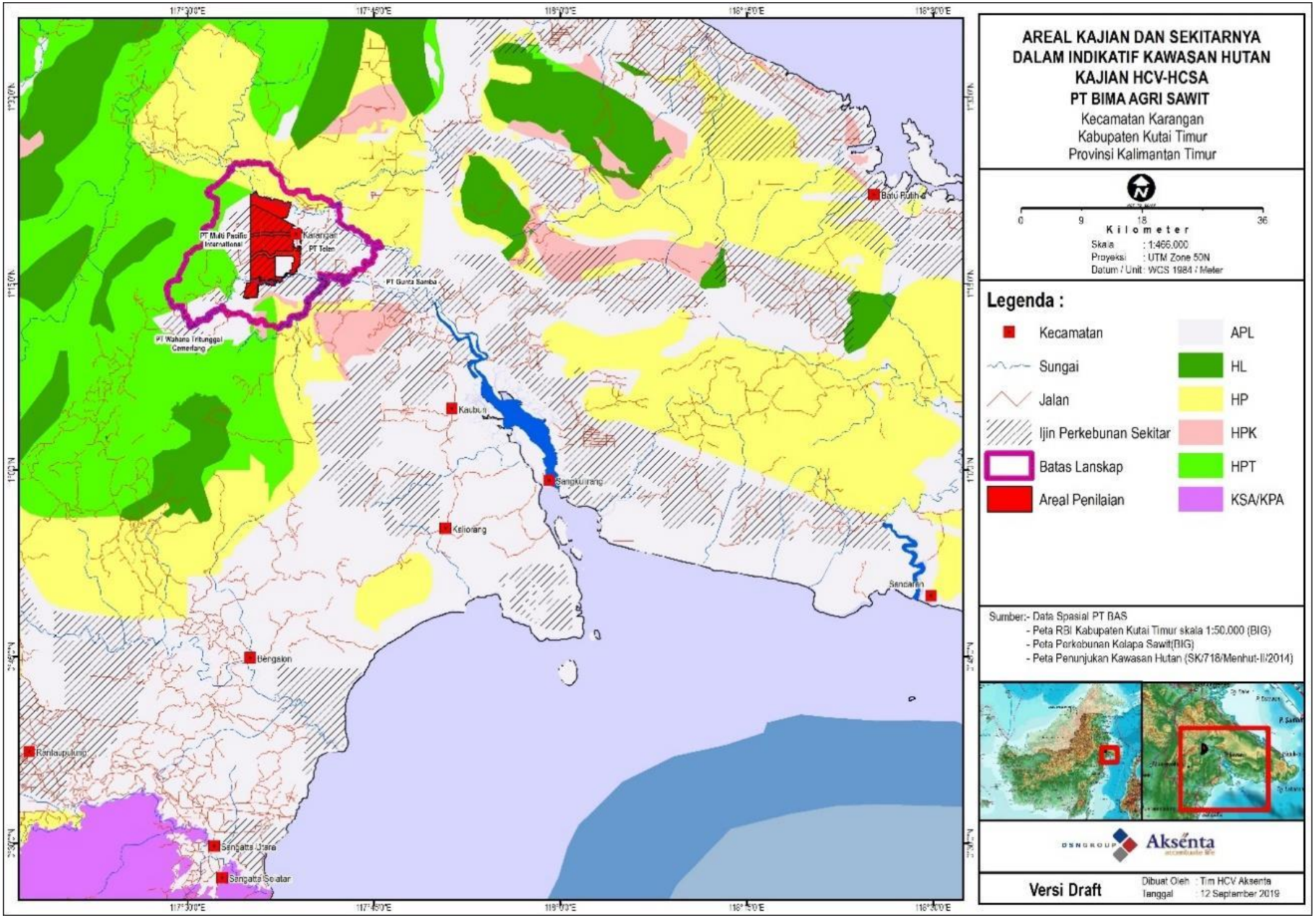


Figure 3 Forested Area in around PT BAS

2. Land Cover

Furthermore, the land cover analysis is carried out at a certain time period using Landsat imagery for certain years. Based on the 2010 Landsat image, PT BAS's area is dominated by thickets of 3,499.38 ha (Nucleus 2,190.35 ha, smallholder 869.10 ha & KT Rantau Pakis 439.93 ha). In 2010, secondary forest was found in an area of 291.59 ha and decreased to only 213.99 ha in 2020. The land cover is shown in Table 2, Table 3 & Table 4 below.

Table 2 Land Cover PT BAS (Nucleus) at Nov 2005, Dec 2007, Jan 2010, Juni 2014, Juni 2019 & Juni 2020

Tutupan Lahan	1 November 2005	1 December 2007	1 Januari 2010	Juni 2014	27 Juni 2019	Juni 2020*
Hutan Sekunder	7,91	7,91	7,91	4,46	4,46	4,46
Belukar	1.954,38	1.954,38	1.736,77	223,63	254,80	254,80
Semak Belukar	2.919,46	2.900,96	2.190,35	457,83	361,83	358,84
Kebun Campuran	-	-	-	21,66	23,37	23,37
Karet	-	-	-	4,54	4,54	4,54
Semak	203,21	192,79	450,45	96,32	106,81	106,81
Lahan Terbuka	150,24	188,46	254,14	41,13	39,15	42,14
Kelapa Sawit	-	-	595,58	4.385,63	4.440,24	4.440,24
Jumlah	**5.235,21**					
	*Sebagai pembanding tutupan lahan saat *ground-thruthing* dengan saat dilakukan penyusunan laporan LUCA NPP					

Table 3 Land Cover PT BAS (Smallholder) at Nov 2005, Dec 2007, Jan 2010, Juni 2014, Juni 2019 & Juni 2020

Tutupan Lahan	1 November 2005	1 December 2007	1 Januari 2010	Juni 2014	27 Juni 2019	Juni 2020*
Hutan Sekunder	0,89	0,89	0,89	0,89	0,89	0,89
Belukar	520,33	507,08	481,66	33,16	47,44	47,44
Semak Belukar	880,73	886,24	869,10	240,01	218,39	218,39
Semak	118,25	111,18	98,45	10,80	3,10	3,10
Lahan Terbuka	28,21	43,02	82,45	19,83	14,95	14,95
Kelapa Sawit	-	-	15,86	1.243,71	1.263,63	1.263,63
Badan Air	24,11	24,11	24,11	24,11	24,11	24,11
Jumlah	**1.572,51**					
	*Sebagai pembanding tutupan lahan saat *ground-thruthing* dengan saat dilakukan penyusunan laporan LUCA NPP					

Table 4 Land Cover PT BAS (KT Rantau Pakis) at Nov 2005, Dec 2007, Jan 2010, Juni 2019 & Juni 2020

Tutupan Lahan	1 November 2005	1 December 2007	1 Januari 2010	27 Juni 2019	Juni 2020*
Belukar	402,47	320,42	282,79	208,64	208,64
Semak Belukar	410,40	347,24	439,93	611,62	611,62
Semak	8,36	51,46	107,02	30,15	32,76
Lahan Terbuka	34,11	136,22	25,60	4,93	2,32
Jumlah	**855,34**				
	*Sebagai pembanding tutupan lahan saat *ground-thruthing* (Juni-Juli 2019) dengan saat dilakukan penyusunan laporan LUCA NPP				

3. Soil Map

Based on landsystem Soil Taksonomi System USDA, 1982 and based on Clasification System Soil Research System in Bogor, 1981, Types of soil in the entire AoI are mineral soils. No locations in the area belong to histosol soil order (peat). Soil types in the AoI is dominated by associations of hapludults and paleudults soils distributed in the middle and north parts. Distribution map of soil types in PT BAS presented in Figure 4

Table 5 Characteristic Soil Type in PT BAS

No	Soil Type Association	Description
1	Inceptisol (*Tropaquepts)*	The soil has soil temperature regim or more hot and has shallow groundwater, has natrium ratio can be exchange rate (ESP) of 15% or more, where the sodiumadsorpsi natrium (SAR) of 13% or more in half or more soil volume within 50 cm of the mineral soil surface, decreased ESP or SAR value following an increase of depth below 50 cm, and groundwater within 100 cm of the mineral soil surface for part of a year
2	Inceptisol (*Dystropepts)*	The soil occupies the shape of choppy territory, surging up into the hills, even there are some steep spots, developing from new sandstone parent material began to develop, epipedon ochric, B-chikik horizon, deep solum thickness, sandy clay texture (SCL), soil reaction Rather sour, saturation basa <50% and drained until well
3	Entisol *(Tropaquents)*	The soil occupies a flat area and usually there is a puddle of water, evolved from sediment material and has not developed, medium solum thickness, diverse texture and is a layer of precipitated soil acid sediment and poorly drained / obstructed
4	Ultisol (*Tropudults dan Paleudults*)	The soil occupies the shape of choppy territory, surging up into the mountains, there are even some steep spots, developing from sandstone parent material has advanced, having ochric and horizon characteristic horizon, horizontal thickness thickness, upper layer texture is sandy clay (SL), while The bottom is sandy clay clay to sandy clay (SCL-SC), acid soil reaction, low base saturation <50% and well drained.
5	Histosol (*Tropohemists dan Troposaprists)*	Is a type of peat soil found in lowland with a certain depth and is very acidic, has a high cation but not saturated and is very poor in both primary and minor nutrients, flood waters through the sediment of organic matter can produce moderate or high concentrations of nitrogen, phosphorus and potassium in the surface layers.

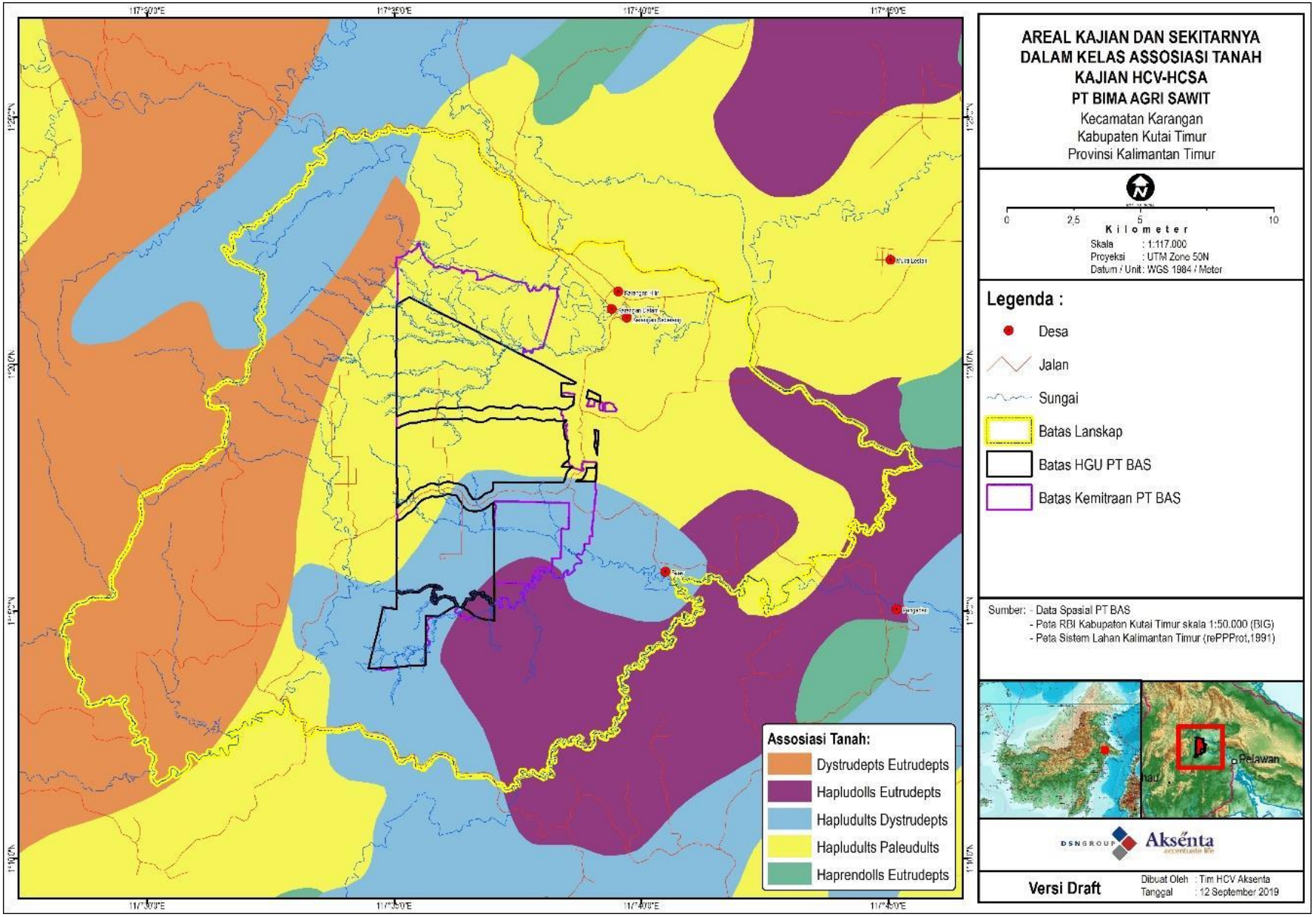


Figure 4 Maps of Soil Type PT BAS

Chapter 2

2. Assessment process and methods

2.1. SEIA Assessment

2.1.1 Assesor Credentials

a. AMDAL (Environtment Impact Assesment)

Composition team of AMDAL (PT AGRO TRIMITRA KONSULTAN) :

Leader	:	Ir. Darul Aksa, MP
Physical chemistry	:	Ir. Darul Aksa, MP
	:	Dr. Amir Masruhim
Biology	:	Ir. Hj. Hastaniah, MP
	:	Drs. Rudi Kartika, M.Si
Social, Economic, Cultural & Healthy	:	Dr. Jawatir Pardosi, M.Si
	:	Dra. Marisi N, M.Kes

Update AMDAL Smallholder (PT. Bhumi Pasa Hijau)

Leader	:	Yanto Ardianto
Quality Control	:	Idung Risdiyanto
Member	:	Fersely Getsemani Feliggi
	:	Aulia Bahadori Mukti
	:	Hariadi Propantoko
	:	Priyo Dwi Utomo
	:	Heidei Putra Hutama
	:	Muhamad Fakhrul
	:	Ryan Karida Pratama

b. SIA (Social Impact Assessment) conducted by :
Social Impact Assessment conducted by : BIOREF (Faculty of Forestry IPB)
Address Jl Lingkar Kampus IPB, Dramaga Bogor 16680
Telp: 62-251-8621677
Email : bioref.center@gmail.com.
Assesor :

1. Dr. Ir. Tutut Sunarminto, MSi (Leader)
2. Joko Mijiarto, S.Hut, MSi (Member)

Update SIA Conducted by PT Gagas Dinamiga Aksenta
PT Gagas Dinamiga Aksenta
Alamat Lindeteves Trade Center Lantai UG Blok A26 No. 2
Jl. Hayam Wuruk No.127 RT/RW 001/006, Mangga Besar Tamansari, Jakarta Barat DKI Jakarta

Composition team :

1. Ahmad Arief Hilman (Leader)
2. Noor Rakhmat Danumiharja (Member)
3. Chandra Darmawan (Member)

2.1.2 Methodology

The EIA study was conducted on August 2015 and SIA was conducted on July 2017. Village assessment including Baay & Karangan Seberang villages on Karangan Sub District, Kutai Timur District, East Kalimantan PT BAS. The study done in six methods are :

1) Library Studies : This method is used to gain an understanding of the social and environmental context of the identification area, carried out in the early stages prior to the field and at the stage of yield analysis;
2) Dialogue; This method is used to identify stakeholders, explore the issues that impact, explore expectations, ideas and aspirations to get a solution to the issues that occur, conducted through meetings both formal and non-formal and on specific topics (Focussed Group Discussion);
3) Field Observation; This method is used to directly understand the field facts which indicate the occurrence of social issues and impacts that occur;
4) In-depth Interviews; To explore and gain a deeper understanding of the issues raised by in-depth interviews with selected key figures who were respondents. Respondents' choice is based on the knowledge they have or the perpetrator or the direct feelings of an impact.
5) Triangulation ; The above methods are done in an integrated way to verify each other against the issues, opinions, and emerging ideas.
6) Social-Learning Cycle; Social Impact Assessment is not a one-time linear process, but a cyclic process that serves as social learning processes to respond to the environmental changes that occur.

Stages of Social Impact Assessment activities refer to A Comprehensive Guide for Social Impact Assessment (2006).

- **Study Preparation and Pre-assessment.** This activity aims to collect basic information (both spatial and non-spatial information), either in the form of information data sourced from publications (study reports, journals, books, statistical data, etc.) or through communications with parties deemed to have information , Knowledge, or experience related to social issues at the study site (socio-cultural of the local community, community history and demography, history of social conflict, regional development, government policies and plans, etc.). Activities identifying community profiles, identifying potential key stakeholders, defining the scope of the study, defining methods, and designing social surveys are conducted through a Focussed Group Discussion (FGD) process which is attended by all team members and headed by the team leader. If required, the team may invite related parties or other related parties as resource persons.
- **Field Activity.** This activity aims to collect data and information and examine the social impact directly in the field. The sequence of activities in the field is as follows:
    a) **Opening Meeting.** This activity is intended to convey the purpose of Social Impact Assessment, scoping, arranging field work teams, and agreeing on daily activity schedules. In this activity also carried out basic training activities (introduction) about Social Impact Assessment: about the background, purpose and objectives, concepts and how to identify

it.

b) **Social Mapping and Participatory Stakeholders (Mapping and Participatory Stakeholders).** This activity aims to identify: 1) key parties that will or have been affected (both positive and negative) or will or have impacted (both positive and negative) on the Company's presence and operations, 2) key parties Expedite / support or otherwise or potentially impede the presence and operation of the Company and 3) the portrait of life (socio-cultural and socio-economic) of the community in and around the corporate governance area.

c) **Field Observation.** This activity aims to collect and explore information relating to social impact (primary) directly in the field, which examines three sub-studies of the Social-Culture and Community Empowerment; Socio-Economic & Rural Development; as well as Employment & Social Relations. The review will involve counter parts from PT BAS and local communities with the coordination of experts from Gagas Dinamiga Aksenta.

d) **Focussed Group Discussion.** This activity aims to collect information and opinions from its participants, and clarify, confirm, complement and depend the results of field findings in the form of brainstorming discussions on several social issues recorded, both positive and negative.

e) **Analysis and identification records in the field**. This activity aims to process and analyze the data and information obtained from field activities and then compile them into an "identification record" containing the findings while in the field such as social issues, social impact predictions, conclusions, and justification or argument to be submitted to management unit PT BAS. In this activity, clarification of the results of temporary findings and data / information is still needed.

f) **Closing Meeting.** This activity aims to deliver temporary results, in the form of brief information on social portraits, social issues and predictions of social impacts to the Management Unit. The purpose of this activity is for the Management Unit to get the substance of the identification results and can follow up important or urgent things done, without waiting for the final Results Report is completed.

- **Social Impact Assessment, Analysis and Prediction of Social Impact**. This activity aims to process and analyze more comprehensively and thoroughly on all field results and to confirm, clarify, and revise on special cases based on the opinion of employee and community around PT BAS. The results are then re-presented PT BAS for inputs and improvements. Social impact analysis and prediction activities were conducted at the BIOREF in Bogor. Whereas if necessary presentation / expose can be done in Company office.
- **Report Writing (Draft).** This activity is in the form of writing workshop, ie all members of the SIA Team meet, discuss, review together, and test the results of analysis and mapping, to then prepare a report. Reports are prepared in a format and systematics that can be accounted for, but also coherent and simple, accompanied by a visual presentation, so easy to read and understood by the Management Unit of the garden and company. The output of this stage is the Draft Report. Furthermore, Draft Reports are submitted to the Company for scrutiny, input and correction if there is any error in the data and information. Furthermore, this draft report document is sent back to the Bioref SIA Team to be refined.
- **Report Writing (Final).** This activity is focused on incorporating relevant suggestions from the

company and from others considered important to be included as part of the Final Report. The output of this stage is the Final Report.

2.2. LUC Assessment

2.2.1 Assessor Credentials

Land Use Change conducted by :
PT Gagas Dinamiga Aksenta
Alamat Lindeteves Trade Center Lantai UG Blok A26 No. 2
Jl. Hayam Wuruk No.127 RT/RW 001/006, Mangga Besar Tamansari, Jakarta Barat DKI Jakarta
Composition team :

1. Ryan Karida Pratama
2. Ferri Agus

2.2.2 Methodology

LUCA has 11 steps for identify and categorize land cover. LUCA Analysis carried out remote sensing, Land use change analysis are as follows :

a. Choosen Relevant time of clearance period
The assessment was conducted over several cut-off period refers to the RSPO Remediation and Compensation procedures, namely (i) before November 2005 (RSPO Principles & Criteria was first applied), (ii) November 2007 (deadline for the trial of RSPO Principles & Criteria implementation), (iii) January 2010 (the RSPO New Planting Procedure was effective), (iv) July 2008 (PT Dharma Satya Nusantara as holding company became a member of RSPO), and (v) July 2020 (interim report of HCV Assessment was received by PT BAS).

b. Date of satellite image acquisition for each time of clearance period
Land use change analysis was done by using satellite images from several dates of acquisition. Ideally, the use of satellite image is acquired in the cut-off date (early November 2005, end of November 2007, early January 2010, end of November 2013). However, in some cases, the quality of satellite images in cut-off acquisition date did not qualify for land cover change analysis (eg the satellite image was dominated by cloud cover). So that the satellite image used was the nearest satellite image acquisition of cut-off date.
In the land cover change analysis, three types of satellite images were used, namely (i) Landsat 5 TM with 30 m spatial resolution and (ii) Landsat 7 ETM + with 30 m spatial resolution, and (iii) Landsat 8 OLI with 30 m resolution. Satellite images of Landsat 7 ETM + has a very high noise level, because there were pixels that were not interpreted due to stripping, so it took some satellite images as fillers.

c. Analysis Stages and Process
The process of remote sensing on Landsat satellite images and spatial analysis were performed by using ERDAS Imagine 9.1 software and Global Mapper V.13. Analysis was performed by using spatial operations with ArcGIS v.10.1 software. All of supporting vector data was processed using the ArcGIS device. The stages taken were started from pre-processing to the application of the compensation scheme. The following are descriptions of the stages performed in the land use change analysis (LUCA).
   - Image Pre Processing
   - **Satellite image acquisition**. The process of downloading and ordering of satellite images.

- **Rectification.** The process of geometric correction is done if satellite image with geometric shifting is found where the object's position on a satellite image is not the same as the position of the corrected image. The allowed value of RMSE in this process is 0.05, where the RMSE value of the object's position in a satellite image overlaps with other.
  - **Root Mean Square Error (RMSE) Classification.** Errors that may be done during classification, this value is obtained when the rectification on the satellite image is conducted.
  - **Image Filling.** Inserting process on each satellite image noise that has stripping by using image filler with mosaic method.
  - **Resolution Sharpening.** Performed only on the latest satellite images, which are the satellite images in 2014, using Landsat satellite image panchromatic band 8 with 15 m spatial resolution, generating multispectral satellite image with 15 m resolution.
  - **Histogram Equalization**. Equalization of contrast and brightness on the entire satellite images used in the analysis.

- Image Classification : Supervised Classification/ Visual Interpretation

Land cover classification was done under guidance (supervised classification) followed by visual correction (visual interpretation) applied to satellite images which were ready to be processed. Classification was done by using ERDAS Imagine 9.1 and ArcGIS v.10.1 software.

d. Field & Verification

- Sampling Method

Determination of the number of sample points that must be verified is done by using the formula of Taro Yamane (1967). The mathematical formulation as follows:

$$n = \frac{N}{N.d^2 + 1}$$

Where:

n = Number of samples

N = Number of populations

d^2 = Assigned precision (in this case, the specified minimum and maximum precision is in 95% and 90% confidence interval)

Placement of the observation point on calculations was done by using purposive sampling technique, in accordance with the area of land cover were found and divided proportionally by considering the focus of study that will be observed in the field is known (Expert judgment).

e. Validating the land cover data

Visual Observation. It is a direct observation on the field in determined areas based on the survey design. The observation location were focussed in location with similar/equal land covers to November 2005, then sampling was performed outside the assessment location.

f. Compiling information related to historical land use in the study area

Visual Observation. It is a direct observation on the field in determined areas based on the survey design> The observation location were focused in location with similar/equal land covers to November 2005 land covers to verify the loss land cover. If the land covers in the assessment do not

represent the land cover in November 2005,then sampling was performed outside the assessment location.

g. Identifying the loss of social HCVs

In-depth Interviews. Performing verification with regards to the possibility of the social function loss of the HCV 4,5, and 6 due to Land clearing

h. Identifying the loss of areas where planting is prohibited by RSPO P&C or by country's specific legislation (e.g. riparian zones, steep slope, deep peat)

Spatial Analysis. Data overlay of land clearing and/or interpretation of satellite images by the river banks, slope maps and map of soil types

i. Vegetation Coefficients

Land cover class	Vegetation Coefficient	Encountered/Not Encountered
Primary Forest	1	
Secondary Forest	0.7	
Thicket	0.7	
Agroforest	0.4	
Shrub	0	
Bush	0	
Open Land	0	

2.3. Fragile Soil Assessment

2.3.1 Assesor Credentials

Fragile Soil Assessment conducted at the same time with Integrated High Conservation Value-High Carbon Stock Approach Assessment by :

PT Gagas Dinamiga Aksenta

Alamat Lindeteves Trade Center Lantai UG Blok A26 No. 2

Jl. Hayam Wuruk No.127 RT/RW 001/006, Mangga Besar Tamansari, Jakarta Barat DKI Jakarta

Table 6 Composition team Fragile Soil Assessment

No	Name	Position	Skill
1	Idung Risdiyanto	Lead Assessor (ALS15029IR)	Hydrology, forest ecology, spatial modelling, carbon stock, land suitability, peat survey, watershed management, and soil and water conservation.
2	Ryan Karida Pratama	Member of Team HCV & HCS	Spatial analysis, carbon stock, landuse change, and patch analysis.
3	Fersely Getsemani Feliggi	Member of Team HCV & HCS	Hydrology, watershed management, soil and water conservation and spatial analysis.
4	Pramitama Bayu Saputro	Member of Team HCV & HCS	Wildlife identification, ecological landscape, wildlife conservation and carbon stock.

5	Rahmat Darmawan	Member of Team HCV & HCS	Flora identification, ecological landscape and ecosystem management.
6	Andri Novi Hendrarto	Member of Team HCV & HCS	Socio-economic aspects, social impact management, socio-cultural aspects and participatory mapping
7	Miranty Magetsari	Member of Team HCV & HCS	Social institution, social impacts, FPIC verification, management system and participatory mapping.
8	Heidei Putra Hutama	Member of Team HCV & HCS	Spatial analysis, land cover change and carbon stock.
9	Risa Desiana Syarif	Member of Team HCV & HCS	Spatial analysis, land cover change and patch analysis.
10	Andrini Eka Diah	Member of Team HCV & HCS	Spatial analysis, land cover change and carbon stock.
11	Pungky Alim Febriani	Member of Team HCV & HCS	Spatial analysis, land cover change and carbon stock.
12	Priyo Dwi Utomo	Member of Team HCV & HCS	Spatial analysis, land cover change and carbon stock.
13	M. Ahda Agung Arifian	Member of Team HCV & HCS	Flora identification, forest ecology and carbon stock.
14	Ferry Agus	Member of Team HCV & HCS	Flora identification, forest ecology and carbon stock.

2.3.2 Methodology

The assessment process described in this report is as follows:

1. Compilation of secondary and available primary data, including preliminary stakeholder consultation during a short term pre-visit to the survey site
2. Team formation and project scope briefing
3. Team to assess the accuracy of topographical conditions described in secondary DEM data, general field observations
4. Analysis and Mapping

2.4. GHG Assessment

2.4.1 Assesor Credentials

GHG Assessment based on at the same time with Integrated High Conservation Value-High Carbon Stock Approach Assessment by :

PT Gagas Dinamiga Aksenta

Alamat Lindeteves Trade Center Lantai UG Blok A26 No. 2

Jl. Hayam Wuruk No.127 RT/RW 001/006, Mangga Besar Tamansari, Jakarta Barat DKI Jakarta

No	Name	Position	Skill
1	Idung Risdiyanto	Lead Assessor (ALS15029IR)	Hydrology, forest ecology, spatial modelling, carbon stock, land suitability, peat survey, watershed

			management, and soil and water conservation.
2	Ryan Karida Pratama	Member of Team HCV & HCS	Spatial analysis, carbon stock, landuse change, and patch analysis.
3	Fersely Getsemani Feliggi	Member of Team HCV & HCS	Hydrology, watershed management, soil and water conservation and spatial analysis.
4	Pramitama Bayu Saputro	Member of Team HCV & HCS	Wildlife identification, ecological landscape, wildlife conservation and carbon stock.
5	Rahmat Darmawan	Member of Team HCV & HCS	Flora identification, ecological landscape and ecosystem management.
6	Andri Novi Hendrarto	Member of Team HCV & HCS	Socio-economic aspects, social impact management, socio-cultural aspects and participatory mapping
7	Miranty Magetsari	Member of Team HCV & HCS	Social institution, social impacts, FPIC verification, management system and participatory mapping.
8	Heidei Putra Hutama	Member of Team HCV & HCS	Spatial analysis, land cover change and carbon stock.
9	Risa Desiana Syarif	Member of Team HCV & HCS	Spatial analysis, land cover change and patch analysis.
10	Andrini Eka Diah	Member of Team HCV & HCS	Spatial analysis, land cover change and carbon stock.
11	Pungky Alim Febriani	Member of Team HCV & HCS	Spatial analysis, land cover change and carbon stock.
12	Priyo Dwi Utomo	Member of Team HCV & HCS	Spatial analysis, land cover change and carbon stock.
13	M. Ahda Agung Arifian	Member of Team HCV & HCS	Flora identification, forest ecology and carbon stock.
14	Ferry Agus	Member of Team HCV & HCS	Flora identification, forest ecology and carbon stock.

2.4.2 Methodology

2.4.2.1 Methods and Carbon Stock Assessment Procedures

1. **Approach**

   Inventory data collected in inventory plots was entered and checked in an excel spreadsheet, and then imported into an Access database for analysis. Biomass and carbon content is initially calculated by tree using the Allometric Equations method. This data is then used to calculate the following:

   - Total biomass and carbon mass per plot

- Strata averages of total biomass and carbon mass per ha, as well as strata averages distributed by diameter class
- 90% confidence intervals
- Statistical difference (or not) between strata using the Scheffé's test.

Biomass is reported in bone dry tonnes per ha. The Carbon (C) fraction of biomass is reported in tonnes of C/ha (Mg C/ha).

a. Stems per hectare

Stems per hectare is calculated from the plot size. The equation used is:

Stems per hectare = (Count of trees in the plot) / (Plot size in hectares)

b. Tree Biomass

Tree biomass was estimated for the living trees with DBH larger or equal to 5 cm using the Allometric Equations method. The following equation for wet tropical forests (Chave, et. al. 2005) was applied. This widely used equation relates DBH, total tree height and species-specific wood density (ρ) to estimate Above Ground Live Biomass (AGLB) per tree measured in the forest plots. The resulting AGLB is the total biomass of the stem, crown, and leaves for trees in kilograms.

AGLBi = 0.0776[ρ*i D2iHi]0.940*

Where: AGLB = Above ground live biomass in kilograms

D = Diameter at breast height (1.3m above ground) in centimetres

H = Total tree height in metres

ρ = Specific gravity in grams per cubic centimetre

Chave et al. (2005) found that locally, the error on the estimation of a tree's biomass was of ± 5%.

Genus and/or species-specific gravity values were determined for the species observed in the inventory from the following sources in order of priority:

1. Global Wood Density Database. Chave J, Coomes DA, Jansen S, Lewis SL, Swenson NG, Zanne AE (2009), Towards a worldwide wood economics spectrum. Ecology Letters 12(4): 351-366.
2. Preference is given to wood density estimates from Indonesia and South-East Asia, in order of priority. IPCC (2006): 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 4. Table 4.13 – Basic Wood Density of Tropical Tree Species.
3. Where no wood density was available for the species, there were assigned a wood density value of 0.585 g/cm3.
4. This figure was derived from the weighted average wood density of tree species in the forest inventory with identified wood density estimates.

c. Palm Biomass

The equation used for estimating palm biomass was:

Palm Biomass1 (tonne) **= [Specific gravity] * D2/40000*(palm height)**

For palms, specific gravity is assumed to be 0.247 tonne per green m^3

d. Tree and Palm Carbon Content

The C fraction of biomass is calculated in tonnes of C (Mg C). The equation used for estimating Tree and Palm Carbon Content was:

Carbon Mass (tonne) = Biomass * (Carbon conversion factor)

The carbon conversion factor estimates the carbon component of the vegetation biomass. This can be derived for specific forest types or the IPCC standard value of 0.47 can be used. In this case the IPCC standard value has been used

e. **Carbon Mass per Hectare**

The equation for estimating tree carbon mass per hectare in each plot is:

Total Carbon (tonne/ha) = Σ ([Tree Carbon]) / [Plot size in hectares]

Separate calculations of volume are made for estimating tree volume in sub-plots because the plot size differs between the main and subplot.

f. **Analysis of Carbon Estimate Precision and Significant Difference between Strata Carbon Estimate Precision**

The target precision level for carbon stock estimates is 90% confidence intervals within 10% of the average total carbon stock per ha in each strata for the designated above ground carbon pools.

90% confidence intervals (CI) were calculated for each land cover strata from the calculated carbon per ha in each plot using the following standard formula:

CI = $t\alpha/2 \cdot s/\sqrt{n}$

Where: t is the Student's t value,

α determines the level of confidence

s is the standard deviation of the sample and n is the sample size.

Significant Difference between Strata

Following completion of processing of raw data and estimation of average carbon stocks per stratum, two tests are performed to assess significant difference between strata:

1. The ANOVA test is applied to determine whether there are significant differences between the strata carbon estimates.
2. A Scheffé's pairwise multiple comparisons test is conducted to determine which groups are significantly different. The Scheffé's test is a method for statistical comparison of multiple strata

Reff:

Integrated High Conservation Value-High Carbon Stock Approach Assessment Report by Gagas Dinamiga Aksenta, July 2020

2.4.2.2 Methods and procedures GHG assessment

Net GHG emissions are calculated by adding the emissions released during land clearing, crop production and crop processing, and subtracting from these emissions the sequestration of carbon in the standing crop and in any conservation areas. Stages of activity measurement and mapping GHG assessment in the concession area of PT. BAS as system boundary for the greenhouse gas calculation in Palm GHG. GHG Calculation stages are divided into input, output agricultural. This emission sources included in the calculator are :

I. Land clearing;
II. Manufacture of fertilisers and transport to the plantation;
III. Nitrous oxide and carbon dioxide resulting from the field application of fertilisers and mill by-products and other organic sources such as palm litter;
IV. Fossil fuel used in the field (mainly for collection of FFB);

V. Methane produced from palm oil mill effluent (POME); and

VI. Carbon dioxide and nitrous oxide generated by the cultivation of peat soils.

In addition, the following GHG fixation and credits are considered:

I. Carbon dioxide fixed by oil palm trees, ground cover and carbon sequestered in plantation litter (see crop sequestration, below);

II. Carbon dioxide fixed by biomass in conservation areas;

III. GHG emissions avoided by the selling of mill energy by-products (e.g.

IV. electricity sold to the grid; palm kernel shell sold to industrial furnaces.

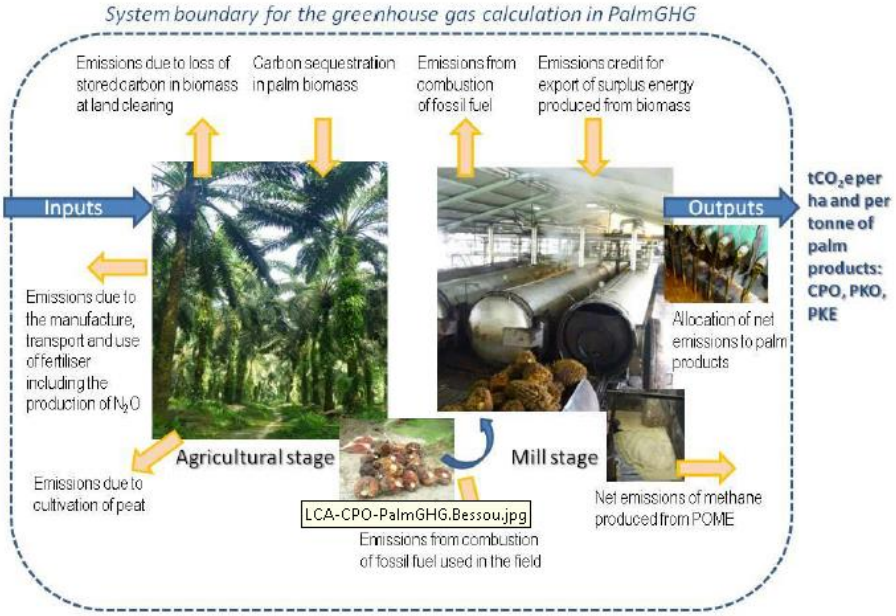


Figure 5 System Boundary of Palm GHG

2.5. HCV & HCS Assessment

2.5.1 Assesor Credentials

Integrated High Conservation Value-High Carbon Stock Approach Assessment by:

PT Gagas Dinamiga Aksenta

Alamat Lindeteves Trade Center Lantai UG Blok A26 No. 2

Jl. Hayam Wuruk No.127 RT/RW 001/006, Mangga Besar Tamansari, Jakarta Barat DKI Jakarta

Table 7 Composition team HCV & HCS Assessment

Team leader and GIS expert

Name	Role	Institution	Expertise	Experience
Idung Risdiyanto	Lead Assessor (ALS15029IR); HCS Registered Practitioner	PT Gagas Dinamiga Aksenta	Hydrology, forest ecology, spatial modelling, carbon stock, land suitability, peat survey, watershed management, and soil and water conservation.	Country: Indonesia and Papua New Guinea Language: Indonesian and English
Ryan Karida Pratama	GIS and remote sensing expert; HCS Registered Practitioner	PT Gagas Dinamiga Aksenta	Spatial analysis, carbon stock, landuse change, and patch analysis.	Country: Indonesia and Malaysia Language: Indonesian and English

Team's environmental and social experts

Name	Role	Institution	Expertise	Experience
Fersely Getsemani Feliggi	Ecosystem service expert	PT Gagas Dinamiga Aksenta	Hydrology, watershed management, soil and water conservation and spatial analysis.	Country: Indonesia and Malaysia Language: Indonesian and English
Pramitama Bayu Saputro	Biodiversity expert	PT Gagas Dinamiga Aksenta	Wildlife identification, ecological landscape, wildlife conservation and carbon stock.	Country: Indonesia and Papua New Guinea Language: Indonesian and English
Rahmat Darmawan	Ecological and flora expert	PT Gagas Dinamiga Aksenta	Flora identification, ecological landscape and ecosystem management.	Country: Indonesia and Malaysia Language: Indonesian and English

Andri Novi Hendrarto	Social, economic and cultural expert	PT Gagas Dinamiga Aksenta	Socio-economic aspects, social impact management, socio-cultural aspects and participatory mapping	Country: Indonesia, Papua New Guinea and Malaysia Language: Indonesian and English
Miranty Magetsari	Social expert	PT Gagas Dinamiga Aksenta	Social institution, social impacts, FPIC verification, management system and participatory mapping.	Country: Indonesia and Malaysia Language: Indonesian and English
Heidei Putra Hutama	GIS and remote sensing expert	PT Gagas Dinamiga Aksenta	Spatial analysis, land cover change and carbon stock.	Country: Indonesia Language: Indonesian and English
Risa Desiana Syarif	Ahli GIS dan HCS patch analysis Ahli GIS dan HCS patch analysis	PT Gagas Dinamiga Aksenta	Spatial analysis, land cover change and patch analysis.	Country: Indonesia and Malaysia Language: Indonesia and English
Andrini Eka Diah	Ahli GIS dan *remote sensing*	PT Gagas Dinamiga Aksenta	Spatial analysis, land cover change and carbon stock.	Country: Indonesia Language: Indonesia and English
Pungky Alim Febriani	GIS and remote sensing expert	PT Gagas Dinamiga Aksenta	Spatial analysis, land cover change and carbon stock.	Country: Indonesia Language: Indonesia and English
Priyo Dwi Utomo	GIS and remote sensing expert	PT Gagas Dinamiga Aksenta	Spatial analysis, land cover change and carbon stock.	Country: Indonesia Language: Indonesia and English
M. Ahda Agung Arifian	Flora and carbon expert	PT Gagas Dinamiga Aksenta	Flora identification, forest ecology and carbon stock.	Country: Indonesia Language: Indonesia

				and English
Ferry Agus	Flora and carbon expert	PT Gagas Dinamiga Aksenta	Flora identification, forest ecology and carbon stock.	Country: Indonesia Language: Indonesia and English

2.5.2 Methodology

This Assessment is carried out from June to December 2019 (Table 8). Its implementation involves three main phases, i.e. pre-assessment, scoping study and full assessment.

Table 8 Phases of HCV-HCSA Assessment in PT BAS concession

Phase	Activity	Location	Timeline
PREASSESSMENT			
Information exchange and desktop study	▪ Collecting initial data and information from the company concerning the project status	- Aksenta office, Jakarta - DSN principal office, Jakarta	14-23 June 2019
	▪ Collecting initial data and secondary sources (report, journal, nook, statistic and basemap) including tenurial assessment report and participatory mapping, Environmental Impact Analysis (EIA) and Social and Environmental Impact Assessment (SEIA) review and update as the social study baseline.		
	▪ Secondary data and spatial analysis.		
SCOPING STUDY			
Scoping study	▪ Field visit and initial consultation with key stakeholders (government institution, NGO and academics), and visit to community representatives. ▪ Checking land cover resulted from desktop study.	Samarinda, Sangatta, and Baay, Karangan Seberang, Karangan Dalam, and Karangan Hilir Villages	26 June-4 July 2019
	▪ Prepare field survey design: timeline, team composition and field assessment support facility.	Aksenta office, Jakarta	8-10 July 2019
ASSESSMENT			
Field survey	▪ Checking land cover resulted from scoping study. ▪ Collecting field data. ▪ Interview using triangulation technique and confirmation with stakeholders. ▪ Compiling field data and team's internal coordination.	Baay, Karangan Seberang, Karangan Dalam, and Karangan Hilir Villages	13-21 August 2019
Participatory mapping	Workshop with informants and community members who have knowledge over and experience with the Assessment area.	Baay, Karangan Seberang, Karangan Dalam, and Karangan Hilir Villages	13-20 August 2019
Closing meeting	▪ Presentation to and discussion with the MU. ▪ Submitting the interim report.	PT BAS estate office	22 August 2019

Stakeholder consultation	Direct meeting, presenting representatives of key stakeholders in the Assessment area including local community members, local government institutions, relevant district government-level institutions, as well as NGOs and companies operating around the Assessment area.	Baay, Karangan Seberang, Karangan Dalam, and Karangan Hilir Villages; Sangatta, Samarinda City, and Bogor City	29 October-3 November 2019; 11-16 January 2020
Analysis and reporting	▪ Field and spatial data analysis. ▪ Preparing (draft) report. ▪ Aksenta's internal QC. ▪ Report finalisation. ▪ Submitting report to HCVRN.	Aksenta office, Jakarta	October 2019-January 2020

Other studies in the Assessment area include Social Environmental Impact Assessment Review Update (2017), tenurial assessment and participatory mapping (2019), Land Use Change Analysis (LUCA) (2019) and Social Liability Assessment (2019), the results of which are used as supporting data and information for this Assessment.

The assessment process described in this report is as follows:

1. Pre Assessment.

Pre-assessment is an initial phase carried out before the assessment implementation is mutually agreed upon by the Assessment team and the company. Two major issues are assessed in this phase, i.e. (i) meeting of precondition (due diligence) for the Assessment implementation (Table 9); and (ii) the company's approval and capacity to meet the requirements in the assessment implementation. Activities involved at this phase include: collecting information and reviewing the company policies concerning the Integrated HCV-HCSA Assessment including the FPIC process that the company has carried out; as well as desktop study and initial assessment from secondary data, such as project status review, study of literature and statistical data, spatial analysis including initial land cover analysis.

Table 9 Due diligence against four preconditions

Precondition	Due diligence
1. Commitment to environmental and social conservation.	The company has commitment to environmental and social safeguards, as represented by DSN Group's Sustainability Policy (http://www.dsn.co.id/sustainability/policy.php).
2. Company commitment to a moratorium on any land clearing or land preparation until the proposed Integrated Conservation and Land Use Plan (ICLUP) has been completed or finalised.	▪ PT BAS is yet to have activities for land clearing or preparation. This company commitment is mentioned in statement of moratorium of land clearing or preparation in PT BAS operational area. ▪ Analysis of Sentinel-2 satellite images (December 2018 and April 2019) finds no indication of land clearing by the company in the Assessment area. Land cover changes that took place within the period are community farming activities (non-corporate clearance). This requires further verification at scoping study phase.

3.	Demonstration of legal rights to or permit for exploring the Area of Interest ("AoI").	▪ PT BAS obtained HGU concession covering an area of 5,222 ha based on National Land Agency ("BPN") Head Decree No. 14-HGU-BPN RI-2008 dated 5 May 2008. Other than the HGU concession, the Assessment area also includes plasma area or lands of PJ Cooperative, DMP Cooperative, and Rantau Pakis SG, some of which are already with Land Ownership Statement (SKT) with individual areas ranging from 2 to 5 ha. ▪ Permission to explore the AoI concerning this Assessment is expressed by community representatives through village governments, as can be seen on letters from Baay, Karangan Seberang, Karangan Dalam dan Karangan Hilir Villages responding the HCV-HCSA Assessment permission request.
4.	FPIC process has been initiated with full disclosure of the proposed project, with all potentially affected communities, and the process for further negotiation and consent is already agreed upon, with fairly appointed representatives.	▪ PT BAS already held information dissemination events in early 2019 for all community members and stakeholders that may potentially get affected relating to the planned plantation development, including job opportunity offer to Village-Owned Enterprise (BUMDES) on 24 January 2019 and 14 February 2019, as well as dissemination of information on conservation (6 March 2019) and plasma certification (21 March 2018). ▪ On 20 June 2019, the company initiated permission requests from community representatives through village governments regarding the implementation of the Integrated HCV-HCSA Assessment in Baay, Karangan Seberang, Karangan Dalam and Karangan Hilir Villages. This will be confirmed during scoping study.

Due diligence finds that the company is considered to have met the four preconditions. Further, the Assessment team already ensured that the company has approved all phases to be carried out in the Assessment, all ALS procedures and requirements including the timeline and the implied review costs, and understands the consequence of the Assessment result, including the size of area of development, size of conservation area, and recommendations for managing and monitoring the conservation areas. Conclusion is drawn in this preassessment phase that the Integrated HCV-HCSA Assessment implementation can move forward to the next phase.

2. Scooping Study

2.1. Activity summary and scoping study conclusion

Activities during the scoping study phase include collecting information, carrying out initial field survey, visiting community representatives, groundtruthing initial land cover, identifying stakeholders and initial consultation (Table 10). These activities are carried out to understand the landscape context, define the Assessment landscape (AoI) boundaries, plan field survey for full assessment, and carry out initial identification of potential presence of HCV and HCS areas.

Table 10 Summary of scoping study activity description

Activity	Description	Timeline
Collecting information	Desktop study in Jakarta:	14-23 June 2019

	■ Initial review of project status and planned development. ■ Study of literature and statistical data. ■ Spatial analysis of the basemap including initial land cover.	
Initial field survey	■ Understanding the landscape context from the desktop study output and ■ defining the landscape/AoI boundaries. ■ Groundtruthing initial land cover. ■ Identifying biophysical and ecological key features as well as potential ■ HCV and HCS. ■ Visiting sample community members. ■ Identifying key stakeholder and carrying out initial consultation. ■ Reviewing documents in PT BAS estate office.	26 June-4 July 2019
Visiting sample community members	■ Interview and field orientation in Baay Village. ■ Interview and field orientation in Karangan Seberang Village. ■ Interview and field orientation in Karangan Dalam Village ■ Interview and field orientation in Karangan Hilir Village.	27 June-2 July 2019
Groundtruthing of initial land cover map	■ Verifying land cover in the Assessment area and its surroundings. ■ Verifying natural vegetation cover in Nyuaring hill. ■ Verifying natural vegetation cover in Rantau Pakis SG lands. ■ Initial verification of settlement area distribution.	27 June-3 July 2019
Identifying stakeholders and carrying out initial consultation	■ Interview and discussion with the Central Government: Natural Resources Conservation Agency (“BKSDA”), BPCB. ■ Interview and discussion with local governments: East Kalimantan Province Forestry Office, and East Kalimantan Provincial Land and Spatial Planning Office. ■ Interview and discussion with NGOs: BOSF, TNC and PKPB. ■ Interview (private communication with academics: Dr Pindi Setiawan (prehistoric cave painting expert). ■ Interview and FGD with community representatives.	24 June-2 July 2019

Total 111 locations are visited at this phase, including 53 locations for initial land cover verification, 36 for observation of biophysical and ecological key features, and 22 others for social observation (Figure 6). Land cover based on groundtruthing includes six types, i.e. low-

density secondary lowland forest, shrub, bush, oil palm, barren soil and water body. Many forest-covered areas are distributed in the northern part, which are managed by Rantau Pakis SG, and several enclaves are found in the middle part. Furthermore, forest fragments are also found on a karst hill in the southern part of the HGU concession and Karangan and Muara Bulan riparian areas (Figure 6).

Based on initial consultation and field visit, conclusion is drawn that conservation area identification focus at the next phase includes the presence of rivers, i.e. Karangan and Muara Bulan, along with their tributaries and riparian areas, in addition to the presence of karst are including potential presence of prehistoric cave. Other important matter that should also be assessed further is potential presence of charismatic species (orangutan) and key species that may potentially be present in this area such as gibbon, sun bear, saltwater crocodile and groups of hornbills. Orangutan presence is indicated with the finding of nests in Rantau Pakis SG area which is a low-density secondary lowland forest and in the forest edge that borders shrubland.

Community key representatives identified other than village heads or village government staff include traditional leaders, smallholder group and cooperative. Environmental and social NGOs of particular concern about conservation issues in this area are Borneo Orangutan Survival Foundation, Konservasi Alam Nusantara Foundation (affiliated with The Nature Conservancy) and Pemuda Karangan Peduli Bumi NGO.

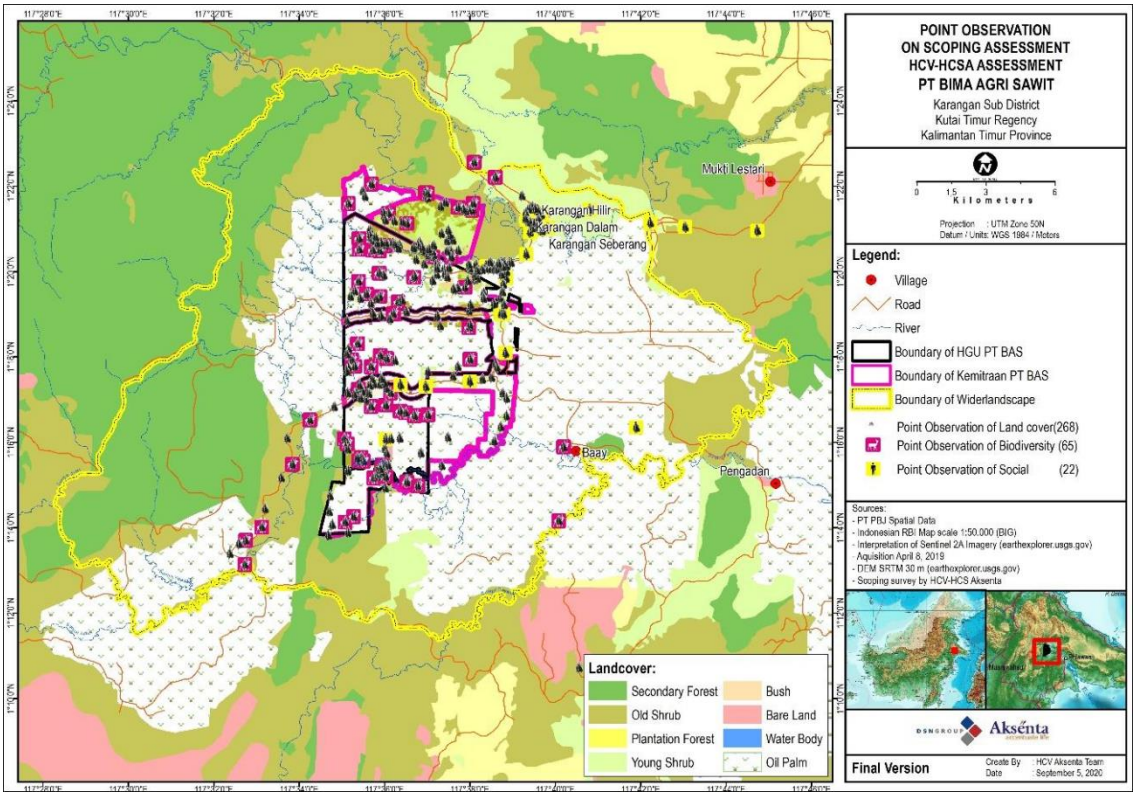


Figure 6 Locations of groundtruthing activity including villages visited at scoping study phase

The following is concluded from the output of scoping study as to the issues found during due diligence phase.

- It is confirmed that the company is committed to environmental and social conservation. Field observation finds that the company has allocated karst hills, caves and riparian areas as HCV areas.
- No land clearing has been carried out by the company prior to HCV-HCSA Assessment implementation or otherwise before the assessment output is finalised. It has been confirmed that land cover change from December 2018 to June 2019 is out of community farming activities instead.
- The Assessment area is located in Plantation Zone or Non-Forestry Cultivation Zone. Based on legal documents, PT BAS MU area includes its HGU concession (as per BPN Head Decree No. 14-HGU-BPN RI 2008) and PJ Cooperative area (as per East Kutai District Head Decree No. 525.26/K.361/HK/VI/2018). As for CMP Cooperative and Rantau Pakis SG areas, decrees for these is being proposed to East Kutai District Head concerning plasma spatial designation.
- The company has initiated an FPIC process as to the planned plantation development. This process is a follow-up of the cooperation agreements mutually agreed by and between the company and PJ Cooperative (dated 12 June 2017) and DMP Cooperative (dated 20 December 2013, with revision date of 18 October 2016) and Rantau Pakis SG (dated 12 December 2017). PJ Cooperative includes Karangan Seberang Village community, while DMP Cooperative includes Baay Village community.
- As to the HCV-HCSA Assessment implementation, informants interviewed already know that environmental and social assessments, including HCV-HCSA, are in place and give permission to Aksenta team to have activities in their respective area.

FPIC process during scoping study produces consent from representatives of all villages for the implementation of the HCV-HCSA Assessment in their respective area. Community can understand Aksenta team's presentation on HCV, HCSA, CSA and FPIC. They allow participatory mapping activities so long as applicable norms, ethics, tradition and culture in each village are respected. They agree that the Assessment result be entirely presented through public consultation to be held once the (draft) report is done to allow them to give input and confirm the Assessment output. Based on preassessment (Section 3) and scoping study, conclusion can be drawn that the HCV-HCSA Assessment can proceed to full assessment phase.

2.2. List of scoping study consultations

At this phase, consultations with stakeholders are focused on collecting major issues relevant to the Assessment substance (Table 11). Informants are selected taking into account the relevance of their activities and main concern with the Assessment area, in addition to the potential presence of HCV HCS elements.

Table 11 Summary of consultation at scoping study phase

Name	Role/ Position	Organisation / Social Group	Major Concern & Recommendation
24 June 2019			
Eko Prasetyo	Best Management Practices (BMP) Staff at	Borneo Orangutan Survival Foundatio	▪ Based on indications, the Assessment area is situated within orangutan distribution area (see PHVA, 2016). ▪ Matters to take into account: verify if orangutan is

	Orangutan Conservation	n	present/absent; if they are present, estimate the population, size of conservation area allocated, intact corridor with no disconnection; and if the conservation area is not sufficient, relocate them (last option). ▪ River buffer zone can serve as orangutan corridor. ▪ Management input: SOP, training on wildlife conflict mitigation. ▪ Conservation areas are important not only to orangutan, but also other key wildlife species such as gibbons and hornbills.
26 June 2019			
1. Rahmadi 2. Arliansyah	Forest Area Control and Security Staff	East Kalimantan Provincial Forestry Office	▪ Important species in Karangan Sub-District include hornbill, orangutan, sun bear, Sunda pangolin, proboscis monkey, *meranti*, *keruing*, *bengkirai*, and Borneo ironwood. ▪ Concerning human-wildlife conflict prone areas (especially crocodile and orangutan), it is advised to coordinate with BKSDA. ▪ Number of land fire cases in Karangan Sub-District is considered low. It is advised that the company apply 'zero burning' policy. ▪ Prior to land clearing, the company is advised to apply for Timber Use Permit (IPK) for trees with diameter > 10 cm. ▪ The company must map traditional lands or burial grounds before land clearing and protect them. ▪ Cooperation will be required with Bengalon Production Forest ▪ Management Unit on conservation areas to allow formation of wildlife corridor.
Shahar Alhaqq	Head of Forest Area Control and Security Department	East Kalimantan Province Forestry Office	▪ Karangan Sub-District is not a fire-prone area. ▪ The Assessment area is entirely on mineral soils. ▪ In general, social conflict is relatively low. ▪ Potential presence of wildlife in Karangan Sub-District includes these species: Bornean banteng, orangutan, crocodile and sun bear. ▪ *Meranti* group is the dominant flora group. ▪ The updated map on East Kalimantan Provincial Forest Area can be seen in Decree No. 278/2017.
1. Edi Sudiono 2. Arif Rifqi 3. Faisal 4. Dian Mayasari	1. Kalimantan Programme Coordinator 2. GIS 3. Staff 4. Staff	Konservasi Alam Nusantara Foundation (affiliated with The Nature Conservancy)	▪ There are indications of karst areas and potentials of prehistoric caves. ▪ Based on the temporary output of TNC and UGM assessment, the Assessment area is surrounded by areas of karst landscape. ▪ Conflict with orangutan in the area is relatively high. ▪ Indication of orangutan habitat presence: population gets higher southwestward and gets lower southward and eastward. ▪ PT Telen to the east of PT BAS concession cooperates with Ecositrop in mitigating conflict with orangutan; it is advised to consult Ecositrop. ▪ Mulawarman University assessment (May, 2019) finds Storm's stork around the area. ▪ Major rivers in the Assessment area are habitats to saltwater crocodile; conflict frequently takes place.

			▪ Baay and Karangan Dalam are old villages. There is a proposal for village forest in Karangan Dalam, but make sure if it is within or outside PT BAS concession. ▪ Use of Non-Timber Forest Products (NTFP) including swiftlet nest, rattan, honey and ecotourism. ▪ There is Sacred Stone site in Karangan Hilir. ▪ The Assessment villages are resettlement villages. ▪ Other important wildlife species: Miller's langur *(Presbytis canicrus)* and helmeted hornbill *(Rhinoplax vigil)*. ▪ Dominant plant species: meranti, bengkirai, Borneo ironwood. Refer to Indonesian Institute of Sciences (LIPI) assessment result for vegetation species in Sangkulirang-Mangkalihat Peninsula.
Yoyok S.	Staff	East Kalimantan BKSDA	▪ There are indications of the presence of orangutan and saltwater crocodile. ▪ Confirmation that rhinos are absent in the Assessment area; potential presence of rhinos is found in West Kutai District. ▪ Banteng may potentially be present in the Assessment area and its surroundings. ▪ For the updated map of orangutan distribution, refer to 2016 assessment *(Population and Habitat Viability Analysis – PHVA)*. ▪ It is expected that HCV areas be designed taking into account wildlife corridor, particularly where orangutan presence is confirmed. ▪ It is advised that the company carry out information dissemination and counselling events for community on the presence of wildlife species in its concession. ▪ East Kalimantan BKSDA once cooperated with DSN Group in Wahau concerning wildlife conflict resolution.
27 June 2019			
Kartika	PR Staff	Kalimantan Region Cultural Reserve Agency	▪ Designation and preservation of national cultural reserve refer to Law 11 of 2010 and Law 5 of 2015. ▪ Sangkulirang-Mangkalihat karst is listed as national cultural reserve and it is being proposed to become UNESCO's world heritage. ▪ There has been BPCB assessment on prehistoric caves in Sangkulirang-Mangkalihat since 2012 to date (pending publication). It is indicated that several sites of cave here are older than karst caves in Maros, South Sulawesi. ▪ The officer responsible for cultural reserve at province and district level is Maintenance Officer, particularly for listed sites, and he/she cooperates with provincial/district education office.

Bony Briks	Spatial Use and Control Staff – Sangkulirang-Mangkalihat Karst Landscape Mapping Team	East Kutai District Land and Spatial Planning Office	▪ East Kutai District Spatial Plan 2015-2035 has been issued based on District Regulation No. 1/2016. Based on the regulation, it is known that PT BAS concession is situated in Plantation Zone spatial class. ▪ Before designated by Geological Agency, a Karst Landscape Area must meet the following criteria in the first place: there are endo- and exo-karst; a particular study should be performed and then verified by Geological Agency and proposed to the relevant local government (as per Energy and Mineral Resources Minister Regulation No. 17/2012. ▪ It is confirmed that PT BAS operational area is outside Karst Landscape Area, based on the most recent natural landscape area mapping assessment which is now still pending publication.
Dr Pindi Setiawan	Historical cave painting expert	Bandung Institute of Technology	▪ Any cave located within cultivation zone must be enclaved. ▪ There are 52 sites of prehistoric painting heritage. ▪ Before 1985, Dayak Basap Village was located in Tintang (Tentang). Later on, they migrated because of El Nino's drought. Similar migration also took place in Mau Village in the end of the 19th century. ▪ Presence of karst area is important for catching and storing rainwater. ▪ Presence of oil palm plantations since 2005 have brought about economic stability and security to the local area.
28 June 2019			
Saipul Anwar	Chief	Pemuda Karangan Peduli Bumi Group	▪ Karst area may potentially become a special tourist destination. ▪ Karangan Hilir and Karangan Dalam Village Forests have been designated and must be protected. ▪ There are caves and historical burial ground around PT BAS concession. ▪ PT BAS concession is surrounded by karsts, forest areas and oil palm plantations.
1. Riduan 2. Sugiarto Izamsah	1. Village Head 2. Village Consultative Board (**"BPD"**) Chief 3. Traditional Chief	Karangan Dalam Village	▪ Description on population, boundaries, tradition and village history. ▪ Livelihoods are earned mainly from dry and irrigated rice fields, swiftlet nest, oil palm and rubber plantations, working in oil palm and logging companies, trade activities and fishing. ▪ *Leboq/Basap Pelas Tahun* traditional ceremonies are performed in traditional houses in local villages. ▪ PT BAS HGU concession is not part of the village territory.
			▪ Village maps (and boundaries) is already issued and we confirm that PT BAS concession is located in Karangan Seberang Village. ▪ River Karangan is community source of water. They get the water through Local Government Water Company (PDAM).
29 June 2019			

1. A. Muzahid 2. Yanaraeni 3. Fadli 4. Husin	1. Village Head 2. BPD Chief 3. Traditional Chief 4. Karangan Seberang Traditional Group Leader	Karangan Seberang Village	▪ Description on population, boundaries, tradition and village history. ▪ Main sources of livelihood: rice fields, swiftlet nest, oil palm and rubber plantations, working in oil palm and logging companies, trade activities and fishing. ▪ *Leboq/Basap Pelas Tahun* traditional ceremony. ▪ PT BAS HGU concession is not part of the village territory. ▪ Village maps (and boundaries) is already issued. ▪ River Karangan is community source of water. They get the water through Local Government Water Company (PDAM).
Julkifli Samuel	Chief	Rantau Pakis SG	▪ Consists of ex-logging company worker groups members who are from immigrant Dayak ethnic. They obtained lands from Karangan Dalam Traditional Chief. ▪ Currently their main sources of livelihood are: mixed garden, secondary crops, rubber, pepper and oil palm. ▪ It is expected that the company clear lands immediately.
30 June 2019			
1. Sairaji 2. Bahar udin Arbi 3. Sunardi	1. Community leader 2. Youth leader 3. Traditional leader	Baay Village	▪ Description on population, boundaries, tradition and village history. ▪ Main sources of livelihood: rice fields, swiftlet nest, oil palm and rubber plantations, hunting, fishing, working in oil palm and logging companies and trade activities. ▪ Description on village forest ▪ *Leboq/Basap Pelas Tahun* traditional ceremony. ▪ PT BAS HGU concession is part of the village territory. ▪ The village's boundaries with Pengadan Village are yet to be mutually agreed. ▪ There is a historical burial ground of Hadrat Tambi around the village settlement. ▪ Indexim Coalindo's coal mining already starts at exploration phase. ▪ There is a cave of cultural values in PT BAS concession. ▪ Cave with *lungun* (Dayak traditional coffin) is found within PT MPI concession. ▪ River Baay is community's source of water.
1 July 2019			
1. Jabir 2. Khairil 3. Safiatur	1. Village Head 2. BPD Chief 3. Traditional Chief	Karangan Hilir Village	▪ Description on population, boundaries, tradition and village history. ▪ Main sources of livelihood: cacao, dry and irrigated rice fields, oil palm and rubber plantations, swiftlet nest, working in oil palm and logging companies, trade activities and fishing. ▪ There are no *Leboq/Basap* traditional ceremonies because the majority of the population is of Buginese ethnic. Every ethnic brings and lives with their culture. ▪ PT BAS HGU concession is not part of the village territory. ▪ There is a village forest already, in Araraya area. ▪ Community sources of water include rivers passing through their settlements, including River Karangan.

1. Munaji 2. Rolly 3. Ratna	1. Director 2. Secretary 3. Member	PJ Cooperative	▪ Some of the cooperative's lands already have Land Ownership Certificate (SHM). ▪ It is expected that the profit-sharing portion gets larger. ▪ The plantation land was previously a concession of logging company redistributed by Mr Awang Faroek (District Head) to local families so that each family got 5 ha.
Jainudin (Cecel)	Karya Adat Smallholder Group Leader	Remote Indigenous Village (KAT) Community	▪ History of KAT settlers' migration from Tabang Hulu. ▪ Sources of livelihood: rice fields, rubber plantation, secondary crop, and oil palm plantation. ▪ Community uses rivers for fishing and sanitation.
2 July 2019			
1. Awang Supriadi 2. Ayi Mulyanto	1. Secretary 2. Treasurer	DMP Cooperative	▪ The cooperative management sees to it that plantation lands are covered with Land Ownership Certificate (SHM). ▪ It is expected that the profit-sharing portion gets larger ▪ The plantation land was previously a concession of logging company redistributed by Mr Awang Faroek (District Head) to local families so that each family got 5 ha. ▪ Most of the partnership plantation locations are in overlap with PT Ganda Dinamiga's mining concession, for which joint management has been agreed.

3. Full Assessment

a. Description of AoI

a.1. AoI boundaries

The AoI boundaries are obtained from aggregating the biodiversity, hydrology and social landscape boundaries. In this Assessment, the AoI boundaries are defined taking into account watershed/sub watershed boundaries, as well as the presence of natural ecosystems, land cover and/or locations that may potentially serve as habitat to wildlife, particularly areas of connectivity to the Assessment area, village settlement locations and roads. Based on the said criteria, boundaries of midstream Karangan sub-watershed and Muara Bulan sub-watershed are made the basis of the AoI boundaries. These boundaries are then adjusted following the connectivity of land cover and areas that may potentially serve as habitats to wildlife species around PT BAS concession. These sub-watershed boundaries is cutted following the road in the south, west and north, then the AOI boundary follows the Muara Bulan and Karangan Rivers to the east (**Figure 7**). Total area of the AoI or this Assessment landscape is 44,531.1 ha with various conditions of land cover.

a.2. Landscape context

Physical landscape

See the following characteristics of physical environment in the Assessment area and its surroundings.

- Given its position against the watershed boundaries, it is located in the middle of the watershed.

- The AoI has wet tropical climate with an average rainfall is 2,257 mm per year and is considered type A based on Schmidt & Ferguson climate classification, and type Af (tropical rainforest climate) based on Koppen classification (Koppen, 1990 in Kottek *et al.*, 2006).
- The AoI is located in a lowland with elevation of < 600 m a.s.l. The Assessment area (MU) is surrounded by hills indicated as karst hills. Slopes in the AoI vary from flat (< 8%) to steep (> 40%). The MU is dominated by 0-8% slope class.
- Based on land system map (RePPProT, 1990), the AoI is divided into six land systems with three land physiographic forms, i.e. (i) hills; (ii) mountains and (iii) plains. Land physiographic forms in the area is dominated by hills with Maput (MPT) land system.
- Based on Sheet Geological Map of Muaralasan and Sangatta, the AoI is dominated by three geological formations, i.e. Domaring, Manumbar and Marah whose one of its constituting rocks is limestone.
- Types of soil in the entire AoI are mineral soils and it is dominated by associations of hapludults and paleudults soils distributed in the middle and north parts.

Biodiversity landscape

Borneo Island has high biodiversity. There has been recorded 267 species from Dipterocarpaceae plant family, 155 out of which are Bornean endemic, in addition to 225 terrestrial mammal species (44 out of which are endemic (Payne *et al*., 2000)), 639 bird species (37 of which are endemic (MacKinnon *et al*., 2000)), 166 snake species (Inger and Stuebing, 1997) and around 140-150 amphibian species (Inger and Stuebing, 1999). The island is a home to about 15 thousand flowering plant species, three thousand of which are woody plant species, 155 endemic plant species, 200 orchid species and more than one thousand fern species (Whitten *et al*., 1997).

Located between Sangkulirang-Mangkalihat karst landscapes, the Assessment area and its surroundings are indicated to have karst ecosystem fragments. The following is information on the Assessment area position against conservation areas and Key Biodiversity Areas (KBA).

1. The nearest conservation areas from the Assessment area is Kutai National Park (±75 km south) and Muara Kaman-Sedulang Nature Reserve (±130 km southwest).
2. The Assessment area is near Sangkulirang KBA being a karst ecosystem.
3. Important Bird Areas (IBA) around the Assessment area include Sangkulirang IBA with EBAs that mutually connect to one another. Sangkulirang IBA can support bird species such as moustached hawk-cuckoo *(Cuculus vagans)*, Malaysian hawk-cuckoo *(Cuculus fugax)*, Gould's bronze cuckoo *(Chrysococcyx russatus)* and white-necked babbler *(Stachyris leucotis)* (Birdlife International, 2019).
4. The Assessment area is far away from the four Ramsar sites in Borneo Island, i.e. KinabatanganSegama, Kuching, Lake Sentarum and Tanjung Puting.
5. Based on Intact Forest Landscape (IFL) and Heart of Borneo (HoB) maps, it is known that the Assessment area is located quite far away from IFL and HoB, i.e. ±90 km northwest.

Based on the important biodiversity distribution map presented in IUCN Red List of Threatened Species, several Rare, Threatened and Endangered (**"RTE"**) species indications are found in areas including the AoI. Wildlife species with specific global concern include Bornean orangutan *(Pongo pygmaeus)*, Müller's gibbon *(Hylobates muelleri),* Proboscis monkey *(Nasalis larvatus)* and banteng *(Bos javanicus)*. RTE plant species include *Hopea nervosa*, *Eusideroxylon zwageri* and *Dipterocarpaceae* group (*Shorea bracteolate, S. gratissima, S. longisperma,* and *Dipterocarpus grandifolius*).

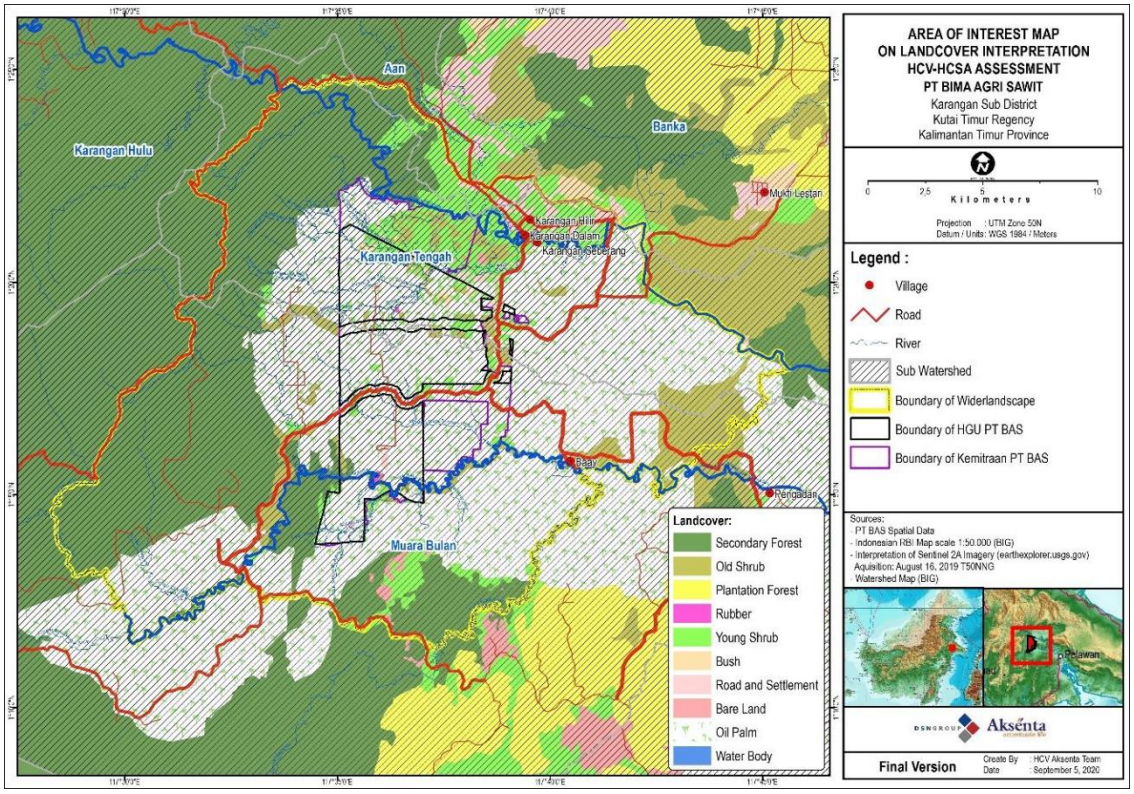


Figure 7 Boundaries of the AoI in this HCV-HCSA Assessment in PT BAS MU area

Social, economic and cultural contexts

Based on BPS 2018 document, it is known that the largest village is Karangan Dalam and the smallest is Karangan Seberang. Karangan Hilir has the largest population and Karangan Dalam has the smallest (**Table 12**). Indigenous communities populating Karangan Sub-District are Dayak Basap/Lebo'.[2] Traditional law becomes the first reference for dispute resolution among community members and the basis to traditional ceremony performance. Traditional land rights also serve as the first reference for land tenure although their position before the national law is weaker than land rights authorised by the Government, e.g. ownership rights or HGU.

Table 12 Demographic information of local villages in the assessment area

Village	Area (km²)	Population	Number of Families	Majority Ethnic*	Majority religion*
Karangan Dalam	720.00	1047	**327	Basap	Islam
Karangan Hlir	301.38	*1730	*539	Bugis	Islam
Karangan Seberang	138.05	1674	**523	Basap	Islam
Baay	390.74	1408	**440	Basap	Islam

Source: *Kabupaten Kutai Timur dalam Angka 2018, Kecamatan Karangan dalam Angka 2018*, field observation 2019 (*), and estimate (**)

[2]According to Riduan, Karangan Dalam Village Head, and Ijamsah, Karangan Dalam traditional chief, Dayak Basap peoples are similar to Dayak Lebo'. According to Jainudin (Cecel), Dayak Lebo' is what outsiders refer to Dayak Basap. Sunardi, a Basap traditional leader who lives in Baay Village, uses Dayak Tapian to refer to Dayak Basap as they live by the rivers.

In this landscape area there has been found archaeological items in the form of figurative cave paintings distributed in karst mountain caves or karst area. Researcher findings suggest that this area has been long witnessed human civilisations. Uranium-series analysis of the carbonate calcium deposit covering reddish orange animal figurative paintings in Lubang Jeriji Saleh results in the date at least 40 ka BP (kilo annum Before Present) or 40,000 years ago that, to the best knowledge of the researchers, is the oldest date in the world for one figurative artwork (Aubert et al., 2018).
Karst hills in the AoI have long become the locations for collecting swiftlet nests, logging activities and coal mining. Many migrant people from outside the island, mainly from Sulawesi and Java, have tried their luck in this area. These migrant communities joined with one another and formed smallholder groups as a community organisation. Other community organisations such as Family Prosperity Development (PKK) and youth organisations are sourced from village organisations and programmes as their parents. In addition, there are also religious organisations formed based on religious activities. In the Assessment area, the community also has Pemuda Karangan Peduli Bumi organisation actively involved in environmental activities.
Local villages already have access to complete facilities, almost similar to those in urban areas. There are traditional markets, schools, clinics, village and sub-district offices, asphalt road network, banks, and even recreational facilities and lodgings. All community members in the Assessment area find it easy to access those available facilities.
In general, main characteristics of modern economic in the AoI includes plantation sector, particularly oil palm plantation, forestry sector and coal mining sector. As for community economic, it is formed by dry and irrigated rice farming, rubber plantation, secondary crop and cacao plantation. Community economic activities that keep developing are swiftlet nest business. Household-scaled animal farming and freshwater aquaculture are practiced to meet own consumption. Trade activities develop at the sub-district centre that includes the areas of Karangan Dalam, Karangan Hilir and Karangan Seberang Villages.

Landuse and development trend

The AoI is dominated by plantation areas, referring to East Kalimantan Provincial Spatial Plan 2015-2035. Other than PT BAS, there are also other oil palm plantations in the Assessment landscape, including PT Telen, PT Multi Pasific International, PT Wahana Tritunggal Cemerlang, and PT Gunta Samba. Forest areas can be found in the western, northern and southern parts of the AoI.
Since 1970s, the presence of migrant communities has been attracted mainly by the operations of logging companies. Two large corporate groups operating around the AoI are PT Sumalindo and PT Sagara Timber. Following the presence of large logging companies, local community also got involved in logging activities. They name the time as 'banjir kap' era where local village and migrant communities massively logged timbers that were transported by floating them through the rivers when they got flooded up to the estuaries. The past activities determined the current condition of land cover in the Assessment area.
Based on forest area map, East Kalimantan Provincial Spatial Plan (RTRW), landuse and interview, it is projected that trend of development in the AoI will be relying on mining, forestry and oil palm plantation sectors. The AoI is located far away from the centres of East Kutai and Berau Districts, making it less than likely to develop as the centre of trade activities. However, the area will be relying on the presence of oil palm plantation workers which is more stable for economic growth in the long run rather than extractive sectors such as forestry and mining.

a.3. Image analysis and land cover classification

Analytical approach and land cover classification in this Assessment employs the third option based on Modul 4 of HCS Approach Toolkit, namely satellite image-based land cover classification, using inventorying plots as one of the tools for verifying land cover class. This option is used given the

availability of satellite images on a time-series basis, the Assessment's short timeline and cost efficiency. The entire length of land cover analysis uses ArcGIS 10.3 software.

Satellite image preparation

Satellite images used include Sentinel-2A (USGS; https://earthexplorer.usgs.gov/) acquired on 8 April 2019, with cloud cover above 20% in the AoI. After field activities, satellite images of the better quality will be produced, i.e. Sentinel-2A image acquired on 16 August 2019 with cloud cover less than 5% in the AoI (**Figure 8**). Layer compositing band 11, band 8a and band 4 is carried out using image analysis tools producing pseudo-natural colour. In addition, this Assessment also uses 2016 hi-res image obtained from Microsoft Bing map for validating initial land cover class prior to field survey.

Land cover class segmentation and classification

Land cover segmentation is carried out through visual interpretation by performing manual digitation. This method takes into account colour, texture, form, location and size of the object detected on a satellite image to differ a land cover type from another (Bakker et al., 2009). Every object with different composition of colours, textures, forms and sizes are separated into different classes of land cover. For oil palm plantation, the segmentation and classification use the company's planting year data. The land cover classes used refer to Indonesia National Standard (SNI) 7645-1:2014 on Land Cover Classification – Section 1: Small and Medium Scale (Table 13). See Table 13 and Figure 9 for final land cover classification.

Field verification and validation

Land cover can be verified through visual observation (Congalton and Green, 2009) and biomass measurement (Bakker et al., 2009). The first method (visual observation) is applied during scoping study and full assessment, while the second one (biomass measurement) is applied only during full assessment. Based on HCSA Toolkit, there should be 50 sampling spots for each land cover class for visual land cover verification. As for number of sampling spots for biomass measurement, this is set using experimental design method taking into account carbon value deviation at each land cover class.

There are 267 spots for field verification, consisting of 164 spots for carbon stock measurement and another 103 for exclusively visual observation. Based on the verification spots, it is known that three land cover classes have less than 50 sampling spots, i.e. medium-density secondary lowland forest (14 spots), rubber plantation (3 spots) and bush/barren soil (47 spots). However, medium-density secondary forest and rubber plantation have relatively small areas (Table 10) and they are distributed in several locations within the Assessment area. For this reason, number and distribution of land cover verification samples already represent the land cover types found in the Assessment area, making it sufficient to proceed to validation.

Land cover is validated through accuracy assessment using overall accuracy and kappa accuracy (Cohen, 1960). The value of overall accuracy to meet is 70% for initial land cover and 80% for final land cover (HCSA Toolkit v.2). Accuracy assessment performed over the final land cover analysis and output of field verification over 267 sampling spots including biomass samples and land cover verification. Reclassification produces 98.5% for overall accuracy and 98% for kappa accuracy. Given the overall accuracy value, final land cover classification can be used as the basis to patch analysis decision tree.

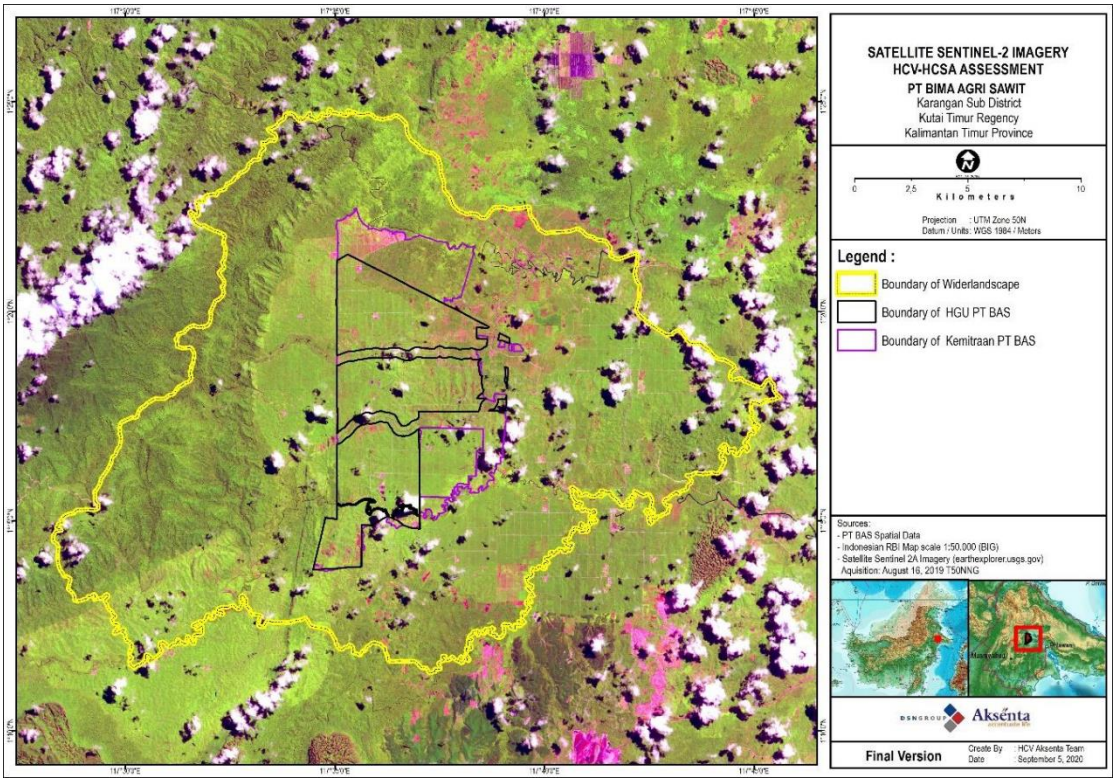


Figure 8 Sentinel-2 satellite image for the assessment area and AoI dated 16 August 2019

Table 13 Land cover classification referring to Indonesia National Standard (SNI) and its equals under HCS land cover classification

No.	Land Cover Class	SNI Definition[7]	HCS Land Cover Class	HCS Definition[8]
HCS Classes				
1	Medium-density secondary lowland forest	Forest that grows and develops in dryland habitat that takes form of lowland forest that has undergone human intervention, with density of 41%-70%.	Low to Medium-Density Forest (HKR-HKS)	Natural forest with closed to open canopy, ranging from low to medium density. Inventorying data indicates the presence of trees with diameter >30 cm dominated by climax species.
2	Low-density secondary lowland forest	Forest that grows and develops in dryland habitat that takes form of lowland forest that has undergone human intervention, with density of 10%-40%.	Young Regeneration Forest (HRM)	Severely disturbed forest or otherwise forest areas that are in the regeneration process towards their original structure. The diameter distribution is dominated by trees with Diameter at Breast Height ("DBH") of 10-30 cm and with pioneer species frequency higher than that of HK1. In this land cover class, it is likely to find small areas that take form of farmlands or plasma plantations.

No.	Land Cover Class	SNI Definition*)	HCS Land Cover Class	HCS Definition**)
Non-HCS Classes				
3	Thicket	Dryland on which various heterogeneous and homogeneous natural vegetation species grow with low to high density. Such area is dominated by natural lowland vegetation (SNI 7645-2010 land Cover Classification). In SNI 7645-1: 2014, shrub falls under thicket class (p.51). Vegetation formation or structure that takes form of groups of shrubs with height ranging from 50 cm to 2 m, dominated by woody vegetation alternated with very short trees (≤5 m tall). Or: Dryland on which various heterogeneous and homogeneous natural vegetation grows with low to high density. Such area is dominated by (natural) short vegetation.	Shrub (B)	Lands that were once a forest that has been cleared not so long ago. Dominated by short shrubs with limited cover of canopy, they include areas with tall grasses as well as distributed ferns and pioneer tree species. Several old forest patches are also likely to find under this land category.
4	Rubber plantation	Lands planted with rubber trees, taking form of a vast and homogeneous expanse, with regular planting pattern, and managed by individuals and companies.	Plantation Forest (HT)	A vast area planted with trees (e.g. rubber and acacia).
5	Oil palm plantation	Lands planted with oil palms, which take form of a vast expanse, with regular planting pattern, and are industry-oriented.	Plantation area (AGRI)	For example, large-scale oil palm plantations overlapping with development area.
6	Bush	Land cover that takes form of natural plants with average height of 0.5-2 m, some of which are woody while some are not.	Barren Soil (LT)	Recently cleared lands, most of which are in the form of grass or plants and few woody plants.
7	Barren Soil	Barren soils other than lava bed, rocky expanse and sand expanse.	Others	Development area, settlement, road, etc. Water bodies such as river and lake.
8	Roads and settlement areas	**Road network:** Developed area comprising one or more lanes on both sides that can still be developed for non-railway transportation. These lanes may take form of concrete, asphalt or hardened and consolidated soil. For areas which are less than 1 mm wide on image, they need to be represented with straight line, and if they are too small to be seen on the image, data can be taken from basemaps such as Indonesia Topographic Map (RBI) or other topographic maps. **Urban settlement:** Manmade land cover taking the form of buildings mainly used by urban population for their dwelling. Urban settlement buildings are characterised with high building density and made out of permanent/long-lasting materials such as brick wall, tile/concrete/zinc roof. **Rural settlement:** Manmade land cover in the form of premises for rural population's residence. Rural settlement is characterised with relatively low density of building, can be constructed out of not only permanent/long-lasting materials such as concrete wall, roof tile/concrete roof/iron roof sheet, but also non-permanent materials such as wooden wall, and thatched roof, and is associated with use of agricultural lands such as rice field, dry rice field, or mixed garden and house yard.		
9	Water body	Any naturally occurring body of water (including natural lake/pond, river/stream, marine waters and swamp)		

Note: *) SNI 7645-1:2014 Land cover classification – Part 1: Small and medium scale; **) HCSA Toolkit Module 4

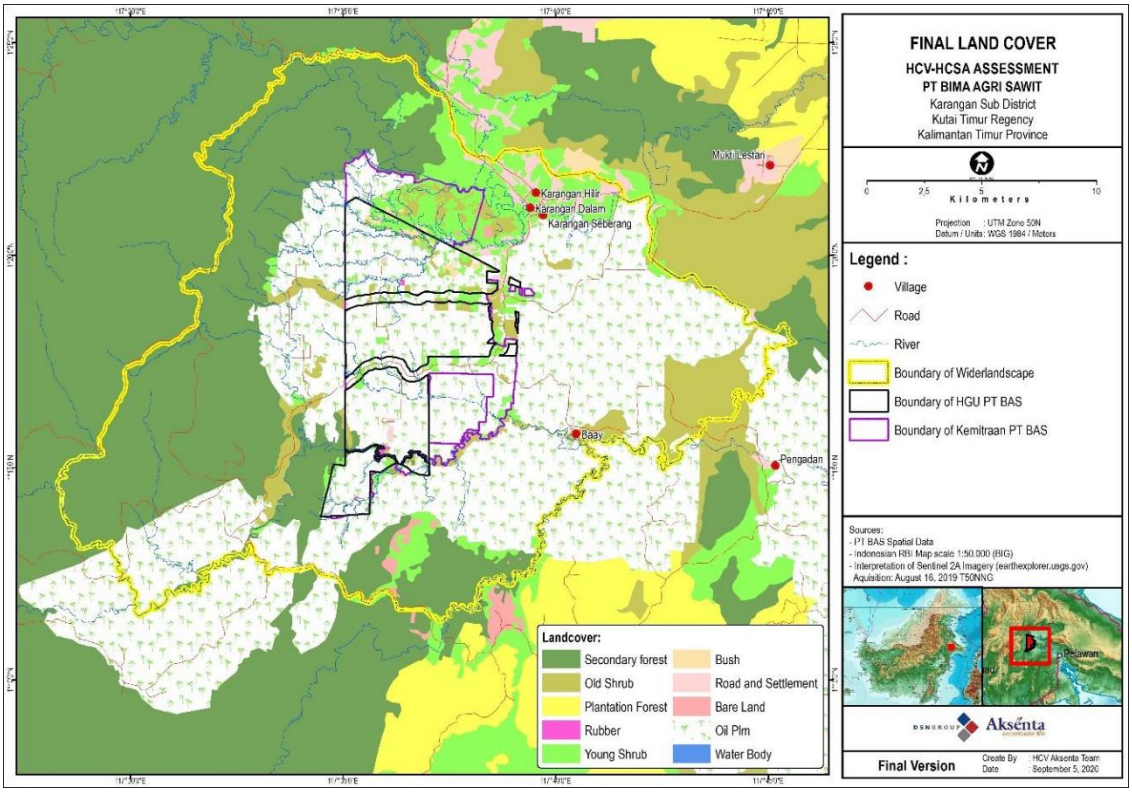


Figure 9 Map of final land cover in the assessment area

Table 14 Area and classification of final land cover and its equals under HCS classification

Land Cover Class	HCS Land Cover Class	Area (ha)	%
Medium-density secondary lowland forest	Young Regeneration Forest (HRM), low, medium or high-density forest (HKR, HKS or HKT).	43.4	0.6
Low-density secondary lowland forest		505.1	6.6
Thickets	Shrub (B)	1,162.3	15.2
Rubber plantation	Plantation Forest (HT)	22.4	0.3
Oil palm plantation	Plantation Area (AGRI)	5,709.1	74.5
Bush	Barren soil (LT)	137.8	1.8
Barren soil	Others	11.4	0.1
Roads and settlement area		47.5	0.6
Water body		24.1	0.3
	Total	7,663.1	100.0

b. Social field: Method and output

b.1. Social assessment method

This Assessment is a rapid assessment using methods prioritising qualitative approach to the select informants. Information on HCV specifically relates to specific subjects and is known to only specific people. Informants at all phases of this Assessment are selected through purposive sampling method. They are selected taking into account the key stakeholder or social groups, as well as whether they represent administrative territories in the AoI.

Snowball sampling (Hendriks, *et al.*, 1992) is then performed towards the informants, along with triangulation method to reduce bias (Olson, 2004). Informants should be those who have information about village areas, present and past landuse activities, local community culture, areas of important values to community and presence of forest areas. Therefore, village heads and their staffs as well as

traditional structures or religious leaders, elders or community leaders, smallholder groups and management of cooperatives in partnership with company are selected as informants.
Snowball sampling enables tracing the most competent informants to find answer concerning the presence of HCVs and direct consultation with stakeholders relevant to the HCV/HCS areas. For example, information on the presence of HCV 6 is collected upon tracing to Pemuda Karangan Peduli Bumi NGO Leader. FPIC principles are used in identifying HCV 5-6 together with local communities.
Limiting factors in snowball sampling method that do not represent the entire population are counterbalanced with use of purposive sampling and triangulation. As such, the Assessment is not a census and number of informants is not defined quantitatively in the beginning as the representatives of the entire population. Number of informants grows and represents the AoI in terms of spatial aspects and can be accounted for qualitatively representing social groups.
Primary and secondary data is used in this Assessment. The former is collected through in-depth interview, Focus Group Discussion (**"FGD"**) and participatory mapping. Field observation is carried out once information is collected about locations indicated to have HCV-HCS from preassessment, interview, FGD and participatory mapping. The latter is collected through desktop study over maps and various references relevant to the AoI (**Table 15**). The company's internal secondary data is collected from Environmental Impact Assessment (EIA) and made baseline to social assessment. Its external secondary data concerning with population, demographic condition, social and economic aspects, livelihood and ethnicity is collected from BPS literatures. Information on local cultural reserves is gained from the website of Ministry of Education and Culture. Information on cultural heritage protected under UNESCO's tentative list can be accessed on UNESCO website. Information on prehistoric caves in Sangkulirang-Mangkalihat Peninsula is gained from Fage et al. (2010). As for the spatial data used includes basemaps and thematic maps such as settlement distribution, river network and Sentinel-2 satellite images. All data and information collected corelates to and corrects one another to serve the triangulation principle.

Table 15 Secondary data used and analysed in the social HCVs

HCV Type	Type of data and information	Sources
HCV 4	▪ Watershed map ▪ Land system map ▪ River and stream network map ▪ Peat Hydrological Unit map ▪ Digital Elevation Model 30 meter, SRTM ▪ Sentinel-2 satellite imagery, acquisition date on 8 April 2019 ▪ Monthly rainfall data in Karangan District ▪ Hotspot data in 2009-2018 ▪ Landscape of karst area	▪ MoEF (2017) ▪ RePPProt (1990) ▪ Geospatial Information Agency (2017) ▪ MoEF (2017) ▪ USGS (www.earthexplorer.usgs.gov) ▪ USGS (www.earthexplorer.usgs.gov) ▪ Statistic Agency of Kutai Timur (2014-2019) ▪ NASA (www.firms.modaps.eosdis.nasa.gov) ▪ Pergub Kaltim no 67 tahun 2012
HCV 5	▪ Settlement location map ▪ River and stream network map ▪ Statistic of Kutai Timur Regency in 2019 ▪ SEIA PT BAS	▪ Geospatial Information Agency (2017) ▪ Statistic Agency of Kutai Timur (2019) ▪ PT BAS
HCV 6	▪ Settlement location map ▪ Statistic of Kutai Timur Regency in 2019 ▪ Citizenship, ethnicity, religion and colloquial language of Indonesian citizens ▪ World Heritage sites ▪ Borneo Uncovering Prehistoric Caves	▪ Geospatial Information Agency (2017) ▪ Statistic Agency of Kutai Timur (2019) ▪ Statistic Indonesia (2011) ▪ UNESCO (www.whc.unesco.org) ▪ Fage et al. (2010)

Output of field activity: interview/discussion, participatory mapping and field survey

Interview and discussion are carried out towards 97 informants, involving 11 communities/stakeholders, i.e. company management, workers, village/sub-village governments/Neighbourhood Unit (RT), community leaders, smallholders/fishermen/hunters, housewives, smallholder group, traditional/ethnic group leader, cooperative, teacher and NGOs.
Participatory mapping is carried out in four Assessment villages, two multipurpose cooperatives and 1 Smallholder Group. Field verification is carried out in enclave areas, Rantau Pakis SG area, DMP Cooperative area, PJ Cooperative area, and PT BAS HGU concession (**Figure 10**). See **Table 16** for summary of the interview with respondents.

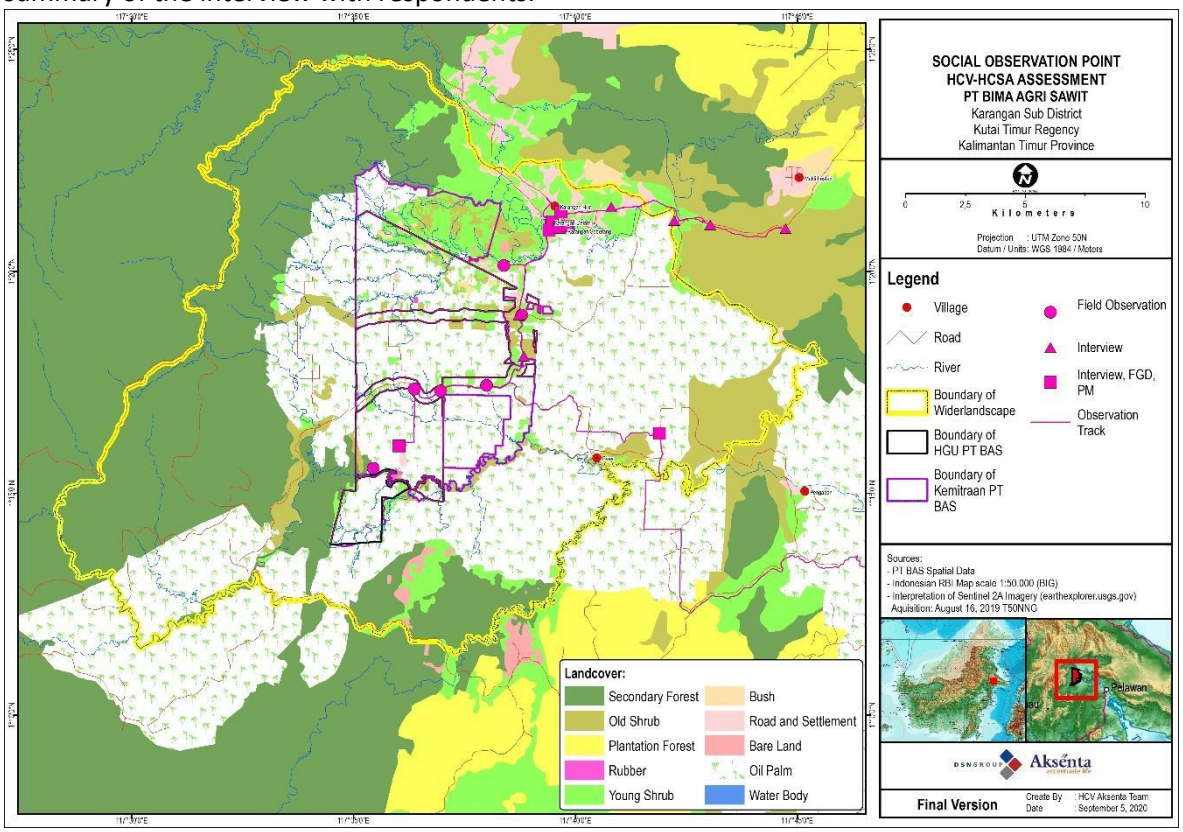


Figure 10 Map of social field activities

Table 16 Summary of interview and discussion at the full assessment phase

Expert/ Organisation/ Social Group	Name/Position/ Role	Interaction Type	Concern and/or Recommendations
Karangan Seberang Village	A Mujahid (Village Head) Yandraini (BPD) Fadli (Traditional Chief)	Direct meeting	• PT BAS concession is located within Karangan Seberang Village area. It was previously PT Sangkulirang Karangan Dalam concession, core commonly known to community as Swarga. • Logging company operation started in 1969 to 1985. In 2000s, logging companies with Timber Use Permit (IPK) went back to operation up to 2005. • Karangan Seberang Village has no forest areas. However, Dayak Basap indigenous peoples in Karangan Seberang Village (together with others from Batu Lepoq and Baay Villages) in proposing for a traditional forest in Beriun area (outside Karangan Seberang Village). • Community have hunting activities in lake Tabo karst area at KM 42. • Traditional ceremonies still performed by Dayak Basap communities include *pelas kampung* as a way in which they express their gratitude for the yields and repel bad lucks.

Expert/ Organisation/ Social Group	Name/Position/ Role	Interaction Type	Concern and/or Recommendations
Karangan Dalam Village	Riduan (Village Head) Sugiarto (BPD) Liamsah (Traditional Chief)	Direct meeting	• Karangan Dalam Village is a parent village having undergone an administrative exclusion in 2005, from which new villages were born, i.e. Karangan Hilir and Karangan Seberang. • PT BAS HGU concession is located in Karangan Seberang Village. Only few community members of Karangan Dalam Village have activities in PT BAS concession.
Karangan Hilir Village	Jabir (Village Head) Khairil (BPD)	Direct meeting	• PT BAS concession is located in Karangan Seberang Village. However, some community members of Karangan Hilir farm or have lands in the area.
	Syafii (BUMDES Director)		• Village boundaries are already clear in Karangan Sub-District. Only Batu Lepoq's are yet to be definitive. • All areas in this village belong to forest areas. No land certificates have been issued by the Village Government. • Village Forest of Karangan Hilir of 7,598 ha located in Araraya area. • *Pelas Kampung* traditional ceremonies are no longer performed by Dayak Basap indigenous peoples, just like in other villages. Community in this village is more heterogeneous. Village traditional institution can even be led by those from other Dayak ethnic groups.
Pemuda Karangan Peduli Bumi NGO (karst area environmental activist)	Saiful Anwar (Leader)	Direct meeting	• Karst or stone-hills are or important values to Dayak Basap peoples because such areas are where their ancestors lived and produce swiftlet nests. • Swiftlets no longer inhabit caves in the karst hills (around the Assessment area) because a massive fire once occurred in 1998, damaging those hills. • Villages in Karangan Sub-District have 4 out of 5 social forestry schemes offered by the government. The locations are around Mt. Beriun, Mt. Gergaji, and Araraya karst area. Dayak communities need these forests, particularly for hunting, collecting forest fruits (*kerantungan*, *layong*, and *dopar*), and fishing *jelawat* fish.
PJ Cooperative	Munaji (Management Staff) Rolly (Management Staff)	Direct meeting	• PT Segara Timber once operated in the present day's Assessment area until 1990, replaced by Labaika and KWS. No forests remain in the location. In around 2005, Karangan Seberang community established farms along KWS main road (the present day's PJ Cooperative plantation area). • Lands for PJ Cooperative, i.e. 420 ha and 60 ha, are obtained from acquisition of lands from the farmers. The compensation was a package of ~~collected~~ sum of money ("*tali-asih*")
DMP Cooperative	Awang (Management Staff) Ayi Mulyanto (Management Staff)	Direct meeting	• The cooperative area of about 350 ha is in overlap with PT Ganda Dinamika mining business concession. Agreement is already in place on landuse arrangement. • The entire area of 466 ha has already been planted since 2209 to 2012.
Rantau Pakis SG	Julkipli Samuel (Leader), Y Boas Lebo (Treasurer), Suwanto, Yus Melud, Yansen P, Jhon Arfang, and Parel Samuel (Member)	Direct meeting	• Rantau Pakis is a group of 36 loggers. They are migrant community from Dayak Karayan ethnic group who wished to stay in Karangan Village and were given lands by Dayak Basap in Karangan in 1996. The lands are located between River Karangan and Keledan. • Based on calculation, the area was around ±900 ha in 2004 after distributed to other groups. At the time this Assessment is carried out, Rantau Pakis SG area is around ±700 ha including locations that belong to PT BAS HGU concession. • Areas of six smallholders from Rantau Pakis SG have been planted with oil palms by PT BAS. The locations are in Block A5, A6, A7, and B5-B6 to the right side of River Keledan. However, the problem has been resolved on 1 December 2017 by PT BAS (the previous management) and the landowners in question and sealed with a cooperation agreement governing a profit-sharing scheme in managing the lands.

Expert/ Organisation/ Social Group	Name/Position/ Role	Interaction Type	Concern and/or Recommendations
			• The landowners demand a transparency of information regarding yield, including the yield's tonnage calculation and operational activities. • There are lots of Borneo ironwood trees in the potential areas for partnership with Rantau Pakis SG in which the timber stocks can be used by community. • According to the informants, many orangutans can still be found in the areas. However, no conflicts ever took place with them. • Once an agreement is reached between Rantau Pakis SG and PT BAS to develop partnership plantations, Rantau Pakis SG members would like to have lands along by River Karangan. However, areas of 300 m from the river will remain uncleared and allocated for community's farms and rice fields. • The plan for partnership plantation itself was made in around 2013, however, until the company was taken over by DSN, such agreement has not materialised. In 2019, the partnership idea was reproposed to PT BAS (under the new management), the scheme for which is yet to be defined. That, according to the SG member, is because the company was waiting for the HCV-HCSA assessment output, hence the better calculation. It is expected that decision will be taken in the next meeting concerning the cooperation scheme to carry out. • Rantau Pakis SG has a big expectation for this partnership plantation cooperation, given their lands are currently unmanaged. The land management are only on a seasonal basis, involving only few lands because of lack of capital and so on. • According to Rantau Pakis SG, currently their lands are covered by thickets.
Land and Plant Compensation ("**GRTT**")-receiving smallholder group from Karangan Seberang Village	Cecel (Leader) Husni (Member)	Direct meeting	• Land acquisition process is carried out through smallholder groups, but the GRTT compensation was paid directly from PT BAS to each individual. • Karya Adat Smallholder Group members farmed in the past. Lands that PT BAS has cleared into oil palm plantation were previously *bajang* (ex-fields). • Some lands of its SG were cleared and planted in the first place, after which the compensation was made. The payment was not instant; but rather, in several terms. Some of them are not completely paid.
Community leader	Sariaji (Baay Village), ex PR staff of PT BAS 2009	Direct meeting	• PT BAS held information dissemination events in Karangan Seberang and Baay Villages. The company's PR Manager presented in these events. District and sub-district representatives, as well as local village community members attended the meetings. • PT BAS acquired lands from SGs who actually are 'logger groups' as they never cultivated these lands. Some of them are logged-over areas left behind by logging companies.
GRTT-receiving community members from Baay Village	Sunardi (GRTT-receiving community member) Sariaji (DMP Cooperative Member)	Direct meeting	• Area of lands released to PT BAS is 5 ha. A compensation of IDR 4 million per ha was directly made by PT BAS (not through the SG) in 2011. • There are no coercions, pressures or promises whatsoever to hand over these lands.

Expert/ Organisation/ Social Group	Name/Position/ Role	Interaction Type	Concern and/or Recommendations
			• These lands were once divided into plots during a programme of forest area redistribution to local community (around 2005).
Farmer in enclave area	Yan (Karangan Seberang Village) Anisa Putri (Baay Village)	Direct meeting	• There are no coercions, pressures or promises whatsoever to hand over these lands.
Community members owning enclaves in Karangan Seberang Village	Anton Siti Sholeha	Direct meeting	• Newcomers from Flores who came in 1993. Initially worked in logging company. • In 2005 they received lands from the District Government's land redistribution programme (5 ha). The area was once PT KWS concession. • Land clearing was carried out by each recipient. They cleared their lands and then made boundaries between them. This delineation activity was recorded by the committee. • PT BAS started nursery development in around 2007 and has already acquired the lands. • In 2007, the land compensation was IDR 5 million per 5 ha, but then increased in 2008-2009 to IDR 5 million/ha. • There are no coercions, pressures or promises whatsoever to hand over these lands. • The cooperation scheme that the informants opted was partnership arrangement, in which they released 2 ha to the PT BAS, while the other 3 ha remained in their possession. The plantations were completely financed by the company until the oil palm started producing fruits (estimated at age 5). • Other than lands from the redistribution programme, the informants also have other lands they secured through buying from other community members. They started planting their own oil palms in around 2011. • Every land planted with oil palms within HGU has already been completely compensated. This can be seen from several enclaves that remain unsold to the company and are managed by their owners.
Community members owning enclaves in Karangan Dalam Village	Sukirman, Rullah, Lasmini	Direct meeting	• Most of migrant community members (Bugis ethnic group) once worked in PT Segara Timber (a Forestry Concession/HPH holder). The migration already took place in 1980s. • Other than working in logging company, they normally also worked as carrier workers helping swiftlet nest collectors in Mt. Beriun. But now, it is difficult to collect even only 1 ounce • Migrant community normally started with 1 ha of forest per year. • The informants have lands in PT BAS HGU concession which they originally obtained from the government's redistribution programme from ex-HPH concession where each got land of 5 ha. These lands have currently been put under a profit-sharing scheme. • There are no coercions, pressures or promises whatsoever to hand over these lands. • Initially Sukirman bought 5 ha from fellow community members. However, 3 ha were sold to the company in 2015 because he needed it. The price was IDR 10 million/ha.

Expert/ Organisation/ Social Group	Name/Position/ Role	Interaction Type	Concern and/or Recommendations
			• In 1991, when PT Segara Timber (a logging company) started being inactive, coffee plantation took its place. In 1997, community planted cacao. To date, cacao plants can still be found in community plantations. • Cacao can be harvested twice in a month at price of IDR 23,000/kg. Nowadays, the best yield they can produce is ± 0,5-2 tonne/ha/month every harvest, making it much less than profitable compared to oil palm. • As for oil palm, the price at collector is maximum IDR 900 with yield range of 2 tonnes/ha every 20 days. According to him, this is because of lack of maintenance and fertiliser application, leading to low production. • Local community normally also has rubber plantation, an example is Sukirman who still maintain 400 rubber trees in this plantation. Rubber price is IDR 7,000/kg (collector price). • Many villagers work in PT BAS plantations and mills, so that this is very helpful to them.
Community members owning enclaves in Baay Village	Nursam Ratnawati	Direct meeting	• In 2006, Nursam (a migrant from Sulawesi) came to Karangan upon information from his colleague that there would be an oil palm plantation development. In the beginning he had 5 ha of oil palm plantation out of clearing lands. Together with Bahar, who has long lived in this area, today he owns 20 ha in total from buying from his colleagues. • Based on his experience in dealing with oil palm when he was in Malaysia, the informant started planting oil palms in his land. • The land of 15 ha in which he also built his house is located around PT BAS *Afdeling* 6 (Plantation Unit 6), while another 5 ha are located far from home, which he bought from Lambo Atta, a fellow villager. • Nursam's areas are entirely planted and managed by himself under no aid or partnership programme including PT BAS. Seedlings he planted is from his own nursery. The seeds came from his colleague in Sumatera. Currently his yield could reach ± 2 tonnes/ha, sent to PT BAS PKS. • The informant was once offered to sell his lands to the company, but he declined and decided to manage them himself. However, the company is still willing to cooperate with him by issuing a Cooperation Contract (SPK) allowing him to sell his FFBs to the company mill. It is the profit from this SPK that allows him to accept mill's purchase price.

4. Preliminary study

Preliminary study was initialized with desk and documents review to determine the assessment areas, based on legal aspects, land covers, biodiversity, social condition, economy, and potential/existing conflicts. Discussions between PT Gagas Dinamiga Aksenta and PT BAS were then conducted to reach a consensus on field work activities and total assessment area. From the scoping process, we identified an 7,692 ha-area of PT BAS as our assessment area.

5. HCV assessment – field work method

Opening meetings are conducted through meetings with the Management and PT BAS field staff to ensure proper positioning of the assessment location and sharing of basic HCV identification plans in the field to establish an understanding of HCV activities and establish an integrated working team. Scoping studies were conducted early socialization prior to field visits accompanied by initial mapping

and basic site information and villages around the permit area.

Field works were carried out to verify potential HCV areas identified from desktop analysis, which covered the following activities: 1) flora and fauna observation; 2) hydrology and environmental services assessment; 3) socio-economics-cultural identification including participatory mapping.

Identification of HCV 1, HCV 2 and HCV 3 was performed by determining the sample areas at the assessed location. A random sample stratification is determined by considering the representation of habitat based on current land cover conditions at Identification of HCV 4 is conducted by analyzing the spatial layout, landscape area, topography and watershed locations supported by spatial information from overlay of supporting reference maps. Followed by field surveys, interviews with respondents at selected locations, such as springs sites, river networks, road networks, boundaries, soil types, topographic areas, river border conditions, land clearing locations and several locations which represents the water system in the plantation plan.

Identification of HCV 5 and HCV 6 is conducted through a participatory mapping process to obtain information directly from the community by mapping the areas with the most potential HCVs related to HCV 5 and HCV 6.

In identifying and measuring threats to HCVs, it is conceptually conducted to look at the causal sequence of threats and spatially to see potential threat sites that have occurred as well as potential threats in the future. To understand the threats to identified HCVs is an important step in making management decisions to protect and/or enhance these values (Stewart et al., 2008). Source of threats can be identified from scientific references, determining their parameters and thresholds. Further, current and past threats were identified during field works, discussion with the company, and public consultation. Observation points during HCV identification activities within PT BAS permits area are presented in Figure 11.

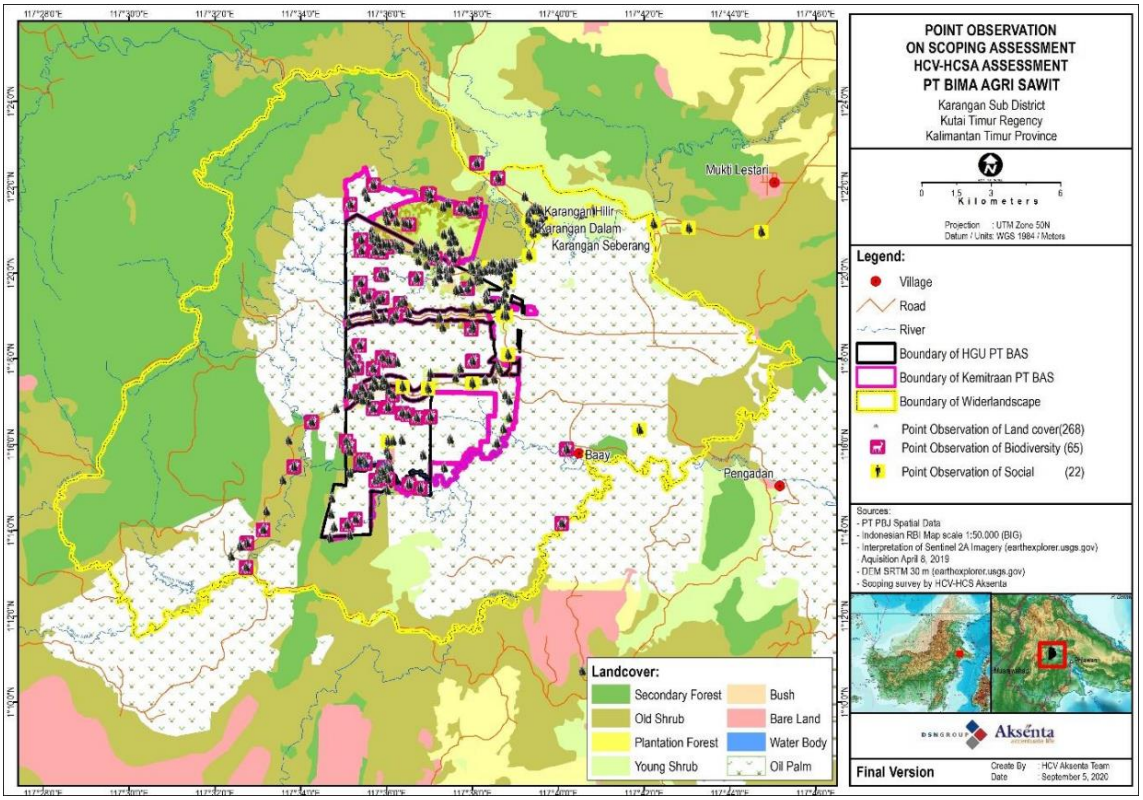


Figure 11 Map of Observation during identification of HCV Management Area in PT BAS

6. Potential threat

Threats towards the presence of HCV within the study area were measured in conceptual ways, to understand contributing factors and their current and future spatial location (Sanderson et al. 2002). Source of threats can be identified from scientific references, determining their parameters and thresholds. Further, current and past threats were identified during field works, discussion with the company, and public consultation.

7. Reference

These categories of references were gathered and collected during pre-assessment: information related to species, habitat, conservation areas and ecosystem (HCV 1-3), watershed, slope, land physiography (HCV 4), livelihood statistical data, and village distribution (HCV 5), and ethnic and religion composition (HCV 6).

8. Public Consultation

Consultation with associated stakeholders were conducted in all HCV identification phases, including pre-assessment, field identification, and reporting. Two approaches were used for consultation: interview and formal meeting (either through presentation and discussion). We classified related stakeholders into three groups, based on their relation and interests towards the assessment areas: 1) local communities, 2) organizations and institutions representing local communities and local governments, and 3) district governments.

For HCV 1-3 identification purpose, we consulted with local communities about the history of natural resource utilization, their current existence, locations and distribution of RTE species, and threats, HCV

4 identification, services provided by surrounding environment, directly used by local communities, and their utilization history were discussed. Also, discussion about regulation related to environmental services provision and protection was undertaken with the local authority/management unit and regarding HCV 5-6, consultations with local communities are utterly fundamental to identify and verify: land use history; sites and resources fundamental for satisfying basic needs for local communities; the origin; sacred and religious sites; archeological or historical significance for the traditional cultures; their past and current status; as well as their management planning in the future.

Summary of recommendations gathered from related stakeholders and approaches undertaken by the consultant team were presented on Table 17 below.

Table 17 Description of Stakeholders' Recommendations Related to HCV assessment processes

Name	Role/ Position	Organisation/ Social Group	Major Concern & Recommendation
24 June 2019			
Eko Prasetyo	Best Management Practices (BMP) Staff at Orangutan Conservation	Borneo Orangutan Survival Foundation	▪ Based on indications, the Assessment area is situated within orangutan distribution area (see PHVA, 2016). ▪ Matters to take into account: verify if orangutan is present/absent; if they are present, estimate the population, size of conservation area allocated, intact corridor with no disconnection; and if the conservation area is not sufficient, relocate them (last option). ▪ River buffer zone can serve as orangutan corridor. ▪ Management input: SOP, training on wildlife conflict mitigation. ▪ Conservation areas are important not only to orangutan, but also other key wildlife species such as gibbons and hornbills.
26 June 2019			
1. Rahmadi 2. Arliansyah	Forest Area Control and Security Staff	East Kalimantan Provincial Forestry Office	▪ Important species in Karangan Sub-District include hornbill, orangutan, sun bear, Sunda pangolin, proboscis monkey, *meranti*, *keruing*, *bengkirai*, and Borneo ironwood. ▪ Concerning human-wildlife conflict prone areas (especially crocodile and orangutan), it is advised to coordinate with BKSDA. ▪ Number of land fire cases in Karangan Sub-District is considered low. It is advised that the company apply 'zero burning' policy. ▪ Prior to land clearing, the company is advised to apply for Timber Use Permit (IPK) for trees with diameter > 10 cm. ▪ The company must map traditional lands or burial grounds before land clearing and protect them. ▪ Cooperation will be required with Bengalon Production Forest ▪ Management Unit on conservation areas to allow formation of wildlife corridor.

Shahar Alhaqq	Head of Forest Area Control and Security Department	East Kalimantan Province Forestry Office	▪ Karangan Sub-District is not a fire-prone area. ▪ The Assessment area is entirely on mineral soils. ▪ In general, social conflict is relatively low. ▪ Potential presence of wildlife in Karangan Sub-District includes these species: Bornean banteng, orangutan, crocodile and sun bear. ▪ *Meranti* group is the dominant flora group. ▪ The updated map on East Kalimantan Provincial Forest Area can be seen in Decree No. 278/2017.
1. Edi Sudiono 2. Arif Rifqi 3. Faisal 4. Dian 5. Mayasari	1. Kalimantan Programme Coordinator 2. GIS 3. Staff 4. Staff	Konservasi Alam Nusantara Foundation (affiliated with The Nature Conservancy)	▪ There are indications of karst areas and potentials of prehistoric caves. ▪ Based on the temporary output of TNC and UGM assessment, the Assessment area is surrounded by areas of karst landscape. ▪ Conflict with orangutan in the area is relatively high. ▪ Indication of orangutan habitat presence: population gets higher southwestward and gets lower southward and eastward. ▪ PT Telen to the east of PT BAS concession cooperates with Ecositrop in mitigating conflict with orangutan; it is advised to consult Ecositrop. ▪ Mulawarman University assessment (May, 2019) finds Storm's stork around the area. ▪ Major rivers in the Assessment area are habitats to saltwater crocodile; conflict frequently takes place. ▪ Baay and Karangan Dalam are old villages. There is a proposal for village forest in Karangan Dalam, but make sure if it is within or outside PT BAS concession. ▪ Use of Non-Timber Forest Products (NTFP) including swiftlet nest, rattan, honey and ecotourism. ▪ There is Sacred Stone site in Karangan Hilir. ▪ The Assessment villages are resettlement villages. ▪ Other important wildlife species: Miller's langur *(Presbytis canicrus)* and helmeted hornbill *(Rhinoplax vigil)*. ▪ Dominant plant species: meranti, bengkirai, Borneo ironwood. Refer to Indonesian Institute of Sciences (LIPI) assessment result for vegetation species in Sangkulirang-Mangkalihat Peninsula.
Yoyok S.	Staff	East Kalimantan BKSDA	▪ There are indications of the presence of orangutan and saltwater crocodile. ▪ Confirmation that rhinos are absent in the Assessment area; potential presence of rhinos is found in West Kutai District. ▪ Banteng may potentially be present in the Assessment area and its surroundings. ▪ For the updated map of orangutan distribution, refer to 2016 assessment *(Population and Habitat Viability Analysis – PHVA)*. ▪ It is expected that HCV areas be designed taking into account wildlife corridor, particularly where orangutan presence is confirmed.

			▪ It is advised that the company carry out information dissemination and counselling events for community on the presence of wildlife species in its concession. ▪ East Kalimantan BKSDA once cooperated with DSN Group in Wahau concerning wildlife conflict resolution.
27 June 2019			
Kartika	PR Staff	Kalimantan Region Cultural Reserve Agency	▪ Designation and preservation of national cultural reserve refer to Law 11 of 2010 and Law 5 of 2015. ▪ Sangkulirang-Mangkalihat karst is listed as national cultural reserve and it is being proposed to become UNESCO's world heritage. ▪ There has been BPCB assessment on prehistoric caves in Sangkulirang-Mangkalihat since 2012 to date (pending publication). It is indicated that several sites of cave here are older than karst caves in Maros, South Sulawesi. ▪ The officer responsible for cultural reserve at province and district level is Maintenance Officer, particularly for listed sites, and he/she cooperates with provincial/district education office.
Bony Briks	Spatial Use and Control Staff – Sangkulirang-Mangkalihat Karst Landscape Mapping Team	East Kutai District Land and Spatial Planning Office	▪ East Kutai District Spatial Plan 2015-2035 has been issued based on District Regulation No. 1/2016. Based on the regulation, it is known that PT BAS concession is situated in Plantation Zone spatial class. ▪ Before designated by Geological Agency, a Karst Landscape Area must meet the following criteria in the first place: there are endo- and exo-karst; a particular study should be performed and then verified by Geological Agency and proposed to the relevant local government (as per Energy and Mineral Resources Minister Regulation No. 17/2012. ▪ It is confirmed that PT BAS operational area is outside Karst Landscape Area, based on the most recent natural landscape area mapping assessment which is now still pending publication.
Dr Pindi Setiawan	Historical cave painting expert	Bandung Institute of Technology	▪ Any cave located within cultivation zone must be enclaved. ▪ There are 52 sites of prehistoric painting heritage. ▪ Before 1985, Dayak Basap Village was located in Tintang (Tentang). Later on, they migrated because of El Nino's drought. Similar migration also took place in Mau Village in the end of the 19th century. ▪ Presence of karst area is important for catching and storing rainwater. ▪ Presence of oil palm plantations since 2005 have brought about economic stability and security to the local area.
28 June 2019			

Saipul Anwar	Chief	Pemuda Karangan Peduli Bumi Group	▪ Karst area may potentially become a special tourist destination. ▪ Karangan Hilir and Karangan Dalam Village Forests have been designated and must be protected. ▪ There are caves and historical burial ground around PT BAS concession. ▪ PT BAS concession is surrounded by karsts, forest areas and oil palm plantations.
1. Riduan 2. Sugiarto Izamsah	1. Village Head 2. Village Consultative Board 3. (**"BPD"**) 4. Chief 5. Traditional Chief	Karangan Dalam Village	▪ Description on population, boundaries, tradition and village history. ▪ Livelihoods are earned mainly from dry and irrigated rice fields, swiftlet nest, oil palm and rubber plantations, working in oil palm and logging companies, trade activities and fishing. ▪ *Leboq/Basap Pelas Tahun* traditional ceremonies are performed in traditional houses in local villages. ▪ PT BAS HGU concession is not part of the village territory.
			▪ Village maps (and boundaries) is already issued and we confirm that PT BAS concession is located in Karangan Seberang Village. ▪ River Karangan is community source of water. They get the water through Local Government Water Company (PDAM).
29 June 2019			
1. A. Muzahid 2. Yanaraeni 3. Fadli 4. Husin	1. Village Head 2. BPD Chief 3. Traditional Chief 4. Karangan Seberang Traditional Group Leader	Karangan Seberang Village	▪ Description on population, boundaries, tradition and village history. ▪ Main sources of livelihood: rice fields, swiftlet nest, oil palm and rubber plantations, working in oil palm and logging companies, trade activities and fishing. ▪ *Leboq/Basap Pelas Tahun* traditional ceremony. ▪ PT BAS HGU concession is not part of the village territory. ▪ Village maps (and boundaries) is already issued. ▪ River Karangan is community source of water. They get the water through Local Government Water Company (PDAM).
Julkifli Samuel	Chief	Rantau Pakis SG	▪ Consists of ex-logging company worker groups members who are from immigrant Dayak ethnic. They obtained lands from Karangan Dalam Traditional Chief. ▪ Currently their main sources of livelihood are: mixed garden, secondary crops, rubber, pepper and oil palm. ▪ It is expected that the company clear lands immediately.
30 June 2019			

1. Sairaji 2. Baharu din Arbi 3. Sunardi	1. Community leader 2. Youth leader 3. Traditional leader	Baay Village	▪ Description on population, boundaries, tradition and village history. ▪ Main sources of livelihood: rice fields, swiftlet nest, oil palm and rubber plantations, hunting, fishing, working in oil palm and logging companies and trade activities. ▪ Description on village forest ▪ *Leboq/Basap Pelas Tahun* traditional ceremony. ▪ PT BAS HGU concession is part of the village territory. ▪ The village's boundaries with Pengadan Village are yet to be mutually agreed. ▪ There is a historical burial ground of Hadrat Tambi around the village settlement. ▪ Indexim Coalindo's coal mining already starts at exploration phase. ▪ There is a cave of cultural values in PT BAS concession. ▪ Cave with *lungun* (Dayak traditional coffin) is found within PT MPI concession. ▪ River Baay is community's source of water.
1 July 2019			
1. Jabir 2. Khairil 3. Safiatur	1. Village Head 2. BPD Chief 3. Traditional Chief	Karangan Hilir Village	▪ Description on population, boundaries, tradition and village history. ▪ Main sources of livelihood: cacao, dry and irrigated rice fields, oil palm and rubber plantations, swiftlet nest, working in oil palm and logging companies, trade activities and fishing. ▪ There are no *Leboq/Basap* traditional ceremonies because the majority of the population is of Buginese ethnic. Every ethnic brings and lives with their culture. ▪ PT BAS HGU concession is not part of the village territory. ▪ There is a village forest already, in Araraya area. ▪ Community sources of water include rivers passing through their settlements, including River Karangan.
1. Munaji 2. Rolly 3. Ratna	1. Director 2. Secretary 3. Member	PJ Cooperative	▪ Some of the cooperative's lands already have Land Ownership Certificate (SHM). ▪ It is expected that the profit-sharing portion gets larger. ▪ The plantation land was previously a concession of logging company redistributed by Mr Awang Faroek (District Head) to local families so that each family got 5 ha.
Jainudin (Cecel)	Karya Adat Smallholder Group Leader	Remote Indigenous Village (KAT) Community	▪ History of KAT settlers' migration from Tabang Hulu. ▪ Sources of livelihood: rice fields, rubber plantation, secondary crop, and oil palm plantation. ▪ Community uses rivers for fishing and sanitation.
2 July 2019			
1. Awang Supriadi 2. Ayi Mulyanto	1. Secretary 2. Treasurer	DMP Cooperative	▪ The cooperative management sees to it that plantation lands are covered with Land Ownership Certificate (SHM). ▪ It is expected that the profit-sharing portion gets larger ▪ The plantation land was previously a concession of logging company redistributed by Mr Awang Faroek (District Head) to local families so that each family got 5 ha. ▪ Most of the partnership plantation locations are in overlap with PT Ganda Dinamiga's mining concession, for which joint management has been agreed.

The whole series of HCV assessment on PT BAS permit area was carried out from June 2019 to early January 2020, as follows :

Table 18 Time schedule HCV & HCS Assessment

Phase	Activity	Location	Timeline
PREASSESSMENT			
Information exchange and desktop study	▪ Collecting initial data and information from the company concerning the project status	- Aksenta office, Jakarta - DSN principal office, Jakarta	14-23 June 2019
	▪ Collecting initial data and secondary sources (report, journal, nook, statistic and basemap) including tenurial assessment report and participatory mapping, Environmental Impact Analysis (EIA) and Social and Environmental Impact Assessment (SEIA) review and update as the social study baseline.		
	▪ Secondary data and spatial analysis.		
SCOPING STUDY			
Scoping study	▪ Field visit and initial consultation with key stakeholders (government institution, NGO and academics), and visit to community representatives. ▪ Checking land cover resulted from desktop study.	Samarinda, Sangatta, and Baay, Karangan Seberang, Karangan Dalam, and Karangan Hilir Villages	26 June-4 July 2019
	▪ Prepare field survey design: timeline, team composition and field assessment support facility.	Aksenta office, Jakarta	8-10 July 2019
ASSESSMENT			
Field survey	▪ Checking land cover resulted from scoping study. ▪ Collecting field data. ▪ Interview using triangulation technique and confirmation with stakeholders. ▪ Compiling field data and team's internal coordination.	Baay, Karangan Seberang, Karangan Dalam, and Karangan Hilir Villages	13-21 August 2019
Participatory mapping	Workshop with informants and community members who have knowledge over and experience with the Assessment area.	Baay, Karangan Seberang, Karangan Dalam, and Karangan Hilir Villages	13-20 August 2019
Closing meeting	▪ Presentation to and discussion with the MU. ▪ Submitting the interim report.	PT BAS estate office	22 August 2019
Stakeholder consultation	Direct meeting, presenting representatives of key stakeholders in the Assessment area including local community members, local government institutions, relevant district government-level institutions, as well as NGOs and companies operating around the Assessment area.	Baay, Karangan Seberang, Karangan Dalam, and Karangan Hilir Villages; Sangatta, Samarinda City, and Bogor City	29 October-3 November 2019; 11-16 January 2020
Analysis and reporting	▪ Field and spatial data analysis. ▪ Preparing (draft) report. ▪ Aksenta's internal QC. ▪ Report finalisation. ▪ Submitting report to HCVRN.	Aksenta office, Jakarta	October 2019-January 2020

2.6. FPIC Process

2.6.1 Assessor Credentials

FPIC Assessment were conducted by:
Dept. CSR of PT Bima Agri Sawit
Address: Gedung Sapta Mulia Center Jl. Rawa Gelam V Kav. OR/3B Kawasan Industri Pulogadung
Telp: 62-21- 4618135
Email: agustinus.triwibowo@dsngroup.co.id

Composition Team:

1. Imanuel Tibian, Trained by LINKS
2. Suriansyah
3. Nan Kebelen
4. Sujatmika

For implementation of FPIC, DSN Team accompanied with Gagas Dinamiga Aksenta.

2.6.2 Methodology

The assessment process described in this report is as follows

A. Community Engagement Activities

Community engagement activities included the following

1. Initial socialisation of HCS program, field work plan and schedules at Kabupaten level (Opening Stakeholder Consultation Meeting) and village level.
2. Focus Group Discussions (FGD) at Desa level with Kepala Desa, support staff and a range of community members, including representatives of various key groups (youth, women, farmers).
3. In-field participatory mapping of land cover and land use together with community representatives, with focus on identifying and describing current and future community land use plans.
4. Socialisation of draft ICLP. This was carried out in a second separate site visit once HCV and HCS results had been developed.

B. Opening meeting

The primary objectives of the Opening Meeting were:

1. To introduce and broadly describe BAS planned project development.
2. To describe BAS's environmental and social commitments, including commitment to the principles of FPIC.
3. To describe the assessments to be carried out before development can begin (HCV, SIA, HCS) including assessment objectives, processes and time schedules.
4. To seek input and feedback from attendees.

C. Initial Consultation and Focus Group Discussions (FGD) at village level

Initial consultations were started with introductions and a dicussion about the HCS, HCV and SIA assessment processes, activities and outcomes, and the rights and roles of communities in the assessment process. This was followed by a question and answer session. After the initial discussion, FGD were held to collect information focussing on land use, land tenure, food and water security, sacred site identification and concerns and expectations

D. Participatory mapping

Participatory mapping was carried out collaboratively at Desa level by teams consisting of community members, Gagas Dinamiga Aksenta surveyors and BAS field staff. Objectives of the Participatory Mapping activities were as follows:

- Ground truthing of land cover and land use maps.

- Identification of land areas communities currently use or plan to use for long term agriculture and as such are important for food security.
- Identification of any additional no-go areas not captured during HCV assessment, with major focus on community/customary land use aspects.
- Identification of sensitive sites land uses requiring additional joint discussion with communities before being classed as “go – area”. In particular, padi fields (sawah) and other food production areas (related to food security and Government rice field rehabilitation programs) productive rubber plantation land, and tembawang areas.
- Identification of settlement areas and land for planned expansion of settlements.
- Improved mapping of rivers and streams requiring buffering, with particular focus on streams used for water suuply.
- Checking identification and boundaries of steep land, peat land areas and other potential conservation areas (if any).
- Identifying areas of land areas Communities currently use for collection of forest products (timber and non-timber).

The participatory mapping exercise included the following activities:

1. Detailed mapping of land cover from aerial photography and satellite imagery (desk top activity prior to field visit).
2. Initial socialisation (during FGD), including listing of target areas for field survey, and selection of the Desa team to be involved in the field mapping.
3. GPS surveys in the field to identify and ground truth land cover and land use, and map streams and no-go areas.
4. Integration of results into the draft Integrated Land Use Plan. (Office based activity after the first field visit).
5. Participatory review of draft land use plans with communities (during the second field visit).

Chapter 3

3. Summary of findings

3.1. SEIA Findings and Results

Existence of PT BAS Oil Palm Plantation in Karangan Subdistrict will certainly have a positive and negative impact for community and environment in the village located around area of the company.

Positive Impact

There is balance results for (potential) positive and negative impacts at PT BAS based on Bioref studies & PT Gagas Dinamiga Aksenta, i.e

a. Job opportunities for around community
b. Opening access of road and entry transmigrants is an opportunity for PT BAS fulfilling needs of employees
c. Oil palm plantation will reduce unemployement rate of rural communities, while reducing exodus of villagers out of village looking for decent livelihoods
d. Oil palm plantation based on plasma, is expected to encourage increase income in society
e. Opening access for new economic activities for the community around the oil palm plantation
f. Chance and certainty of getting cash with periodic fixed (salary paid every month).
g. PT BAS management has a better CSR program

Negative Impact

The result of interview and Focus Group Disscusion (FGD) with most of the people in villages around PT BAS has negative impact, i.e:

a. The community concerns over declining forest area and conversion land to oil palm plantation will results the loss of full ownership of community land
b. Concerns of pollution in river water
c. Public perception if company has operating can decreasing empty land to be processed.
d. The awareness of the existence of layoffs of local workers with the presence of workers from outside the village / outside Sintang because quality of workers
e. To bring in labor from outside the village can provoke emotion, social jealousy and weaken the bargaining position of some local people to become a workforce in the company
f. Concerns about the location of plasma far from village.
g. Community concerns about changes in farming patterns from rice cultivators, planters and rubber plantations to oil palm plantations
h. Negative attitudes towards CSR programs that have not been realized.
i. The community considers that the company has not been serious in handling programs that lead to the development, improvement of village physical facilities (roads, educational facilities, infrastructure, health, worship, etc.), although the community is aware that PT BAS is still in the process of preparing and has not operated the process development of oil palm plantations.

Public Expectations

With a wide range of impacts, then the public has the expectation that negative impact can be minimalize and positive impact can be enhanced. From the interview results with people in nine village, community expectation are follow as:

a. Educational programs (honorariums for elementary school teachers, assistance for teaching and learning tools, PAUD building assistance, kindergartens and facilitation of elementary education infrastructure facilities, awarding scholarships for outstanding students)
b. Health program (development assistance and facilities of polindes, guidance of posyandu, free medical treatment from company, assistance for clean water infrastructure).
c. Economic program (Plasma scheme).
d. Environmental programs, such as: support for the improvement of village facilities and infrastructure, such as (facilitation infrastructure, repair and maintenance of rural roads, making roads to other villages, building roads to community farms, facilitation of mini tower signal HP). Village support / activation concerns fire (the formation of community teams concerning fire in each village). Agricultural support (fertilizer assistance for rice fields).
e. Programs of religion, culture, social and sport, such as (assistance of village events / PHBN and PHBA, if there is a problem between the community and the company then resolved with customs / respect the customs in the local area)

Company Social Activities

Social activities is a part invitation of PT BAS. Based on report company social activity over the past few years,

the company's social activity programs are :

a. Develop productive economic business to villagers
b. Develop entrepreneur intergrated agricultural
c. Strengthening capacity of economic business and smallholder
d. Strengthening community aware zero burning of land
e. Social visit to around village
f. Assistance to cost of education, education campaign, the provision of educational facilities.
g. Assistance for socio – cultural (donation or support for traditional ceremonies, feast day, etc)

3.2. LUC Findings and Results

Land cover change in the assessment area is highly affected by community use of land resources such as swidden slash and burn shifting cultivation. This activity has long taken place and been managed through generations. Farming activity is carried out to meet the needs for food and made community main livelihood, which is why it is carried out intensively and massively.

in 2005 the PT obtained a location permit from the Kutai Timur District. Based on LUCA calculations, PT BAS has a compensation (liability) of 1,357.46 ha consisting of 1,068.99 ha of nucleus plantations and 288.47 ha of smallholder.

Figure 12 to Figure 28 show plant cover maps from 2005, 2007, 2009, 2010, 2014, 2019 and 2020 according to interpretation satellite imagery. Table 19 to table 21 shows the total results in Hectare (ha) for land cover in plantation for each date. The results interpretation satellite imagery to show areal concession of PT BAS indicated are follow as secondary forest, agroforest, shrubs, bareland, secondary swamp forest.

Table 19 Land Cover PT BAS (Nucleus) at Nov 2005, Dec 2007, Jan 2010, Juni 2014, Juni 2019 & Juni 2020

Tutupan Lahan	1 November 2005	1 December 2007	1 Januari 2010	Juni 2014	27 Juni 2019	Juni 2020*
Hutan Sekunder	7,91	7,91	7,91	4,46	4,46	4,46
Belukar	1.954,38	1.954,38	1.736,77	223,63	254,80	254,80
Semak Belukar	2.919,46	2.900,96	2.190,35	457,83	361,83	358,84
Kebun Campuran	-	-	-	21,66	23,37	23,37
Karet	-	-	-	4,54	4,54	4,54
Semak	203,21	192,79	450,45	96,32	106,81	106,81
Lahan Terbuka	150,24	188,46	254,14	41,13	39,15	42,14
Kelapa Sawit	-	-	595,58	4.385,63	4.440,24	4.440,24
Jumlah	**5.235,21**					
	*Sebagai pembanding tutupan lahan saat *ground-thruthing* dengan saat dilakukan penyusunan laporan LUCA NPP					

Table 20 Land Cover PT BAS (Smallholder) at Nov 2005, Dec 2007, Jan 2010, Juni 2014, Juni 2019 & Juni 2020

Tutupan Lahan	1 November 2005	1 December 2007	1 Januari 2010	Juni 2014	27 Juni 2019	Juni 2020*
Hutan Sekunder	0,89	0,89	0,89	0,89	0,89	0,89
Belukar	520,33	507,08	481,66	33,16	47,44	47,44
Semak Belukar	880,73	886,24	869,10	240,01	218,39	218,39
Semak	118,25	111,18	98,45	10,80	3,10	3,10
Lahan Terbuka	28,21	43,02	82,45	19,83	14,95	14,95
Kelapa Sawit	-	-	15,86	1.243,71	1.263,63	1.263,63
Badan Air	24,11	24,11	24,11	24,11	24,11	24,11
Jumlah	**1.572,51**					
	*Sebagai pembanding tutupan lahan saat *ground-thruthing* dengan saat dilakukan penyusunan laporan LUCA NPP					

Table 21 Land Cover PT BAS (KT Rantau Pakis) at Nov 2005, Dec 2007, Jan 2010, Juni 2019 & Juni 2020

Tutupan Lahan	1 November 2005	1 December 2007	1 Januari 2010	27 Juni 2019	Juni 2020*
Belukar	402,47	320,42	282,79	208,64	208,64
Semak Belukar	410,40	347,24	439,93	611,62	611,62
Semak	8,36	51,46	107,02	30,15	32,76
Lahan Terbuka	34,11	136,22	25,60	4,93	2,32
Jumlah	**855,34**				
	*Sebagai pembanding tutupan lahan saat *ground-thruthing* (Juni-Juli 2019) dengan saat dilakukan penyusunan laporan LUCA NPP				

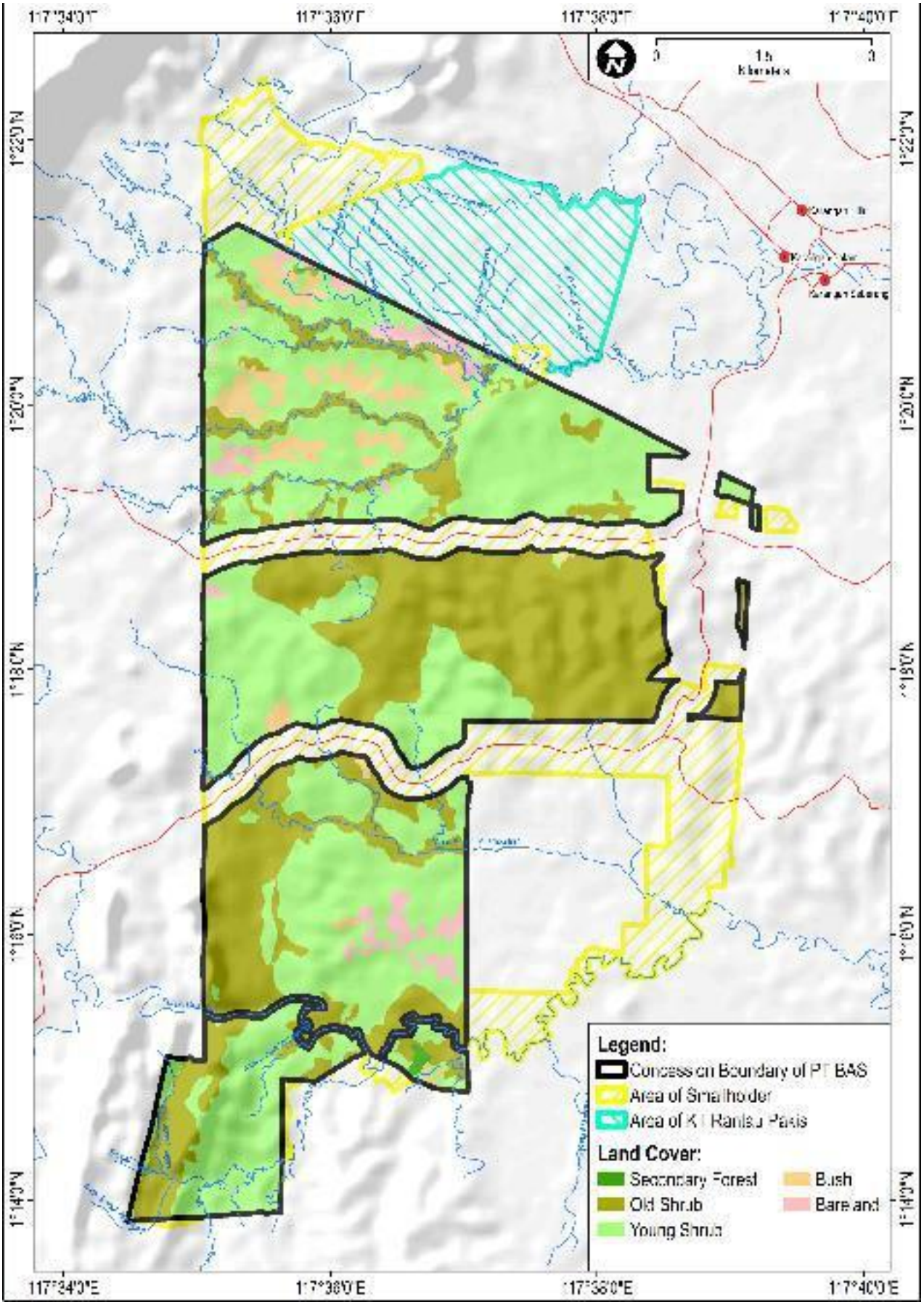


Figure 12 Interpretation Land Cover 2005 (Nucleus)

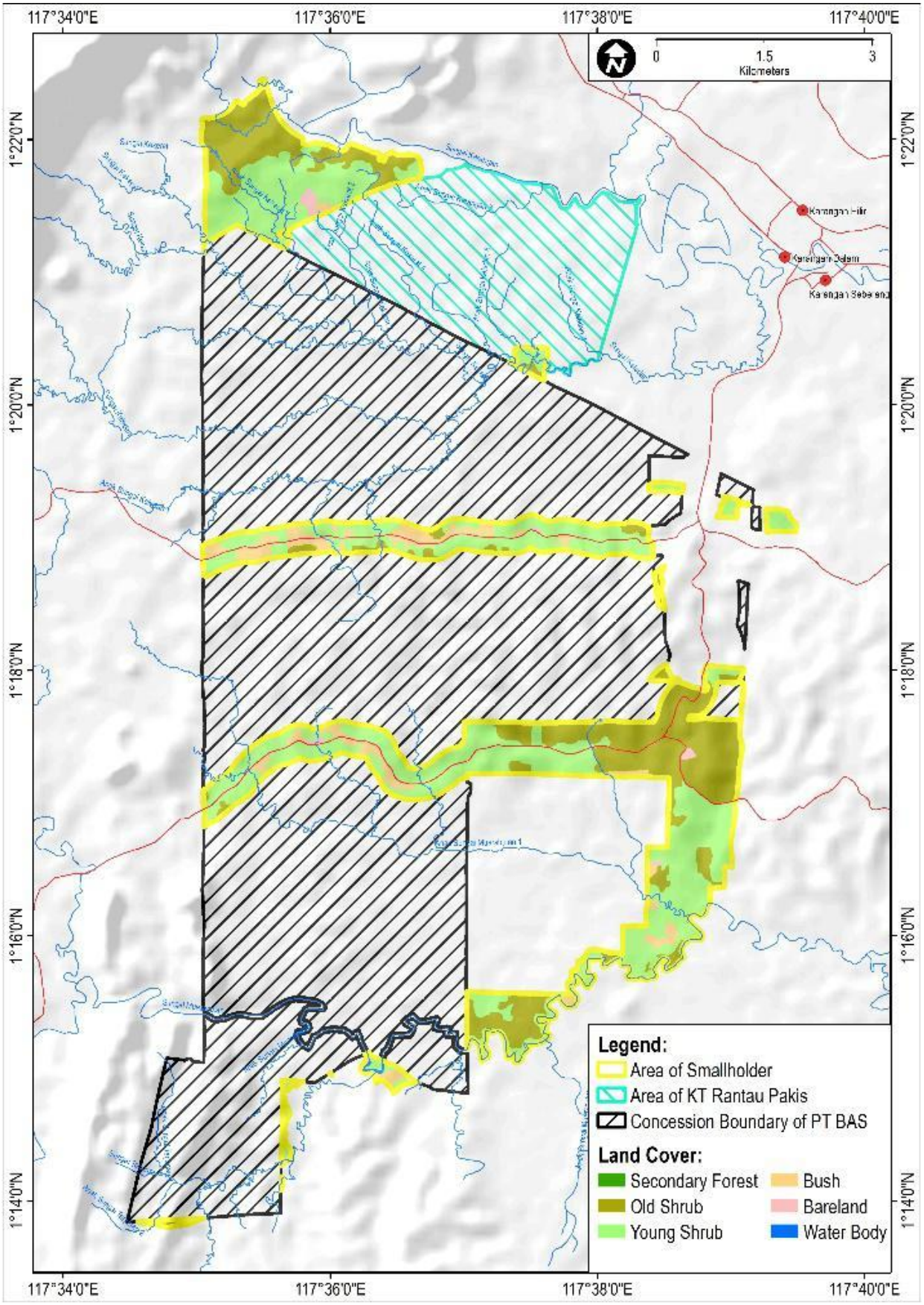


Figure 13 Interpretation Land Cover 2005 (Smallholder)

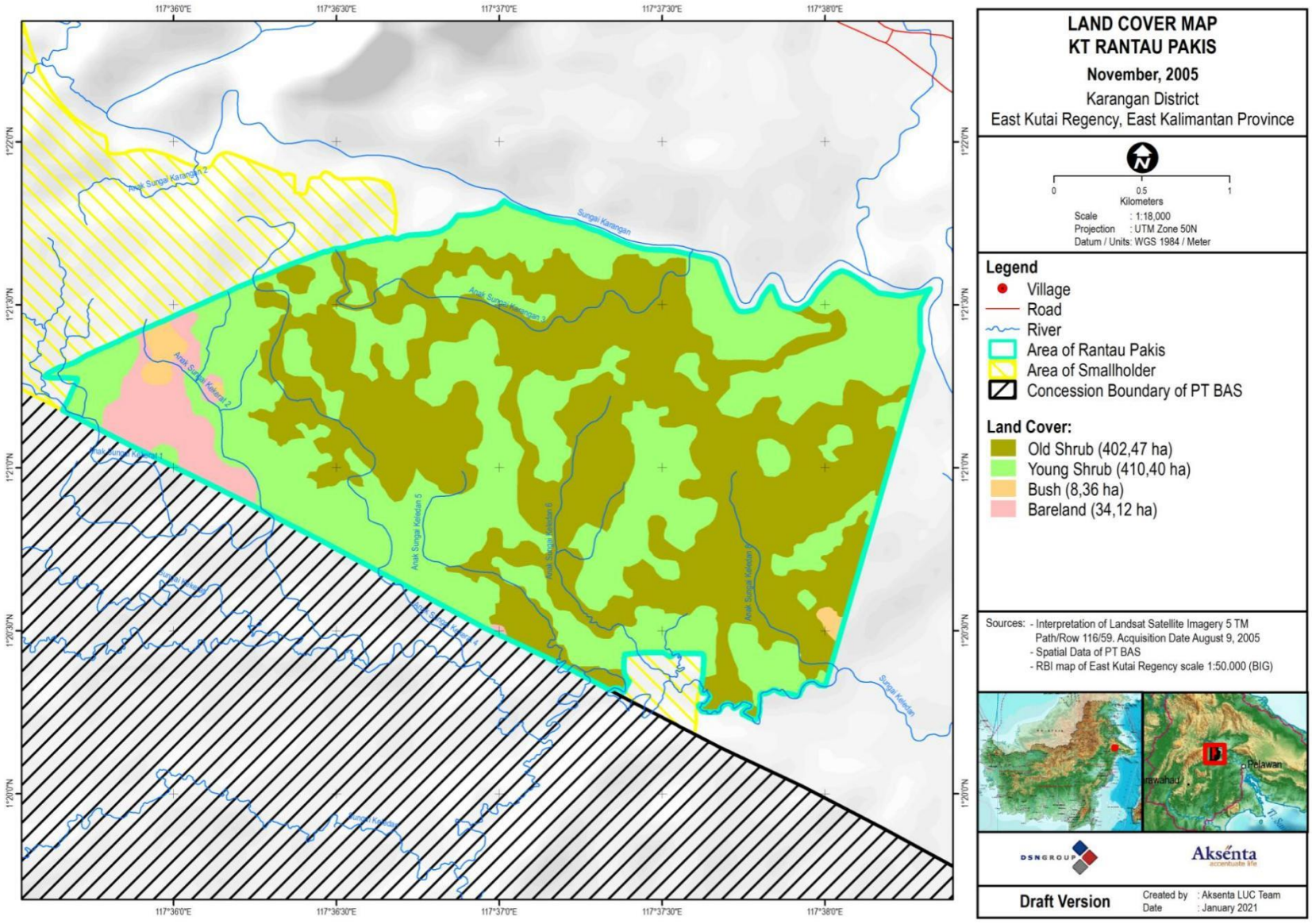


Figure 14 Interpretation Land Cover 2005 (KT Rantau Pakis)

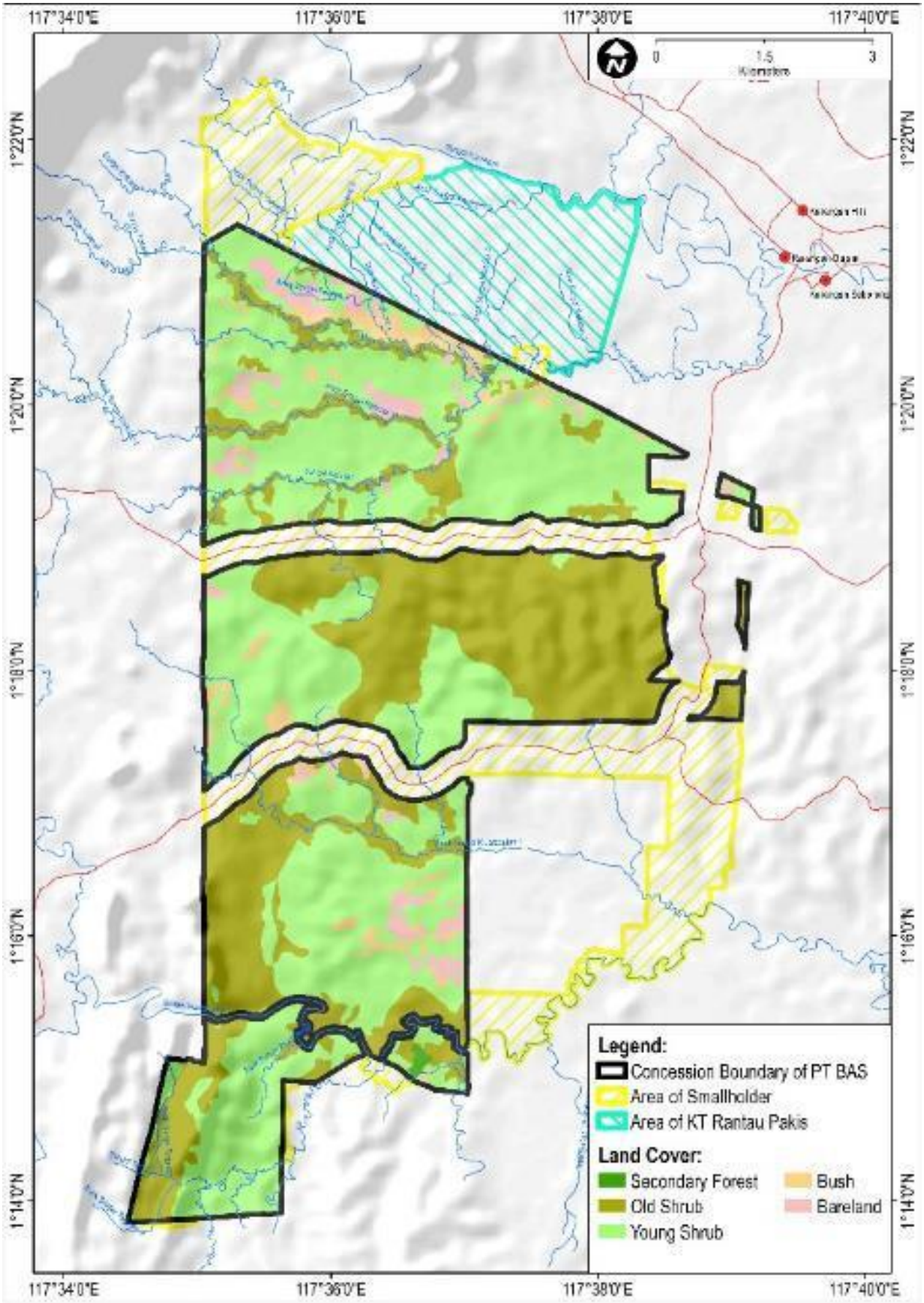


Figure 15 Interpretation Land Cover 2007 (Nucleus)

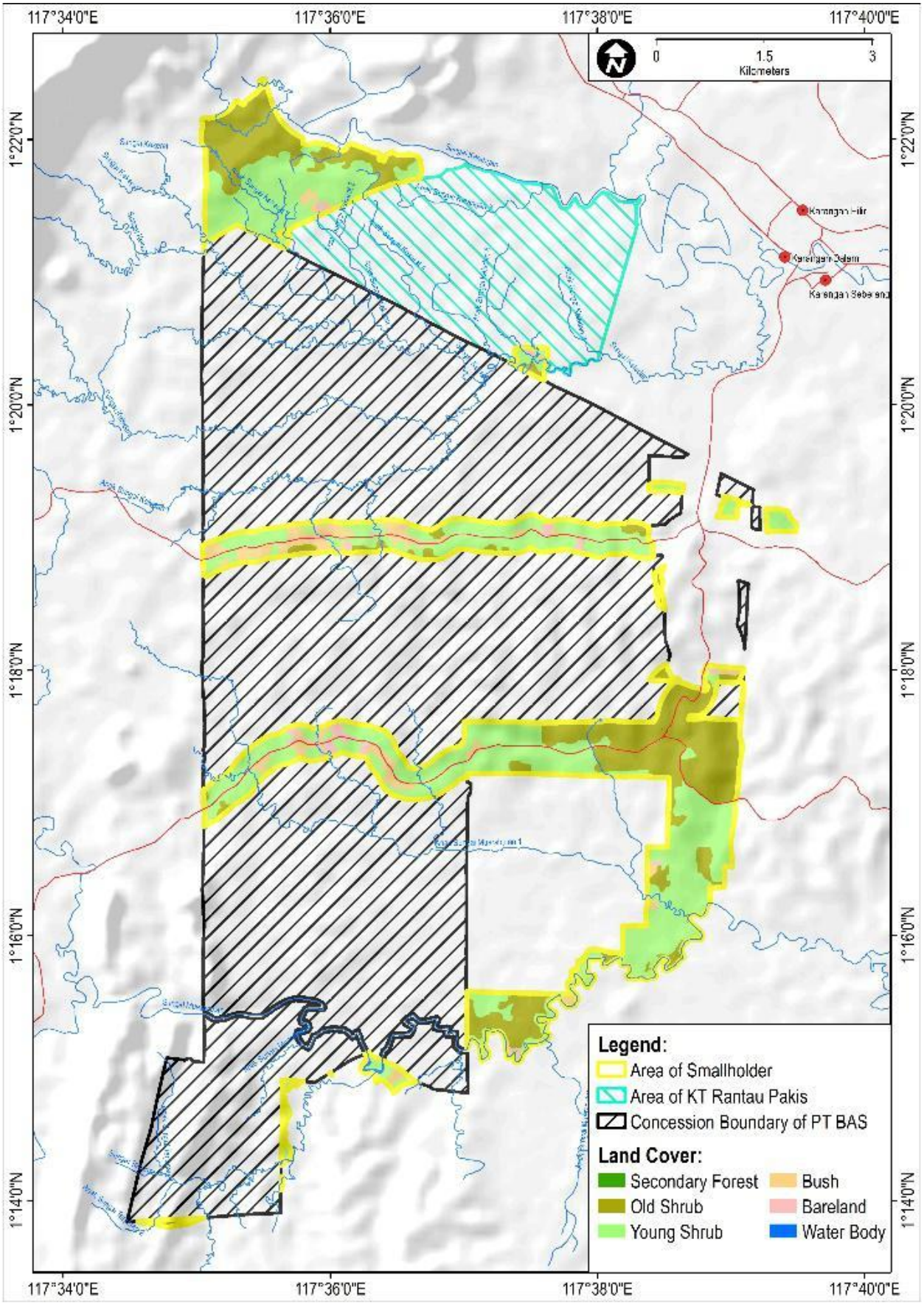


Figure 16 Interpretation Land Cover 2007 (Smallholder)

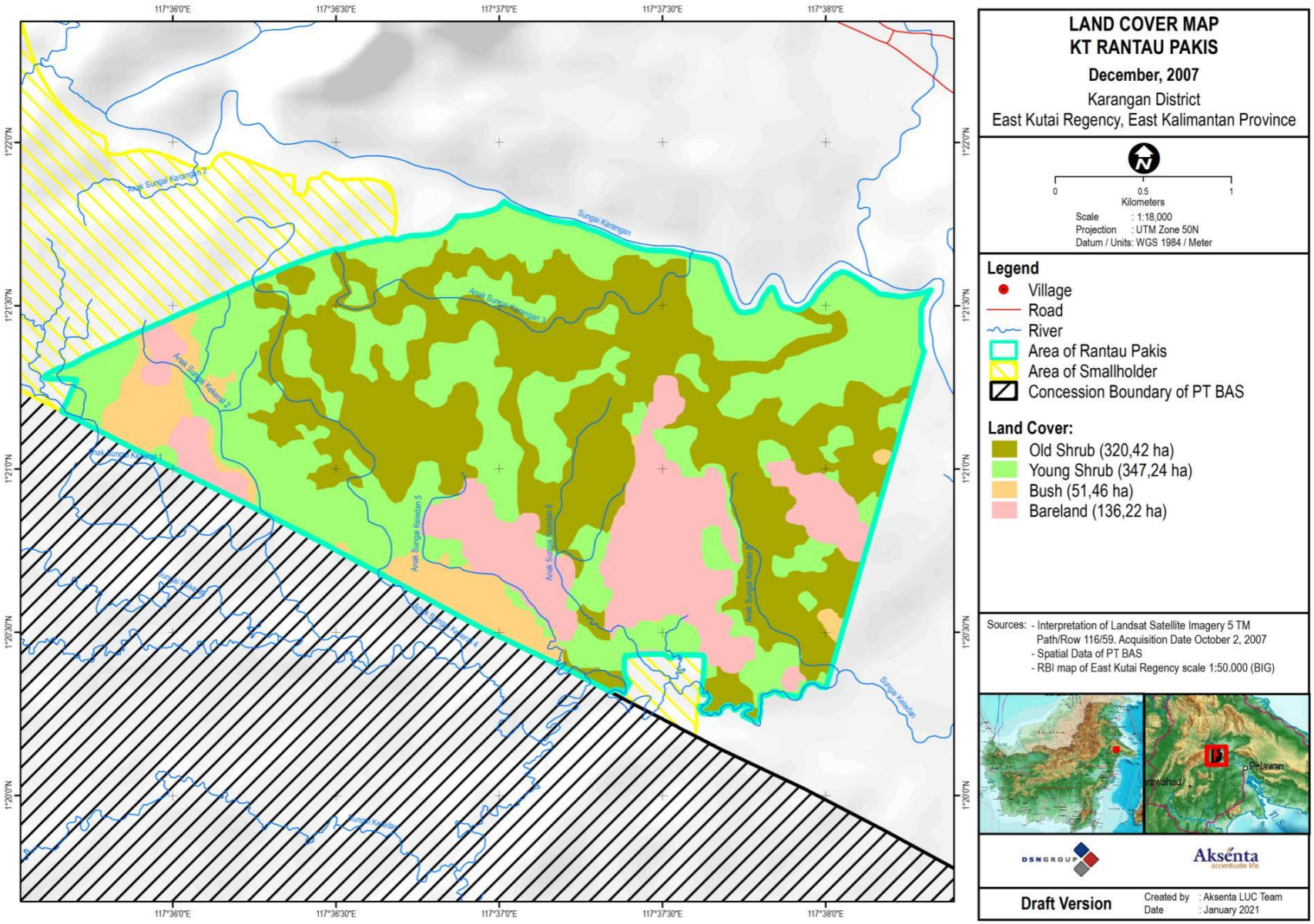


Figure 17 Interpretation Land Cover 2007 (KT Rantau Pakis)

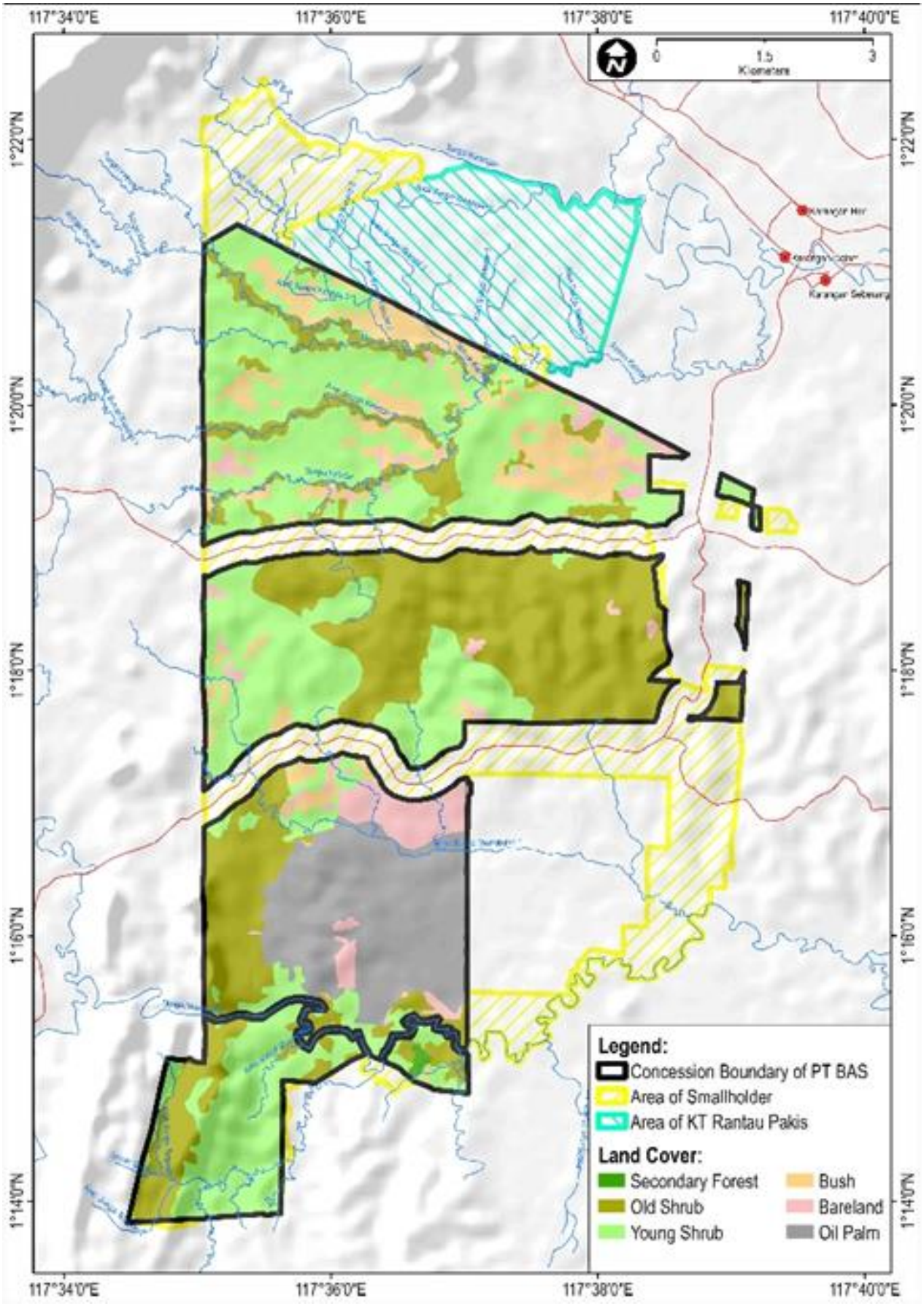


Figure 18 Interpretation Land Cover 2010 (Nucleus)

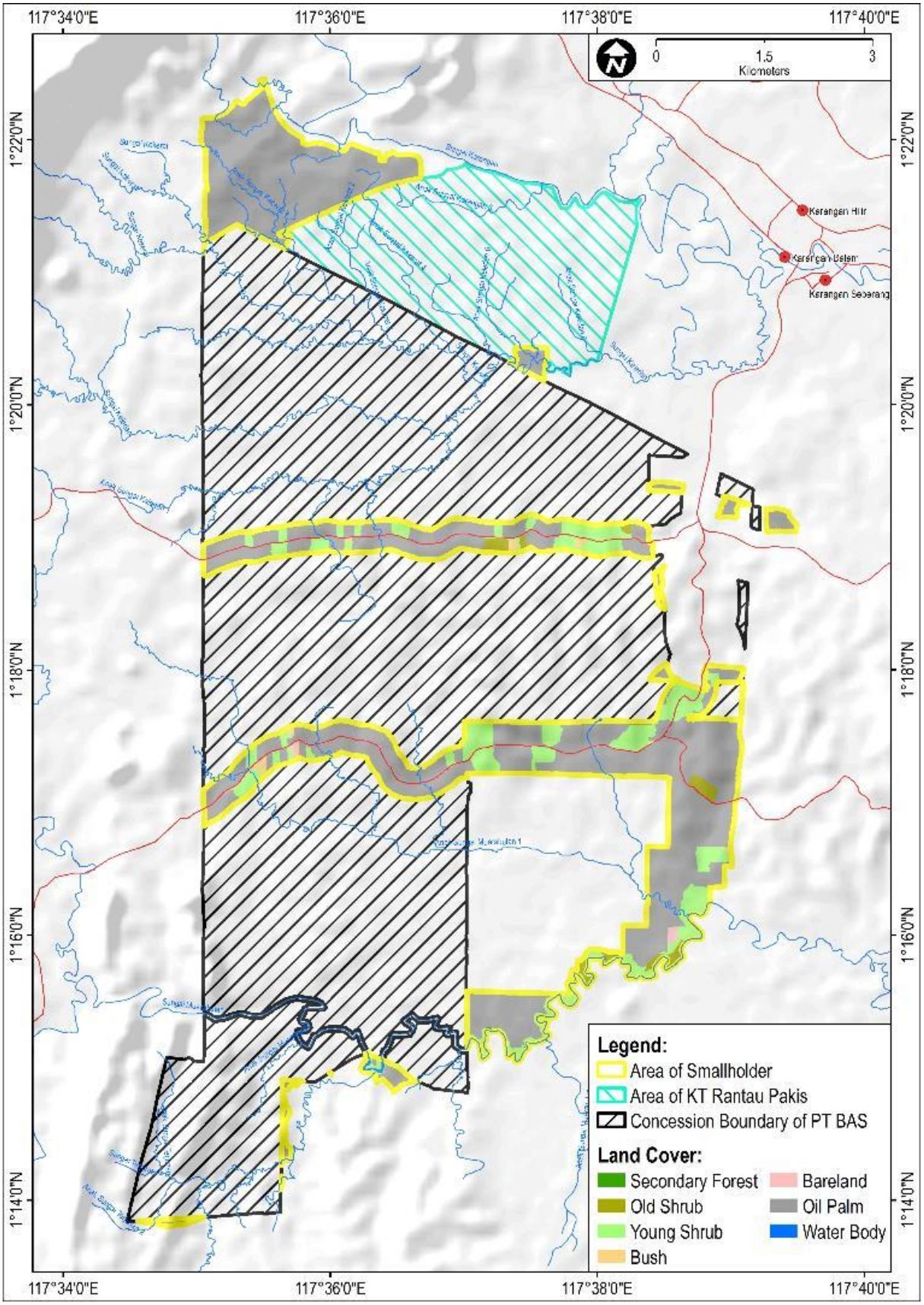


Figure 19 Interpretation Land Cover 2010 (smallholder)

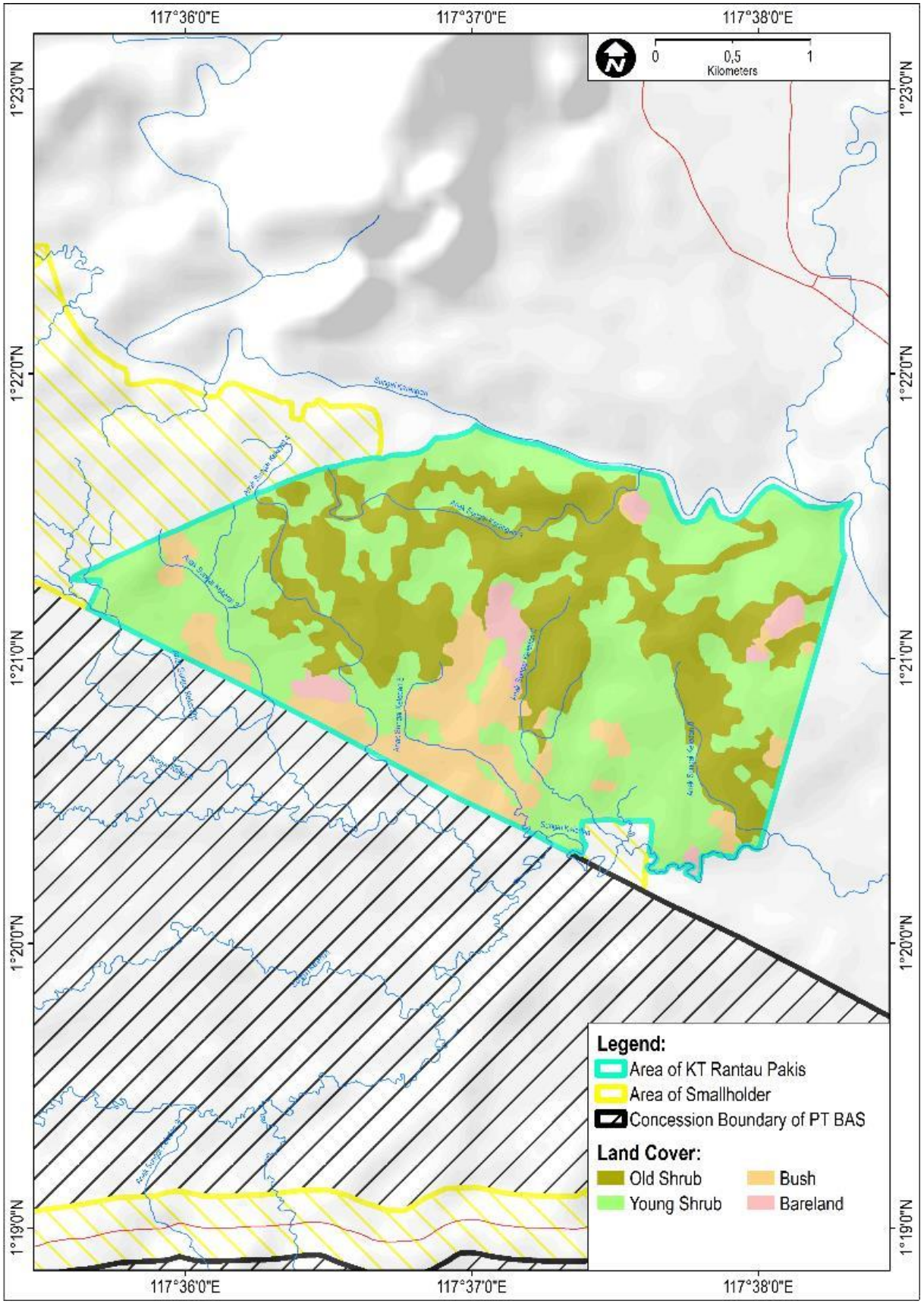


Figure 20 Interpretation Land Cover 2010 (KT Rantau Pakis)

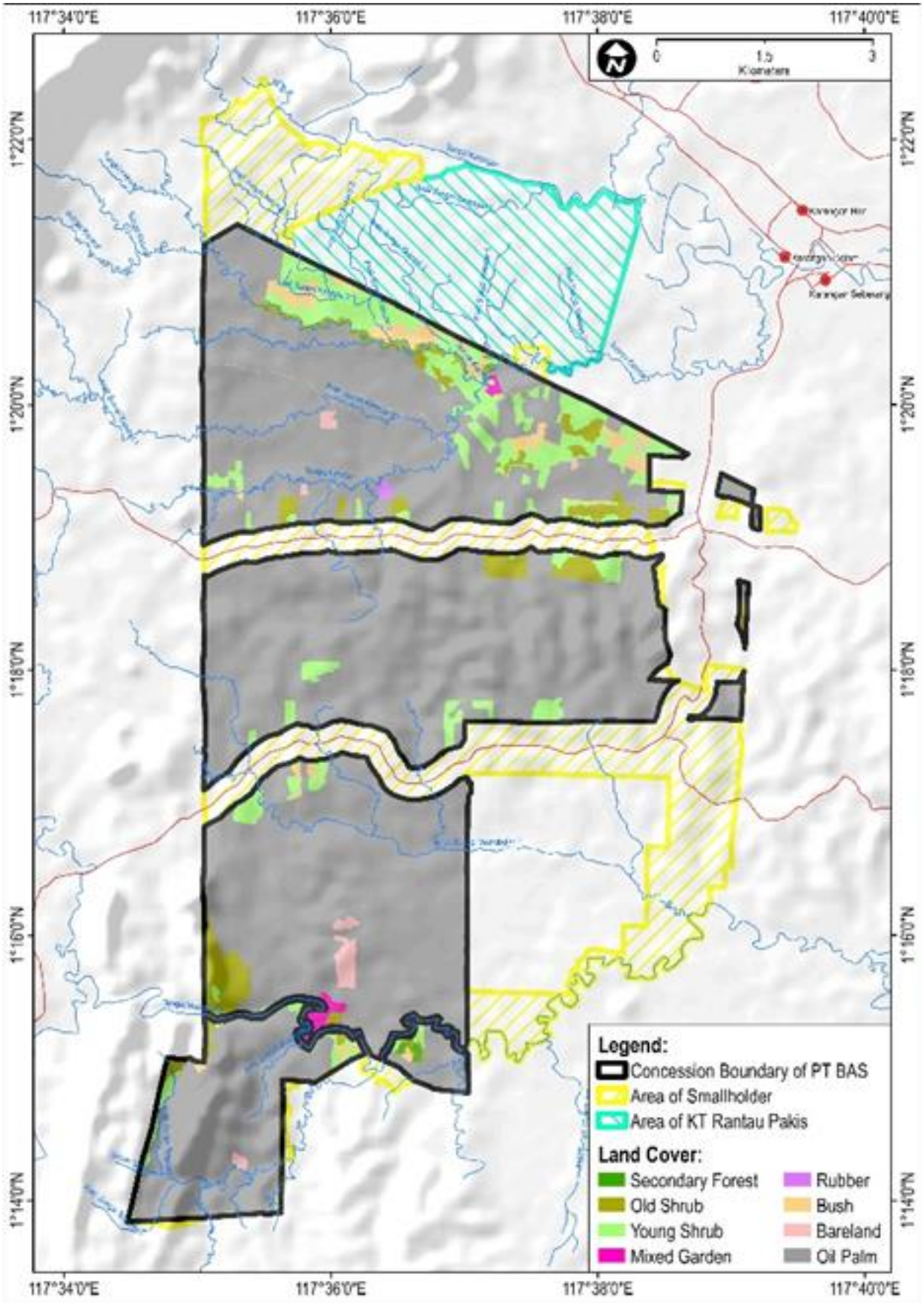


Figure 21 Interpretation Land Cover 2014 - Nucleus (HCV oleh BIOREF)

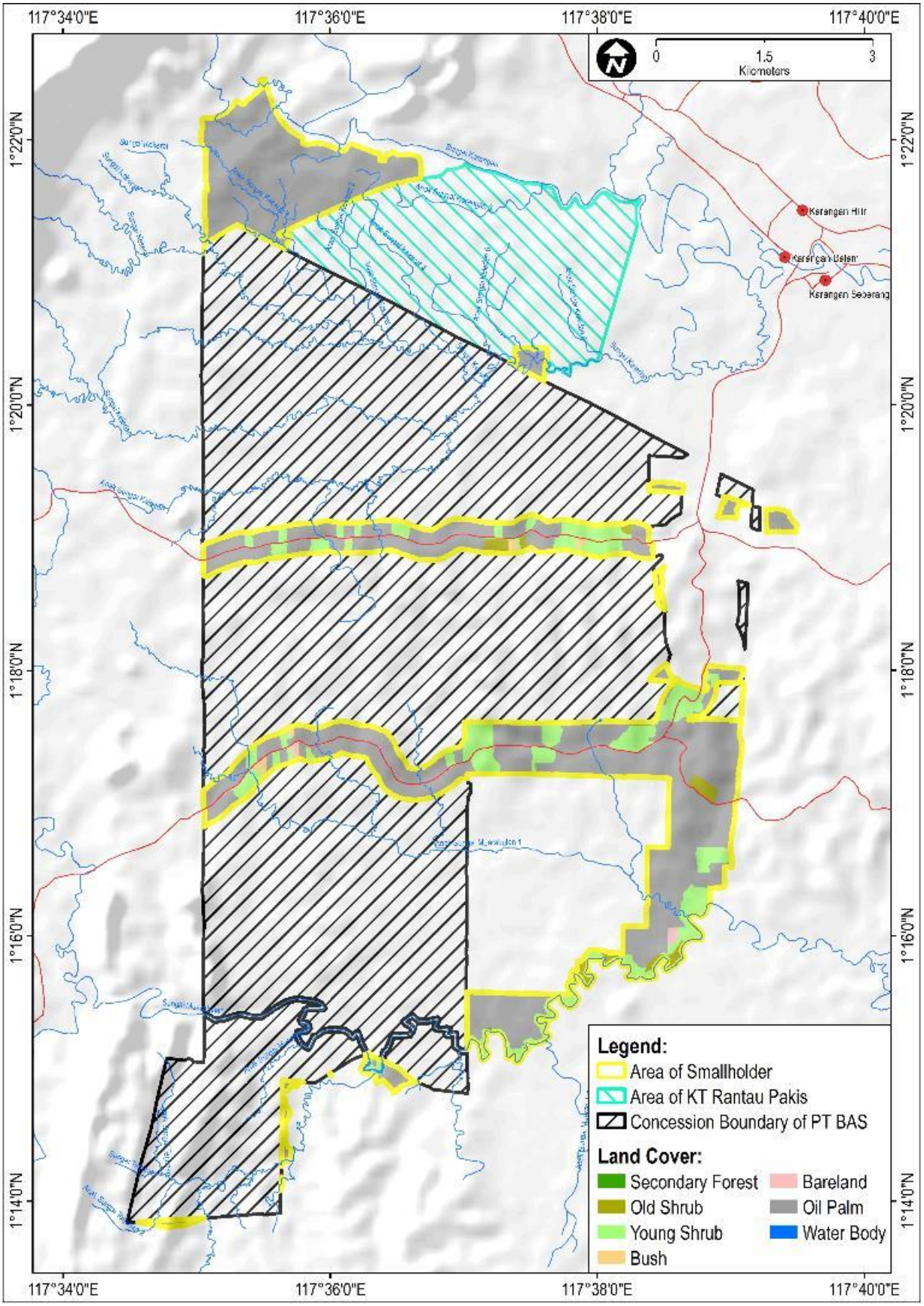


Figure 22 Interpretation Land Cover 2014 - Smallholder (HCV oleh BIOREF)

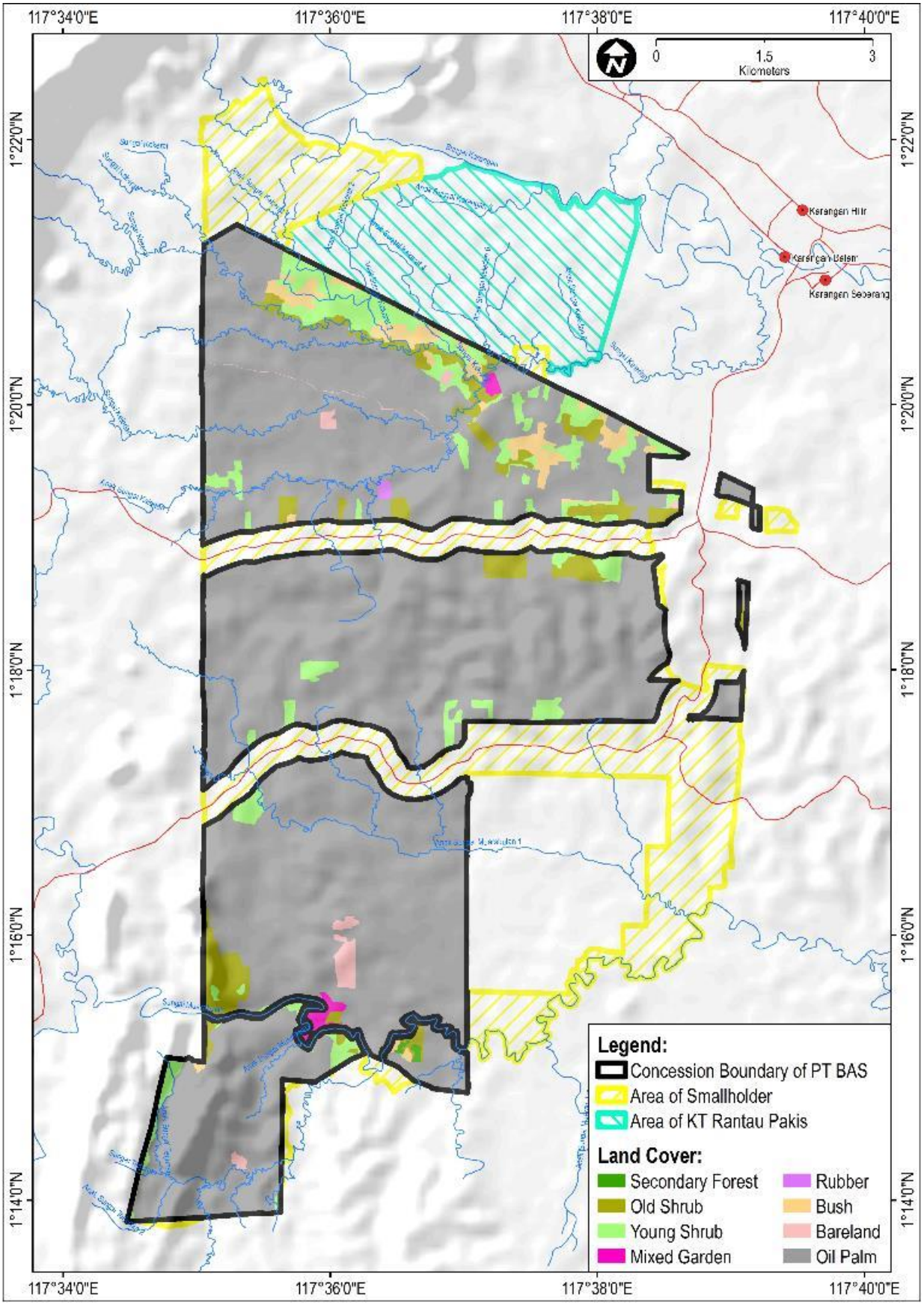


Figure 23 Interpretation Land Cover 2019 -Nucleus (HCV HCS Integrasi)

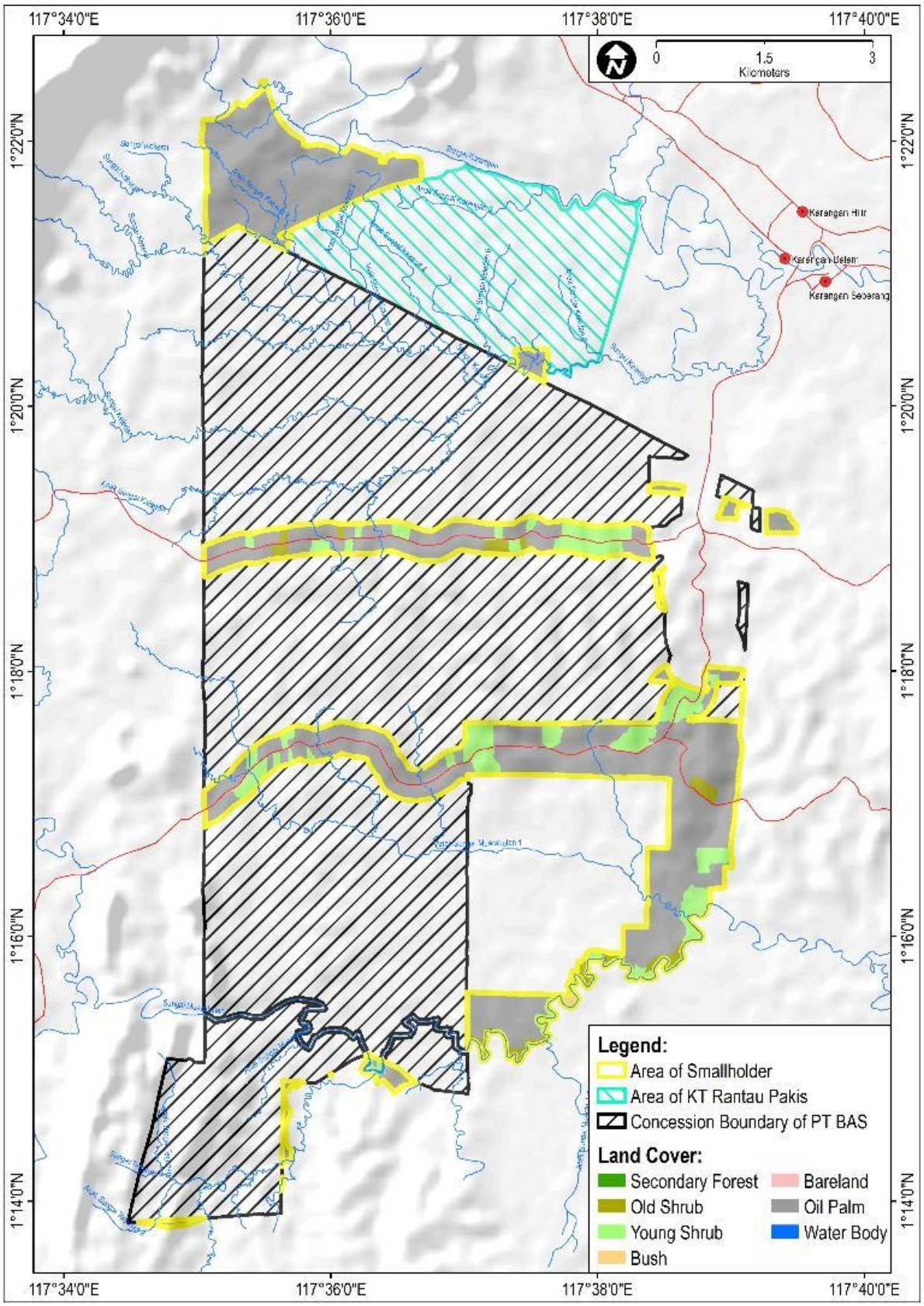


Figure 24 Interpretation Land Cover 2019 -Smallholder (HCV HCS Integrasi)

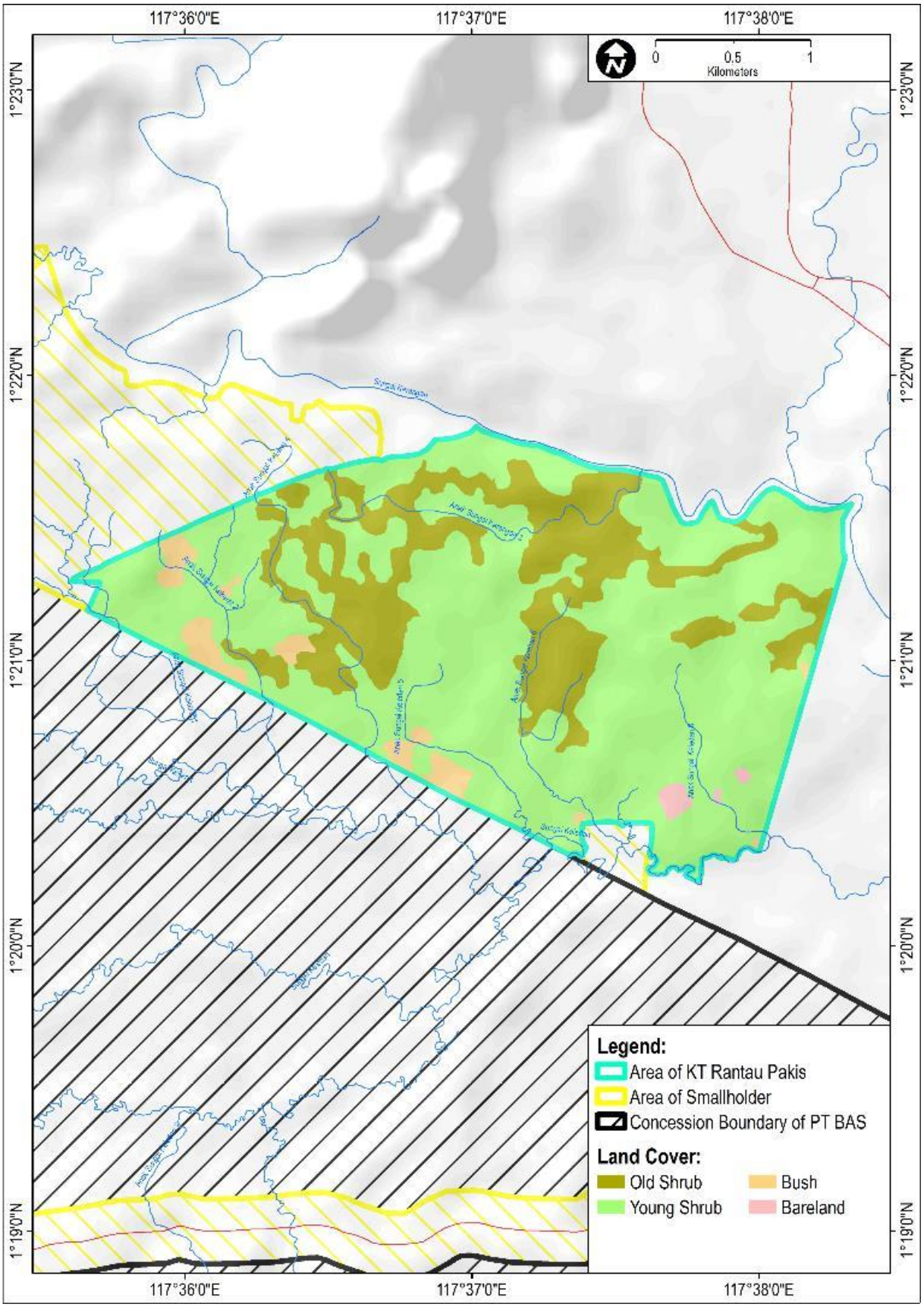


Figure 25 Interpretation Land Cover 2019 -KT Rantau Pakis (HCV HCS Integrasi)

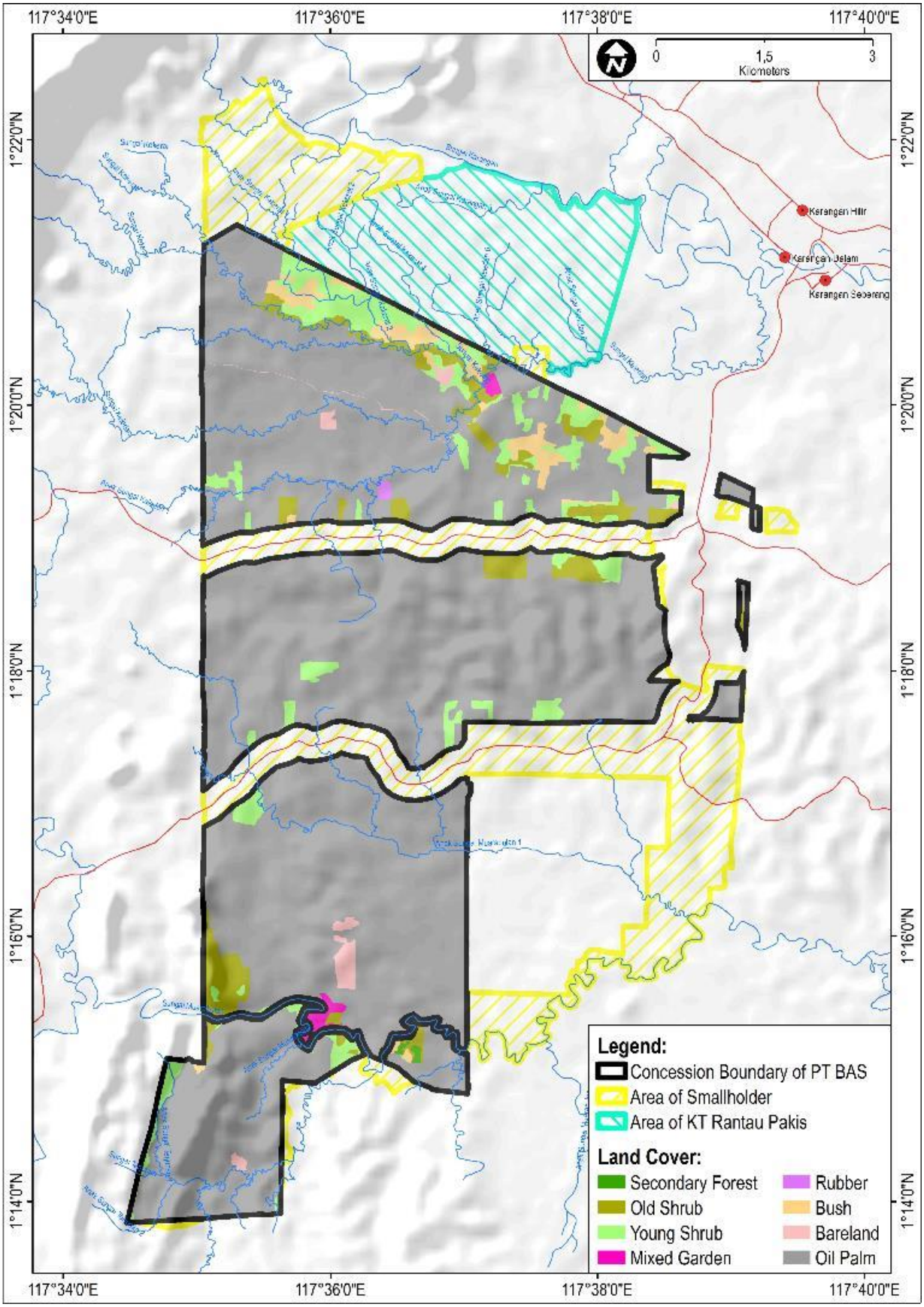


Figure 26 Interpretation Land Cover 2020 (Nucleus)

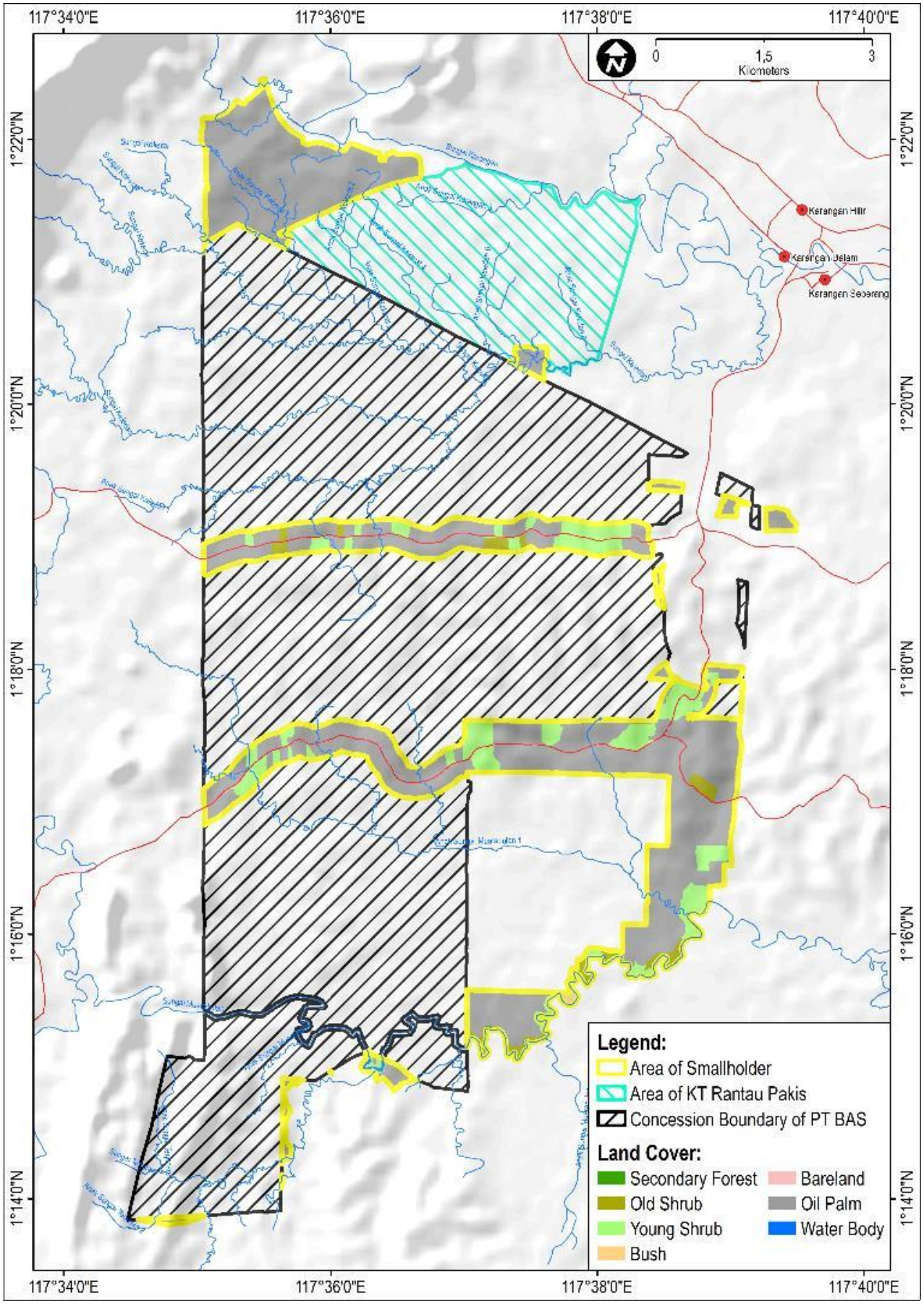


Figure 27 Interpretation Land Cover 2020 (Smallholder)

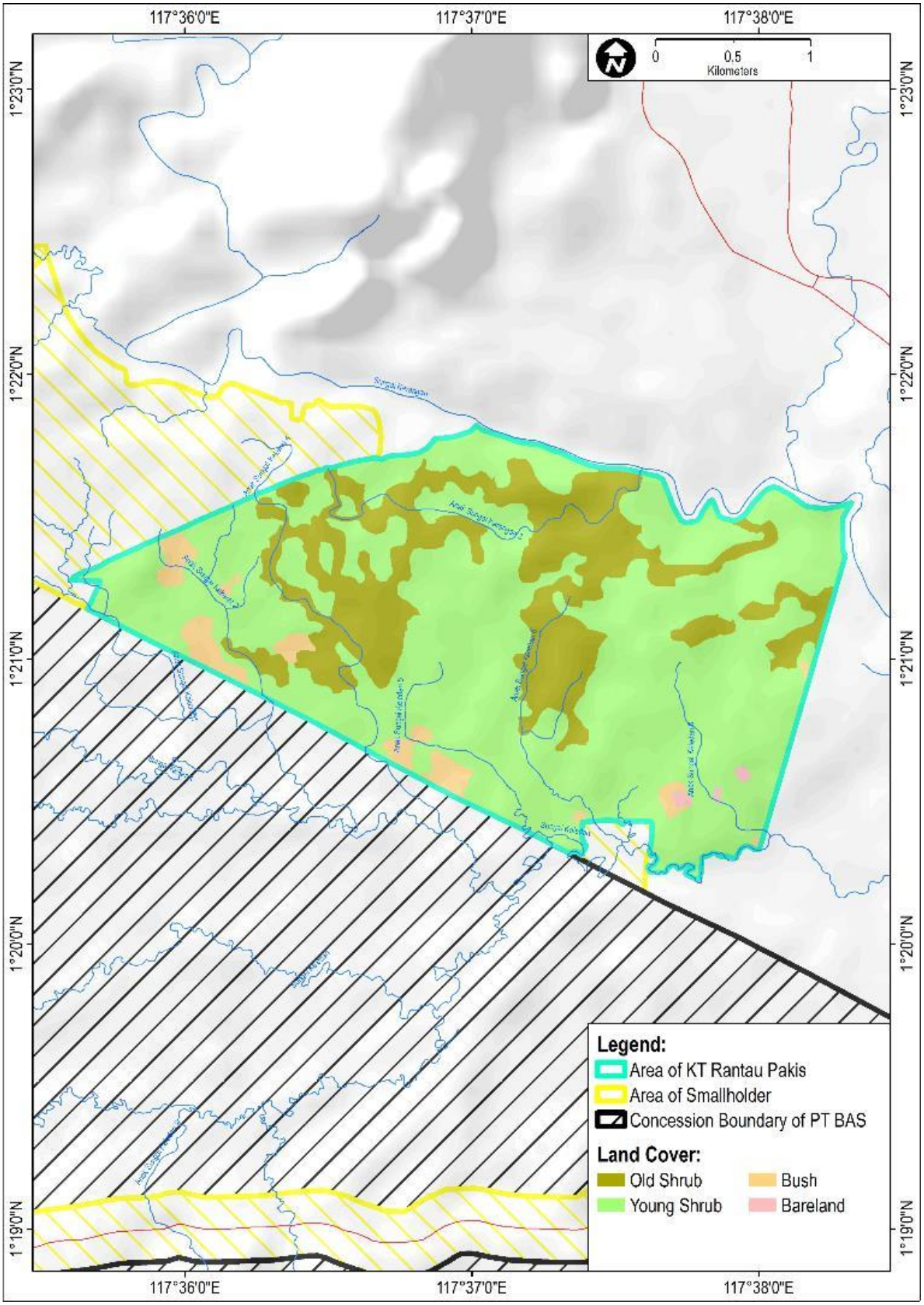


Figure 28 Interpretation Land Cover 2020 (KT Rantau Pakis)

3.3. HCV & HCS Assessment

3.3.1. Finding and decision on the absence of HCV

National and Regional Context

In the context of national policy concerning new permit issuance moratorium, the Assessment area is entirely located outside primary forest moratorium areas and peatland moratorium based on Indicative Map of New Permit Granting Moratorium (PIPPIB Map 15th revision). In the context of local policy, as per East Kalimantan 2015-2035 Provincial Spatial Plan Map, the Assessment area is situated on plantation areas. Plantation areas account for 24% of East Kutai District total area and, at sub-district level, 22% of Karangan Sub-District area.

The Assessment area is located at Sangkulirang-Mangkalihat peninsula which is one of the karst distribution areas in Kalimantan. However, based on East Kalimantan Governor Regulation No. 67/2012,1 it is known that the area is outside karst landscape. Karst areas, including prehistoric caves, are distributed around the Assessment area. Study about cave paintings in Kalimantan indicates that hand-patterned cave paintings in Sangkulirang-Mangkalihat karst area originate from at least 10,000 years ago (Fage et al., 2010). This karst area is also a national cultural reserve and listed in UNESCO's proposed world heritage.

The Assessment area is located in a biogeographic zone of Borneo containing biodiversity wealth. The island itself is one of the islands with globally high biodiversity and belongs to Sundaland biodiversity hotspot that becomes a conservation priority at global level with 15,000 endemic plant species (5% of the global population) and 701 endemic vertebrate species (2.6%) which is the second highest in the world just after Andes Mountains tropical zone (Myers, et al., 2000).

Landscape Context

Physical landscape

See the following characteristics of physical environment in the Assessment area and its surroundings.

- The AoI is entirely situated in Karangan watershed. Given its position against the watershed boundaries, it is located in the middle of the watershed.
- The AoI has wet tropical climate with year-round rainfall and is considered type A based on Schmidt & Ferguson climate classification, and type Af (tropical rainforest climate) based on Koppen classification (Koppen, 1990 in Kottek *et al.*, 2006). Its average rainfall is 2,257 mm per year with rainfall peaks occurring in March and December.
- The AoI is located in a lowland with elevation of < 600 m a.s.l. The Assessment area (MU) is surrounded by hills indicated as karst hills. In the southern part of the MU area, there is a small hill that connects to another that lies lengthwise southward. Slopes in the AoI vary from flat (< 8%) to steep (> 40%). The MU is dominated by 0-8% slope class.
- Based on land system map (RePPProT, 1990), the AoI is divided into six land systems with three land physiographic forms, i.e. (i) hills; (ii) mountains and (iii) plains. Land physiographic forms in the area is dominated by hills with Maput (MPT) land system.
- Based on Sheet Geological Map of Muaralasan and Sangatta, the AoI is dominated by three geological formations, i.e. Domaring, Manumbar and Marah whose one of its constituting rocks is limestone. With limestone as the constituting rock, such geological formation indicates the potential presence of karst in the Assessment area
- Types of soil in the entire AoI are mineral soils. No locations in the area belong to histosol soil order (peat).

Soil types in the AoI is dominated by associations of hapludults and paleudults soils distributed in the middle and north parts.

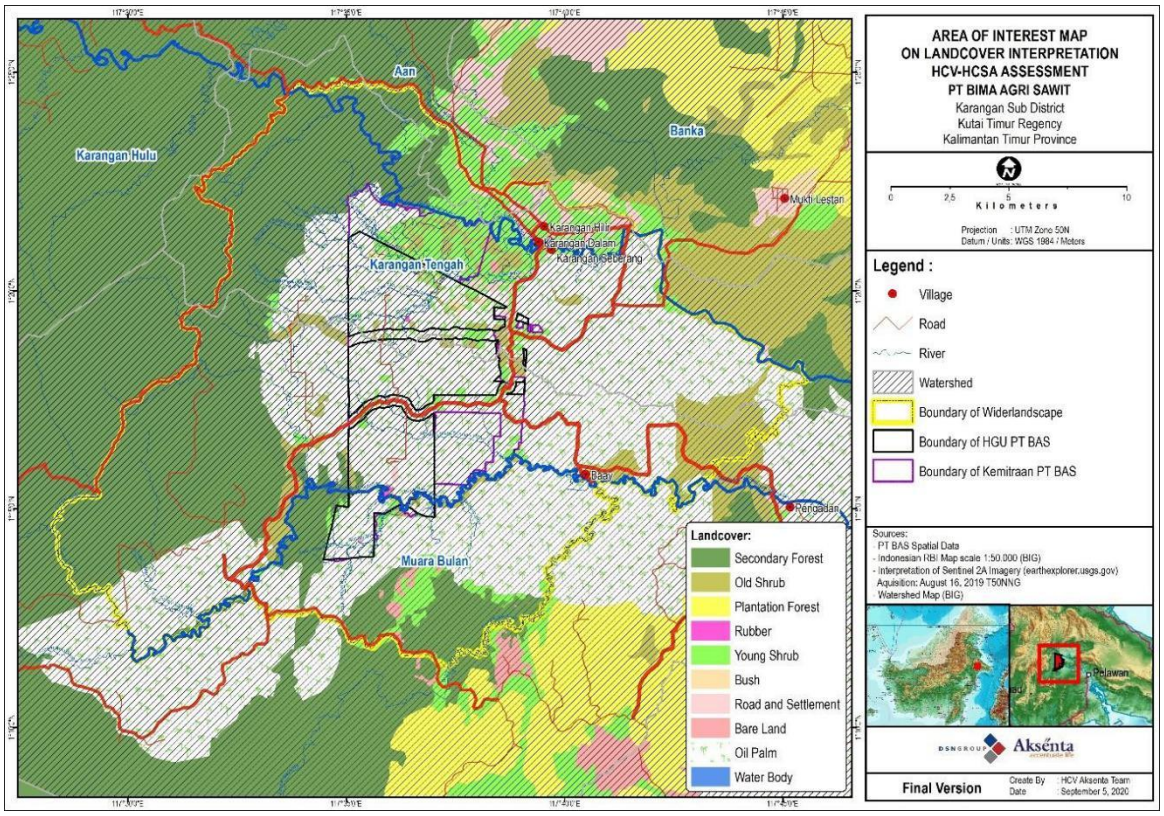


Figure 29 Boundaries of the AoI in this HCV-HCSA Assessment in PT BAS MU area

Biodiversity landscape

Borneo Island has high biodiversity. There has been recorded 267 species from Dipterocarpaceae plant family, 155 out of which are Bornean endemic, in addition to 225 terrestrial mammal species (44 out of which are endemic (Payne et al., 2000)), 639 bird species (37 of which are endemic (MacKinnon et al., 2000)), 166 snake species (Inger and Stuebing, 1997) and around 140-150 amphibian species (Inger and Stuebing, 1999). The island is a home to about 15 thousand flowering plant species, three thousand of which are woody plant species, 155 endemic plant species, 200 orchid species and more than one thousand fern species (Whitten et al., 1997).

Located between Sangkulirang-Mangkalihat karst landscapes, the Assessment area and its surroundings are indicated to have karst ecosystem fragments characterised with composition of low- biomass trees growing on limestone or karst. The following is information on the Assessment area position against conservation areas and Key Biodiversity Areas (KBA).

1. The nearest conservation areas from the Assessment area is Kutai National Park (±75 km south) and Muara Kaman-Sedulang Nature Reserve (±130 km southwest).
2. The Assessment area is near Sangkulirang KBA being a karst ecosystem. This indicates that the Assessment area may potentially serve as a corridor that connects multiple patches of the KBA.
3. Important Bird Areas (IBA) around the Assessment area include Sangkulirang IBA with EBAs that mutually connect to one another. Sangkulirang IBA can support bird species at sub-alpine ecosystem or birds

normally found inhabiting steep slopes such as moustached hawk-cuckoo *(Cuculus vagans)*, Malaysian hawk-cuckoo *(Cuculus fugax)*, Gould's bronze cuckoo *(Chrysococcyx russatus)* and white-necked babbler *(Stachyris leucotis)* (Birdlife International, 2019).

4. The Assessment area is far away from the four Ramsar sites in Borneo Island, i.e. Kinabatangan- Segama, Kuching, Lake Sentarum and Tanjung Puting.
5. Based on Intact Forest Landscape (IFL) and Heart of Borneo (HoB) maps, it is known that the Assessment area is located quite far away from IFL and HoB, i.e. ±90 km northwes

Based on the important biodiversity distribution map presented in IUCN Red List of Threatened Species, several Rare, Threatened and Endangered (**"RTE"**) species indications are found in areas including the AoI. Wildlife species with specific global concern include Bornean orangutan *(Pongo pygmaeus)*, Müller's gibbon *(Hylobates muelleri),* Proboscis monkey *(Nasalis larvatus)* and banteng *(Bos javanicus)*. RTE plant species include *Hopea nervosa*, *Eusideroxylon zwageri* and *Dipterocarpaceae* group (*Shorea bracteolate, S. gratissima, S. longisperma,* and *Dipterocarpus grandifolius*).

Social, economic and cultural contexts

Based on BPS 2018 document, it is known that the largest village is Karangan Dalam and the smallest is Karangan Seberang. Karangan Hilir has the largest population and Karangan Dalam has the smallest (**Table 22**).

Indigenous communities populating Karangan Sub-District are Dayak Basap/Lebo'. According to Riduan, Karangan Dalam Village Head, and Ijamsah, Karangan Dalam traditional chief, Dayak Basap peoples are similar to Dayak Lebo'. According to Jainudin (Cecel), Dayak Lebo' is what outsiders refer to Dayak Basap. Sunardi, a Basap traditional leader who lives in Baay Village, uses Dayak Tapian to refer to Dayak Basap as they live by the rivers.

Traditional law becomes the first reference for dispute resolution among community members and the basis to traditional ceremony performance. Traditional land rights also serve as the first reference for land tenure although their position before the national law is weaker than land rights authorised by the Government, e.g. ownership rights or HGU.

Table 22 Demographic information of local villages in the assessment area

Village	Area (km²)	Population	Number of Families	Majority Ethnic*	Majority religion*
Karangan Dalam	720.00	1047	**327	Basap	Islam
Karangan Hlir	301.38	*1730	*539	Bugis	Islam
Karangan Seberang	138.05	1674	**523	Basap	Islam
Baay	390.74	1408	**440	Basap	Islam

Source: *Kabupaten Kutai Timur dalam Angka 2018*, *Kecamatan Karangan dalam Angka 2018*, field observation 2019 (*), and estimate (**)

The large landscape of the AoI is part of Sangkulirang-Mangkalihat Peninsula. In this area there has been found archaeological items in the form of figurative cave paintings distributed in karst mountain caves or karst area. Researcher findings suggest that this area has been long witnessed human civilisations. Uranium-series analysis of the carbonate calcium deposit covering reddish orange animal figurative paintings in Lubang Jeriji Saleh results in the date at least 40 ka BP (kilo annum Before Present) or 40,000 years ago that,

to the best knowledge of the researchers, is the oldest date in the world for one figurative artwork (Aubert *et al*., 2018).

Karst hills in the AoI have long become the locations for collecting swiftlet nests, logging activities and coal mining. Many migrant people from outside the island, mainly from Sulawesi and Java, have tried their luck in this area. Before people name it Karangan, it was previously known as Perondongan which means fruit garden.

These migrant communities joined with one another and formed smallholder groups as a community organisation. Their main function is a place where smallholder organise themselves in cultivating lands together. Other community organisations such as Family Prosperity Development (PKK) and youth organisations are sourced from village organisations and programmes as their parents. In

addition, there are also religious organisations formed based on religious activities. In the Assessment area, the community also has Pemuda Karangan Peduli Bumi organisation actively involved in environmental activities and quite well-known nationwide.

All community members in the Assessment area find it easy to access healthcare as every village has Women and Children Clinic (Posyandu) and Village Clinic (Poskesdes). There are sub-district clinics (Puskesmas) near the centres of Karangan Hilir, Karangan Dalam and Karangan Seberang Villages Only Baay Village is located rather far from Puskesmas. Every village, except Karangan Seberang, has its own State's elementary school. Even Karangan Seberang has a teacher vocational high school, which is the highest level of education in Karangan Sub-District. Only Karangan Hilir has junior high school (BPS 2018). Local villages already have access to complete facilities, almost similar to those in urban areas. There are traditional markets, schools, clinics, village and sub-district offices, asphalt road network, banks, and even recreational facilities and lodgings.

In general, main characteristics of modern economic in the AoI includes plantation sector, particularly oil palm plantation, forestry sector and coal mining sector. As for community economic, it is formed by dry and irrigated rice farming, rubber plantation, secondary crop and cacao plantation. Community economic activities that keep developing are swiftlet nest business. Household-scaled animal farming and freshwater aquaculture are practiced to meet own consumption. Trade activities develop at the sub-district centre that includes the areas of Karangan Dalam, Karangan Hilir and Karangan Seberang Villages.

Landuse and development trend

The AoI is dominated by plantation areas, referring to East Kalimantan Provincial Spatial Plan 2015- 2035. Other than PT BAS, there are also other oil palm plantations in the Assessment landscape, including PT Telen, PT Multi Pasific International, PT Wahana Tritunggal Cemerlang, and PT Gunta Samba. Forest areas can be found in the western, northern and southern parts of the AoI.

Since 1970s, the presence of migrant communities has been attracted mainly by the operations of logging companies. Two large corporate groups operating around the AoI are PT Sumalindo and PT Sagara Timber. According to informants from Karangan Hilir Village, local villages developed from PT Sangkurilang (Suwarga) logging camps. Logging roads that logging companies constructed were then developed by the local governments into village roads and main access to Berau and Sangatta.

Following the presence of large logging companies, local community also got involved in logging activities. They name the time as 'banjir kap' era where local village and migrant communities massively logged timbers that were transported by floating them through the rivers when they got flooded up to the estuaries. The past activities determined the current condition of land cover in the Assessment area.

Based on forest area map, East Kalimantan Provincial Spatial Plan (RTRW), landuse and interview, it is projected that trend of development in the AoI will be relying on mining, forestry and oil palm plantation sectors. The AoI is located far away from the centres of East Kutai and Berau Districts, making it less than likely to develop as the centre of trade activities. However, the area will be relying on the presence of oil palm plantation workers which is more stable for economic growth in the long run rather than extractive sectors such as forestry and mining.

Result and Justification

Based on HCV assessment in the concession area of PT BAS, there are found five HCVs, such as HCV1, HCV2, HCV3, HCV4, & HCV5. A summary of the findings is presented on Table 23

Table 23 Summary of HCV areas found at PT BAS permit area

HCV 1	Finding
Concentrations of biological diversity including endemic species, and rare, threatened or endangered species, that are significant at global, regional or national levels.	**Present**: Population of RTE and/or endemic species, including orangutan, gibbon, clouded leopard, sun bear, wrinkled hornbill, rhinoceros hornbill, king cobra, Asiatic softshell turtle, *keruing*, Borneo ironwood, *bengkirai*, *kayu buyung*, and *dedera*. **Potential**: - **Absent**: -
HCV 2	**Finding**
Large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.	**Present**: Karst areas to the south of the HGU, connected to the larger forest areas. **Potential**: - **Absent**: -
HCV 3	**Finding**
Rare, threatened, or endangered ecosystems, habitats or refugia	**Present**: These locations are located in Karangan and Muara Bulan Riparian Forest Ecosystems, Lowland Forest Ecosystem on sandy rocks (in Rantau Pakis SG area and enclaves), and Karst Forest Ecosystem in the southern part of the HGU concession **Potential**: - **Absent**: -
HCV 4	**Finding**
Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.	**Present**: Areas with important ecosystem service values take form of rivers, reservoirs, oxbow lakes, springs, water body banks, karst areas, and low-density secondary forest area where *mengeris* trees are found. **Potential**: Water body bank (river, spring and reservoir) and steep areas covered by oil palms may potentially serve as HCV 4 area. **Absent**: -
HCV 5	**Finding**
Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc...), identified through engagement with these communities or indigenous peoples.	**Present**: There are rivers used by local communities for fish farming and fishing. **Potential**: - **Absent**: -
HCV 6	**Finding**

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.	**Present**: Outside the MU area but within the AoI there are two sites of old burial ground, i.e. (i) Nyuaring Hill cave; and (ii) complex of historical burial grounds of Baay Village community. There are plant resources used in traditional ceremonies. **Potential**: There are two caves that may potentially have important historical and cultural values acknowledged by local communities.

Management of HCV conducted on HCVs which were find within and around the permit area of PT BAS; on the other hand HCV monitoring conducted on several monitoring locations which represent several HCV areas. Total area size of HCV management in the area is 909.5 ha or 11.9 % as shown in **Table 24**

Table 24 Area size of management of HCV within and around the permit of PT BAS

ID	Name	Area (ha)	
		HCV	HCVMA
1	Karangan (1) tributary, OU Corridor	0.2	1.8
2	Karangan (2) tributary, OU Corridor	0.4	2.3
3	Kerekat tributary (1)	4.7	9.9
4	Secondary forest in Rantau Pakis SG area, River Karangan and its riparian area, Kerekat tributary and its riparian areas (2&4), Keledan tributaries and their riparian areas (5, 6, 7 & 8).	573.2	583.2
5	Secondary forests in Kerekat riparian area, Kerekat and its riparian area, Kerekat tributary (2) and its riparian areas, and corridor.	61.3	89.3
6	Kerekat tributary (3) and its riparian area.	0.6	4.7
7	Secondary forest in Kerekat riparian area, secondary forest in Keledan riparian area, Kekerat and its riparian area, Keledan and its riparian area, and Keledan tributary (5) and its riparian area (5).	56.8	77.9
8	Keledan and its riparian area.	1.4	7.1
9	Bayada and its riparian area, Bebaya tributary (1) and its riparian area, OU corridor	1.8	15.9
10	Secondary forest as OU stepping stone, Bebaya tributary (2) and its riparian area, and erosion management area.	26.4	610.3
11	Secondary forest as OU stepping stone, Bebaya tributary (3) and its riparian area, Spring E12, Reservoirs (F11&F11P), OU corridor, and erosion management area	13.4	43.0
12	Secondary forest and thickets as OU stepping stone, OU corridor, erosion management area.	45.3	518.3
13	Secondary forest as OU stepping stone, spring buffer zone, OU corridor, and erosion management area.	147.8	542.6
14	Reservoir G14	0.1	1.9
15	Lebuyu and its riparian area, Lebuyu tributary (1) and its riparian area, and erosion management area.	4.2	129.0
16	Lebuyu tributary (2) and its riparian area.	0.5	3.8
17	Kekotol and its riparian area.	0.6	3.7
18	Thicket as OU stepping stone, thicket as OU stepping stone, Lebuyu tributary (3) and its riparian area, OU corridor.	39.9	175.6
19	Secondary forest as OU stepping stone, OU corridor.	4.8	6.0
20	Secondary forest at Block H/I as OU stepping stone, OU corridor	8.0	59.3
21	Thicket as OU stepping stone, OU corridor.	12.7	34.1
22	Karst hill, Cave L6A, Muara Bulan and its riparian area, OU corridor	63.6	105.0
23	Secondary forest in Muara Bulan riparian area, Muara Bulan and its riparian area, Muara Bulan tributaries (1 & 2) and their riparian areas, Oxbow lake, OU corridor.	67.2	170.0
24	Muara Bulan riparian secondary forest, Muara Bulan and its riparian area, OU corridor.	74.8	114.5

25	Muara Bulan tributary (1) and its riparian area, OU corridor, and erosion management area.	8.2	175.4
26	Betung and its riparian area, Muara Bulan tributary (2) and its riparian area.	0.4	2.3
27	Karst Hill, Buayan (1) and its riparian area.	18.6	20.1
28	Karst Hill, Buayan and its riparian area, Buayan tributaries (1, 2, 3, 4 & 5) and their riparian areas, erosion management area, corridor.	4.8	72.0
Total Area (ha)*		**1,241.8**	**3,579.1**
HCV/HCVMA Area in Overlap with Community Lands (ha)		**332.3**	**391.0**
Total Nett of HCV/HCVMA (ha)		**909.5**	**3,188.1**
Assessment Area/PT BAS MU Area (ha)		**7,663.1**	**7,663.1**
%Nett Area against the Assessment Area		**11.9**	**41.6**

In summary, almost all environmental and social conservation values are identified in the MU area; only peats are not found (**Table 25**). See below the summary of the HCV-HCSA Assessment in PT BAS concession.

- Total Assessment area (MU area): 7,663.1 ha.
- Total area proposed for conservation: 1,046.4 ha (HCV, 'No Go' HCVMA, and HCS area).
- Total area proposed for development: 535.5 ha.
- Community lands for future sources of livelihood: 550.4 ha.
- Total 'No Go' HCVMA with strict protection (nett): 1,046.4 ha.
- Total converted/convertible 'Go' HCVMA with management prescription (nett): 2,141.6 ha.

Table 25 Recapitulation of size of conservation and management areas in the assessment area

Environmental and social value to be conserved	Area (ha) where the value is found (inside MU only	Management areas (ha) (inside MU only)
HCS Forest	547.6	547.6
Peat	-	-
HCV 1	1,220.2	2,535.9
HCV 2	1,220.2	2,535.9
HCV 3	958.1	958.1
HCV 4	1,023.8	2,456.2
HCV 5	71.3	110.0
HCV 6	0	3.4
Local people lands (if any additional to HCV 5 & 6). May be indicative	550.4	550.4
Net Total (after subtracting overlaps)	**1,596.8**	**3,738.5**

A. HCV 4

All HCV 4 indications are found in the Assessment area (**Table 26**). It is found in 25 locations, taking form of rivers, reservoirs, oxbow lake, water body bank, karst hills and secondary forests (**Figure 30**). Major rivers in this area include Karangan and Muara Bulan. Rivers flowing down the MU area empty to one of them. Reservoirs are found in three locations, i.e. Block F11, F11P, and G14, while oxbow lake is found in Block M9/M12. Playing role as a fine regulator in flood control and as important aquifer charging area (Haryono, 2001; William, 2008), karst areas are found in the southwestern part of PT BAS HGU concession, including in a cave in L6A. Total indicative HCV 4 area is 1,023.8 ha and the HCV Management Area (**"HCVMA"**) 4 is 2,456.2 ha.

Width of riparian area ranges from 5 m to 50 m, while those of reservoir and oxbow lake buffer zone are 50 m, and spring bank includes a radius of 200 m. Widths of water body banks are set taking into account the important functions and values in each riparian area, and using *RSPO Manual on Best Management Practices (BMPs) for the Management and Rehabilitation of Riparian Reserves* (Barclay *et al.*, 2017) and *Simplified Guide Management and Rehabilitation of Riparian Reserve* (Lucey *et al.*, 2018). Another reference is *Riparian Buffers: A Livestock Best Management Practice for Protecting Water Quality* (Gumbert *et al.*, 2009).

Identification also finds important areas of HCV 4, in which replanting is not recommended. These take form of water body banks already covered by oil palms. Although the riparian areas are no longer naturally vegetated the presence remains important to protect and manage to support functions of water body as HCV 4 area. As such, all water body banks covered by oil palms should be made strictly protected HCVMA. In addition, there are also convertible HCVMAs with management prescription, taking the form of undulating-rolling areas that may potentially have high-level erosion if the land cover gets cleared and left without land management.

Table 26 Indication of HCV 4 presence in the assessment area

HCV 4	Finding
Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.	**Present**: Areas with important ecosystem service values take form of rivers, reservoirs, oxbow lakes, springs, water body banks, karst areas, and low-density secondary forest area where mengeris trees are found. **Potential**: Water body bank (river, spring and reservoir) and steep areas covered by oil palms may potentially serve as HCV 4 area. **Absent**: -
Situations that Qualify as HCV 4	**Indication in the Assessment Area**
Managing extreme flow events, including vegetated riparian buffer zones or intact floodplains.	**Present**: There are water bodies taking form of river, reservoir and oxbow lake functioning to control surface runoff. This function is also supported by the presence of riparian areas that remain in natural condition at several river segments.
Maintaining downstream flow regimes.	**Present**: The Assessment area is situated in the middle part of Karangan watershed, so that water bodies in this area still contributes to fluctuation of downstream rivers. Karst areas also function as flood regulator through their function of water absorption.
Maintaining water quality characteristics.	**Present**: There are riparian areas currently covered by secondary forests functioning as soil erosion filter. **Potential**: Banks of water bodies (rivers, springs and reservoirs) that are covered by oil palms still function as buffer zones to the water bodies.
Fire prevention and protection.	**Present**: River Karangan and Muara Bulan have significant width to allow them to function as natural firebreaks.
Protection of vulnerable soils, aquifers and fisheries.	**Present**: Presence of karst area plays important role as aquifer absorption area. In addition, River Karangan and Muara Bulan also serve as fishing ground for local community

Provision of clean water and natural ecosystems that play an important role in stabilising steep slopes.	**Present**: There are rivers and springs that are sources of water to community, as well as karst areas with slope >40%. **Potential**: There are steep areas prone to erosion, but they are currently covered by oil palms.
Protection against winds, and the regulation of humidity, rainfall and other climatic elements.	**Present**: There are currently naturally vegetated riparian areas that play roles in microclimate regulation.
Pollination services, e.g. exclusive pollination for subsistent food crops	**Present**: Caves in karst areas and mengeris trees in secondary forest areas in the northern part function to support pollination service.

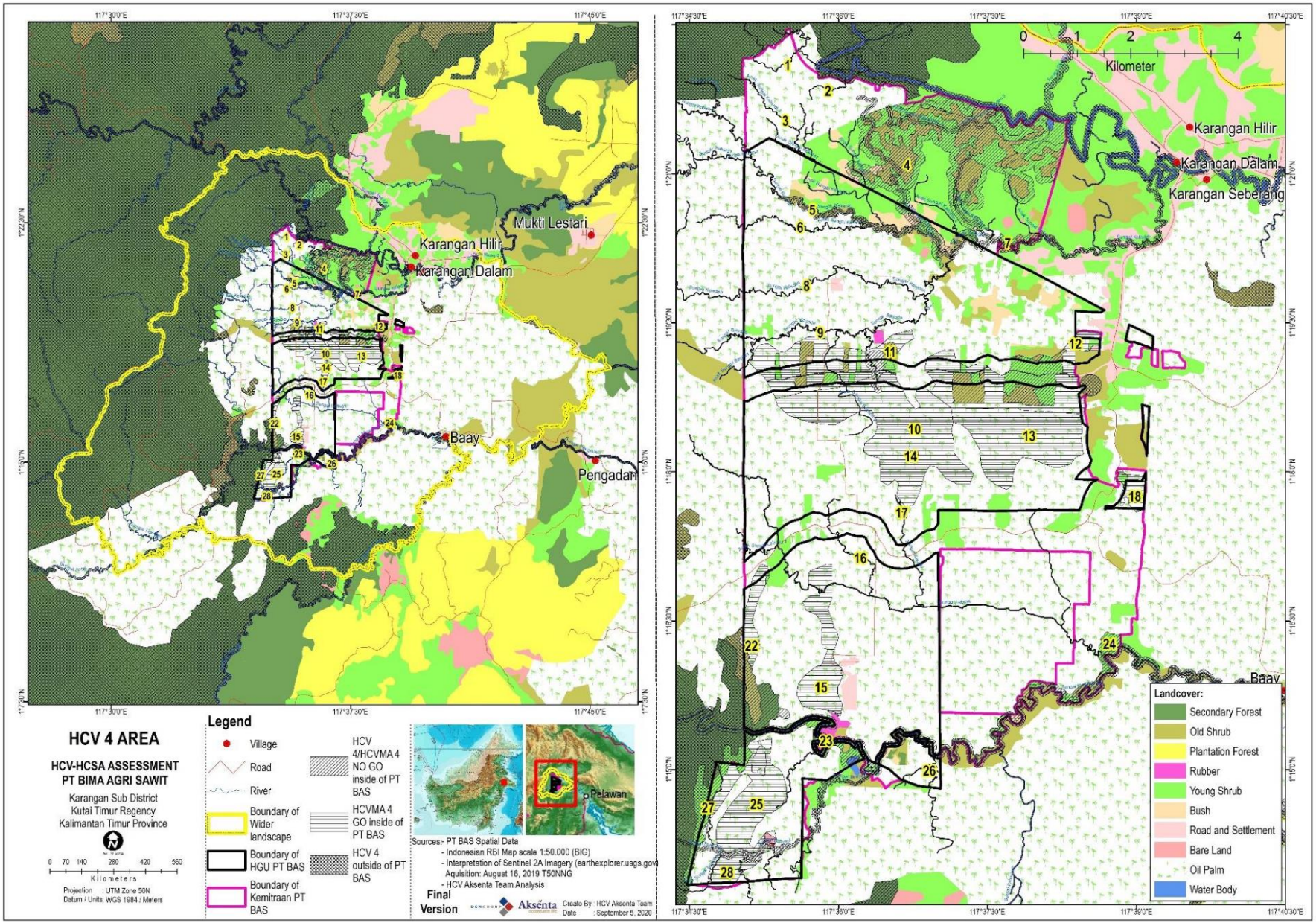


Figure 30 Map of HCV 4 areas in the MU area and its surroundings

B. HCV 5

This Assessment, observation and consultation with local community in the Assessment area indicate that most of them are not dependant on forest resources to meet their life needs. All their needs can be easily met through buying from local markets in Karangan Seberang, Karangan Hilir and Karangan Dalam Villages.

Most of families in Karangan Hilir currently heavily depend on cultivating rice fields in their village for earning livelihood. Few members of Baay, Karangan Dalam, Karangan Hilir dan Karangan Seberang Village community depend on fishing and fish farming to earn livelihood. As such, parts of water bodies of River Karangan, Muara Bulan and Baay flowing through Baay, Karangan Dalam, Karangan Dalam and Karangan Hilir Villages are HCV 5 areas to few local families.

As can be seen in **Table 27**, there are strong indications of the presence of HCV 5 areas in the Assessment area, in the form of rice fields and rivers. The majority of local community who populates Karangan Dalam and Karangan Seberang Villages obtain sources of water to meet their daily needs from clean water network under Local Government Water Company (PDAM) management which source their water from River Karangan.

Total HCV 5 area in PT BAS MU area is 71.3 ha entirely in the form of river (**Figure 31**). As for River Karangan, that is also identified as HCV 5 area, it is located outside the MU area but still within the AoI. As for hunting grounds are located around Mt. Beriun, as well as PT Araraya and PT KTW concessions to the west of the AoI, including Karangan Dalam, Karangan Hilir, and Baay village forests, in addition to rice fields in Karangan Hilir Village, all of which are outside the AoI.

Table 27 Indication of HCV 5 presence in the assessment area

HCV 5	Finding
Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc...), identified through engagement with these communities or indigenous peoples.	**Present**: There are rivers used by local communities for fish farming and fishing. **Potential**: - **Absent**: -
Situations that qualify as HCV 5	**Indication in the Assessment Area**
Hunting and trapping grounds (for game, skin and furs).	**Absent**. Hunting and trapping grounds are found in downhill Mt. Beriun outside the AoI.
Non-Timber Forest Products (NTFP) such as nuts, berries, mushrooms medicinal plants, rattan	**Absent**. There is use of NTFP outside the company concession in forest area, particularly around Beriun Hill. Each village has Village Clinics. Sub-District Clinic is found in Karangan Sub-District.
Fuel for household cooking, lighting and heating	**Absent**. The majority of the community is used to LPG, while some others still use firewood they collect from house yards for special purposes. State Electricity Company (PLN) service already reaches out all of the villages.
Fish (as essential sources of proteins) and other freshwater species relied on by local communities	**Present**. Few community members in Karangan Dalam, Karangan Hilir, Karangan Seberang and Baay Villages depend on fishery activity.
Building materials (poles, thatching, timber)	**Absent**. Most of local buildings are already made of building materials easily accessed at local market. Timbers are bought from market or neighbours who still own many trees in their house yards and from forest areas outside the company concession.
Fodder for livestock and seasonal grazing	**Absent**. There are no permanent or nomadic herdsmen. Fodder is obtained from house yards and markets.

HCV 5	Finding
Water sources necessary for drinking water and sanitation	**Present**. Most of families have dug or drilled wells and have access to Local Government Water Company (PDAM) service. Few of them still use rivers as sources of clean water.
Items which are bartered in exchange for other essential goods, or sold for cash which is then used to buy essentials including medicine or clothes, or to pay for school fees.	**Absent**. Community is already capable of accumulating wealth and earn income from rubber, oil palm, irrigated rice and cacao.

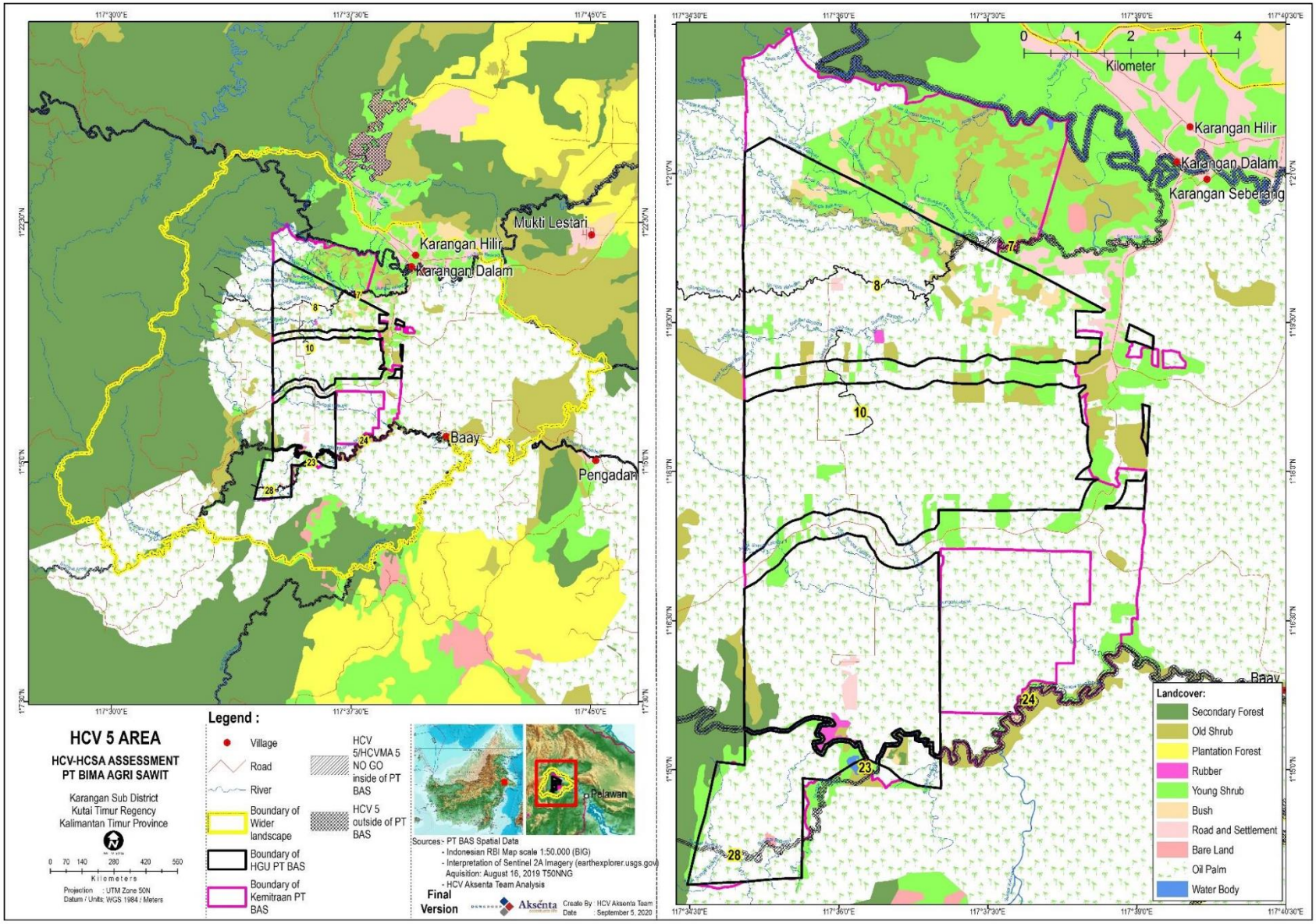


Figure 31 Map of HCV 5 areas in the MU area and its surroundings

C. HCV 6

One situation is found in the Assessment area, qualifying as HCV 6 (**Table 28**). *First*, sites of potentially important historical and cultural values, even if they remain unprotected by legislation, and potential religious or sacred sites, burial ground, or where traditional ceremonies of important roles to local communities or indigenous peoples are performed. Both sites take the same forms, i.e. cave (BAS 1 and BAS 2 caves) within the MU area (**Figure 32**). *Second*, the presence of plant resources used in traditional ceremonies.

Caves with important cultural values that have been identified by East Kalimantan Province Cultural Reserve Preservation Agency (BPCB) and acknowledged by national policies are located outside the AoI. Sangkulirang-Mangkalihat prehistoric rock art area that has been listed under UNESCO's Tentative List since 2015 are also located outside the AoI. Karst hill areas mentioned in this area proposal includes Merabu, Batu Raya, Batu Gergaji, Batu Nyere, Batu Tutunambo, Batu Pengadan and Batu Tabalar.

A site of Dayak Basap old burial ground taking form of a cave on Nyuaring karst hill cliff contains *lungun* (Dayak traditional wooden coffin). Nyuaring hill burial ground is located within PT MPI concession, to the west of the MU area. PT MPI has assigned this site as a protected area. In final consultation with Baay Village traditional chief, Sahrudin P, he mentions that the old burial ground in Baay is a site of important historical and cultural values as well as a religious or sacred site. Burial grounds or locations where traditional ceremonies take place play important roles to local communities or indigenous peoples. These burial grounds are where Baay Village ancestors, who were the first Islamic missionaries in the village, were buried. The burial ground is within the AoI but outside the MU area (**Figure 9**).

Table 28 Indication of HCV 6 presence in the assessment area

HCV 6	Finding
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.	**Present**: Outside the MU area but within the AoI there are two sites of old burial ground, i.e. (i) Nyuaring Hill cave; and (ii) complex of historical burial grounds of Baay Village community. There are plant resources used in traditional ceremonies. **Potential**: There are two caves that may potentially have important historical and cultural values acknowledged by local communities.
Situations that qualify as HCV 6	**Indication in the Assessment Area**
Sites recognised as having high cultural value within national policy and legislation.	**Absent**. There is an Ancient Kutai Site in East Kutai District, which has been assigned by on Minister Decree No. PM.29/PW.007/MKP/2008. The AoI is not concerned with this site.
Sites with official designation by national government and/or an international agency like UNESCO.	**Absent**. Sangkulirang-Mangkalihat karst area is listed under UNESCO Tentative List and some of the caves are located near the AoI.
Sites with recognised and important historical or cultural values, even if they remain unprotected by legislation.	**Present.** There are two sites of old burial ground located outside the MU area but within the AoI, i.e. (i) Nyuaring Hill cave; and (ii) complex of historical burial grounds of Baay Village community.
Religious or sacred sites, burial grounds or sites at which traditional ceremonies take place that have importance to local or indigenous people.	**Potential.** BAS 1 and BAS 2 caves with potentially important historical and cultural values, as well as sacred sites playing important roles to local communities and indigenous peoples.
Plant or animal resources with totemic values or used in traditional ceremonies.	**Present.** Plant resources used in performing traditional ceremonies.

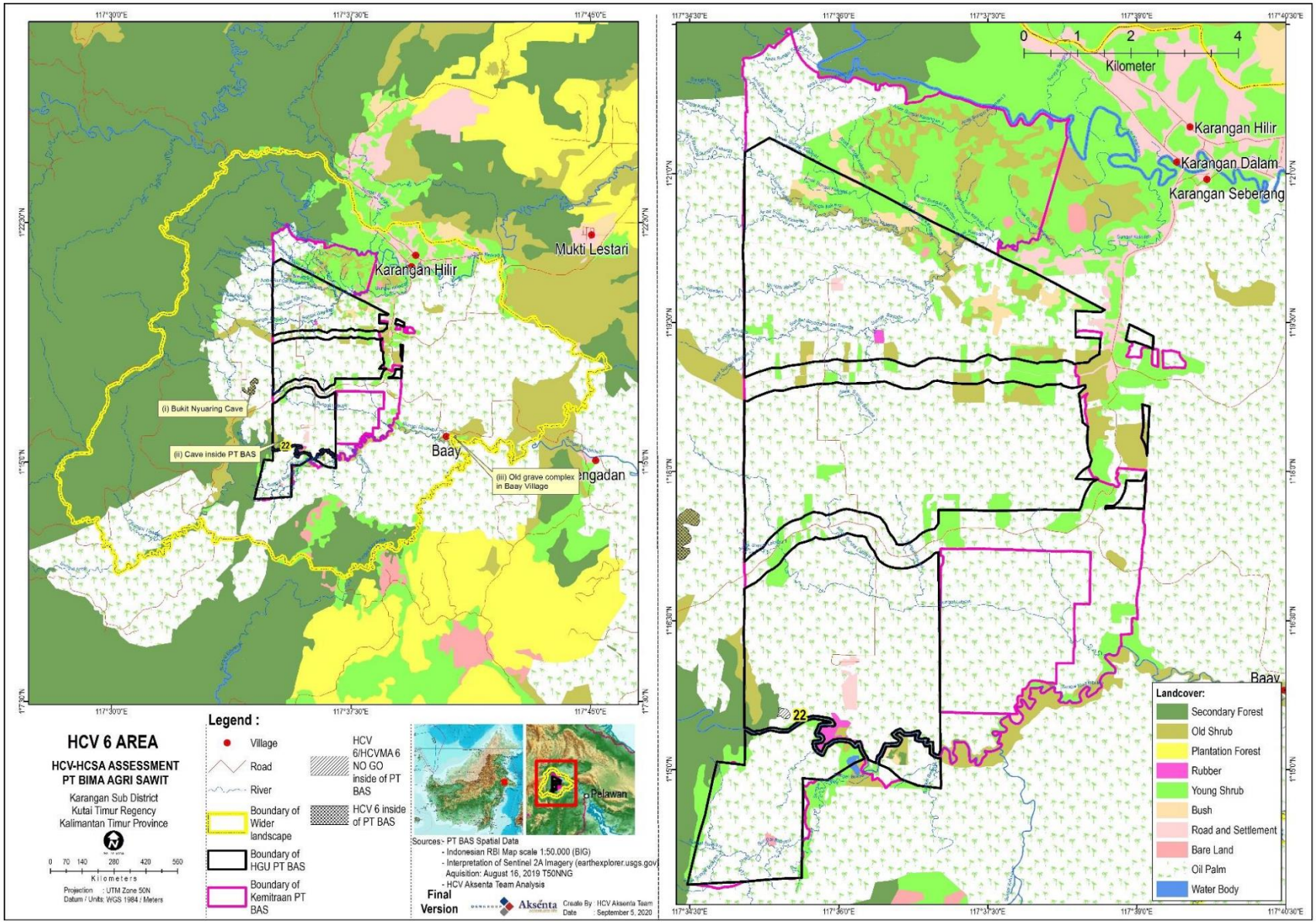


Figure 32 Map of HCV 6 areas in the MU area and its surroundings

D. Community lands and future source of livelihood

Based on interview with informants, especially those from smallholder groups, it is known that they have many stocks of land for farming/foods, which is why they would like to cooperate with the PT BAS under oil palm plantation development partnership scheme. People economic sector in community lands is dominated by oil palm and cacao plantations, in addition to mix garden and rice cultivation (including rice fields). Rubber plantations and swiftlet nest business are growing. Apart from that, freshwater aquaculture and hunting sub-sectors in currently forested areas remain practiced in a small scale. Sources of local community livelihood is moderately secured with the presence of these economic activities.

Local governments aid farmer groups in rice field construction. Community is involved in this area as the landowner and managing individuals. The majority of community rice fields have no technical irrigation so that they can only harvest once in a year. Annual farming activities are still carried out traditionally using slash and burn technique. Rice fields are outside the AoI. As for most of the farms within the MU area, they are not cultivated and serve only as backup lands.

Availability of community sources of livelihood in the future can be projected against the availability of rice as the staple food. Statistics of *Kecamatan Karangan dalam Angka 2018* (BPS, 2018) indicate that total irrigated and dryland rice field harvest areas were respectively 79 ha and 244 ha in 2017. Average national rice consumption per capita in 2017 is 117.58 kg per capita per year. Assuming that Milled Dry Husk (GKG) production is 5.08 tonnes per ha[3] and there are only two times of harvest in a year. Assuming that husk-to-grain conversion 64.02%[4] , the produced rice will be 2,100 tonnes per year. Karangan Sub-District population is 12,358 people, the total needs for rice is 1,453 tonnes per year. Given that such condition, it is concluded that sources of livelihood of Karangan SubDistrict population in the future is quite well secured.

If we use HCV-HCSA Assessment Guide, it is known that area that should be allocated to maintain food security is 0.5 ha per person. Given such indicative figure, area that should be allocated for Karangan Sub-District food security is 6,179 ha, which is much larger than the areas of dryland and irrigated rice fields combined together. In the future, the local community can rely on their sources of livelihood from food crop yields with additional alternative cash income they can earn from working in local plantation, forestry and mining companies or from oil palm, cacao, swiftlet nest and rubber sap.

Environment section: method and output

E. Environmental assessment method

Method used in secondary data analysis is desktop review and spatial analysis including map analysis. Specifically, for example, literatures on potential presence of karst ecosystem or important species in East Kutai such as orangutan, Proboscis monkey, Bornean white-bearded gibbon and banteng. To assess HCV 1, 2 and 3, thematic maps on Borneo biodiversity and updated information on globally and nationally important species, such as what IUCN, CITES, BirdLife International, Ramsar, Intact Forest Landscape, and Ministry of Environment and Forestry (MoEF) have published, are collected. Further, concerning forest inventorying and carbon calculation, several relevant references are collected, particularly those concerned with method and allometric equation for biomass estimation (**Table 29**).

3 https://databoks.katadata.co.id/datapublish/2017/07/31/produktivitas-padi-indonesia-di-bawah-vietnam
4 https://industri.kontan.co.id/news/bps-revisi-konversi-gkg-ke-beras-sekarang-jadi-6402

Table 29 Secondary data used in study of the environment and biodiversity aspect

Kategori	Jenis data dan informasi	Sumber data
HCV 1, 2, 3	▪ Conservation area map ▪ IUCN Red List of Threatened Species. ▪ Status of protection species in Indonesia ▪ Appendices I, II and III, valid from 4 October 2017 ▪ Birds in Sumatera, Jawa, Bali and Kalimantan ▪ Mamalia in Kalimantan, Sabah, Sarawak & Brunei Darussalam ▪ Orangutan nest intventory ▪ Amphibia of Borneo ▪ A Field Guide to The Reptiles of South-East Asia ▪ Sentinel-2 satellite imagery	▪ MoEF (2014)[5] ▪ IUCN (www.iucnredlist.org) ▪ MoEF (2018)[6] ▪ CITES (2017) ▪ MacKinnon *et al.*, 2016 ▪ Payne *et al.* (2000) ▪ Atmoko dan Rifqi (2012) ▪ Inger (2005) ▪ Das (2010) ▪ USGS (www.earthexplorer.usgs.gov)
Inventarisasi hutan dan pendugaan cadangan karbon	▪ Green House Gas assessment procedure for new planting - version 3 ▪ HCS Approach Toolkit Version 2 ▪ Monograph: Allometric Models for Estimating Tree Biomass at Various Forest Ecosystem Types in Indonesia ▪ Sentinel-2 satellite imagery ▪ Guidelines for Using Allometric Models for Estimating Indonesian Forest Biomass and Carbon Stock	▪ RSPO, 2016 ▪ HCSA Steering Group, 2017 ▪ Krisnawati *et al.*, 2012 ▪ USGS (www.earthexplorer.usgs.gov) ▪ Head of Research and Development Forestry Decree No.P.01/VIII-P3KR/2012

Field measurement is carried out by establishing measurement plots for measuring DBH to estimate each tree individual's biomass value. Number of biomass measurement samples is set using experimental design method, taking into account the variable of Aboveground Biomass (**"AGB"**) value deviation at each class of initial land cover (*equation 1*). As many as 211 spots are set for sampling spot design based on the equation (**Table 30**).

$$N = \frac{t^2 \times s^2}{E^2} \qquad (equation\ 1)$$

Note:
N = number of samples
t = value of t from Student's T-Test table for confidence interval 90%
s = standard deviation estimated based on available data set from the similar forest type.
E = standard error as the percentage of estimated average value

Table 30 Designed number of inventorying plots in natural vegetation land cover

Density Class	T Value	Standard Deviation (tonne-c/ha)	Mean (tonne-C/ha)	AGB Carbon Stock Range (tonne-C/ha)	Planned Number of Plot	Realisation
Low-density secondary lowland forest	1.66	32	55	35-75	56	62
Thickets	1.66	14	25	15-35	88	88
Bush and barren soil	1.66	5	10	5-15	67	14
Total					**211**	**164**

[5] Ministry of Forestry Decree No. SK.718/Menhut-II/2014
[6] Ministry of Environment and Forestry Decree No. P.106/MENLHK/SETJEN/KUM.1/12/2018

Based on biomass estimation and land cover verification, there has been found new land cover that was not identified during scoping study, i.e. medium-density secondary lowland forest in Muara Bulan riparian ecosystem. There are 14 spots of cover verification samples in the forest area, 4 out of which are locations of biomass sample locations and the other 10 are land cover sampling spots outside the Assessment area. The medium-density secondary forest land cover statistical analysis is then included in low-density secondary forest land cover statistical analysis

Vegetation inventorying plots are placed on both random and systematic manners. Plot placement combination aims at increasing the data accuracy and making sure that plots are distributed in the entire area (polygon). They are randomly placed in areas with relatively small polygon. As for systematic placement is carried out in areas with relatively large polygons, using transect line and regular distance. Stands are inventoried at each sampling location using circle plot (**Figure 33**) and the measured carbon sample is AGB carbon.

Carbon stock is estimated using generic allometric equation for secondary forest (Adinugroho, 2009), which is relevant to be used in this Assessment because it has relatively same condition of land cover, i.e. in areas disturbed by logging activities and previously burnt forest. As for undergrowth biomass value, this is estimated using dry weight coefficient of 0.64 from the wet weight. The carbon stock value is derived using coefficient of 0.47 of the tree and undergrowth biomass value (HCSA Steering Group, 2017). Statistical test is then performed to identify the quality and distribution of carbon value estimation data. The statistical tests include Anova test and Scheffé analysis, which are simple statistical tests.

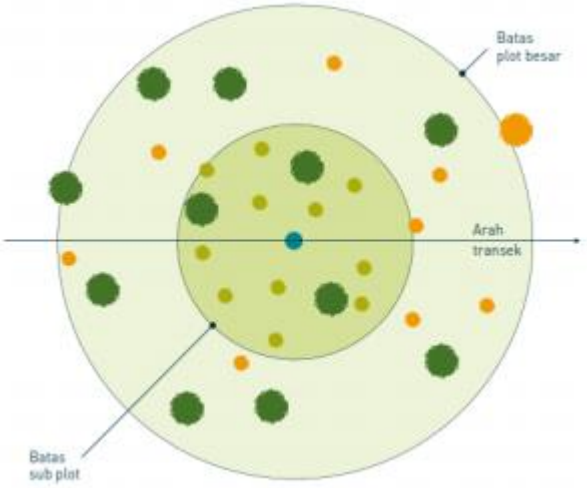


Figure 33 Plot and sub-plot form and size

HCV 1: Wildlife and Plant Species

Survey and field data collection method for HCV 1 involves the following data collection and extraction techniques: (i) exploration, where all data on wildlife species, orangutan nest distribution and plant species are collected along the route of field survey and verification; (ii) line transect, where wildlife and plant data are collected and extracted in particular distance (distance between observation plot is 200-400 m) and transect often follows footpath already in the location; (iii) line transect for inventorying orangutan nests; (iv) observation plot (circular microhabitat plot with diameter of 50 m and 20 x 100 m profile diagram plot (5 20 x 20 m sub-plots); this sampling technique is used for plant taxa, identifying orangutan nesting trees and food; and (v) interview with local community on the presence of wildlife species and threats to various wildlife species. Wildlife and plant species observation focuses on identifying the presence of RTE or restricted-range species. Orangutan population estimation is focused on Rantau Pakis SG area.

HCV 2

Method that this assessment uses to identify HCV 2 area is combination between spatial analysis and qualitative observation. Employing GIS techniques and remote sensing, spatial analysis is carried out to identify the position

in the assessment area against any IFL, conservation or other natural ecosystem areas within and around the Assessment area. Several indicators are observed, focusing on: i) the presence of natural ecosystems; ii) verification of natural ecosystem in the context of the wider landscape; and iii) verification of connectivity between a potential area and two or more large landscapes.

HCV 3

HCV 3 is identified by combining spatial analysis and groundtruthing based on two approaches, i.e. precautionary approach based on HCV Toolkit for Indonesia (Consortium for Revision of the HCV Toolkit for Indonesia, 2008) and subjective approach referring to the situations that qualify as HCV 3 referring to Common Guidance for the Identification of HCVs (October 2013). Groundtruthing is carried out to verify the land cover produced by satellite image interpretation and make sure whether natural ecosystems are present (or absent) in the Assessment area, i.e. qualitative observation over several indicators, such as phases of succession that are taking place and the ecosystems' quality or condition.

Hydrological functions and environmental services

Field activity for identifying hydrological functions and environmental services, including observation of soil type, is carried out based on the object assessed. For each type of Assessment object, the basic question to ask is what kind of environmental services values, functions and benefits are ultimately important and the object can provide. Each Assessment object found must be accompanied with the following: (i) toponyms; (ii) location description; (iii) current status (e.g. type and intensity of its use); (iv) threats and potential threats; (v) coordinate; and (vi) documentation in the form of field photograph. Soil type is identified particularly to verify the presence (or absence) of peat soil.

Field activity output: interview/discussion and field survey

Interview during field data collection is carried out towards 13 informants, concerning biodiversity and environmental aspects (Table 31). Information collected from them relates to the presence of flora and fauna species, interaction between community and flora and fauna, and identification of threats to flora and fauna and their habitats.

Table 31 Summary of interview during field data collection

Expert/ Organisation/ Social Group	Name	Type of Interaction	Concern and/or Recommendation
Researcher in Ecositrop Foundation	Miftah Ayatussurur	Interview	- Ecositrop once conducted a survey in PT Telen concession (to the east of PT BAS concession). - In PT Telen concession there has been found orangutan, sun bear and clouded leopard. - Orangutans around PT Telen concession (including PT BAS) use karst ecosystems to the north and west of PT BAS as their refugia due to the absence of natural habitats in the Assessment area. - Orangutan adapts to the condition where they lack of natural habitats in search for ideal food, consuming Borneo ironwood seeds and leaves.
Researcher in Ecositrop Foundation	Komar	Interview	

Expert/ Organisation/ Social Group	Name	Type of Interaction	Concern and/or Recommendation
			- In PT Telen concession, there has identified orangutan that consumes shoots of oil palms of age above 5 as the form of this species adaptation. This is also likely to occur in PT BAS concession, for which mitigation efforts should be established. - There has been found orangutan habitat pouches to the east of PT Telen concession. Orangutan corridor should be designed taking into account the findings of Ecositrop Research Team in PT Telen concession and the presence of the habitat pouches to the east of PT Telen concession. - During survey in PT Telen concession and its surroundings, no helmeted hornbill *(Buceros vigil)* has been encountered, neither did he gain information on this species presence.
Karangan Seberang Village community member/PT BAS worker	M. Suryadi	Interview/field assistance	- Community no longer poach wildlife for meeting their needs. Hunting is only done as a hobby, including fishing in the rivers. - Fishing activities in the rivers are also not much carried out as conflicts frequently take place between human and crocodile, especially in River Karangan. - Currently, interaction is very low between community and lands in Rantau Pakis SG area. Community expects that the lands be immediately made object of cooperation with PT BAS
PT BAS worker	• Emilianus • Silvester	Interview/field assistance	- No orangutan has been sighted while working in PT BAS concession. - Crocodiles are often encountered in River Muara Bulan.
PT BAS worker security officer	Oscar	Interview	- Once saw a clouded leopard passing by in Block D14. - Saltwater crocodile and Asiatic softshell turtle are often found in River Keledan. - Gibbon voice is frequently heard in Rantau Pakis SG area. - Orangutan nests are often found in enclaves within PT BAS HGU concession. - During land clearing activities at N and O (southern part of PT BAS concession), there once found footprint presumed to be banteng's. Today, no more information is gained on the presence of banteng in PT BAS concession.
Leader of Rantau Pakis SG	Julkipli	Focus Group Discussion	- Many orangutans are found in the Rantau Pakis SG area (the Assessment area). - Community no longer poaches to meet their daily needs. This activity is now incidentally done only when prey is encountered when community visits their lands. - Borneo ironwoods are often found in Rantau Pakis SG area. Community uses this timber species to fill in their stock of timber. - Community expects that the cooperation with PT BAS in managing lands in Rantau Pakis SG area be immediately realised.
Treasurer of Rantau Pakis SG	Y. Boas Lebo	Focus Group Discussion	
Member of Rantau Pakis SG	Suwanto	Focus Group Discussion	
Member of Rantau Pakis SG	Yus Melud	Focus Group Discussion	
Member of Rantau Pakis SG	Yansen P	Focus Group Discussion	
Member of Rantau Pakis SG	Jhon Arfang	Focus Group Discussion	
Member of Rantau Pakis SG	Parel Samuel	Focus Group Discussion	

Survey activity for environmental HCVs includes forest inventorying plots establishment; field observation for HCV 1, 2 and 3 that includes fauna and flora identification, and rare and threatened ecosystem presence verification; land cover groundtruthing; and field observation for HCV 4 related to rivers (Figure 34). Locations are visited during full assessment (Table 32) to follow up the output of field verification during scoping study phase. In full assessment, field survey is prioritised to visit areas covered with medium-density secondary lowland forest to ensure the presence of orangutan distribution in the Assessment area.

Table 32 Recapitulation of environmental field survey activity

No.	Line/Survey Location	Identification		Orangutan		Verification		FI Sample	River	Soil
		Fauna	Flora	Population Estimation	Potential Presence of Food Trees and Nests	Land Cover	Ecosystem			
1	Rantau Pakis SG area*	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Enclaves in PT BAS HGU concession	✓	✓	-	✓	✓	✓	✓	✓	✓
3	Karst ecosystems in the southern part of PT BAS HGU concession (inside the concession)	✓	✓	-	✓	✓	✓	✓	✓	✓
4	Karst ecosystems to the southwest of PT BAS HGU concession (outside the concession)	✓	✓	-	✓	✓	✓	-	-	✓
5	River Muara Bulan	✓	✓	-	✓	✓	✓	✓	✓	✓
6	Secondary forest to the west of PT BAS and PT MPI concessions (outside PT BAS HGU concession)	✓	✓	-	✓	✓	✓	-	-	-

Note: ✓ = type of activity carried out; - = not carried out

* = Including River Karangan and Keledan, as well as their tributaries

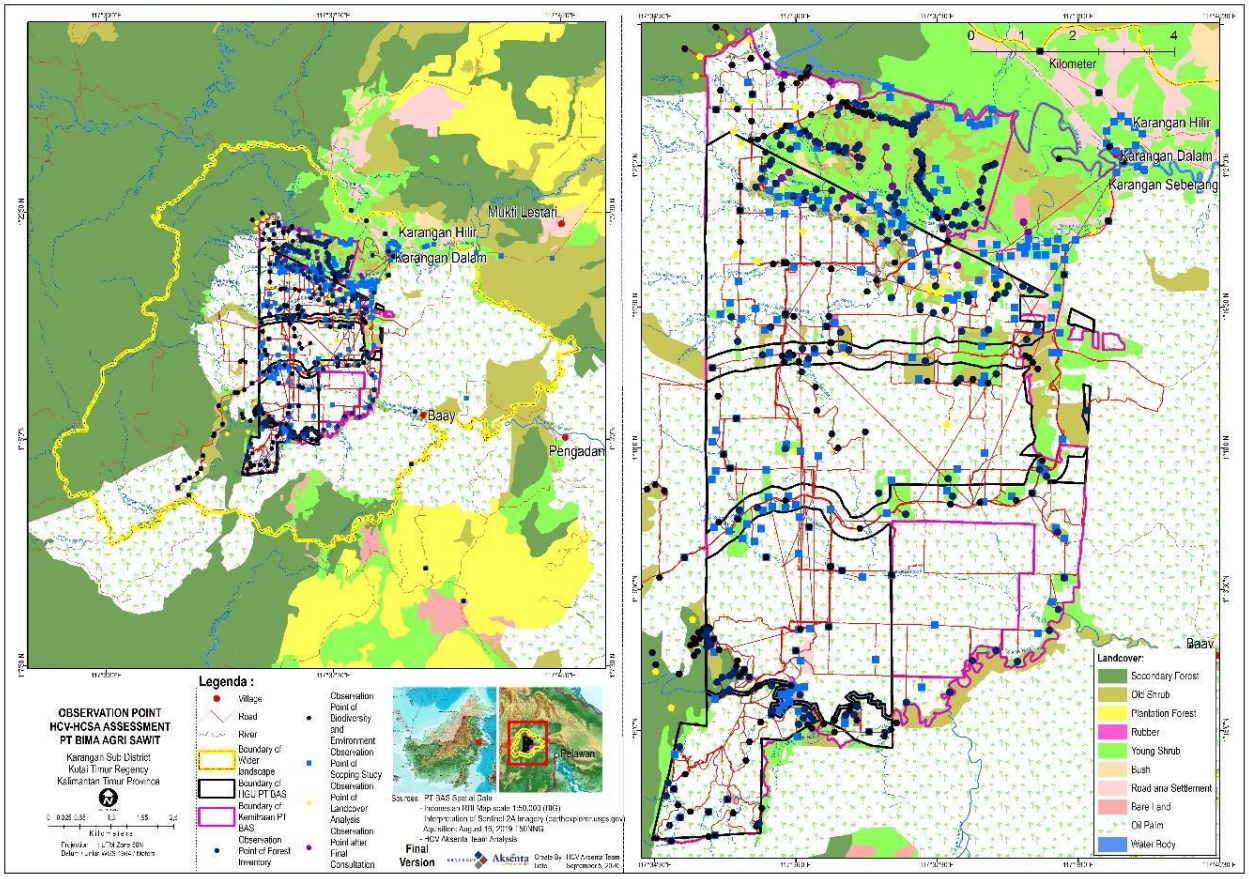


Figure 34 Locations of environmental field (HCV 1, HCV 2, HCV 3, sample FI and HCV 4) data collection survey

HCS classification and carbon assessment

1. **Strata description**

Table 33 Description of HCS land cover class strata and their equals to land cover class

HCS Land Cover Class	Average Carbon Amount	Land Cover Class	Description	Photograph
Potential HCS Class				
High-Density Forest (HDF)	-	-	*Not found.*	-
Medium-Density Forest (MDF)	-	-	*Not found.*	-
Low-Density Forest (LDF)	83.9 tonne-C/ha	Medium-density secondary lowland forest	This land cover is found taking form of small fragments of Muara Bulan riparian area, totalling to 5.3 ha. Vegetation inventorying indicates that medium-density secondary lowland forest is dominated by tree individuals with DBH>20 cm that are denser than those with DBH<20 cm. Plant species found include *Cananga odorata, Dracontomelon dao, Kleinhovia hospital, Dillenia excelsa* and *D. grandifolia.*	
Young Regeneration Forest (YRF)	38.6 tonne-C/ha	Low-density secondary lowland forest	Low-density secondary lowland forest is found in lowland forest, riparian and karst ecosystems. Given the composition, this land cover type is dominated by trees with DBH of 10-20 cm, while trees with DBH > 20 cm are found much less than those with DBH 10-20 cm. In addition, wildlings with diameter < 10 cm have moderately high density. As many as 153 species from 38 families have been identified. Some of them are pioneer species such as *Macaranga spp., Ficus spp,* and *Mallotus spp.* Dominant plant species include *Ptemandra rostrata, Kleinhovia hospital, Macaranga gigantea, Shorea sp., Palaquium sericeum* and *P. rostratum, Eusideroxylon zwageri*), and *Lagerstomia speciose.*	 

HCS Land Cover Class	Average Carbon Amount	Land Cover Class	Description	Photograph
Non-HCS Class				
Shrub (S)	16.8 tonne-C/ha	Thicket	Thickets are found in riparian and lowland forest ecosystems. Riparian thickets are found in Muara Bulan riparian area, while thickets in lowland forest ecosystems are found in enclaves and Rantau Pakis SG area. There has been found 108 plant species from 32 families. Dominant vegetation in all growth levels is *Macaranga gigantea*.	
Plantation Area (AGRI)	-	Oil palm plantation	Oil palm plantations identified in the Assessment area includes plantations of PT BAS, DMP Cooperative and PJ Cooperative.	
Plantation Forest (FP)	-	Rubber plantation	Rubber plantations are found in enclaves in PT BAS HGU concession. They are intensively managed by the owners so that rubber *(Hevea brasiliensis)* becomes the dominant plant.	
Barren Soil (OL)	5.4 tonne-C/ha	Bush	Such land cover type is dominated by plants with height <2 m. Several species found include *Nauclea subdita*, *Trema tomentosa*, *Vitex pinnata*, *Lycopodium cernuum*), *Nephrolepis biserrata*, *Melastoma malabathricum*, and *Imperata cylindrica*.	
		Barren soil	-	-
Others		Roads and settlement areas	-	-
		Water body	-	-

2. Estimated area of vegetation stratification

Table 34 Classification of HCS areas in the Assessment area

HCS Land Cover Class	Land Cover Class	HGU Concession*	Rantau Pakis SG*	DMP Cooperative*	PJ Cooperative*	Total *
Area (ha)						
Potential HCS Class						
High-Density Forest (HDF)	*Not found.*	-	-	-	-	-
Medium-Density Forest (MDF)	*Not found.*	-	-	-	-	-
Low-Density Forest (LDF)	Medium-density secondary lowland forest	42.0	-	0.9	-	**43.3**
Young Regeneration Forest (YRF)	Low-density secondary lowland forest	220.0	237.7	29.9	17.5	**505.1**
HCS potential Sub-total		**262.0**	**237.7**	**30.8**	**18.0**	**548.5**
Non-HCS Class						
Shrub (S)	Thicket	361.3	582.6	151.9	66.5	**1,162.3**
Plantation Area (AGRI)	Oil palm plantation	4,445.8	15.5	696.0	551.7	**5,709.1**
Plantation Forest (FP)	Rubber plantation	22.4	-	-	-	**22.4**
Barren Soil (OL)	Bush	104.5	30.1	3.1	-	**137.8**
Others	Barren soil	6.5	4.9	-	-	**11.4**
	Roads and settlement area	32.6	-	9.6	5.4	**47.5**
	Water body	-	-	24.1	-	**24.1**
Non-HCS Sub-Total		**4,973.2**	**633.1**	**884.7**	**623.6**	**7,114.6**
Total (Assessment area) *		**5,235.2**	**870.8**	**915.5**	**641.6**	**7,663.1**
Percentage (%)						
Potential HCS Class						
High-Density Forest (HDF)	*Not found.*	-	-	-	-	-
Medium-Density Forest (MDF)	*Not found.*	-	-	-	-	-
Low-Density Forest (LDF)	Medium-density secondary lowland forest	0.5	-	0.01	-	**0.6**
Young Regeneration Forest (YRF)	Low-density secondary lowland forest	2.9	3.1	0.4	0.2	**6.6**
Potential HCS Sub-Total		**3.4**	**3.1**	**0.4**	**0.2**	**7.2**
Non-HCS Class						
Shrub (S)	Thicket	4.7	7.6	2.0	0.9	**15.2**
Plantation Area (AGRI)	Oil Palm Plantation	58.0	0.2	9.1	7.2	**74.5**
Plantation Forest (FP)	Rubber Plantation	0.3	-	-	-	**0.3**
Barren Soil (OL)	Bush	1.4	0.4	0.04	-	**1.8**
Others	Barren soil	0.1	0.1	-	-	**0.1**
	Road and settlement area	0.4	-	0.1	-	**0.6**
	Water body	-	-	0.3	-	**0.3**
Non-HCS sub-total		**64.9**	**8.6**	**11.5**	**8.1**	**92.8**
Total (Assessment area) *		**68.3**	**11.4**	**11.9**	**8.4**	**100.0**

Note: * = GIS area

3. Vegetation stratification map

See **Figure 35** for final land cover map

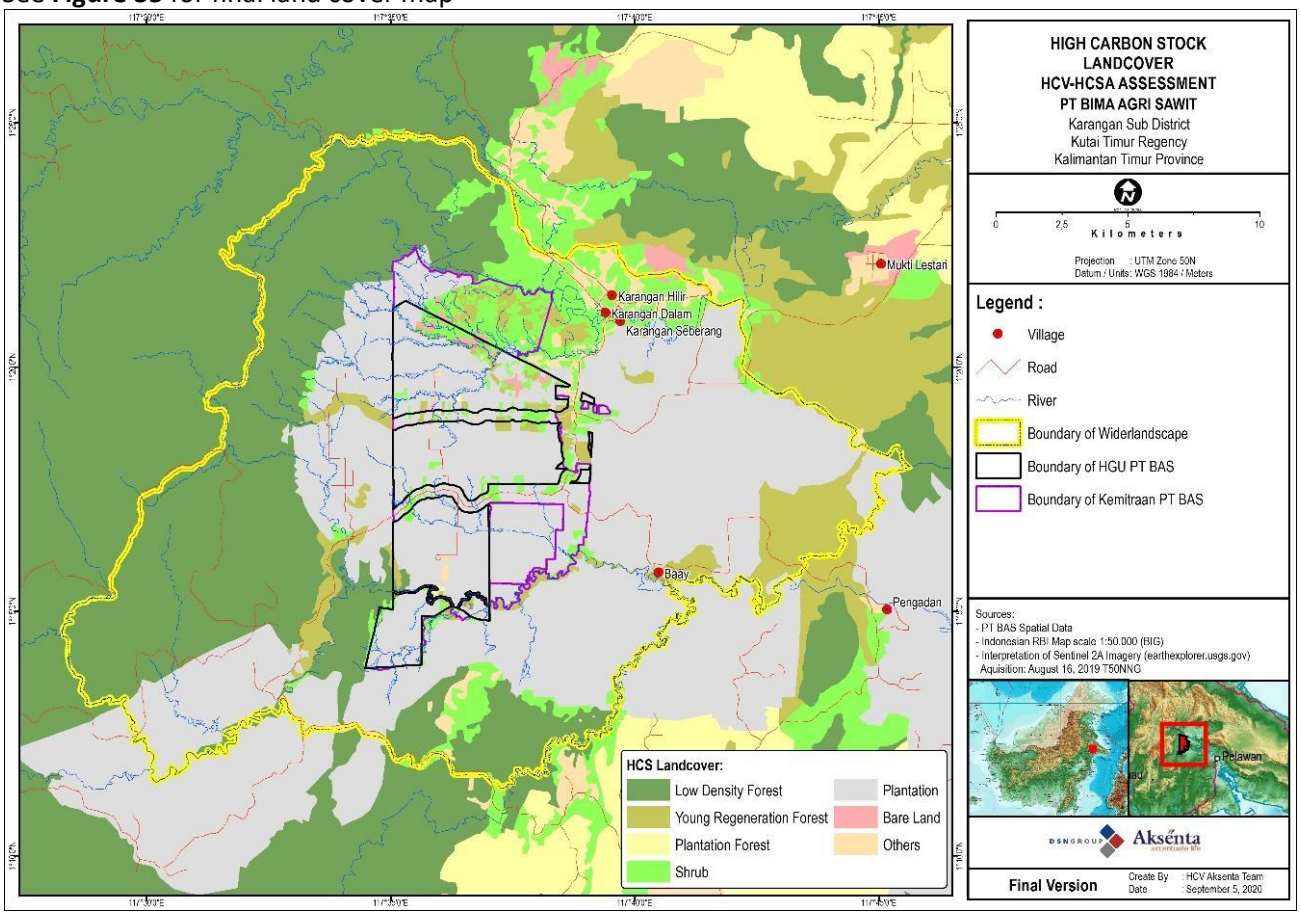


Figure 35 Map of vegetation stratification (HCS cover class) in the assessment area

4. Carbon stock estimate for vegetation stratification

Table 35 Estimation of carbon stock by HCS land cover class

HCS Land Cover Classification	Area (ha)	Number of Plot	Carbon Stock Average (tonne-C/ha)	Standard error of the mean	Confidence limits (90%)		Total Carbon Stock (Kilotonne-C)
					Lower	Upper	
Potential HCS Land Cover Class							
High-Density Forest (HDF)	-	-	-	-	-	-	-
Medium-Density Forest (MDF)	-	-	-	-	-	-	-
Low-Density Forest (LDF)	43.3	4	83.9	2.6	79.7	88.2	3.6
Young Regeneration Forest (YRF)	505.1	58	38.6	0.6	37.6	39.6	19.5
Non-Potential HCS Land Cover Class							
Shrub (S)	1,162.3	88	16.8	0.2	16.5	17.1	19.5
Plantation Area (AGRI)	5,709.1	-	-	-	-	-	-
Plantation Forest (FP)	22.4						
Barren Soil (OL)	137.8	14	5.4	0.4	4.7	6.1	0.7
Others	83.1	-	-	-	-	-	-

5. Carbon stock statistical analysis

Table 36 ANOVA output for plot-scale land cover carbon stock in average

Source	SS	df	MS	F	P-value	F_90% CL	Significance
Between Groups	37,070.8	3.0	12,356.9	4,199.1	0.0	2.12	Significant
Error	470.84	160.0	2.94	-	-	-	-
Total	**37,541.7**	**163.0**	**230.32**	-	-	-	-

Table 37 Scheffé test output for plot-scale land cover carbon stock in average

Variables	N	SS	Avg	
LDF	4	105.1	83.9	
YRF	58	33.5	38.6	
S	88	296.1	16.8	
OL	14	36.1	5.41	
SSE		470.8		
MSE		2.9		
p		0.100		
k-1		3.0		
N		164.0		
F		2,118		
Pair Wise Difference (Absolute values)				
Type	LDF	YRF	S	OL
LDF	-	45.3	67.1	78.5
YRF		-	21.8	32.2
S			-	11.4
OL				-
Scheffe Comparison Values				
Type	LDF	YRF	S	OL
LDF	-	2.2	2.2	2.5
YRF		-	0.7	1.3
S			-	1.2
OL			-	-
Significant Differences				
Type	LDF	YRF	S	OL
LDF	-	Significant	Significant	Significant
YRF		-	Significant	Significant
S			-	Significant
OL			-	-

Carbon stock estimate at plot level indicates that each HCS land cover class (LDF, YRF, S, and OL) significantly differs from one another. Furthermore, significant difference is also found in composition of trees with DBH >30 cm and canopy cover of each land cover class. Average number of trees with DBH > 30 cm in each plot is 10.3 trees/plot (64 trees/ ha) in LDF, 2.9 trees/plot (18 trees/ha) in YRF, and 0.3 tree/plot (2 trees/ha) in S.

F. HCV 1

HCV 1 criteria in the Assessment area are met through five out of six biodiversity situations that qualify for HCV 1 (**Table 38**). Areas important to biodiversity include forests in mixed dipterocarp forest ecosystems in Rantau Pakis SG area, forest fragments in enclaves, hilly areas with karst ecosystems, as well as rivers and their riparian areas (**Figure 37**). Total HCV 1 area is 1,220.2 ha with HCVMA of 2,535.9 ha.

HCV 1 for concentration of biodiversity, particularly orangutan, is found in low-density secondary lowland forest area in Rantau Pakis SG area. River Karangan, Muara Bulan, and Kekerat, as well as fragment of River Keledan, Kekerat 4 tributary and Keledan 6 tributary and River Buayan are defined as HCV 1 area, concerning their function as wildlife corridor. HCV 1 areas in these rivers also include their riparian areas with width of 50 m for tributary and 100 m for major rivers, as per national laws and regulations (Presidential Decree No. 32/1990 and Government Regulation No. 26/2008).

Table 38 Indication of HCV 1 presence in the assessment area

HCV 1	Finding
Concentrations of biological diversity including endemic species, and rare, threatened or endangered species, that are significant at global, regional or national levels.	**Present**: Population of RTE and/or endemic species, including orangutan, gibbon, clouded leopard, sun bear, wrinkled hornbill, rhinoceros hornbill, king cobra, Asiatic softshell turtle, *keruing*, Borneo ironwood, *bengkirai*, *kayu buyung*, and *dedera*. **Potential**: - **Absent**: -
Situations that qualify as HCV 1	**Indication in the Assessment area**
A high overall species richness, diversity or uniqueness.	**Present**. Several locations in the Assessment area that are still naturally vegetated may potentially serve as corridor/refugia to wildlife species. These locations include Rantau Pakis SG area, enclaves in PT BAS HGU concession, Keledan, Karangan and Muara Bulan riparian area and tributaries, and karst forest in the southern part of PT BAS concession.
Populations of multiple endemic or RTE species.	**Present**. RTE and endemic species include orangutan, gibbon, clouded leopard, *keruing* and *dedera*. RTE species include wrinkled hornbill, sun bear, macaque, rhinoceros hornbill, black hornbill, and king cobra. As for endemic species that does not fall under RTE category, it includes dusky munia *(Lonchura fuscans)*.
Important populations or a great abundance of individual endemic or RTE species.	**Absent**. It is estimated that orangutan population within the Assessment area is relatively small in number compared to those in Borneo Island.
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.	**Present**. Species with small population in the Assessment area include orangutan and gibbon. Orangutan population is concentrated at secondary forest land cover in Rantau Pakis SG area. One group of gibbons is found in Rantau Pakis SG area, and several others are to the north of PT BAS HGU concession (outside the concession). Both locations are connected through Karangan riparian area.
Sites with significant RTE species richness.	**Present**. RTE species found in the Assessment area are concentrated in locations with secondary forest land cover in Rantau Pakis SG area.
Particularly important genetic variants, subspecies or varieties.	**Present**. There are sub-species of Bornean orangutan *(Pongo pygmaeus ssp. Morio)* and gibbon *(Hylobates muelleri ssp. Funereus)*.

RTE species found in the Assessment area includes five mammal species, four bird species, two reptilian species, and nine plant species. Three species have Critically Endangered (CR) species, i.e. orangutan, *keruing* and *merawan*; four have Endangered (EN) status, i.e. gibbon, wrinkled hornbill, meranti and jisana; and 13 have Vulnerable (VU) status (**Table 39**). Endemic fauna species found include orangutan, Bornean white-bearded gibbon, clouded leopard and dusky munia. Endemic flora species found include *keruing*, *dedera*, *kayu riwis*, *Popowia cf. odoardi*, *Horsfieldia sp.*, *Syzygium tenuicaudatum*, *Baccaurea edulis*, *Kerotan*, *Palaquium cf. sericeum* and *Palaquium sericeum*. These endemic flora species are those that are associated to mixed dipterocarp forest ecosystem type. Unique flora species found in karst ecosystem are dominated by species from Ficus/*kayu ara* genus *(Moraceae)*.

Orangutan is directly encountered (1 individual) in Rantau Pakis SG area, along with their nests (127 nests) with estimated density of 4,99 nests per ha. Such nest density is concentrated in a low-density secondary forest area. In three nest inventorying transects (2 km each) set up in thicket area, there has been found only three nests located on the edge of low-density secondary forest area. Thicket areas in Rantau Pakis SG are ex-community farms. At the time this assessment is carried out, there has been identified several locations constituting active farms, from the central to the eastern part of the area because of their locations near local settlements.

Potential presence of orangutan food trees is also concentrated in forest-covered areas. Out of 198 plant species identified, 83 have potentials as food trees, and 70 others are found at low-density secondary lowland forest class, 7 are found in medium-density secondary lowland forest class, and the rest are found in thicket class. Food plant species found in thickets are normally fruit species planted by farmers. Other than as source of food, forest in Rantau Pakis SG area is also identified to function as refugia. Based on final consultation,7 it is recommended that refugia for orangutan take form of low-density secondary lowland forest found in Rantau Pakis SG area up to River Karangan, to allow this species to move safer to the larger forest areas to the west through Karangan riparian area.

The form of corridor in the Assessment area is linear, stepping stone-resembling corridor and landscape corridor (**Figure 36**). Buffer zone (100 m wide) should be applied to areas around the lowdensity secondary lowland forest to serve as HCV area that reduced the edge effect in orangutan refugia. As for the thickets in the small fragments of the enclaves, these function as the stepping stone. Riparian belt of 100 m wide from the river should be applied to the riparian areas that become the wildlife corridor (Acrenaz, *et al.*, 2016 in Spehar S. *et al*., 2018).

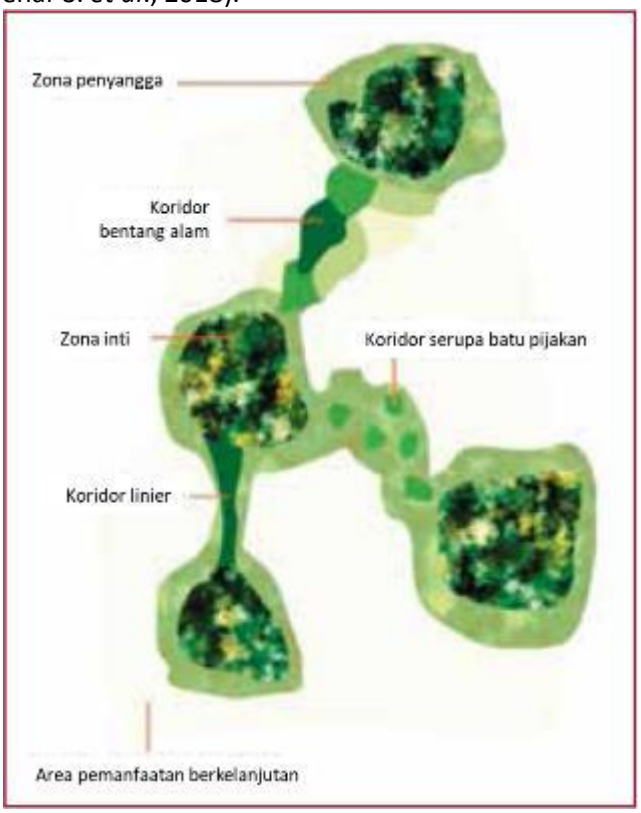


Figure 36 Forms of corridor (Forina, 2014)

7 Pers.comm with Dr. Yaya Rayadin, academics (orangutan reseacher)

Table 39 List of flora and fauna in the assessment area, with RTE and endemic statuses or listed in CITES Appendices, as well as their protection statuses

No.	Scientific Name	Indonesian Name	Status			
			R	IUCN	CITES	Law
Mammal						
1	*Pongo pygmaeus ssp. morio*	Orangutan	E	CR	I	P
2	*Hylobates muelleri ssp. funereus*	Kelampiau	E	EN	-	P
3	*Neofelis diardi*	Macan dahan	E	VU	II	-
4	*Helarctos malayanus*	Beruang madu	-	VU	I	P
5	*Macaca nemestrina*	Beruk	-	VU	-	-
6	*Pardofelis marmorata*	Kucing batu	-	NT	I	P
7	*Prionailurus bengalensis*	Kucing kuwuk	-	LC	II	P
8	*Muntiacus muntjak*	Kijang	-	LC	-	P
9	*Tragulus napu*	Pelanduk	-	LC	-	P
Bird						
1	*Rhabdotorrhinus corrugatus*	Julang jambul-hitam	-	EN	II	P
2	*Anthracoceros malayanus*	Kangkareng hitam	-	VU	II	P
3	*Buceros rhinoceros*	Rangkong badak	-	VU	II	P
4	*Argusianus argus*	Kuau raja	-	NT	II	P
5	*Psilopogon rafflesii*	Takur tutut	-	NT	-	P
6	*Elanus caeruleus*	Elang tikus	-	LC	II	P
7	*Accipiter trivirgatus*	Elang-alap jambul	-	LC	II	P
8	*Haliastur indus*	Elang bondol	-	LC	II	P
9	*Macheiramphus alcinus*	Elang kelelawar	-	LC	II	P
10	*Spilornis cheela*	Elang-ular bido	-	LC	II	P
11	*Microhierax fringilarius*	Alap-alap capung	-	LC	II	P
12	*Anthracoceros albirostris*	Kangkareng perut putih	-	LC	II	P
13	*Loriculus galgulus*	Serindit melayu	-	LC	II	P
14	*Gracula religiosa*	Tiong emas	-	LC	II	P
15	*Psilopogon chrysopogon*	Takur gedang	-	LC	-	P
16	*Aethopyga siparaja*	Burung-madu sepahraja	-	LC	-	P
17	*Hirundo rustica*	Layang-layang api	M	LC	-	-
18	*Lonchura fuscans*	Bondol kalimantan	E	LC	-	-
Reptile						
1	*Ophiophagus hannah*	King Kobra	-	VU	II	-
2	*Amyda cartilaginea*	Labi-labi	-	VU	II	-
3	*Crocodylus porosus*	Buaya muara		LC	II	P
4	*Naja sumatrana*	Ular Kobra	-	LC	II	-
5	*Python reticulatus*	Ular sawa	-	LC	II	-
6	*Varanus salvator*	Biawak	-	LC	II	-
Plant						
1	*Hopea mengarawan*	Merawan	-	CR	-	-
2	*Dipterocarpus tempehes*	Keruing	E	CR	-	-
3	*Shorea pauciflora*	Meranti	-	EN	-	-
4	*Pterocarpus indicus*	Jisana	-	EN	-	-
5	*Mangifera similis*	Merepetung	-	VU	-	-
6	*Shorea laevis*	Bengkirai	-	VU	-	-
7	*Shorea uliginosa*	Kayu Buyung	-	VU	-	-
8	*Eusideroxylon zwageri*	Ulin	-	VU	-	-
9	*Horsfieldia borneensis*	Dedera	E	VU	-	-
10	*Popowia cf. odoardi*	-	E	DD	-	-

No.	Scientific Name	Indonesian Name	Status			
			R	IUCN	CITES	Law
11	*Chisocheton cf. ceramicus*	Kayu Riwis	E	DD	-	-
12	*Horsfieldia sp.*	-	E	DD	-	-
13	*Syzygium tenuicaudatum*	Jambu Air	E	DD	-	-
14	*Baccaurrea edulis*	-	E	DD	-	-
15	*Neonauclea macrophylla*	Kerotan	E	DD	-	-
16	*Palaquium cf. sericeum*	-	E	DD	-	-
17	*Palaquium sericeum*	Nyatoh	E	DD	-	-

Note:
Range: Endemic ▪ Borneo Island; M ▪ Migrant;
IUCN statuses: CR▪ Critically Endangered, EN▪ Endangered, VU▪ Vulnerable;
CITES statuses: App. I ▪ Listed in Appendix I; II▪ Listed in Appendix II;
Law ▪ Protection status based on Law 5 of 1990 and Minister of Environment and Forestry Regulation No. P.106/MENLHK/SETJEN//KUM.1/12/2018.

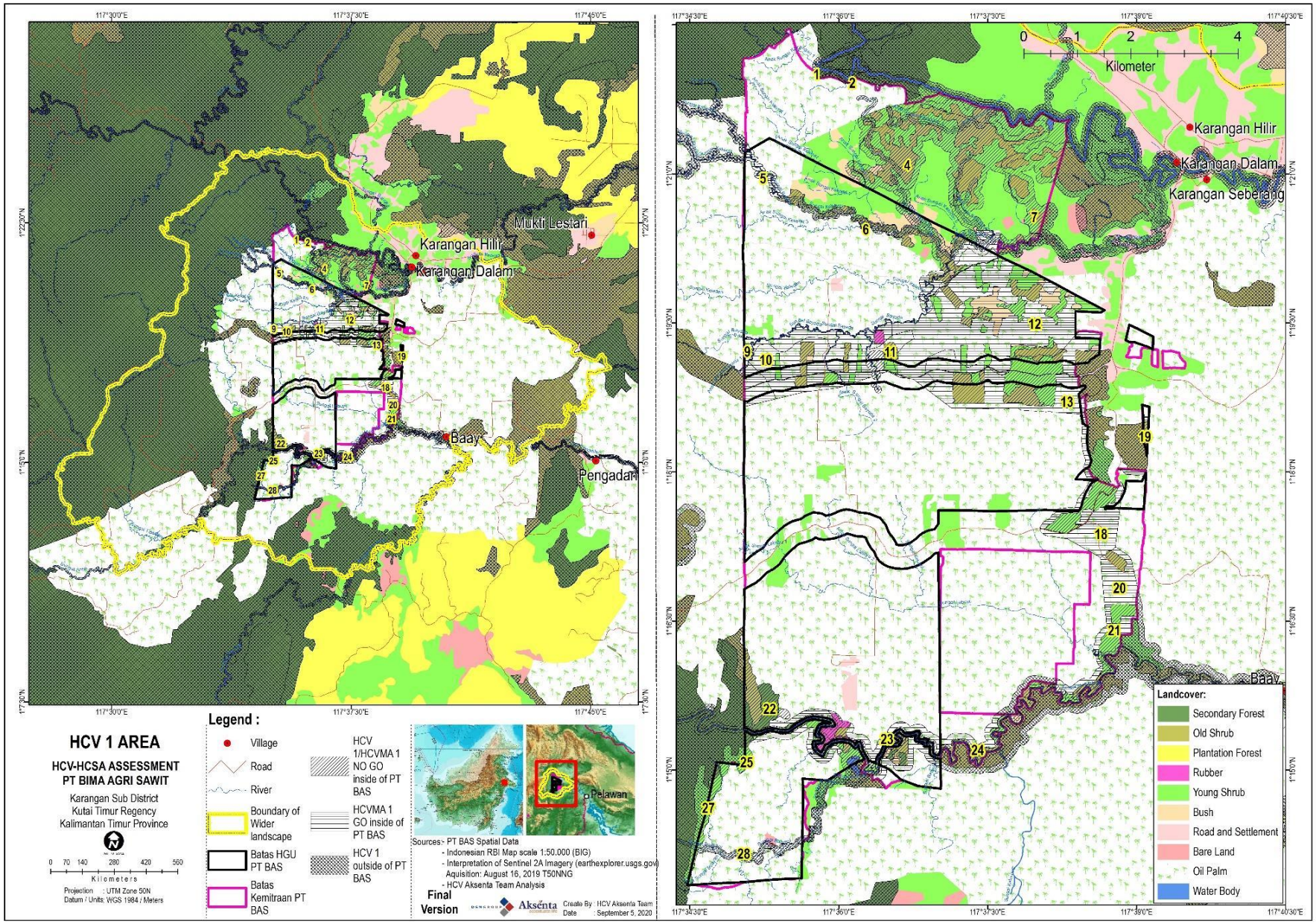


Figure 37 Map of HCV 1 areas in the MU area and its surroundings

G. HCV 2

Based on natural landscape map analysis and groundtruthing, HCV 2 area is concluded to be present in the Assessment area (**Table 40**). However, although the majority of the Assessment area takes form of cultivation zone dominated by oil palm plantations located far from IFL (88 km), there remains natural ecosystems or ecosystem mosaics that are of significant values as landscape (**Figure 38**).

In PT BAS HGU concession, there are small parts that connect directly to the forest landscape to the west of PT MPI and PT BAS concessions, i.e. 1) orangutan refugia in Rantau Pakis SG area and riparian areas around it directly connected through River Karangan; 2) karst ecosystem areas to the southwest of PT BAS, being a small part of the forest landscape to the west. Considered to be HCV 2 area, both areas entirely serve as 'No Go' HCVMA 2 (strictly protected). As for HCVMA 2 Go (with management prescription) is located in areas that, while become orangutan corridor, are not covered with forest. Total area of the HCV 2/'No Go' HCVMA 2 is 1,220.2 ha. If 'Go' HCVMA is also included, the total HCVMA 2 will be 2,535.9 ha.

Table 40 Indication of HCV 2 presence in the assessment area

HCV 2	Finding
Large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.	**Present**: Karst areas to the south of the HGU, connected to the larger forest areas. **Potential**: - **Absent**: -
Situations that qualify as HCV 2	**Indication in the Assessment Area**
Large areas (e.g. could be greater than 50,000 ha, but this is not a rule) that are relatively far from human settlement, roads or other access.	**Absent**. The Assessment area partially takes the form of cultivation lands, around which there are settlements, other developed areas and road access.
Smaller areas that provide key landscape functions such as connectivity and buffering.	**Present**. There are karst forest ecosystems having functions of connectivity or buffering with natural forests or centres of biodiversity around them. These areas are located in the southern part of the Assessment area.
Large areas that are more natural and intact than most other such areas.	**Absent**. There are no areas more natural or intact than the surroundings.

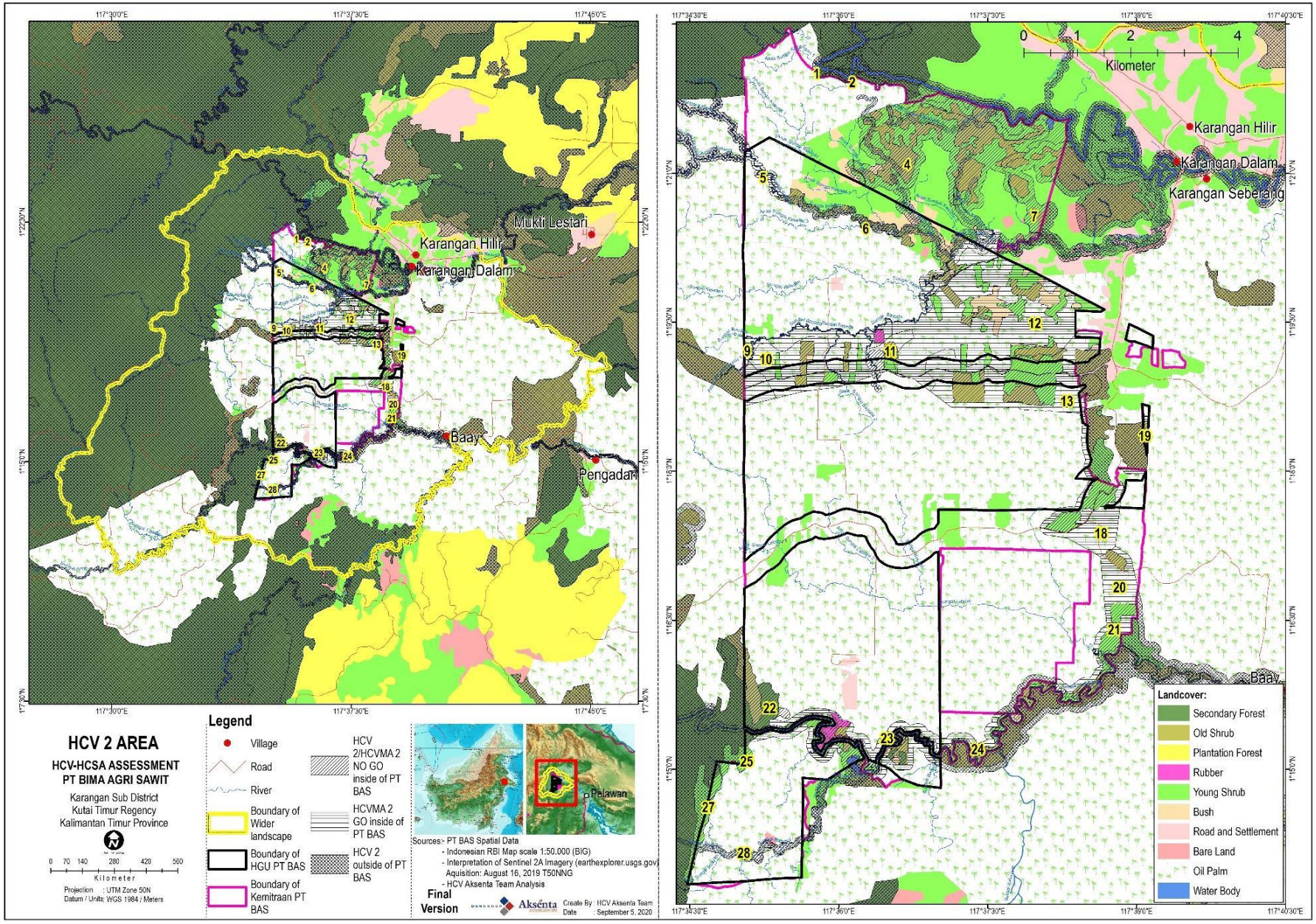


Figure 38 Map of HCV 2 areas in the MU area and its surroundings

H. HCV 3

This Assessment applies precautionary approach according to Toolkit Indonesia, in which 'decision tree' is used as the first phase to identify HCV 3. The decision tree output cannot yet include field findings that relate to the presence of HCV 3, so that this Assessment also applies approach that refers to several situations that qualify as HCV 3 (Brown *et al.*, 2017).

The assessment for defining ecosystem types and field verification of land system map (RePPProT, 1990) indicate that there are four ecosystem types in the AoI, i.e. Lowland Forest Ecosystem on Sandy Rocks, Karst Forest, Riparian Forest, and Heath Forest. All of the ecosystem types are considered rare and threatened based on HCV Toolkit Indonesia 2008. However, there are only three types of ecosystem in the MU area (heath forests are not found).

Applying precautionary approach (HCV Toolkit Indonesia, 2008), the analysis finds the indications of HCV 3 presence in the Assessment area, as shown in the summarized decision tree (**Table 41**). The riparian forest ecosystems are found in the bufferzone of Karangan and Muara Bulan Rivers which are still natural covered by the low density secondary forest. The karst forest ecosystem is located on the hill in the southern part of the concession area with actual conditions currently is still covered by natural vegetation (secondary forest), even though there was a fire in 1997/1998. In the Lowland Forest Ecosystem on sandy rocks, the remaining natural vegetation is located in the forest state area (KBK) within AOI so that it is still possible to maintain the cover. While in the Heath Forest, the current condition is still covered by natural vegetation (secondary forest) and it is located in forest state areas (outside MUs but inside AOI). Size of HCV 3 area in the MU area is 958.1 ha and the location is shown in the **Figure 39**.

Table 41 Summary of the decision tree for identifying HCV 3 using a precautionary approach

Questions	Riparian Forest	Karst Forest	Lowland Forest on Sandy Rocks	Heath Forest (within AOI)
3.1 Does one or more ecosystem(s) categorized as rare or endangered in Table 8.3.1 or 8.3.2 occur (i) within the MU, or (ii) outside the MU but possibly affected by its operations?	Yes	Yes	Yes	Yes
3.2 Do any of the ecosytems present constitute a form of peat land vegetation?	No	No	No	No
3.3 Has the peat land undergone drastic changes affecting natural hydrological processes to the point that restoration of such functions is impossible?	n.a.	n.a.	n.a.	n.a.
3.4 Has land cover of the ecosystem been degraded so severely that it qualifies as 'unproductive land' as defined by Ministry of Forestry Decree of No. 21/pts/2001?	No (HCV 3 present)	No (HCV 3 present)	Yes (HCV 3 may not be present but needs to be continue to 3.5)	No (HCV 3 present)
3.5 Is it possible for the ecosystem to recover – given sufficient time – through natural processes of tree growth, succession and seed dispersal considering the following factors: (i) ecological attributes of the ecosystem, (ii) condition and status of surrounding land, (iii) current land use status and (iv) regional development planning?	n.a.	n.a.	Yes (HCV 3 present)	n.a.

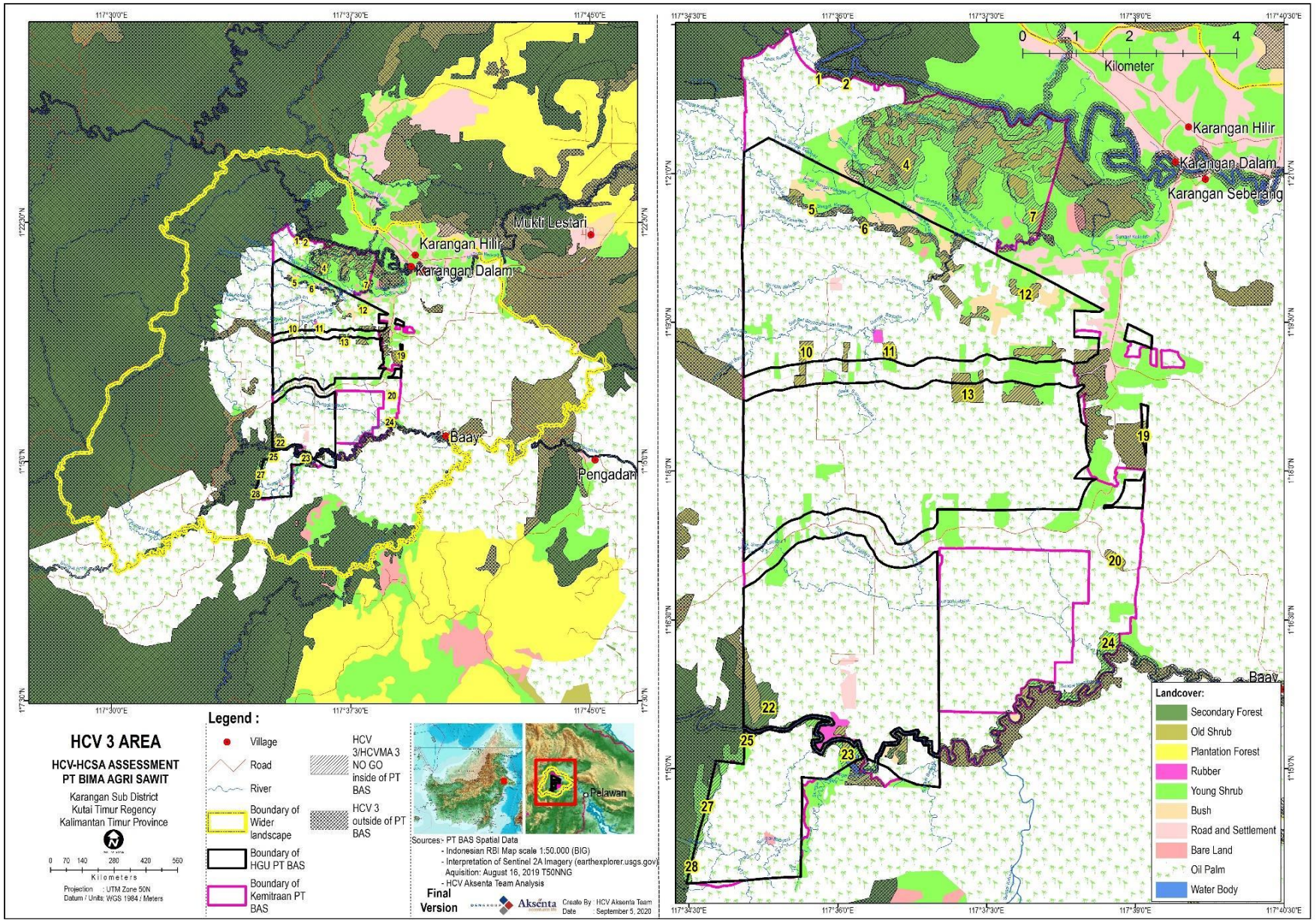


Figure 39 Map of HCV 3 areas in the MU area and its surroundings

I. Peat

The entire Assessment area is not located on or directly borders peatlands. All types of soil in the AoI are mineral soils. Field surveys during scoping study and full assessment also confirm that the entire Assessment area constitutes mineral soils dominated by ultisol soil order. The absence of peats in this area is also indicated by the 1:250,000-scaled Peat Hydrological Unit (KHG) Map (KLHK, 2017)[8] below. The nearest KHG areas from the AoI are 81 km east and 149 km southwest (**Figure 40**).

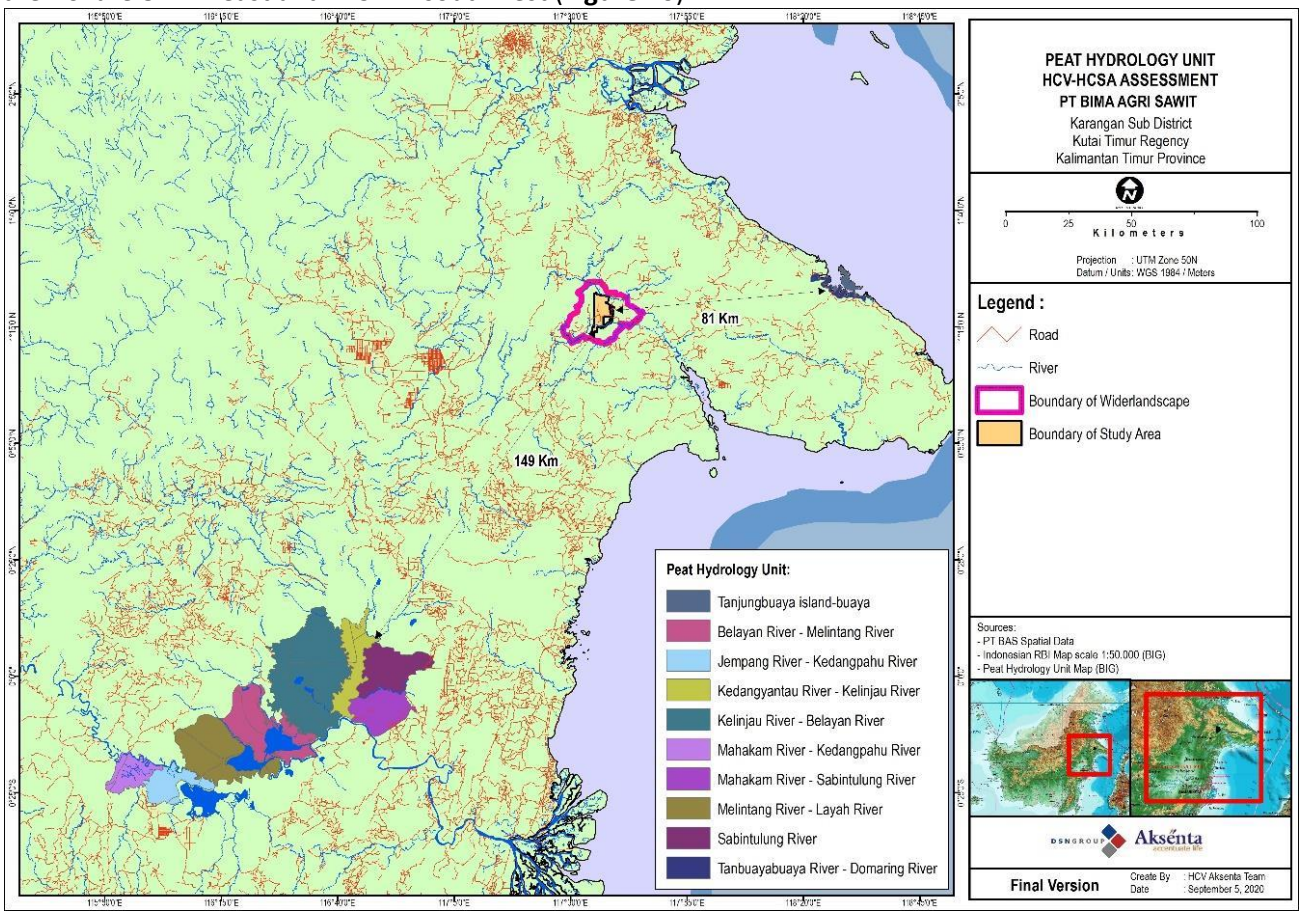


Figure 40 Position of the nearest KHG area from the assessment area

J. Patch Analysis

Patch Analysis Decision Tree (**"PADT"**) is performed over 39 HCV forest patches. The analysis scope includes the AoI, considering the presence of small patches in the Assessment area that are directly connected to the landscape level. The total area of these 27 forest patches is 17,296.7 ha, 547.6 ha out of which are situated within the Assessment area (i.e. the HGU concession and partnership plantations).

There are community lands of 550.4 ha, 332.3 ha out of which have been identified as conservation areas and the other 130.7 ha are areas with HCS land cover. PADT is performed over intact forest patches despite them being situated on community lands. This produces an intact nucleus area for each forest patch. As for the company commitment to respecting community rights, this is taken into account at the 13th analysis phase, where community lands are excluded from both potential area for development and conservation areas.

8 Environmental and Forestry Minister Decree No. SK.129/MENLHK/SETJEN/PKL.0/2/2017 on Designation of National Peat Hydrological Unit Map. The decree is a derivative to Government Regulation No. 71/2014 on Peat Ecosystem Protection and Management, along with its revision in Government Regulation No. 57/2016, also known as Peat Government Regulation.

Based on the PADT output, it is known that all forest patches can be proposed as conservation areas. Four patches are high-priority patches, with nucleus area of more than 100 ha, while the other 35 are patches proposed to be made conservation areas given their connectivity to the high-priority ones (HCV, HCVMA and patch with nucleus area of more than 100 ha).

In the forest patches proposed to become conservation area based on phases 3-12 of PADT analysis, there are conservation areas of 332,3 ha located in community lands. Areas that can be proposed to become conservation areas are 1,046.4 ha, while others that can be proposed as potential areas for development is 536 ha (Table 42 and Figure 41). In the potential areas for development there are locations of 92.5 ha that support HCVs, so that the development process should be taking into account the sustainability of the HCV areas in question by minimising potential negative impacts.

The final phase in establishing an integrated landuse plan, which is checking for field delineation and demarcation, is yet to be carried out. Because of limited time for the Assessment and requirement for large resources for delineation and demarcation, this will be proposed as the follow-up activity to be immediately done before making management plan.

Table 42 Integration of conservation areas into potential area for development

Landuse Plan	Area (ha)				
	PT BAS HGU Concession	Rantau Pakis SG	DMP Cooperative	PJ Cooperative	Total
Community land	65.1	-	58.2	36.2	159.4
Community land with HCVMA	29.9	-	1.0	16.1	47.0
Conservation area in community land	115.3	88.2	60.0	68.8	332.3
Planted area in community land with HCVMA	8.3	-	0.2	3.2	11.7
Sub-Total of Community Land	**218.5**	**88.2**	**119.4**	**124.2**	**550.4**
Conservation Area	**416.2**	**512.2**	**94.3**	**23.7**	**1,046.4**
Developed area	29.6	-	6.8	-	36.4
HCVMA in developed area	2.6	-	1.2	4.5	8.3
Area planted with oil palms	2,667.8	0.7	459.6	316.7	3,444.8
HCVMA in area planted with oil palms	1,649.8	8.0	211.2	172.0	2,040.9
Potential area for development with HCVMA	**89.2**	**-**	**2.7**	**0.6**	**92.5**
Potential area for development	**161.5**	**261.7**	**20.3**	**-**	**443.0**

Note: Conservation areas include HCV, 'No Go' HCVMA and HCS area

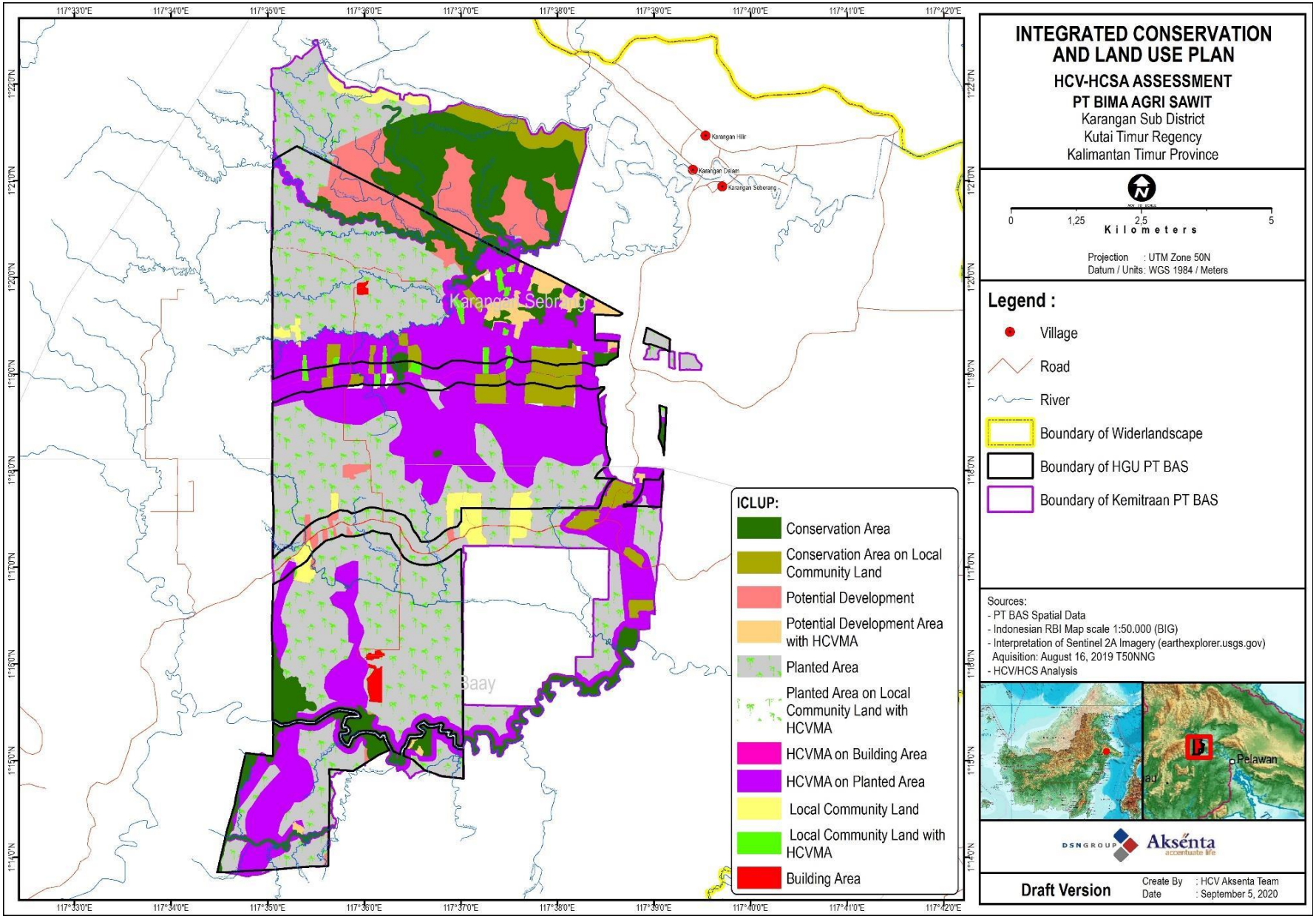


Figure 41 Map of integration between conservation areas and landuse plan

K. Management and Monitoring Recommendation

Threat Assessment

Threats in this Assessment are assessed applying the approach of IUCN Threat Classification Scheme (based on Salafsky et al., 2008). This approach was developed to facilitate identification of threats and their sources. Once threats and their sources are identified, assessment is carried out towards potential impacts and risks for each area along with HCV and HCS elements they contain. Further, weighing is performed to identify, which threats should be made priority, to which management and monitoring planning will be referring.

Threat assessment indicates that, in general, there are four groups of threats to conservation areas, namely threats that are concerned with (i) water bodies (river, spring, reservoir and lake); (ii) riparian vegetation; (iii) karst areas; (iv) the remaining secondary forest area; and (v) RTE species presence. The biggest threat to water body-related HCVs' is potential water pollution because of agrochemical residuals from plantation and farm areas. Threats faced by HCVs relating to riparian vegetation, karst area, secondary forest area and important species presence include logging activities, land fires, and wildlife hunting (Table 30).

Table 43 Summary of the presence of important values and their major threats

Conservation Value	Summary of important values in the Assessment area	Major threats
HCV 1	Endemic or RTE fauna and flora species populations and habitats	▪ Declined size and quality of habitat due to logging activities, landuse conversion and land fires. ▪ Wildlife hunting ▪ Deteriorating quality of aquatic habitats ▪ Human-wildlife conflict.
HCV 2	Karst areas in the Assessment area connecting to karst natural landscape area	▪ Logging activities. ▪ Forest and land fires.
HCV 3	There are karst forest and dipterocarp lowland forest ecosystems	▪ Land conversion and logging activities. ▪ Forest and land fires.
HCV 4	Basic environmental services relating to hydrological system in rivers and lakes, including their banks.	▪ Deteriorating water quality because of pollution from agrochemical residuals. ▪ Landuse conversion in water body banks ▪ Forest and land fires.
HCV 5	Presence of rivers as source of water and fishing ground	▪ Deteriorating water quality because of pollution from agrochemical residuals. ▪ Landuse conversion in riparian areas.
HCV 6	Cave may potentially have prehistoric values	▪ Potential damages to cave because of vandalism.

Recommendation by value

'No Go' HCVMA refers to conservation value areas that cannot be converted or if they have already been converted at the time this Assessment is carried out, replanting is not recommended in such areas. 'No Go' HCVMAs in the Assessment area are located in every HCV area and water body banks, karst hills, and forest-covered areas. As for 'Go' HCVMAs, these are cultivation lands that require specific management efforts compared to other cultivation lands in the Assessment area asthese areas' presence supports HCVs and their functions. 'Go' HCVMAs in the Assessment area are found in cultivation lands that may potentially have high soil erosion unless efforts are made to manage them, in addition to cultivation lands that may potentially be used by wildlife, especially orangutan, as their corridor. Best Management Practice (BMP) for sustainable plantation management needs to be applied in such areas. This practice includes, among others, restriction to use of agrochemicals in water body banks, construction of sediment traps following the water flow directions to reduce the

sedimentary loads in major rivers, application of wildlife conflict mitigation SOP, hunting prohibition, or vegetation enrichment in degraded HCV areas.

Width of major rivers in this area is 100 m, while 50 m-width is applied to water reservoir and oxbow lake banks. Width of tributary riparian areas with only HCV 4 is 5 m, while those of tributary riparian areas also containing HCV 1 and/or 5 range from 50 to 100 m, following RSPO BMP (Barclay et al., 2017 and Lucey et al., 2018) and applicable laws and regulations (Presidential Decree No. 32/1990 and Government Regulation No. 26/2008). In case of spring, their bank is within the radius of 200 m.

In Rantau Pakis SG area, there are thickets areas that, based on the locations are divided into two. First, thicket areas located between or near forest fragments within the radius of 100 m and thicket areas between forest and River Karangan. Second, thicket areas located outside the 100 m-radius from forest fragments. Concerning the presence of HCV 1 in forest fragments in Rantau Pakis SG area, the 'No Go' HCVMA 4 (strictly protected) includes thicket areas that fall under the first category. As for others that fall under the second category, this is considered potential areas of development.

Consideration on designation of orangutan refugia as HCV area is emphasised on locations where nests are present, given orangutan behaviour where they spend more time on the tree as an arboreal species (MacKinnon, 1974) so that they will require trees of sufficiently large DBH quite capable of supporting their weight. Such condition can only be met in areas with low-density secondary lowland forest. The rationale as to why thickets at the distance of 100 m from low-density secondary lowland forest are considered HCV is because such distance is an ecotone zone, in which moderately large trees can still be found, and as part of application of precautionary approach in designing HCV 1 protection and management area.

All in all, the main concerns in managing the identified conservation areas are: (1) stakeholder identification; (2) collaborative management planning for the areas; (3) implementation of important and urgent management actions such as prevention against hunting and logging activities, installation of signboards on conservation areas and dissemination of information on their presence. Further, the plantation management should develop a written plan to protect, maintain and enhance conservation values and integrate them into the plantation development plan. Before preparing a more comprehensive management and monitoring plan, consider seeing Table 31 and Table 32 below that present practical recommendations for dealing with threats and maintaining important values. These recommendations are yet to be detailed as they are currently made on a basis of main threats to each HCV-HCS type.

3.3.2. Overall Summary

A. Summary on conservation area

The HCV-HCSA Assessment indicates that there are 28 locations of conservation values in the Assessment Area (Table 44). Total nett conservation area identified is 1,596.8 ha (Table 44), including includes 'No Go' HCVMA that also include HCS area (1,046.4 ha) and community lands (550.4 ha). The conservation management area is 3,738.5 ha (Table 44) that is a combination between HCVMA (3,579.1 ha, which includes 391 ha of HCVMAs overlapping with community lands) and nett area of community lands (159.4 ha). See Figure 43 for locations of HCV-HCS areas within the MU area and its surroundings and Figure 44 for the conservation management area (HCVMA) in the MU area.

Table 44 Locations and size of the proposed conservation areas and management areas (HCVMA 'No Go Area')

ID	Name	Area (ha)	
		HCV	HCVMA
1	Karangan (1) tributary, OU Corridor	0.2	1.8
2	Karangan (2) tributary, OU Corridor	0.4	2.3
3	Kerekat tributary (1)	4.7	9.9
4	Secondary forest in Rantau Pakis SG area, River Karangan and its riparian area, Kerekat tributary and its riparian areas (2&4), Keledan tributaries and their riparian areas (5, 6, 7 & 8).	573.2	583.2
5	Secondary forests in Kerekat riparian area, Kerekat and its riparian area, Kerekat tributary (2) and its riparian areas, and corridor.	61.3	89.3
6	Kerekat tributary (3) and its riparian area.	0.6	4.7
7	Secondary forest in Kerekat riparian area, secondary forest in Keledan riparian area, Kekerat and its riparian area, Keledan and its riparian area, and Keledan tributary (5) and its riparian area (5).	56.8	77.9
8	Keledan and its riparian area.	1.4	7.1
9	Bayada and its riparian area, Bebaya tributary (1) and its riparian area, OU corridor	1.8	15.9
10	Secondary forest as OU stepping stone, Bebaya tributary (2) and its riparian area, and erosion management area.	26.4	610.3
11	Secondary forest as OU stepping stone, Bebaya tributary (3) and its riparian area, Spring E12, Reservoirs (F11&F11P), OU corridor, and erosion management area	13.4	43.0
12	Secondary forest and thickets as OU stepping stone, OU corridor, erosion management area.	45.3	518.3
13	Secondary forest as OU stepping stone, spring buffer zone, OU corridor, and erosion management area.	147.8	542.6
14	Reservoir G14	0.1	1.9
15	Lebuyu and its riparian area, Lebuyu tributary (1) and its riparian area, and erosion management area.	4.2	129.0
16	Lebuyu tributary (2) and its riparian area.	0.5	3.8
17	Kekotol and its riparian area.	0.6	3.7
18	Thicket as OU stepping stone, thicket as OU stepping stone, Lebuyu tributary (3) and its riparian area, OU corridor.	39.9	175.6
19	Secondary forest as OU stepping stone, OU corridor.	4.8	6.0
20	Secondary forest at Block H/I as OU stepping stone, OU corridor	8.0	59.3
21	Thicket as OU stepping stone, OU corridor.	12.7	34.1
22	Karst hill, Cave L6A, Muara Bulan and its riparian area, OU corridor	63.6	105.0
23	Secondary forest in Muara Bulan riparian area, Muara Bulan and its riparian area, Muara Bulan tributaries (1 & 2) and their riparian areas, Oxbow lake, OU corridor.	67.2	170.0
24	Muara Bulan riparian secondary forest, Muara Bulan and its riparian area, OU corridor.	74.8	114.5
25	Muara Bulan tributary (1) and its riparian area, OU corridor, and erosion management area.	8.2	175.4
26	Betung and its riparian area, Muara Bulan tributary (2) and its riparian area.	0.4	2.3
27	Karst Hill, Buayan (1) and its riparian area.	18.6	20.1
28	Karst Hill, Buayan and its riparian area, Buayan tributaries (1, 2, 3, 4 & 5) and their riparian areas, erosion management area, corridor.	4.8	72.0
Total Area (ha)*		**1,241.8**	**3,579.1**
HCV/HCVMA Area in Overlap with Community Lands (ha)		**332.3**	**391.0**
Total Nett of HCV/HCVMA (ha)		**909.5**	**3,188.1**
Assessment Area/PT BAS MU Area (ha)		**7,663.1**	**7,663.1**
%Nett Area against the Assessment Area		**11.9**	**41.6**

In summary, almost all environmental and social conservation values are identified in the MU area; only peats are not found (**Table 45**). See below the summary of the HCV-HCSA Assessment in PT BAS concession.

- Total Assessment area (MU area): 7,663.1 ha.

- Total area proposed for conservation: 1,046.4 ha (HCV, 'No Go' HCVMA, and HCS area).
- Total area proposed for development: 535.5 ha.
- Community lands for future sources of livelihood: 550.4 ha.
- Total 'No Go' HCVMA with strict protection (nett): 1,046.4 ha.
- Total converted/convertible 'Go' HCVMA with management prescription (nett): 2,141.6 ha

Table 45 Recapitulation of size of conservation and management areas in the assessment area

Environmental and social value to be conserved	Area (ha) where the value is found (inside MU only	Management areas (ha) (inside MU only)
HCS Forest	547.6	547.6
Peat	-	-
HCV 1	1,220.2	2,535.9
HCV 2	1,220.2	2,535.9
HCV 3	958.1	958.1
HCV 4	1,023.8	2,456.2
HCV 5	71.3	110.0
HCV 6	0	3.4
Local people lands (if any additional to HCV 5 & 6). May be indicative	550.4	550.4
Net Total (after subtracting overlaps)	**1,596.8**	**3,738.5**

Note:
- All HCS-potential forest covers are in overlap with HCV areas.
- Total HCV area is 1,241.8 ha, 332.3 ha out of which are in overlap with community lands.
- Total HCVMA is 3,579.1 ha, 391 ha out of which are in overlap with community lands.
- Total community lands not in overlap with HCV/HCS areas or HCVMA is 159.4 ha

B. Alarming issues related to HCV

Some of the alarming issues related with HCV:

1. The assessment area is a habitat for several protected species (orangutans, sun bear, crocodiles)
2. Wildlife conflict with humans is high
3. The existence of karst areas around the assessment area

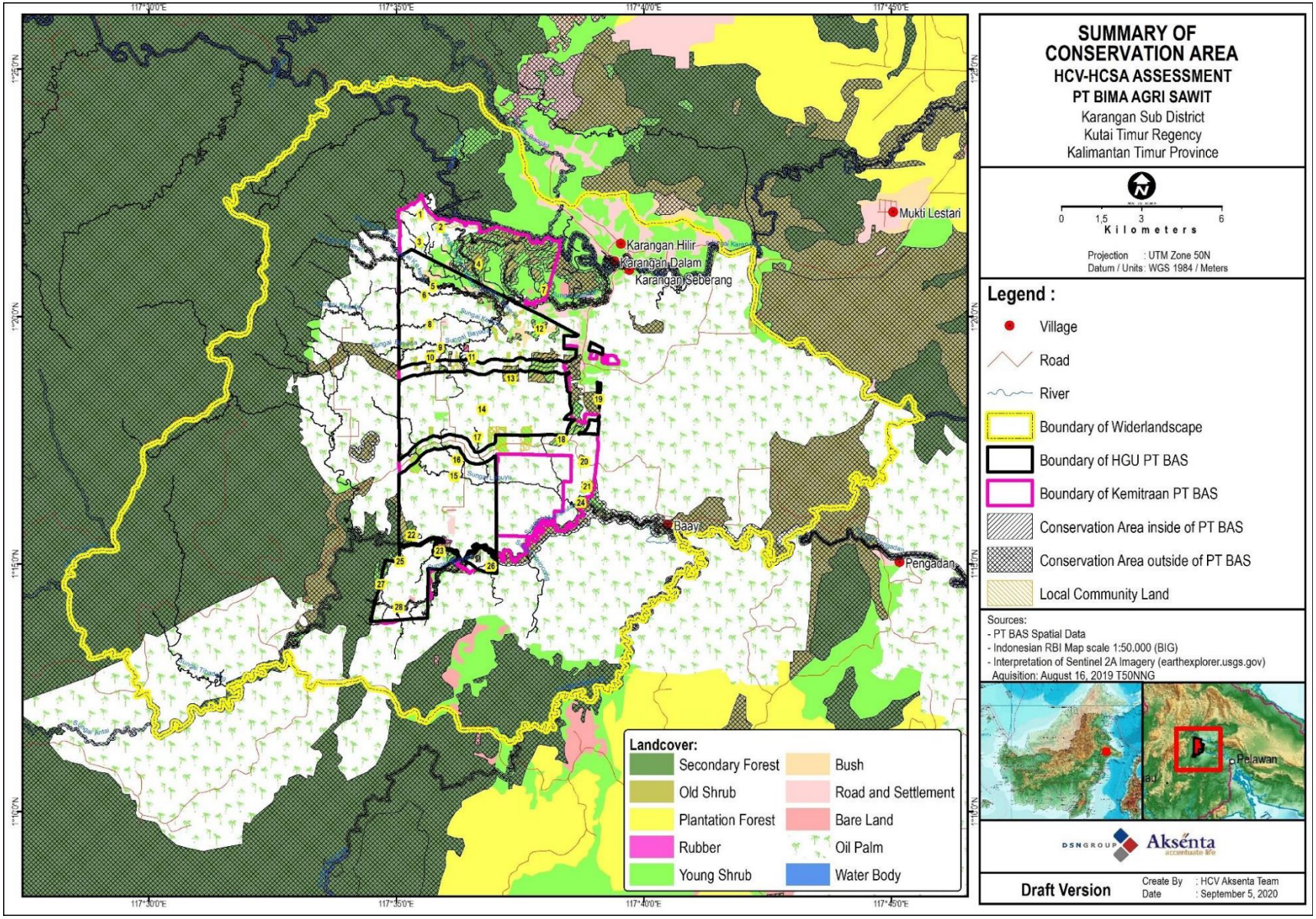


Figure 42 Map of summary of the proposed conservation area

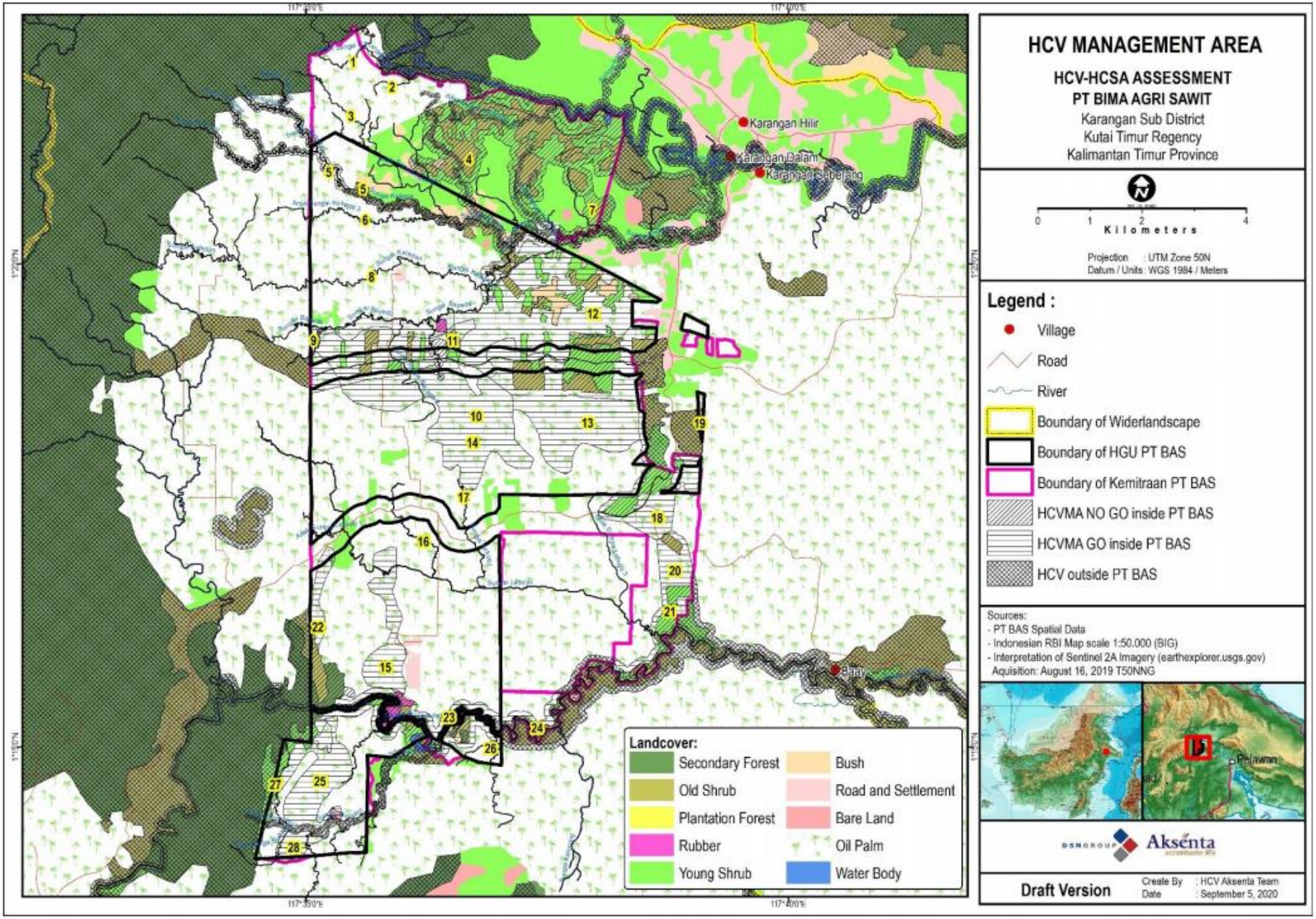


Figure 43 Map of conservation management area (HCVMA) in the assessment area

3.3.3. Stakeholder Consultation

Final consultation with stakeholders is carried out through two approaches as follow: (i) group consultation through Focus Group Discussion (FGD); and (ii) individual consultation through direct meeting and personal communication (by phone). In general, final consultation activities are carried out on 29 October 2019 to 16 January 2020. The consulted stakeholders already represent communities in the Assessment area including traditional institution, village government, community/youth leader, smallholder/smallholder group, fisherman, women's group, trader, and cooperative management. In addition, consultation is also carried out with central to district governments, NGO, academics and neighbouring companies.

The consulted stakeholders confirm the presence of important wildlife species in the Assessment area, including orangutan, hornbill, and crocodile. The presence of secondary forest areas in the Assessment area has also been confirmed to be located in Rantau Pakis SG area, karst areas, and Karangan and Muara Bulan riparian areas. It has also been confirmed that both rivers serve as source of water to community and their fishing ground. Historical sites are found in two locations, i.e. Nyuaring Hill cave (in PT Multi Pasific International) to the west of the MU area and burial ground of Baay Village community ancestor. As for the other two caves in PT BAS HGU concession, these require further assessment to make sure of the cultural or historical values that may potentially found in the locations.

Group consultation

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
1. Musliman AR (M) 2. Kartika Nurani (F) 3. Andika Arief DP (M)	1. Head of Agency 2. PT 3. Staff	Ministry of Education and Culture, East Kalimantan Provincial Cultural Reserve Conservation Agency	East Kalimantan BPCB office, Samarinda	29 October 2019
Consultation method: Formal meeting, Assessment result presentation, FGD **Recommendation and major concern:** ▪ The presence of cultural reserve sites found are protected by the law and must be reported although they remain undesignated. Development may not take place in the cultural reserve sites' core zone. ▪ BPCB already surveyed the caves in River Muara Bulan karst area. ▪ The presence of cultural artifacts in the caves and size of the new zone can be confirmed upon BPCB survey. **Team response:** ▪ Recommendation will be made to allow BPCB formal engagement at delineation phase. ▪ Cave coordinates resulted from the field assessment will be synced with BPCB data to make sure the presence of HCV. ▪ Of any cultural site is found in the Assessment area, the designation will be recommended involving BPCB.				

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
1. Nur Komari (M) 2. Diding (M)	1. Researcher 2. Director	Ecositrop	Ecositrop Office	29 October 2019
Consultation method: Formal meeting, Assessment result presentation, FGD **Recommendation and major concern:** ▪ HCV area designation should take into account the connectivity to PT Telen and PT MPI in order to produce effective corridors. Orangutan corridors are in community lands, so that the land tenurial status should be addressed with the owners individually so as to avoid conflict in the future. ▪ Joint commitment will be necessary between community and the company, as well as between companies in the Assessment area. ▪ Establish information board on HCV presence and instruction boards in HCV areas and install signs along the roads that may				

potentially be passed through by orangutan.

- Enrich habitats in HCV areas.
- Establish taskforce with task to monitor orangutan presence and handle conflicts.
- Based on experience in cooperating with PT Telen, threats to wildlife do not come from local communities, but from outsiders instead who come over the Assessment area.

Team response:

- Design of HCV areas connected to PT Telen and PT MPI concessions will be considered. Addressing land ownership status will be recommended in HCV area management.
- The input is well noted and will be considered for HCV area management recommendation.
- The input is well noted and will be considered for HCV area management recommendation.
- Riparian areas already covered with oil palms will be prioritised in habitat enrichment activity.
- It is expected that PT BAS be able to cooperate with stakeholders in wildlife management.
- Information on potential threats will be considered for HCV management recommendation.

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
1. Maryudi (M) 2. Siyamto (M)	1. Staff 2. Forest Ranger	KPHP Unit XVIII Bengalon	KPHP Office, Sangatta	30 October 2019

Consultation method: Formal meeting, Assessment result presentation, FGD

Recommendation and major concern:

- Education will be necessary for workers concerning the presence of wildlife because it is them who often directly encounter wildlife in the field. This is necessary to prevent them from getting in conflict with wildlife, which may lead to company loss.
- Install information and warning boards and signs concerning HCV area.
- Restore the functions of riparian areas already planted with oil palms by carrying out habitat enrichment, in which us of endemic plant species will be prioritised.

Team response:

- The input is well noted and will be recommended for HCV area management planning.
- Signboard installation will be recommended for HCV area management.
- Riparian areas already planted with oil palms will be recommended to be excluded from replanting and should be rehabilitated instead.

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
1. Abdullah (M) 2. Decky Z (M) 3. Munaji (M) 4. Hairiansyah (M) 5. Fadli (M) 6. Momon (M) 7. Karto (M) 8. Abdur Rajab (M)	1. BPD representative 2. Community leader, Pemuda Karangan Peduli Bumi NGO member 3. Cooperative Director/ smallholder 4. Village government staff/smallholder 5. Traditional chief 6. Sub-village head 7. Cooperative member/ smallholder	▪ Karangan Seberang Village Government ▪ Karangan Seberang Village traditional institution ▪ Pemuda Karangan Peduli Bumi NGO ▪ PJ Cooperative	Karangan Seberang Village Office	31 October 2019

	8. Head of Neighbourhood Unit (RT) 07			

Consultation method: Formal meeting, Assessment result presentation, FGD

Recommendation and major concern:

- Deliver training to build capacity in mitigating conflict with wildlife and dealing with forest fires.
- Disseminate information to community concerning the presence of HCV, especially orangutan, as one of the measures to take to mitigate human-wildlife conflict.
- Relocate orangutans in PT BAS HGU concession.
- Effective orangutan corridor could use Karangan riparian area that currently still has natural land cover, so that their habitat in the Assessment area can be connected to others by upstream Karangan.
- There is a location of rice field construction in Karangan Seberang Village (outside PT BAS HGU concession).

Team response:

- The input is well noted and will be considered for HCV area management recommendation.
- The input is well noted and will be considered for HCV area management recommendation.
- Orangutan relocation will be the last option to take in managing wildlife and is not recommended in the Strategy of Orangutan Conservation Action Plan 2019-2029, in which private companies (oil palm, HTI, HPH and mining) are targeted to be able to independently protect orangutan in their management area.
- Orangutan corridor has been designed to allow movement through Karangan riparian area.

The team has visited the rice field construction location to include it in the map.

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
1. Budhiarsa (M) 2. Muhammad Amrullah (M)	1. Staff 2. Head of Protection Section	East Kutai District Environment Office	Office of Environment Office, Sangatta	30 October 2019

Consultation method: Formal meeting, Assessment result presentation, FGD

Recommendation and major concern:

- Riparian areas must be allocated for conservation area.
- Conservation areas must be secured by installing signboards indicating HCV-HCS presence and hunting, land burning and fish poisoning prohibitions.
- Prevent against and handle forest and land fires. This requires facilities and infrastructures such as fire watchtower, taskforce team and trainings.
- Conservation area (HCV-HCS) management can be synchronised with Environmental Management and Monitoring Plan (RKL/RPL).

Team response:

- All riparian areas have been mapped as HCV areas.
- The input is well noted and will be integrated into the management plan.
- Land fire-related management will be recommended in management and monitoring plan.
- Points in the RKL/RPL will be considered and adjusted to the HCV-HCS management plan, e.g. poaching prevention, river water quality monitoring, and fire prevention and control.

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
1. Riduan (M) 2. Hairul Mugni (M) 3. Anisya (F) 4. Aris Adha (M)	1. Village head 2. Village secretary 3. BPD secretary 4. Social Forestry Assistant	▪ Karangan Dalam Village Government ▪ Kawal Borneo Community Foundation (KBCF) NGO	Karangan Dalam Village Office	31 October 2019

Consultation method: Formal meeting, Assessment result presentation, FGD

Recommendation and major concern:

- Karangan Dalam Village area is not directly affected by PT BAS activities.
- It is expected that PT BAS manage rivers and their riparian areas based on the applicable laws and regulations.
- Reduce the application of chemicals in riparian areas.
- Proboscis monkey has never been sighted along River Karangan near the village/PT BAS concession areas, but many of them are found in upstream Karangan.
- There is an area for planned Village Forest that will be managed by Karangan Dalam Village Forest Managing Unit (LPHD). Located in upstream Karangan, it has potentially high fauna and flora diversity, so that corridor will be necessary to connect the protected species population in the Assessment area and others in the planned location for Village Forest. The corridor can be managed together with the LPHD in the future.

Team response:

- The impacts that can be felt by Karangan Dalam Village community is the quality of River Karangan.
- The input is well noted and will be considered for HCV area management recommendation.
- The input is well noted and will be considered for HCV area management recommendation.
- The information is well noted will be added to the report.

We warmly welcome the planned Village Forest. PT BAS and LPHD are expected to synergise with each other in managing wildlife species and their habitats.

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
1. Iskandar (M) 2. Khairil (M)	1. Village Secretary/ smallholder 2. BPD Head/trader	Karangan Hilir Village Government	Karangan Hilir Village Office	31 October 2019

Consultation method: Formal meeting, Assessment result presentation, FGD

Recommendation and major concern:

- Karangan Hilir Village area is not directly affected by PT BAS activities. However, the company maintains a good relationship with the village community.
- There are no village regulations on river protection. This has been carried out because of community awareness. It is expected that PT BAS refer to the applicable laws and regulations on riparian area management.
- There has been no encounter with orangutan in Karangan Hilir Village.
- Currently there are no rice fields and there is a plan of rice field construction in Karangan Seberang Village area. Community livelihood is earned from cacao and banana plantations and rice farming.
- Hunting activities are no longer common to Karangan Hilir Village community.

Team response:

- It is expected that the good relationship between PT BAS and village community be kept up.
- The input is well noted and will be considered for HCV area management recommendation.
- The information that there has been no encounter with orangutan in the area to the north of River Karangan is in line with another that we gained from Ecositrop researchers.
- This information will be added to the report.
- This information will be added to the report.

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
1. Sahrudin P (M) 2. Mustofa (M) 3. Mansur, SAP MAP (M)	1. Traditional chief 2. BPD Head 3. Village Head *ad interim*	▪ Baay Village traditional institution ▪ Baay Village Government	'Mbak Pur' Restaurant, Karangan	1 November 2019

Consultation method: Informal meeting, Assessment result presentation, FGD

Recommendation and major concern:

- According to the Traditional Chief, there are three tombs of historical values to Baay Village community, i.e. (i) *lungun* cave on Nyuaring karst hill (within PT MPI plantation); (ii) tomb of Islamic missionary in Baay Village; and (iii) burial ground of Baay community ancestors (in PT BAS HGU concession).
- The Traditional Chief checks out names of the rivers on the map and mentions names of the river previously unknown.
- Information on village history, traditional ceremonies, and hunting and fishing methods is confirmed and completed by the Traditional Chief.
- Basap culture knows no use of feather relating to their rituals.
- Village Head mentions that Baay Village and PT BAS have a warm relationship. For example, when they borrowed machines for roadwork in front of Baay State Elementary School.
- A traditional ceremony should be performed before land clearing so that the activity can be carried out appropriately.

Team response:

- Nyuaring Hill burial ground has been identified in the Assessment result. The Islamic missionary tomb and ancestor burial ground will be visited and mentioned in the report. Upon field visit after final consultation, it is confirmed that Baay Village community's historical burial ground complex is located outside the MU area but inside the AoI (see **Sub-Section 7.2.6**).
- Names of tributaries in the HCV map relating to Baay Village will be corrected.
- Cultural information will be completed based on information from the Traditional Chief.
- Report on culture relating to bird will be revised.
- It is expected that such a good relationship between the company and community be kept up where they can support each other.
- Traditional ceremonies will also be recommended in HCV management

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
1. Julkipli Samuel (M) 2. Y. Boaz (M) 3. Jailani (M)	1. Smallholder Group Head/smallholder/ fisherman 2. Group Treasurer/religious leader (pastor) 3. Secretary/ smallholder	Rantau Pakis SG	Julkipli house	31 October 2019

Consultation method: Formal meeting, Assessment result presentation, FGD

Recommendation and major concern:

- Informants gave information on River Setulang in Rantau Pakis SG area, as well as information that the last forest fire occurred in 1997, information on the presence of protected species such as sun bear, tragulus, muntjac, saltwater crocodile and orangutan.
- The most significant damages to oil palms are because of wild boars and porcupine. Damages from orangutan is not significant.
- There is an initiative from the SG regarding Karangan riparian conservation area (width ±500 m) for protecting wildlife and River Karangan.
- There is a commitment to safeguarding wildlife and their habitats by, among others, making an MoU between the SG and PT BAS.
- It is expected that the cooperation between PT BAS and the SG increase the member's prosperity.
- The SG management accepts the proposed HCV areas from the Assessment team. The SG members will also make effort to protect the remaining biodiversity in the HCV areas. This will end up in the good image for PT BAS as the company can guarantee the continuity of cooperation between them and the SG in developing oil palm plantations.

Team response:

- The information will be added to the report.
- The information will be added to the report.
- The team appreciates the initiative, and this will be accommodated in the Assessment report, depending on the condition in the field. It is expected that such a warm relationship between PT BAS and the village community be kept up.
- The team appreciates the initiative and this will be recommended to HCV area management plan.
- The information will be added to the report.
- The information will be added to the report. The SG initiatives in protecting conservation areas will be recommended in HCV area management.

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
1. Nono Wibowo (M) 2. Eko Suyanto (M)	1. Sustainability Staff of Teladan Prima Group 2. PT Telen Manager	PT Telen (Teladan Prima Group)	PT Telen Palm Oil Factory office	1 November 2019

Consultation method: Formal meeting, Assessment result presentation, FGD

Recommendation and major concern:

- In response to the Assessment result, PT Telen presents the result of their own HCV assessment and shows the HCV report and describe the presence of orangutan in Muara Bulan and Karangan HCV areas.
- In managing HCV, PT Telen cooperates with BKSDA and Ecositrop in establishing orangutan taskforce, orangutan conflict mitigation SOP, and the monitoring.

Team response:

- Ecositrop has also be reached out, and coordination with PT Telen will be mentioned in PT BAS HCV management recommendation.
- Establishment of orangutan taskforce and the mitigation SOP will be recommended in HCV management.

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
1. Susi Ambarwati (F) 2. Yanti (F) 3. Siti Rokayah (F) 4. Winarni (F) 5. Tuti (F) 6. Darsarlina (F)	1. Smallholder 2. Smallholder 3. Smallholder 4. Smallholder 5. Smallholder 6. Smallholder	Women's groups of Karangan Hilir and Karangan Dalam	Site	1 November 2019

Consultation method: Formal meeting, Assessment result presentation, FGD

Recommendation and major concern:

- Major sources of livelihood: cacao and oil palm plantations.
- Informants gave information on the presence of orangutan. In mid-October 2019, the species was found in Block C20. Orangutans are also frequently found in the enclaves along PT KWS ex-road up to the location behind the Sub- District Office. In the beginning of oil palm planting, many oil palms were eaten by orangutan. Oil palms of age above 5 years were also consumed by orangutan. In case of encounter with orangutan, when working in PT BAS, they normally would report to foreman who would then report to assistant.
- The informants gave information on the presence of saltwater crocodiles near spring. There was once a victim getting injured because he was attacked by saltwater crocodile.

Team response:

- This information will be added to the report.
- This information will be added to the report. Concerning HCV area management recommendation, in term of SOP improvement and reporting system in case of encounter with protected wildlife species in PT BAS plantation area.
- This information will be added to the report.

Note: Male (M), Female (F)

Individual consultation

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
Yoyok S. (M)	Staff	BKSDA	East Kalimantan BKSDA office, Samarinda	29 October 2019
Consultation method: Formal meeting, Assessment result presentation, interview. **Recommendation and major concern:** ▪ Orangutan corridor design needs to take into account the condition of land cover and the land statuses, especially community lands outside the company concession. ▪ A human-wildlife conflict mitigation plan is necessary, particularly for rare and protected wildlife species such as orangutan. ▪ To date, there is no information on Proboscis monkey in the Assessment area. **Team response:** ▪ Design of corridor with relatively intact natural cover can only be found along River Karangan, Keledan and Muara Bulan, in addition to Rantau Pakis SG area. Other than these locations, corridors are found to take the form of separate patches. ▪ The input is well noted and will be added to the management and monitoring plan. ▪ Field survey output also does not find the presence of Proboscis monkey in the Assessment area; however, thank you for confirming.				

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
H. Kasiyanto (M)	Secretary of East Kutai District Plantation Office	East Kutai District Plantation Office	Office of East Kutai District Plantation Office	30 October 2019
Consultation method: Formal meeting, Assessment result presentation, interview. **Recommendation and major concern:** ▪ The HCV areas should not be abandoned. They should be enriched with native plant species and maintained so that they can grow (e.g. until they are at age 2). ▪ Riparian areas should be secured by planting them with NTFP-producing plants such as sugar palm or cinnamon. *Genjah* sugar palm is popular in East Kutai. ▪ Farming culture in East Kalimantan has fruit garden, which is referred to as *limbo* by Dayak peoples. Kutai peoples call it *perondongan.* **Team response:** ▪ The input will be mentioned in the recommendation for HCV-HCS area management plan. ▪ The input is well noted and will be recommended in the HCV-HCS area management plan.				

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
Bony Briks (M)	Staff of Spatial Use and Control Section – Team of Sangkulirang-Mangkalihat Karst Landscape Mapping Assessment	East Kutai District Land and Spatial Planning Office	Office of East Kutai District Agrarian Affair and Spatial Planning Office, Sangatta	30 October 2019

Consultation method: Formal meeting, Assessment result presentation, interview.

Recommendation and major concern:

- The updated version of East Kutai District Karst Landscape Area has been issued as per Energy and Mineral Resources Minister Decree No. 40/40/2019. This designation is in line with the assessment result of technical team consisting of local government, geological agency and UGM University's Centre for Geographic Study
- Karst area spot in the company concession is not included by the Karst Natural Landscape Area, but this can be made the company's conservation area.

Team response:

- The team will try to access the referred data online, if available. The Karst Natural Landscape Area will be revised referring to the updated data.
- The karst areas in the Assessment area have been classified as HCV areas.

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
Dr Pindi Setiawan, M.Si. (M)	Prehistoric Rock Painting Expert	Faculty of Art and Design of Bandung Institute of Technology	-	29 October 2019 & 11 November 2019

Consultation method: Private communication by phone and email. Map is sent through email and WhatsApp

Recommendation and major concern:

- The company concession is located to the north of the distributed caves (at KM37) known as Batu Maut (Rock of Death). It is the location of the dead, where many *ceruk lunguns* (coffin cave) are found.
- Karst areas in the Assessment area need to be enclaved. Normally *ceruk lunguns* are found on the hilltop.

Team response:

- The karst areas will be proposed to be enclaved.
- The team obtained the location of cave distribution that has been mapped by East Kalimantan BPCB, including locations of caves to the south of the company concession. These caves have been included on the Assessment map.
- It will be recommended that the next delineation process involve East Kalimantan BPCB.

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
Dr. Yaya Rayadin (M)	Academics	Mulawarman University	Talang Sari Complex, Samarinda	3 November 2019

Consultation method: Formal meeting, Assessment result presentation, interview.

Recommendation and major concern:

- From the presented field survey information, and given the condition of land cover in the area, it is estimated that 4-10 orangutans inhabit Rantau Pakis SG area. Actually, it is not necessary to survey population in a conservation area that is less than 500 ha as the output could be biased.
- The area of concern in terms of orangutan is the one located in the northern part of Rantau Pakis SG area. It is recommended to connect the location to the forest area to the northwest.
- Conservation area design for orangutan need to take into account the oil palm age (> 5 years), connectivity to forested areas or habitat pouch at the landscape level, and size of the conservation area.

Team response:

- This information will be added to the section that elaborates orangutan.
- The input is well noted and will be added to the management recommendation section.
- Orangutan corridor design in this Assessment connects the conservation area in the northern part of the Assessment area to the forested area across the River Karangan through Karangan riparian area.

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
E. Prasetyo (M)	Staff of Best Management Practices (BMP) for Orangutan Conservation	Borneo Orangutan Survival Foundation	Kantor BOSF, Bogor	14 January 2020

Consultation method: Formal meeting, Assessment result presentation, discussion.

Recommendation and major concern:

- Model of corridor relevant to the condition in PT BAS is stepping stone consisting of naturally vegetated small patches.
- The conservation area management depends on the company commitment. If necessary, make GRTT compensation for the small patches.
- Establish a team to monitor orangutan. They should be appropriately provided with knowledge to manage the presence of orangutan in PT BAS operational area.
- The company need to educate community concerning the presence of orangutan in PT BAS concession and its surroundings.

Team response:

- The recommendation already reflects the actual condition on the ground.
- This information will be added to the report concerning conservation area management recommendation.
- This information will be added to the report concerning conservation area management recommendation.
- This information will be added to the report concerning conservation area management recommendation.

Note: Male (M), Female (F)

Name (sex)	Position/Role	Organisation/Social Group	Venue	Date
Arif Rifqi (M)	Staff	Konservasi Alam Nusantara Foundation (affiliated with The Nature Conservancy)	TNC office, Samarinda	16 January 2020

Consultation method: Formal meeting, assessment output presentation and discussion

Recommendation and major concern:

- Connectivity is vital in HCV management activities, especially for orangutan.
- Disseminate information to workers and contractors concerning HCV areas and the company's environmental policy.
- Manage river water quality, relating to domestic waste management and application of agrochemicals in riparian areas.

Team response:

- HCV area identification and design in this Assessment also include areas around the Assessment area, i.e. the AoI or the Assessment landscape, taking into account HCV area connectivity.
- The input is well noted and will be added to the management recommendation section.
- The input is well noted and will be added to the management recommendation section.

Note: Male (M), Female (F)

3.4. Soil and Topography Findings and Results

Types of soil in the entire AoI are mineral soils. No locations in the area belong to histosol soil order (peat). Soil types in the AoI is dominated by associations of hapludults and paleudults soils distributed in the middle and north parts.

3.5. GHG Findings and Results

3.5.1. Carbon stock estimate for vegetation stratification

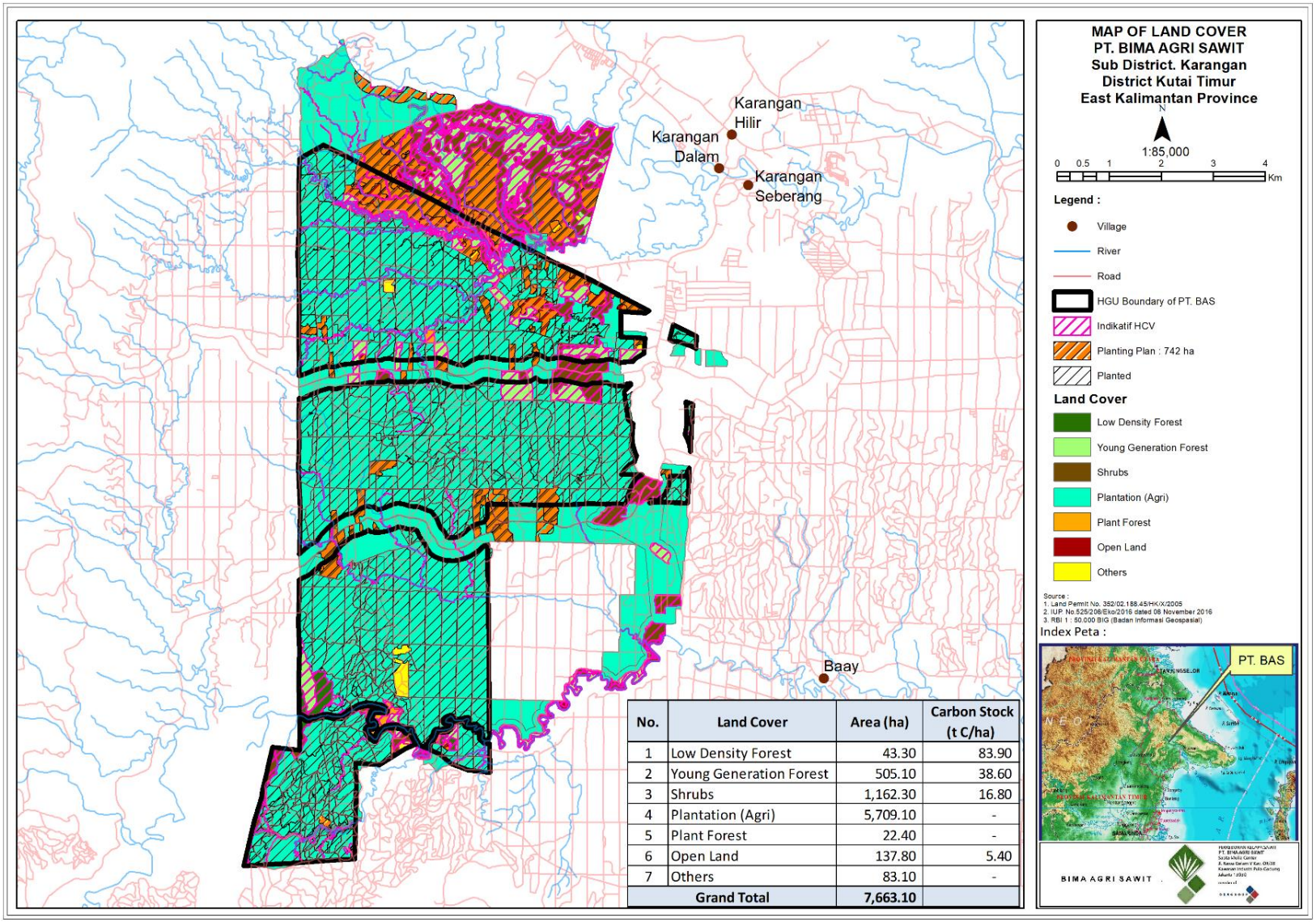
Land Cover Stratification

Table 46 Estimation of carbon stock by HCS land cover class

No	Land Cover	Area (ha)	Carbon Srock (t C/ha)
1	Low Density Forest	43.30	83.90
2	Young Regeneration Forest	505.10	38.60
3	Shrubs	1,162.30	16.80
4	Plantation (Agri)	5,709.10	-
5	Plant Forest	22.40	-
6	Open Land	137.80	5.40
7	Others	83.10	-
Total		**7,663.10**	

Table 47 Total development areas (ha) and carbon stock estimated per land cover class

Land Cover	Carbon Stock (t C/ ha)	New Planting Plan		
		2021	2022	Total
Open Land	5.40	106.53	6.85	**113.38**
Others	-	2.50	9.93	**12.43**
Plant Forest	16.30	-	0.48	**0.48**
Plantation (Agri)	-	-	58.76	**58.76**
Shrubs	16.80	228.22	329.11	**557.34**
Total		**337.26**	**405.13**	**742.39**



No.	Land Cover	Area (ha)	Carbon Stock (t C/ha)
1	Low Density Forest	43.30	83.90
2	Young Generation Forest	505.10	38.60
3	Shrubs	1,162.30	16.80
4	Plantation (Agri)	5,709.10	-
5	Plant Forest	22.40	-
6	Open Land	137.80	5.40
7	Others	83.10	-
Grand Total		**7,663.10**	

Figure 44 Carbon stock map

Table 48 Estimation of carbon stock by HCS land cover class

HCS Land Cover Classification	Area (ha)	Numbe r of Plot	Carbon Stock Average (tonne-C/ha)	Standard error of the mean	Confidence limits (90%)		Total Carbon Stock (Kilotonne-C)
					Lower	Upper	
Potential HCS Land Cover Class							
High-Density Forest (HDF)	-	-	-	-	-	-	-
Medium-Density Forest (MDF)	-	-	-	-	-	-	-
Low-Density Forest (LDF)	43.3	4	83.9	2.6	79.7	88.2	3.6
Young Regeneration Forest (YRF)	505.1	58	38.6	0.6	37.6	39.6	19.5
Non-Potential HCS Land Cover Class							
Shrub (S)	1,162.3	88	16.8	0.2	16.5	17.1	19.5
Plantation Area (AGRI)	5,709.1	-	-	-	-	-	-
Plantation Forest (FP)	22.4						
Barren Soil (OL)	137.8	14	5.4	0.4	4.7	6.1	0.7
Others	83.1	-	-	-	-	-	-

Carbon stock statistical analysis

Table 49 ANOVA output for plot-scale land cover carbon stock in average

Source	SS	df	MS	F	P-value	F_90% CL	Significance
Between Groups	37,070.8	3.0	12,356.9	4,199.1	0.0	2.12	Significant
Error	470.84	160.0	2.94	-	-	-	-
Total	**37,541.7**	**163.0**	**230.32**	-	-	-	-

Table 50 Scheffé test output for plot-scale land cover carbon stock in average

Variables	N	SS	Avg
LDF	4	105.1	83.9
YRF	58	33.5	38.6
S	88	296.1	16.8
OL	14	36.1	5.41
SSE		470.8	
MSE		2.9	
p		0.100	
k-1		3.0	
N		164.0	
F		2,118	

Pair Wise Difference (Absolute values)				
Type	**LDF**	**YRF**	**S**	**OL**
LDF	-	45.3	67.1	78.5
YRF		-	21.8	32.2
S			-	11.4
OL				-

Scheffe Comparison Values				
Type	**LDF**	**YRF**	**S**	**OL**
LDF	-	2.2	2.2	2.5

YRF		-	0.7	1.3
S			-	1.2
OL			-	-
Significant Differences				
Type	**LDF**	**YRF**	**S**	**OL**
LDF	-	Significant	Significant	Significant
YRF		-	Significant	Significant
S			-	Significant
OL			-	-

Carbon stock estimate at plot level indicates that each HCS land cover class (LDF, YRF, S, and OL) significantly differs from one another. Furthermore, significant difference is also found in composition of trees with DBH >30 cm and canopy cover of each land cover class. Average number of trees with DBH > 30 cm in each plot is 10.3 trees/plot (64 trees/ ha) in LDF, 2.9 trees/plot (18 trees/ha) in YRF, and 0.3 tree/plot (2 trees/ha) in S.

3.5.2. Results of GHG Calculations

A. Scenario testing

Table 51 Description of new development scenarios in PT BAS

No	Scenario	Explanation
1	Scenario 1	Mixed vegetation types (non-forest areas) cleared for oil palm development, excluded reserve area**.** No methane capture facility planned for the mill. No clearing of HCV areas and community areas as identified in HCV-HCS Assesment and SEIA • Planned planted area = 742.39 ha (9.7 %) oil palm. • Planned conservation area = 1,423.37 ha (18.6 %) • Planted = 5,497.38 ha (71.7 %)
2	Scenario 2	Mixed vegetation types (non-forest areas) cleared for oil palm development. No methane capture facility planned for the mill. No clearing of HCV areas and community areas as identified in HCVA and SEIA. • Planned planted area = 602.93 ha (7.9 %) oil palm. • Planned conservation area = 1,562.82 ha (20.4 %) • Planted = 5,497.38 ha (71.7 %)

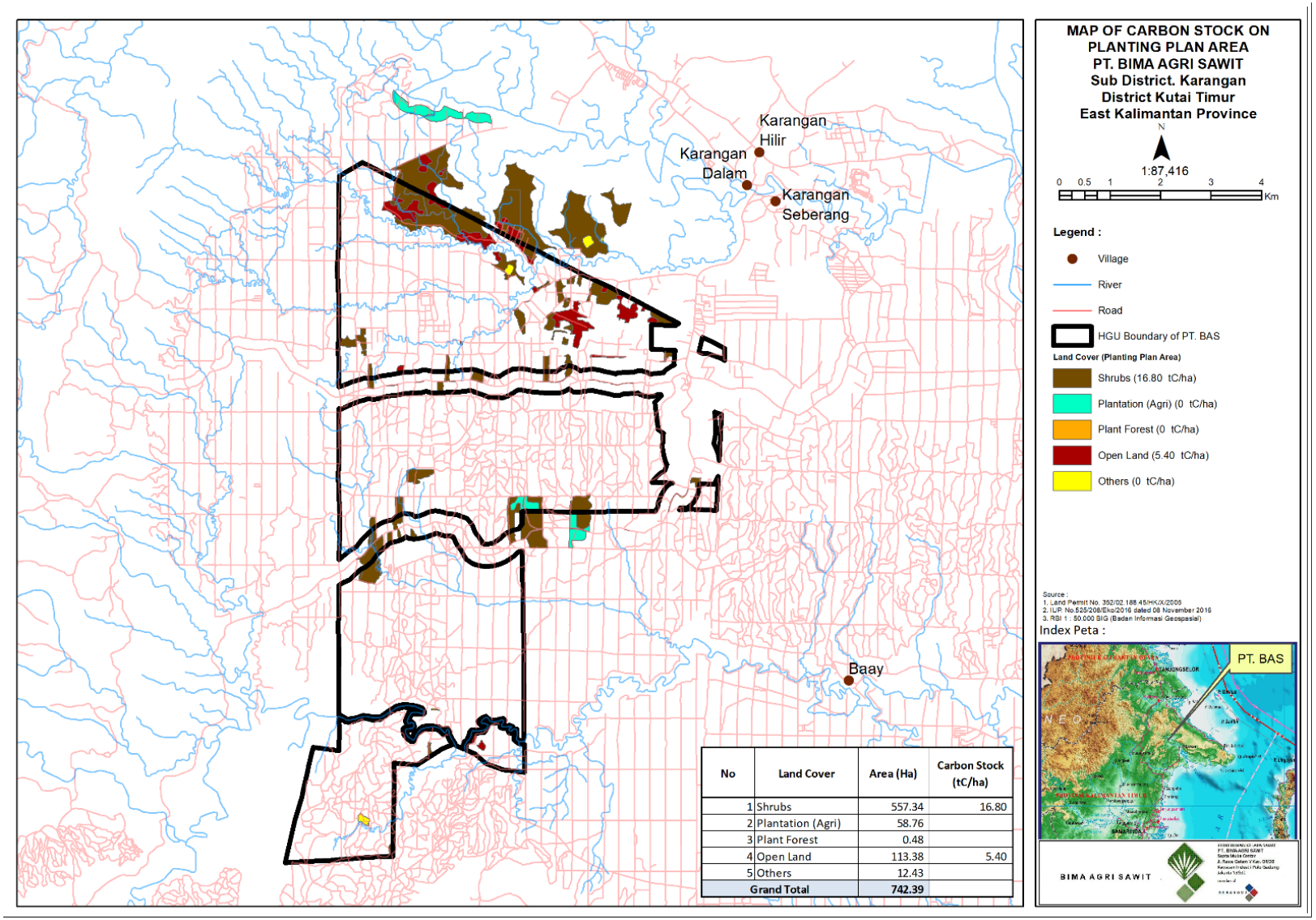
		S1	S2
Area avoided for developments		1,423.4	1,423.37
Potential areas for new development	Open Land	113.38	64.26
	Others	12.43	7.20
	Plant Forest	0.48	0.48
	Plantation (Agri)	58.76	58.76
	Shrubs	57.34	72.23
POME Treatment	Open Pond	Y	Y
	Methane Capture	-	-

Table 52 Total development areas (ha) and carbon stock estimated per land cover class (Scenario 1)

Land Cover	Carbon Stock (t C/ ha)	Planted (ha)	Land Use Plan (ha)		Carbon Planting Plan (t C/ ha)	Carbon Stock Total (t C/ ha)
			Planting Plan	HCV-HCS		
Low Density Forest	83.90		-	43.35	-	3,636.77
Open Land	5.40		113.38	23.83	612.26	740.92
Others	-		12.43	88.57	-	-
Plant Forest	16.30		0.48	21.46	7.83	357.56
Plantation (Agri)	5.11	5,497.35	58.76	139.33		29,103.72
Shrubs	16.30		557.34	596.49	9,084.56	18,807.38
Young Generation Forest	38.60		-	510.35	-	19,699.35
Grand Total		**5,497.35**	**742.39**	**1,423.37**	**9,704.65**	**72,345.69**

Table 53 Total development areas (ha) and carbon stock estimated per land cover class (Scenario 2)

Land Cover	Carbon Stock (t C/ ha)	Planted (ha)	Land Use Plan (ha)		Carbon Planting Plan (t C/ ha)	Carbon Stock Total (t C/ ha)
			Planting Plan	HCV-HCS		
Low Density Forest	83.90		-	43.35	-	3,636.77
Open Land	5.40		64.26	72.95	347.01	740.92
Others	-		7.20	93.80	-	-
Plant Forest	16.30		0.48	21.46	7.83	357.56
Plantation (Agri)	5.11	5,497.35	58.76	139.33		29,103.72
Shrubs	16.30		472.23	681.60	7,697.31	18,807.42
Young Generation Forest	38.60		-	510.35	-	19,699.35
Grand Total		**5,497.35**	**602.93**	**1,562.82**	**8,052.16**	**72,345.73**



No	Land Cover	Area (Ha)	Carbon Stock (tC/ha)
1	Shrubs	557.34	16.80
2	Plantation (Agri)	58.76	
3	Plant Forest	0.48	
4	Open Land	113.38	5.40
5	Others	12.43	
Grand Total		742.39	

Figure 45 Map indicates areas for new development

B. Projection of GHG Emission

Table 54 Projection of GHG Emissions of two development scenarios (tCO2e/ tCPO)

	S1	S2
Land conversion	0.0	0.0
Crop sequestration	(1.6)	(1.6)
Peat oxidation	-	-
Conservation Sequestration	(0.6)	(0.8)
Fertiliser (mineral soil; manufacture & transport)	0.2	0.2
N20 Emissions	0.2	0.2
Fuel Consumption	0.0	0.0
Net estate emission	(1.8)	(1.9)
POME	0.8	0.8
Mill Diesel fuel	0.0	0.0
Purchased Electricity	-	-
Credit	-	-
Net Mill emission	0.9	0.9
Net GHG emission	(0.8)	(0.9)

C. Selection of PT BAS Optimal Scenario

Scenario 1 (S1) is stipulated for GHG calculation and mitigation plan of PT BAS, because until 2022 PT BAS has no plan to build methane capture for managing POME emission from the mill. The prediction of PT BAS GHG emission from POME is calculated from RSPO GHG Calculator default value emission factor. Based on HCS studies conducted by PT Gagas Dinamiga Aksenta, then planting plan in PT BAS will be prioritized in the area of open land, scrub, and mixed agroforestry. In the scenario, GHG emission from land clearing and operation can be covered by carbon sequestration from oil palm and conservation area.

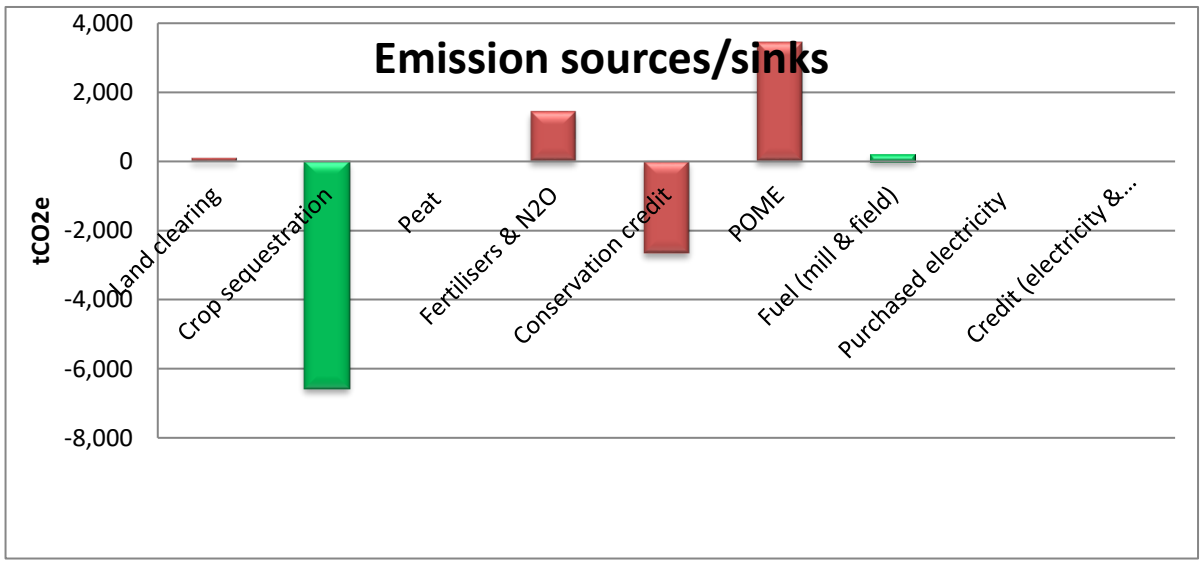


Figure 46 Summary of GHG emissions for new development plan of PT BAS (tCO2e)

New planting plan of PT BAS from 2021 – 2022 are presented in the table 51 and Figure 45

Table 55 New planting plan of PT BAS

No	Plantation	Planted	NPP Plan		Total	Grand Total
			2021	2022		
1	Nucleus	4,578.00	221.06	124.63	345.69	4923.69
2	Smallholder	919.38	116.26	280.50	396.76	1316.14
	Total	5,497.38	337.32	405.13	742.45	6239.83

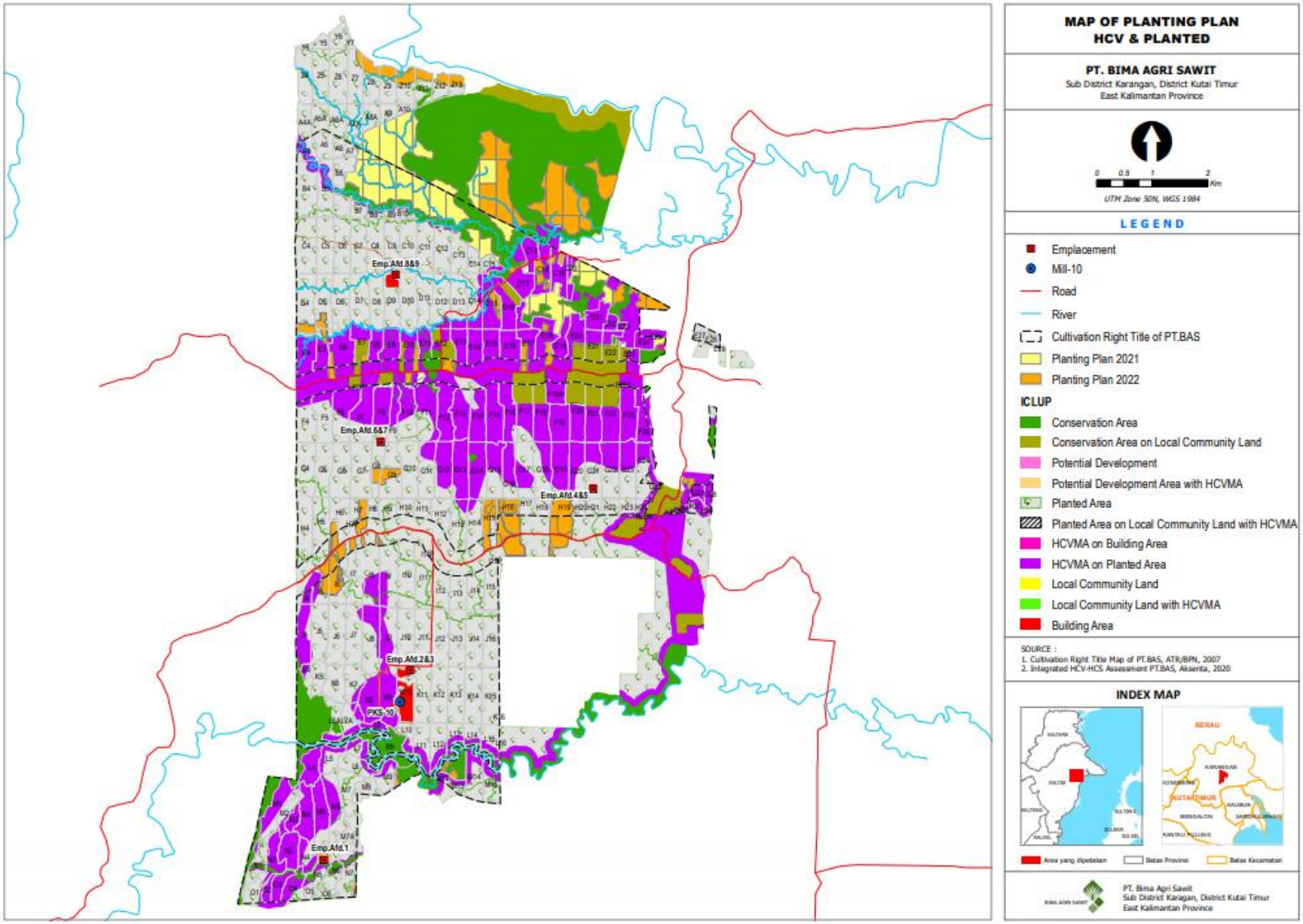


Figure 47 The new planting plan map of PT BAS

3.6. FPIC Process

3.6.1. Community Engagement – Objectives and Approach

The key objectives of DSN Team and Gagas Dinamiga Aksenta community engagement activities were as follows:

1. To share information about the HCS, HCV and SIA assessment processes, activities and outcomes to community representatives.
2. To seek community consent and participation for HCS and participatory mapping activities.
3. To seek information and knowledge on current and future land use at community level as further input into preparation of the Integrated Conservation and Land-use Plan (ICLP).

BAS staff conducted the meeting in Balai Desa Karangan Seberang on January 20rd 2014. There was 15 people attended the meeting, including Village Head, traditional leaders of villages inside the area, a number of other village representatives.

PT DSN acquired PT BAS in December 2018. In July 2019, there was an outreach to the community regarding plantation development by DSN management.

Opening Meeting

The primary objectives of the Opening Meeting were:

1. To introduce and broadly describe BAS planned project development.
2. To describe PT BAS's environmental and social commitments, including commitment to the principles of FPIC.
3. To describe the assessments to be carried out before development can begin (HCV, SIA, HCS) including assessment objectives, processes and time schedules.
4. To seek input and feedback from attendees.

Attendees were positive about PT BAS's planned plantation development. Several speakers gave valuable input:

1. PT DSN will maintain the commitment between the Rantau Pakis farmer groups and the old management of PT BAS
2. For land clearing the area of the Pakis Overseas Farmer Group, a HCV HCS assessment will be preceded

Attendees in general viewed the assessments as positive and the communities agreed to actively support the activities. However, PT BAS was asked to start operations as soon as possible. PT BAS was also requested to share the results of the studies with communities.

3.6.2. Initial Consultation and FGD at Village Level

Initial consultations were started with introductions and a discussion about the HCS, HCV and SIA assessment processes, activities and outcomes, and the rights and roles of communities in the assessment process. This was followed by a question and answer session.

After the initial discussion, FGD were held to collect information focussing on land use, land tenure, food and water security, sacred site identification and concerns and expectations.

Table 56 The schedule of initial socialization activities carried out by Gagas Dinamiga Aksenta in PT BAS

Expert/ Organisation/ Social Group	Name/Position/ Role	Interaction Type	Concern and/or Recommendations
Karangan Seberang Village	A Mujahid (Village Head) Yandraini (BPD) Fadli (Traditional Chief)	Direct meeting	• PT BAS concession is located within Karangan Seberang Village area. It was previously PT Sangkulirang Karangan Dalam concession, core commonly known to community as Swarga. • Logging company operation started in 1969 to 1985. In 2000s, logging companies with Timber Use Permit (IPK) went back to operation up to 2005. • Karangan Seberang Village has no forest areas. However, Dayak Basap indigenous peoples in Karangan Seberang Village (together with others from Batu Lepoq and Baay Villages) in proposing for a traditional forest in Beriun area (outside Karangan Seberang Village). • Community have hunting activities in lake Tabo karst area at KM 42. • Traditional ceremonies still performed by Dayak Basap communities include *pelas kampung* as a way in which they express their gratitude for the yields and repel bad lucks.
Karangan Dalam Village	Riduan (Village Head) Sugiarto (BPD) Liamsah (Traditional Chief)	Direct meeting	• Karangan Dalam Village is a parent village having undergone an administrative exclusion in 2005, from which new villages were born, i.e. Karangan Hilir and Karangan Seberang. • PT BAS HGU concession is located in Karangan Seberang Village. Only few community members of Karangan Dalam Village have activities in PT BAS concession.
Karangan Hilir Village	Jabir (Village Head) Khairil (BPD)	Direct meeting	• PT BAS concession is located in Karangan Seberang Village. However, some community members of Karangan Hilir farm or have lands in the area.

Expert/ Organisation/ Social Group	Name/Position/ Role	Interaction Type	Concern and/or Recommendations
	Syafii (BUMDES Director)		• Village boundaries are already clear in Karangan Sub-District. Only Batu Lepoq's are yet to be definitive. • All areas in this village belong to forest areas. No land certificates have been issued by the Village Government. • Village Forest of Karangan Hilir of 7,598 ha located in Araraya area. • *Pelas Kampung* traditional ceremonies are no longer performed by Dayak Basap indigenous peoples, just like in other villages. Community in this village is more heterogeneous. Village traditional institution can even be led by those from other Dayak ethnic groups.
Pemuda Karangan Peduli Bumi NGO (karst area environmental activist)	Saiful Anwar (Leader)	Direct meeting	• Karst or stone-hills are or important values to Dayak Basap peoples because such areas are where their ancestors lived and produce swiftlet nests. • Swiftlets no longer inhabit caves in the karst hills (around the Assessment area) because a massive fire once occurred in 1998, damaging those hills. • Villages in Karangan Sub-District have 4 out of 5 social forestry schemes offered by the government. The locations are around Mt. Beriun, Mt. Gergaji, and Araraya karst area. Dayak communities need these forests, particularly for hunting, collecting forest fruits (*kerantungan*, *layong*, and *dopar*), and fishing *jelawat* fish.
PJ Cooperative	Munaji (Management Staff) Rolly (Management Staff)	Direct meeting	• PT Segara Timber once operated in the present day's Assessment area until 1990, replaced by Labaika and KWS. No forests remain in the location. In around 2005, Karangan Seberang community established farms along KWS main road (the present day's PJ Cooperative plantation area). • Lands for PJ Cooperative, i.e. 420 ha and 60 ha, are obtained from acquisition of lands from the farmers. The compensation was a package of ~~collected~~ sum of money ("*tali-asih*")
DMP Cooperative	Awang (Management Staff) Ayi Mulyanto (Management Staff)	Direct meeting	• The cooperative area of about 350 ha is in overlap with PT Ganda Dinamika mining business concession. Agreement is already in place on landuse arrangement. • The entire area of 466 ha has already been planted since 2209 to 2012.
Rantau Pakis SG	Julkipli Samuel (Leader), Y Boas Lebo (Treasurer), Suwanto, Yus Melud, Yansen P, Jhon Arfang, and Parel Samuel (Member)	Direct meeting	• Rantau Pakis is a group of 36 loggers. They are migrant community from Dayak Karayan ethnic group who wished to stay in Karangan Village and were given lands by Dayak Basap in Karangan in 1996. The lands are located between River Karangan and Keledan. • Based on calculation, the area was around ±900 ha in 2004 after distributed to other groups. At the time this Assessment is carried out, Rantau Pakis SG area is around ±700 ha including locations that belong to PT BAS HGU concession. • Areas of six smallholders from Rantau Pakis SG have been planted with oil palms by PT BAS. The locations are in Block A5, A6, A7, and B5-B6 to the right side of River Keledan. However, the problem has been resolved on 1 December 2017 by PT BAS (the previous management) and the landowners in question and sealed with a cooperation agreement governing a profit-sharing scheme in managing the lands.

Expert/ Organisation/ Social Group	Name/Position/ Role	Interaction Type	Concern and/or Recommendations
			• The landowners demand a transparency of information regarding yield, including the yield's tonnage calculation and operational activities. • There are lots of Borneo ironwood trees in the potential areas for partnership with Rantau Pakis SG in which the timber stocks can be used by community. • According to the informants, many orangutans can still be found in the areas. However, no conflicts ever took place with them. • Once an agreement is reached between Rantau Pakis SG and PT BAS to develop partnership plantations, Rantau Pakis SG members would like to have lands along by River Karangan. However, areas of 300 m from the river will remain uncleared and allocated for community's farms and rice fields. • The plan for partnership plantation itself was made in around 2013, however, until the company was taken over by DSN, such agreement has not materialised. In 2019, the partnership idea was reproposed to PT BAS (under the new management), the scheme for which is yet to be defined. That, according to the SG member, is because the company was waiting for the HCV-HCSA assessment output, hence the better calculation. It is expected that decision will be taken in the next meeting concerning the cooperation scheme to carry out. • Rantau Pakis SG has a big expectation for this partnership plantation cooperation, given their lands are currently unmanaged. The land management are only on a seasonal basis, involving only few lands because of lack of capital and so on. • According to Rantau Pakis SG, currently their lands are covered by thickets.
Land and Plant Compensation ("GRTT")-receiving smallholder group from Karangan Seberang Village	Cecel (Leader) Husni (Member)	Direct meeting	• Land acquisition process is carried out through smallholder groups, but the GRTT compensation was paid directly from PT BAS to each individual. • Karya Adat Smallholder Group members farmed in the past. Lands that PT BAS has cleared into oil palm plantation were previously *bajang* (ex-fields). • Some lands of its SG were cleared and planted in the first place, after which the compensation was made. The payment was not instant; but rather, in several terms. Some of them are not completely paid.
Community leader	Sariaji (Baay Village), ex PR staff of PT BAS 2009	Direct meeting	• PT BAS held information dissemination events in Karangan Seberang and Baay Villages. The company's PR Manager presented in these events. District and sub-district representatives, as well as local village community members attended the meetings. • PT BAS acquired lands from SGs who actually are 'logger groups' as they never cultivated these lands. Some of them are logged-over areas left behind by logging companies.
GRTT-receiving community members from Baay Village	Sunardi (GRTT-receiving community member) Sariaji (DMP Cooperative Member)	Direct meeting	• Area of lands released to PT BAS is 5 ha. A compensation of IDR 4 million per ha was directly made by PT BAS (not through the SG) in 2011. • There are no coercions, pressures or promises whatsoever to hand over these lands.

Expert/ Organisation/ Social Group	Name/Position/ Role	Interaction Type	Concern and/or Recommendations
			• These lands were once divided into plots during a programme of forest area redistribution to local community (around 2005).
Farmer in enclave area	Yan (Karangan Seberang Village) Anisa Putri (Baay Village)	Direct meeting	• There are no coercions, pressures or promises whatsoever to hand over these lands.
Community members owning enclaves in Karangan Seberang Village	Anton Siti Sholeha	Direct meeting	• Newcomers from Flores who came in 1993. Initially worked in logging company. • In 2005 they received lands from the District Government's land redistribution programme (5 ha). The area was once PT KWS concession. • Land clearing was carried out by each recipient. They cleared their lands and then made boundaries between them. This delineation activity was recorded by the committee. • PT BAS started nursery development in around 2007 and has already acquired the lands. • In 2007, the land compensation was IDR 5 million per 5 ha, but then increased in 2008-2009 to IDR 5 million/ha. • There are no coercions, pressures or promises whatsoever to hand over these lands. • The cooperation scheme that the informants opted was partnership arrangement, in which they released 2 ha to the PT BAS, while the other 3 ha remained in their possession. The plantations were completely financed by the company until the oil palm started producing fruits (estimated at age 5). • Other than lands from the redistribution programme, the informants also have other lands they secured through buying from other community members. They started planting their own oil palms in around 2011. • Every land planted with oil palms within HGU has already been completely compensated. This can be seen from several enclaves that remain unsold to the company and are managed by their owners.
Community members owning enclaves in Karangan Dalam Village	Sukirman, Rullah, Lasmini	Direct meeting	• Most of migrant community members (Bugis ethnic group) once worked in PT Segara Timber (a Forestry Concession/HPH holder). The migration already took place in 1980s. • Other than working in logging company, they normally also worked as carrier workers helping swiftlet nest collectors in Mt. Beriun. But now, it is difficult to collect even only 1 ounce • Migrant community normally started with 1 ha of forest per year. • The informants have lands in PT BAS HGU concession which they originally obtained from the government's redistribution programme from ex-HPH concession where each got land of 5 ha. These lands have currently been put under a profit-sharing scheme. • There are no coercions, pressures or promises whatsoever to hand over these lands. • Initially Sukirman bought 5 ha from fellow community members. However, 3 ha were sold to the company in 2015 because he needed it. The price was IDR 10 million/ha.

Expert/ Organisation/ Social Group	Name/Position/ Role	Interaction Type	Concern and/or Recommendations
			• In 1991, when PT Segara Timber (a logging company) started being inactive, coffee plantation took its place. In 1997, community planted cacao. To date, cacao plants can still be found in community plantations. • Cacao can be harvested twice in a month at price of IDR 23,000/kg. Nowadays, the best yield they can produce is ± 0,5-2 tonne/ha/month every harvest, making it much less than profitable compared to oil palm. • As for oil palm, the price at collector is maximum IDR 900 with yield range of 2 tonnes/ha every 20 days. According to him, this is because of lack of maintenance and fertiliser application, leading to low production. • Local community normally also has rubber plantation, an example is Sukirman who still maintain 400 rubber trees in this plantation. Rubber price is IDR 7,000/kg (collector price). • Many villagers work in PT BAS plantations and mills, so that this is very helpful to them.
Community members owning enclaves in Baay Village	Nursam Ratnawati	Direct meeting	• In 2006, Nursam (a migrant from Sulawesi) came to Karangan upon information from his colleague that there would be an oil palm plantation development. In the beginning he had 5 ha of oil palm plantation out of clearing lands. Together with Bahar, who has long lived in this area, today he owns 20 ha in total from buying from his colleagues. • Based on his experience in dealing with oil palm when he was in Malaysia, the informant started planting oil palms in his land. • The land of 15 ha in which he also built his house is located around PT BAS *Afdeling* 6 (Plantation Unit 6), while another 5 ha are located far from home, which he bought from Lambo Atta, a fellow villager. • Nursam's areas are entirely planted and managed by himself under no aid or partnership programme including PT BAS. Seedlings he planted is from his own nursery. The seeds came from his colleague in Sumatera. Currently his yield could reach ± 2 tonnes/ha, sent to PT BAS PKS. • The informant was once offered to sell his lands to the company, but he declined and decided to manage them himself. However, the company is still willing to cooperate with him by issuing a Cooperation Contract (SPK) allowing him to sell his FFBs to the company mill. It is the profit from this SPK that allows him to accept mill's purchase price.

3.6.3. FPIC Status

Based on document review and interview with respondents during the Assessment, it is known that FPIC elements have been met. As such, the decision making by community already expressing their willingness to release their lands and join the cooperation programme under the partnership scheme represented by the multipurpose cooperatives is the quality one.

'Free' element of FPIC principle is already well met not only during information dissemination events, but also after the event, where no indication of coercion, pressure, intimidation, promise or others that eliminate one's freedom physical and psychologically has been found. One of the informants is Anton, a villager of Karangan

Seberang who mentions that he found a convenient atmosphere in the events where question and answers took place and producing information that he thinks is sufficient.

'Prior' element has already been met, particularly when the information dissemination events are done by the company. Communities in the Assessment area were given enough time to think over and enough space to gather information and have discussion with families or other stakeholders. Community leaders in the area feel they are respected and appreciated by the company because the company gave them notice in the first place prior to the plantation development programme. The company did not set any limitation that narrow down community's movement and space to think over before making decision. This is proven with many enclave community areas within PT BAS MU area. The company provides freedom to community so they can decide whether or not to release their lands to the company. If they opt the latter, the area will be enclaved by the company.

'Informed' element has been met in the beginning of the plantation development. According to community members who already attended information dissemination events from PT BAS, the information on the plantation development programme is considered already clear. However, to some others, particularly Rantau Pakis SG, further discussions will be necessary on the planned partnership plantation development programme upon the HCV-HCSA Assessment.

3.6.4. Summary of others Findings

In general, community members has good communication with PT BAS. Communities generally reported a good relationship with BAS CSR team, and appreciated of CSR programs and the effort PT BAS has made to mend communication. The improved relationship has also made them feel more comfortable to raise issues related to plantation development and impacts.

Other items commonly brought up during FGDs included:

- Maximize employment opportunities to local communities, including staff positions for educated youths (fresh graduates) as well as temporary labouring work (plantation maintenance etc).
- Offering work opportunities to community members that are not members of the plasma farmer co-operative (priority is generally given to members).
- How to apply for assistance under CSR programs.
- Employment issues are discussed indept in the SIA report

3.6.5. Participatory Mapping

3.6.5.1. Participatory Review of Draft ICLP

Objectives and Activities

Participatory mapping was carried out collaboratively at Desa level by teams consisting of community members, Gagas Dinamiga Aksenta surveyors and BAS field staff. Objectives of the Participatory Mapping activities were as follows:

- Ground truthing of land cover and land use maps.
- Identification of land areas communities currently use or plan to use for long term agriculture and as such are important for food security.
- Identification of any additional no-go areas not captured during HCV assessment, with major focus on community/customary land use aspects.
- Identification of sensitive sites land uses requiring additional joint discussion with communities before being classed as "go – area". In particular, padi fields (sawah) and other food production areas (related

to food security and Government rice field rehabilitation programs) productive rubber plantation land, and tembawang areas.

- Identification of settlement areas and land for planned expansion of settlements.
- Improved mapping of rivers and streams requiring buffering, with particular focus on streams used for water suuply.
- Checking identification and boundaries of steep land, peat land areas and other potential conservation areas (if any).
- Identifying areas of land areas Communities currently use for collection of forest products (timber and non-timber).

The participatory mapping exercise included the following activities:

1. Detailed mapping of land cover from aerial photography and satellite imagery (desk top activity prior to field visit).
2. Initial socialisation (during FGD), including listing of target areas for field survey, and selection of the Desa team to be involved in the field mapping.
3. GPS surveys in the field to identify and ground truth land cover and land use, and map streams and no-go areas.
4. Integration of results into the draft Integrated Land Use Plan. (Office based activity after the first field visit).
5. Participatory review of draft land use plans with communities (during the second field visit).

Table 57 shows the schedule of the Participatory Mapping team during the initial Field assessment

Location	No of Community/Groups ID
HGU	97
KSU Permata Jaya	22
KSU Dharma Mulia Palma	27
KT Rantau Pakis	30

3.6.5.2. Participatory Review of Draft ICLP

Participatory Review of draft ICLP was carried out in a second separate site visit once HCV and HCS results had been developed. 1:5000 scale maps were printed and presented for discussion during meetings held in each Desa. Significant input was received during these meetings on what areas communities wished to be included and excluded from the proposed conservation area. In total communities requested 484 ha of land be removed from the planned HCS area (see further discussion on the final draft ICLP in Section 10).

The participatory process also led to improved community awareness of BAS conservation plans and the need for joint management of conservation areas. Although considerable effort was put into the participatory mapping process, it is not perfect and BAS needs to develop procedures for updating and improvement of the dataset. This should be carried out in conjunction with land surveying during the GRTT process. For instance, although the river and stream alignment has been much improved, it is likely smaller

streams have not all been identified correctly, so buffers will have to be measured and marked by BAS surveyors.

Table 58 The activities schedule for final consultation of the draft conservation plan.

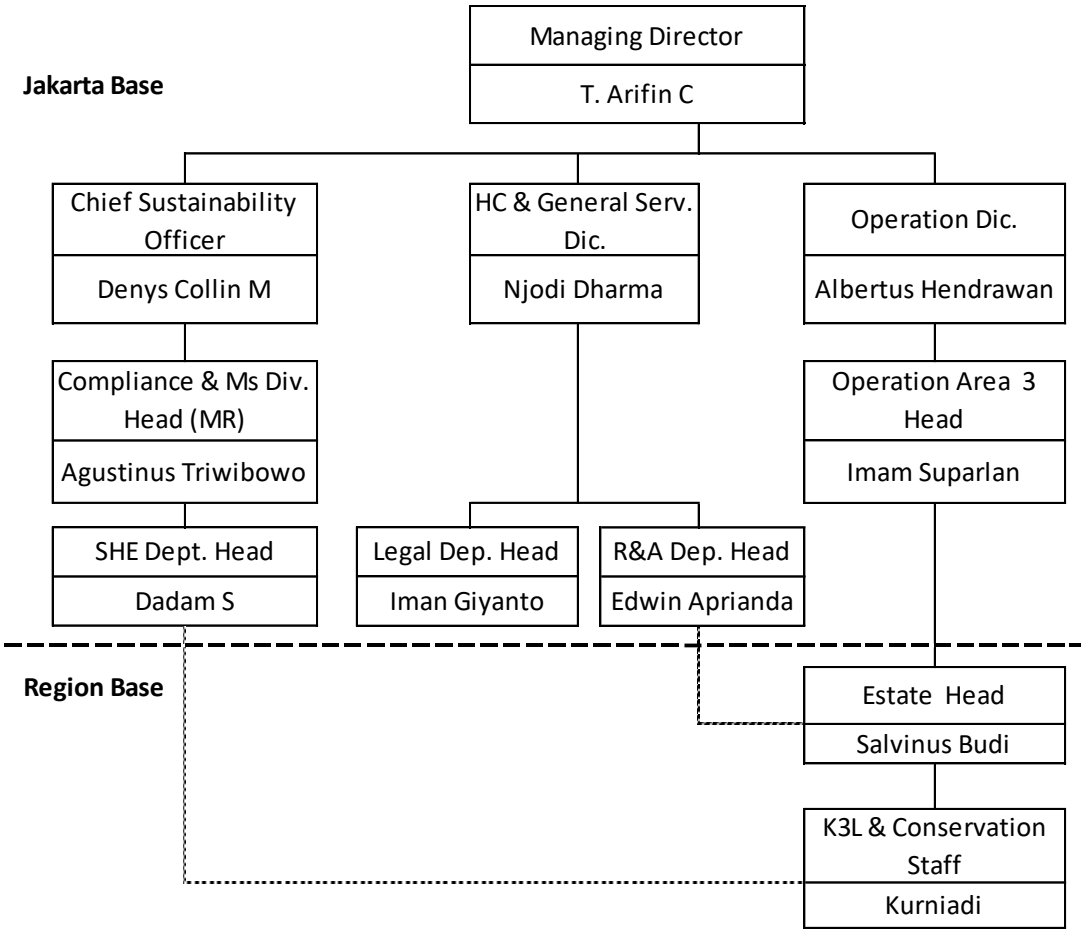
Date	Organization/Social Group	Name
29-10-2019	Ministry of Education and Culture, East Kalimantan Cultural Heritage Conservation Center	1. Musliman AR (L) 2. Kartika Nurani (P) 3. Andika Arief DP (L)
29-10-2019	Ecositrop	1. Nur Komari (L) 2. Diding (L)
30-10-2019	KPHP unit XVIII Bengalon	Maryudi (L) Siyamto (L)
30-10-2019	East Kutai Regency Environmental Service	1. Budhiarsa (L) 2. Muhammad Amrullah (L)
31-10-2019	1. Karangan Seberang Village Government 2. Traditional Institution of Karangan Seberang Village 3. NGO Pemuda Karangan Peduli Bumi 4. Permata Jaya Cooperative	1. Abdullah (L) 2. Decky Z (L) 3. Munaji (L) 4. Hairiansyah (L) 5. Fadli (L) 6. Momon (L) 7. Karto (L) 8. Abdur Rajab (L)
31-10-2019	1. Karangan Dalam Village Government 2. NGO Kawal Borneo Community Foundation (KBCF)	1. Riduan (L) 2. Hairul Mugni (L) 3. Anisya (P) 4. Aris Adha (L)
31-10-2019	Karangan Hilir Village Government	1. Iskandar (L) 2. Khairil (L)
31-10-2019	Rantau Pakis Farmer Group	1. Julkipli Samuel (L) 2. Y. Boaz (L) 3. Jailani (L)
1-11-2019	1. Traditional Institution of Baay Village 2. Baay Village Government	1. Sahrudin P (L) 2. Mustofa (L) 3. Mansur, SAP MAP (L)

Chapter 4

4. Summary of Management Plans

4.1. Team responsible for developing management plans

Monitoring management of HCV and SEIA PT BAS in region base, controlled by Estate Head PT BAS (PH) along with relevant functional departments. Estate planning process synergize with program planning and management of HCV and SIA. The department which involved in management plan and implementation. Area figured below.



4.2. Soil Type and Topography

Based on the land system map (RePPProT, 1990), the AOI area is divided into six land systems with three land physiographical forms (Table 6.1 and Figure 6.6; see also Figure 6.10). The dominant land form in this area is hilly (53%) with the Maput land system (MPT). The area is well-known in the central to eastern part of the AOI region. Areas with the MPT land system also dominate HGU, cooperatives and farmer groups. Based on the land system data, and referring to the indication of the existence of threatened or threatened ecosystems on the island of Kalimantan4, the AOI area has the potential for the presence of three threatened and / or rare ecosystems, namely Lowland Forests on Sandstone (MPT, TWB, TWH) and Forest Kerangas (BRW), and Karst Forest (GBJ, OKI).

Types of soil in the entire AoI are mineral soils. No locations in the area belong to histosol soil order (peat).

Soil types in the AoI is dominated by associations of hapludults and paleudults soils distributed in the middle and north parts.

4.3. GHG Emissions Management and Mitigation Plans

The mitigation plan are associated with oil palm cultivation & processing in the new development of plantation and mill operation.

Land clearing for plantations will be prioritized in areas with low carbon stocks. The efforts to minimize GHG emissions include among others: the efficient use of fuel through the engine maintenance and selection of technology which more efficient fuel usage, an accurate fertilizer recommendations, maximize the use of biological agents for pest control, etc.

In order to determine the successful management of carbon stocks and GHG mitigation, it is necessary for monitoring and periodic evaluation. The efforts of monitoring and evaluation can be carried out as follows:

1. Monitoring land cover by Citra Sentinel, analyze the land cover changes, for calculating the value of carbon sequestration.
2. Establishment of plots vegetation analysis in the conservation area or HCV
   - Number of permanent plots is proportional to the level and extent of land cover.
   - Perform estimation and calculation of carbon stock every year based on the results of the measurements .
   - Creating a carbon balance every year, so that can know the value of net GHG emissions
   - Evaluate any form of management based on the value of benchmarks and targets set.

4.4. Summary of Management and Mitigation SEIA

Potential impact, risk and social issue based on SEIA report has been classified based on the resources from group process development activities oil palm plantation and has done PT. BAS. The assessment of SEIA in the executive summary of AMDAL and SIA Report for identification of negative and positive impact on the environment and surrounding community of PT BAS as **Table 56**

4.5. Summary of Management and Mitigation Plans HCV

Threat Assessment

Threats in this Assessment are assessed applying the approach of IUCN Threat Classification Scheme (based on Salafsky et al., 2008). This approach was developed to facilitate identification of threats and their sources. Once threats and their sources are identified, assessment is carried out towards potential impacts and risks for each area along with HCV and HCS elements they contain. Further, weighing is performed to identify, which threats should be made priority, to which management and monitoring planning will be referring. Threat assessment indicates that, in general, there are four groups of threats to conservation areas, namely threats that are concerned with (i) water bodies (river, spring, reservoir and lake); (ii) riparian vegetation; (iii) karst areas; (iv) the remaining secondary forest area; and (v) RTE species presence. The biggest threat to water body-related HCVs' is potential water pollution because of agrochemical residuals from plantation and farm areas. Threats faced by HCVs relating to riparian vegetation, karst area, secondary forest area and important species presence include logging activities, land fires, and wildlife hunting (Table 55).

Table 59 Summary of the presence of important values and their major threats

Conservation Value	Summary of important values in the Assessment area	Major threats
HCV 1	Endemic or RTE fauna and flora species populations and habitats	▪ Declined size and quality of habitat due to logging activities, landuse conversion and land fires. ▪ Wildlife hunting ▪ Deteriorating quality of aquatic habitats ▪ Human-wildlife conflict.
HCV 2	Karst areas in the Assessment area connecting to karst natural landscape area	▪ Logging activities. ▪ Forest and land fires.
HCV 3	There are karst forest and dipterocarp lowland forest ecosystems	▪ Land conversion and logging activities. ▪ Forest and land fires.
HCV 4	Basic environmental services relating to hydrological system in rivers and lakes, including their banks.	▪ Deteriorating water quality because of pollution from agrochemical residuals. ▪ Landuse conversion in water body banks ▪ Forest and land fires.
HCV 5	Presence of rivers as source of water and fishing ground	▪ Deteriorating water quality because of pollution from agrochemical residuals. ▪ Landuse conversion in riparian areas.
HCV 6	Cave may potentially have prehistoric values	▪ Potential damages to cave because of vandalism.

Management Plan HCV was develop with the intention of providing guidance for the company in designing and implementation HCV and SEIA program. Monitoring HCV area during every six months. So that their resources can be focused a more integrated and effective in achieving the vision of the management plan PT BAS as **Table 57**

Table 60 PT BAS Social Management and Monitoring Program

No	Social Impact/ Social Issues	Target	Strategy Target Achievement	Location	PIC	Timeframe for completion	Monitoring
1	Social						
	a. Labor Empowerment	1. The implementation of job skills training for the surrounding community 2. The implementation of business skills training 3. Communicating with stakeholders regarding labor issues	1. Identify the availability of the workforce in the villages around the Company 2. Identify the types of work available to the local community 3. Identification of relevant stakeholders 4. Organizing job skills training for the workforce of the surrounding community 5. Organizing business skills training for the surrounding community 6. Coordinate with village heads and sub-district heads regarding the availability and acceptance of local community workers 7. Forming a problem handling group (Grievance Mechanism)	Villages around PT BAS	HC Dept/ CSR	2021-2022	Every year (Jan)
	Public health	1. Improve health facilities and the capacity of medical personnel around the company	1. Identification of health facilities and medical personnel available around the Company 2. Identification of health problems in the surrounding community 3. Identification of relevant stakeholders 4. Organizing improved health facilities for the surrounding community	Concession & Villages around PT BAS	CSR / Company Doctor	2021-2022	Every year (Jan)

No	Social Impact/ Social Issues	Target	Strategy Target Achievement	Location	PIC	Timeframe for completion	Monitoring
			5. Coordinate with village heads and sub-district heads regarding the implementation of health programs for surrounding communities 6. Forming a problem handling group (Grievance Mechanism)				
	Establishment of a Community Complaint Handling Group (Grievance Resolution)	Establishment of a Grievance Committee (Grievance Committee)	1. Create public complaint reception posts in each estate and the Village Office 2. Record and document every complaint and problem 3. Establish a standard time for resolving complaints and problems and their follow-up 4. Increase the intensity of meetings with village officials and community leaders, especially in solving problems with the community 5. Socialization of progress and follow-up problem solving	Concession & Villages around PT BAS	Directors, Estate Head,CSR	2021-2022	Every months (Jan-Dec)
	CSR development	An integrated CSR program based on community empowerment	1. Develop community economic potential based on the potential of each village 2. Establish a village treasury oil palm land 3. Improvement of cooperative work programs	Villages around PT BAS	Directors, Estate Head,CSR	2021-2022	Every year (Oct)
	FPIC	Implementation of FPIC	1. Develop and disseminate information on corporate policies stating/suggesting that the company applies FPIC principles in	Villages around PT BAS	CSR	2021-2022	Every months (Jan-Dec)

No	Social Impact/ Social Issues	Target	Strategy Target Achievement	Location	PIC	Timeframe for completion	Monitoring
			implementing PSR programmes to allow all staff/employees to understand and implement 2. Provide cooperative with FPIC principles and require them to apply the principles, following the flowchart in Free, Prior and Informed Consent Guide for RSPO Members. 3. Provide the information dissemination/PR team with comprehensive knowledge and materials including on FPIC phases, negative impacts and risks, impact and risk mitigation, and location and area of potential development of oil palm plantation. 4. Carry out study to confirm the presence/absence of historical and cultural values in the caves (BAS 1 and BAS 2) in the HGU concession.				
2	Living environment						
	Surface Water Quality	Implementation of river water pollution management program	1. Use of chemicals and fertilizers that are safe for the environment 2. Coordinate with village heads and sub-district heads regarding the implementation of water quality monitoring and monitoring programs	Concession & Villages around PT BAS	SHE Dept Head	2021-2022	Every 6 months (June & Dec)

No	Social Impact/ Social Issues	Target	Strategy Target Achievement	Location	PIC	Timeframe for completion	Monitoring
			3. Forming a problem handling group (Grievance Mechanism) 4. Reducing surface runoff, so that the potential for air to absorb into the ground is greater, the peak of river discharge decreases and the river baseflow increases 5. Reducing the rate of erosion and sedimentation products 6. LCC planting				
	Potential Pests and Diseases	1. Implementation of periodic pest management programs for the community 2. Improve the facilities and capabilities of agricultural extension workers around the company	1. Identification of pests and diseases that have the potential to damage the crops of the community around the Company 2. Identify the availability of extension workers in the surrounding community 3. Identification of relevant stakeholders 4. Organizing periodic pest control counseling for the surrounding community 5. Organizing an increase in agricultural extension facilities 6. Coordinate with village heads and sub-district heads regarding the implementation of plant pest management programs for the surrounding community 7. Form a problem handling group (Grievance Mechanism)	Concession & Villages around PT BAS	Estate Head / R&A/CSR	2021 - 2022	Every Year (July)

No	Social Impact/ Social Issues	Target	Strategy Target Achievement	Location	PIC	Timeframe for completion	Monitoring
	Aquatic Biota	Clean river program	1. Identification of the river and water networks that exist around the Company 2. Application of environmentally friendly oil palm plantation management techniques 3. Identification of stakeholders related 4. Coordinate with village heads and sub-district heads regarding the implementation of the clean river program for the surrounding community 5. Forming a problem handling group (Grievance Mechanism)	Concession & Villages around PT BAS	SHE Dept Head, Estate Head, CSR	2021-2022	Every 6 month (Jan & July)
	Erosion and Sedimentation	Implementation of erosion and sedimentation prevention programs	1. Application of environmentally friendly plantation management 2. Use of palm fronds as a barrier to erosion 3. Coordinate with village heads and sub-district heads regarding the implementation of health programs for surrounding communities 4. Forming a problem handling group (Grievance Mechanism) 5. Conducting soil and water conservation 6. Maintenance of drainage channels	Concession PT BAS	Estate Head	2021-2022	Every 3 month (Jan, April, July, Oct)
	Soil fertility	1. The implementation	1. Training of employees in	Concession PT BAS	R&A, Estate	2021-2022	Every Year (June)

No	Social Impact/ Social Issues	Target	Strategy Target Achievement	Location	PIC	Timeframe for completion	Monitoring
		of EFB utilization program 2. Improving the techniques and capacity of the community in utilizing the tankers around the company	environmentally friendly garden waste management 2. Socialize the use of tangkos to reverse soil fertility 3. Coordinate with village heads and sub-district heads regarding the implementation of the Tangkos utilization program to increase soil fertility for the surrounding community 4. Forming a problem handling group (Grievance Mechanism)		Head		
	Potential Land Fires	1. Implementing a socialization program for combating land and garden fires 2. The implementation of training in land and plantation fire management	1. Conducting education and socialization of land and garden fire handling 2. Conduct training on land and garden forest fire management 3. Organizing land and garden fire suppression simulations 4. Coordinate with village heads and sub-district heads regarding the implementation of fire management programs for local communities 5. Forming a problem handling group (Grievance Mechanism)	Concession & Villages around PT BAS	Estate Head, CSR, SHE Dept Head	2021-2022	Every Month (Jan-Des)
3	Employment						
	Occupational Health and Safety	1. The implementation of the K3 socialization and training program	1. Holding K3 socialization and training 2. Complete K3 equipment 3. Forming an K3 organization	Concession PT BAS	SHE Dept Head	2021-2022	Every Year (Jan-Des)

No	Social Impact/ Social Issues	Target	Strategy Target Achievement	Location	PIC	Timeframe for completion	Monitoring
		2. Availability of K3 organization and equipment	4. Forming a problem handling group (Grievance Mechanism)				
	Optimization of workers' institutions	Implementing institutional programs	1. Conducting outreach to workers about the institutions in the company (labor unions and cooperatives) 2. Cooperating with banks and other parties for cooperative development 3. Provide rewards to workers who are willing to contribute more to development 4. institutions within the scope of the company	Concession PT BAS	HC, Estate Head	2021-2022	Every Year (Jan-Des)

Note: The monitoring plan referred to above is a monitoring plan during land clearing

Table 61 Matrix Management and Mitigation Plan HCV & HCS

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
HCV 1							
All species	Loss of land cover which has implications for habitat loss, habitat destruction and habitat fragmentation and loss of important species.	1. Carry out conservation area gazettement involving the following phases: conduct field delineation against the draft HCV-HCS area map, verify the delineation, and finally make it final conservation area map 2. Perform land compensation in conservation areas, so that management conservation area can be carried out independently by the company. 3. Formation of a team for a).managing conservation areas, b). monitoring conservation areas, c). mitigating conflicts between humans and fauna and d).mitigating forest and land fires. 4. Demarcate by installing markers on the conservation area (HCV-HCS) boundaries, followed with installing signboard. In riparian areas, the installation should also	1. The company needs to document this process on a minute of HCVHCS area delineation 2. Conduct a more detailed biodiversity survey to confirm the existence of species potential fauna found in the study area, but not identified during the HCV assessment. 3. Creating a permanent sample plot (PSP) to monitor flora and fauna in the conservation area. 4. Monitoring the conservation area regularly (monthly) at the PSP location by noting the presence of RTE, endemic and protected species. 5. Monitoring the trend of biomass carbon stock growth in PSP locations. 6. Patrols to identify all forms of activity that can lead to loss of land cover. 7. Increase the intensity of patrols during the dry season to prevent forest	HCV & HCS Area PT BAS HCV & HCS Area PT BAS HCV & HCS Area PT BAS HCV & HCS Area PT BAS HCV & HCS Area PT BAS HCV & HCS Area PT BAS	SHE & Conservation Staff SHE & Conservation Staff SHE & Conservation Staff SHE & Conservation Staff SHE, Security, Conservation Staff SHE, Security, Conservation Staff	2021-2022 2021-2022 2021-2022 2021-2022 2021-2022 2021-2022	Every month (Jan-Dec) Every Year (Jan) Every month (Jan-Dec) Every Year (June) Every month (Jan-Dec) Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
		include the HCVMA. 5. Outreach to staff, employees and the community regarding the importance of conservation areas 6. Adjusting the direction of land clearing in areas with potential development to approach conservation areas, so that fauna species can be led to conservation areas and not trapped outside the conservation areas. 7. Habitat enrichment by planting local plant species in areas that have been disturbed by agricultural activities, logging, in the outer part of the ID 04 conservation area and the enclave area which is the Orangutan corridor. 8. Finalise ICLUP applying FPIC principles and engaging local community, village/sub-district government, traditional leaders and stakeholders in the AoI including other companies and local government institutions.	and land fires. 8. Monitoring the area where habitat enrichment is carried out. 9. The finalisation should start with gazettement of conservation areas as part of oil palm plantation evelopment.	HCV & HCS Area PT BAS HCV & HCS Area PT BAS	SHE & Conservation Staff SHE & Conservation Staff	2021-2022 2021-2022	Every month (Jan-Dec) Every Year (Jan)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
		9. Disseminate information to and collaborate with the following stakeholders concerning conservation area management a. The company internal (field workers, staff, and partnership cooperative members). b. Local community (land users, village governments and traditional institutions). c. Neighbouring companies (programme collaboration). d. Relevant stakeholders (consultation). 10. Develop HCV-HCS Management and Monitoring Plans taking into account the following. a. Species protection aspects, including management of potential conflict between human and wildlife (e.g. orangutan), maintenance and enhancement of function of corridor between fragmented habitats, and habitat enrichment. b. Reinforcement of communication with the neighbouring companies to					

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
		develop HCV-HCS management plan and protection action plan. c. Engagement with local community because presence of HCV-HCS, particularly HCV 5 and 6, is every stakeholder's interests and benefits. Community engagement process must apply FPIC principles 11. Develop institutional aspects of HCV-HCS management. a. Establish a management unit to ensure the achievement of the management goals. b. Train staff or recruit those with relevant qualification for HCV-HCS management. 12. Build internal resources' capacity in identification, management, monitoring and evaluation. Monitoring training (e.g. basics of wildlife identification, water quality measurement, and stakeholder engagement). b.					

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
		Application of company's applicable procedures and policies. 13. Disseminate information to the five assessment villages on HCV-HCS knowledge and understanding. 14. Carry out study to confirm the presence/absence of historical and cultural values in the caves (BAS 1 and BAS 2) in the HGU concession.					
	Hunting for pets, trading and food sources	1. Outreach to staff, employees and the community regarding the prohibition of hunting and keeping animals as pets 2. Cooperating with the competent authorities to curb the use of air guns by the public and employees. 3. Information boards relating to hunting prohibitions.	Regular patrols to prevent hunting activities.	HCV & HCS Area PT BAS	SHE, Security, Conservation Staff	2021-2022	Every month (Jan-Dec)
	Logging for building materials	1. Outreach to staff, employees and the community regarding the prohibition of logging. 2. Information board relating to prohibition of logging.	Regular patrols to prevent logging activities.	HCV & HCS Area PT BAS	SHE, Security, Conservation Staff	2021-2022	Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
	Conflict between humans and animals	1. Cooperate with parties with authority and experience in handling conflicts between humans and fauna. 2. Conducting conflict handling and emergency handling training in case of attack from fauna, especially sun bears. 3. Develop an integrated reporting procedure in case of conflict between animals and employees / communities.	1. Regular monitoring at locations that are the potential for conflict between humans and fauna. 2. Intensive supervision at harvesting, maintenance and fertilizing locations near conservation areas.	HCV & HCS Area PT BAS HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff SHE, Security, CSR, Conservation Staff	2021-2022 2021-2022	Every month (Jan-Dec) Every month (Jan-Dec)
Orang utan	Loss of habitat and function of the Orangutan corridor.	1. See section on all species for habitat loss 2. Coordinating with the authorities to conduct a joint review. 3. Conducting habitat enrichment, especially with plant species that become orangutan food pohoon	1. See section on all species for habitat loss 2. Conduct monitoring of nests periodically (monthly), especially the presence of new nests in enclaved areas 3. Updating the Orangutan population data, and nest density periodically (once a year)	HCV & HCS Area PT BAS HCV & HCS Area PT BAS HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff SHE, Security, Conservation Staff SHE, Conservation Staff	2021-2022 2021-2022 2021-2022	Every month (Jan-Dec) Every month (Jan-Dec) Every month (Jan-Dec)
	Logging that can remove nest trees and forage trees.	See the section on all species related to logging	See the section on all species related to logging	HCV & HCS Area PT BAS	SHE, Conservation Staff	2021-2022	Every month (Jan-Dec)
	Conflict with	1. Conduct training with	Reporting procedures are	HCV & HCS Area	SHE, HC, CSR,	2021-2022	Every

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
	employees or the community when orangutans move through plantation areas and roads	parties who are experienced in handling human-orangutan conflicts. 2. Arrange the design of the FFB transportation route in the plantation for reduce the intensity of road use in locations that are potentially traversed by orangutans. 3. Installing signs to reduce speed on roads that have the potential to be traversed by Orangutans. 4. Develop a reporting procedure if an orangutan is found or there is a conflict with an orangutan.	socialized to all staff, employees and society.	PT BAS	Conservation Staff		month (Jan-Dec)
Kalimantan gibbons	Loss of habitat	1. See section on all species for habitat loss 2. Conduct studies on the population and suitability of gibbon habitat 3. Conducting habitat enrichment with species that feed gibbons	1. See section on all species for habitat loss 2. Carry out regular monitoring (1 month) 3. Updating population data and habitat suitability of gibbons (1 year).	HCV & HCS Area PT BAS HCV & HCS Area PT BAS HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff SHE, Conservation Staff SHE, Conservation Staff	2021-2022 2021-2022 2021-2022	Every month (Jan-Dec) Every month (Jan-Dec) Every Year (July)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
	Logging	See the section on all species related to logging	See the section on all species related to logging	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every Year (July)
Sun bear, antelope, horn	Loss of habitat	See the section on all species related to logging	See the section on all species related to logging	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)
	Hunting as a source of food	See the section on all species related to logging	See the section on all species related to logging	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)
	Conflict between humans and sun bears	Conduct training with experienced parties in handling conflicts with Sun bears	See the section on Orangutans on human conflicts	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)
Felidae Group (Rock cats and Kuwuk cats)	Hunting as pets	1. See section on all species related to hunting 2. Outreach to staff, employees and the community regarding the importance of species from the Felidae family as pest control in plantation areas.	See section on all species related to hunting	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)
Group Cercopithecidae, like the Beruk, the long-tailed	Conflict with humans because they are considered as agricultural pests	Training and development of clearing techniques for monkeys and long-tailed monkeys from community farms.	Mapping community lands and the intensity of disturbance to community lands.	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
monkey							
Bucerotidae group (Black-crested hornbill, Rhino hornbill, black hornbill)	Loss of habitat and corridors	1. See section on all species for habitat loss 2. Mapping nest trees and steeping stone trees, both in conservation areas and in plantation areas. 3. Leaving large trees during land clearing as steeping stone trees. 4. Enrich the conservation area with fig trees (Ficus sp.) as a source of feed	1. See section on all species for habitat loss 2. Monitoring the presence of these birds regularly in locations that are often traversed by the birds.	HCV & HCS Area PT BAS HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff SHE, Conservation Staff	2021-2022 2021-2022	Every month (Jan-Dec) Every month (Jan-Dec)
	Hunt	See the section on all species related to logging	See the section on all species related to logging	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)
	Logging	See the section on all species related to logging	See the section on all species related to logging	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)
Group of Raptors (Rat eagle, bondol eagle, bat eagle, crested kestrel and kestrel	Loss of habitat and corridors	1. See section on all species for habitat loss 2. Mapping nest trees and steeping stone trees, both in conservation areas and in plantation areas. 3. Leaving large trees during land clearing as steeping stone trees.	See section on all species for habitat loss	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
	Hunting as pets	1. See section on all species related to hunting 2. Outreach to staff, employees and the community regarding the importance of the raptor species as pest control in plantation areas.	See section on all species related to hunting	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)
	Logging	See the section on all species related to logging	See the section on all species related to logging	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)
Other birds (Serindit malay, tiong gold, takur gedang and honey- bird sepahraja)	Hunt	See the section on all species related to logging	See the section on all species related to logging	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)
Bondol Kalimantan	No serious threats were identified	See the entire species section	See the entire species section	HCV & HCS Area PT BAS	SHE, Conservation Staff	2021-2022	Every month (Jan-Dec)
Layang-layang api	No serious threats were identified	See the entire species section	See the entire species section	HCV & HCS Area PT BAS	SHE, Conservation Staff	2021-2022	Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
Aquatic species (estuarine crocodiles, turtles and the species of the amphibian group)	Loss of habitat	1. See section on all species for habitat loss 2. See section HCV 4 for agrochemical residues 3. Conduct studies on the presence of amphibians as an indicator of environmental disturbances, especially aquatic biota	1. See section on all species for habitat loss 2. Carry out regular monitoring (1 month) 3. Updating population data and habitat suitability of gibbons (1 year).	HCV & HCS Area PT BAS HCV & HCS Area PT BAS HCV & HCS Area PT BAS	SHE, Conservation Staff SHE, Conservation Staff SHE, Conservation Staff	2021-2022 2021-2022 2021-2022	Every month (Jan-Dec) Every month (Jan-Dec) Every Year (July)
	Hunting for food	See section on all species related to hunting	See section on all species related to hunting	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)
	Conflict between humans and crocodiles	1. See section on all species for conflict 2. Install warning boards for crocodiles in water locations	See section on all species for conflict	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)
Other species of reptiles (King Cobra, Cobra Snake, Python Snake)	Conflict between humans and poisonous snakes	1. See section on all species for conflict 2. Outreach to employees on the use of personal protective equipment, especially preventing poisonous snake bites and cobra snakes. 3. Provide anti-snake venom serum at the company	See section on all species for conflict	HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff	2021-2022	Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
		polyclinic					
Important tree species with high economic value include Keruing (Dipterocarpus tempehes, Bengkirai (shorea laevis), Buyung wood (Shoerea uliginosa) and Ulin (Eusideroxylon zwagerii)	Logging has implications for the loss of biodiversity and important animal habitat	1. See section on all species related to logging 2. Marking of trees with RTE, endemic and protected status. 3. Replanting areas that have been logged over from logs with local species that also have ecological value as food trees for animals.	1. See all species sections related to logging and loss of land cover. 2. Carry out chain of custody of the origin of the logs circulating in the study area. 3. Monitoring disturbance and growth rate of saplings in areas that have been logged. 4. Creating PSP to monitor trends in the value growth of biomass carbon stocks.	HCV & HCS Area PT BAS HCV & HCS Area PT BAS HCV & HCS Area PT BAS HCV & HCS Area PT BAS	SHE, Security, CSR, Conservation Staff SHE, Conservation Staff SHE, Conservation Staff SHE, Conservation Staff	2021-2022 2021-2022 2021-2022 2021-2022	Every month (Jan-Dec) Every month (Jan-Dec) Every month (Jan-Dec) Every Year (June)
Other important plant species, between others: Dedera (Horsfieldia borneensis), guava (Syzigium tenuicaudatum), Merepetung	Logging has implications for the loss of biodiversity and important animal habitat	*See the section on important tree species with economic value.*	*See the section on important tree species with economic value.*	HCV & HCS Area PT BAS	SHE, Security, Conservation Staff	2021-2022	Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
(Mangivera similis), Baccaurea edulis, Popowia cf. odoardi and Macaranga pearsonii.							
HCV 2							
Animal refugia as a small part of the forest landscape in the KT Rantau Pakis area	1. Logging and land conversion 2. Forest and land fires	1. Maintaining the integrity of the HCV area, among others by affirming the area HCV and boundary markers 2. Perform reforestation and rehabilitation in HCVMA areas that are already cleared or degraded 3. Initiating forest protection in the karst area as a protection area for key species, apart from being a water catchment area, in collaboration with local stakeholders such as the community, customary stakeholders and village government 4. Facilitating the village government in drafting a village spatial plan	1. Monitoring the boundaries of the HCV area regularly 2. Monitoring vegetation growth (% growth) 3. Documenting records of each meeting with stakeholder 4. See HCV 3 on fire monitoring	HCV & HCS Area PT BAS HCV & HCS Area PT BAS Concession PT BAS Concession PT BAS	SHE, Legal, Conservation Staff, Estate Head Conservation Staff SHE, Conservation Staff, Estate Head SHE, CSR	2021-2022 2021-2022 2021-2022 2021-2022	Every month (Jan-Dec) Every Year (June) Every month (Jan-Dec) Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
		related to the designation of cultivation areas and protected areas 5. See HCV 3 on fire management					
Animal corridors in enclaved areas	1. Logging and land conversion 2. Forest and land fires	1. Maintaining the integrity of the HCV area, among others by affirming the area HCV and boundary markers 2. Perform reforestation and rehabilitation in HCVMA areas that are already cleared or degraded 3. Initiating forest protection in the karst area as a protection area for key species, apart from being a water catchment area, in collaboration with local stakeholders such as the community, customary stakeholders and village government 4. Facilitating the village government in drafting a village spatial plan	1. Monitoring the boundaries of the HCV area regularly 2. Monitoring vegetation growth (% growth) 3. Documenting records of each meeting with stakeholder 4. See HCV 3 on fire monitoring	HCV & HCS Area PT BAS HCV & HCS Area PT BAS Concession PT BAS Concession PT BAS	SHE, Legal, Conservation Staff, Estate Head Conservation Staff SHE, Conservation Staff, Estate Head SHE, CSR	2021-2022 2021-2022 2021-2022 2021-2022	Every month (Jan-Dec) Every Year (June) Every month (Jan-Dec) Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
		related to the designation of cultivation areas and protected areas 5. See HCV 3 on fire management					
Karst area connected to karst landscape area	1. Logging and land conversion 2. Forest and land fires 3. Edaphic factors in the karst ecosystem	1. Maintaining the integrity of the HCV area, among others by affirming the area HCV and boundary markers 2. Perform reforestation and rehabilitation in HCVMA areas that are already cleared or degraded 3. Initiating forest protection in karst areas as habitat for key species and as water catchment areas, in collaboration with local stakeholders such as communities, customary stakeholders and village government 4. Facilitating the village government in drafting a village spatial plan related to the designation of cultivation areas and protected areas	1. Monitoring the boundaries of the HCV area regularly 2. Monitoring vegetation growth (% growth) 3. Documenting records of each meeting with stakeholder 4. See HCV 3 on fire monitoring 5. See section HCV 3 regarding edaphic factors in karst ecosystems	HCV & HCS Area PT BAS HCV & HCS Area PT BAS Concession PT BAS Concession PT BAS HCV & HCS Area PT BAS	SHE, Legal, Conservation Staff, Estate Head Conservation Staff SHE, Conservation Staff, Estate Head SHE, CSR SHE, Conservation Staff, Estate Head	2021-2022 2021-2022 2021-2022 2021-2022 2021-2022	Every month (Jan-Dec) Every Year (June) Every month (Jan-Dec) Every month (Jan-Dec) Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
		5. See HCV 3 on fire management 6. See section HCV 3 regarding edaphic factors in karst ecosystems					
HCV 3							
Karst forest, riparian forest, dipterocarp lowland forest on sandy rock	Logging activities and landuse conversion.	See HCV 2	See HCV 2.	HCV & HCS Area PT BAS	SHE, Legal, Conservation Staff, Estate Head	2021-2022	Every month (Jan-Dec)
	Forest and land fires.	1. Establish SOP for handling fires, including mechanism for quick response and reporting to relevant authorities. 2. Establish taskforce for mitigating and handling land fires, and they should be supported with training and facilities and infrastructures. 3. Disseminate information on the danger of land fire and install signboards on land fires. 4. Collaborate with community, village governments and relevant authorities so that fires can be controlled during land clearing for farms. 5. Maintain areas that may	1. Document SOP information dissemination events and reporting documents. 2. Record the number of fire occurrences, accompanied with documentation and minutes. 3. Coordinate with neighbouring companies and village to provincial governments regarding forest and land fire mitigation. 4. On a regular basis, carry out patrol during dry season (July-September). 5. Monitor firebreak areas, especially in July-September. 6. Monitor water discharge in locations of source of water for dealing with fires.	PT BAS PT BAS PT BAS PT BAS PT BAS	SHE & CSR SHE CSR SHE & Estate Head SHE & Estate Head	2021-2022 2021-2022 2021-2022 2021-2022 2021-2022	Every month (Jan-Dec) Every month (Jan-Dec) Every month (Jan-Dec) Every month (dry season July-September) Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
		potentially become manmade firebreaks such as plantation roads or large channels by, among others. (i) reduce the availability or fuel around the area such as piled fronds, twigs, or wood; and (ii) roads are constructed slightly convex to allow formation of drainage along both sides or the roads. 6. Maintain plantation roads to allow them to support the accessibility of fire quick-response team or land fire patrol team. 7. Map locations of source of water to deal with land fires. 8. Apply fire information system including early warning system that is based on dryness index or watchtower monitoring, and potential event of fire or Fire Danger Rating System (FDRS).	7. Document FDRS-related reports.	PT BAS	SHE	2021-2022	Every month (Jan-Dec)
	Edaphic factors in karst ecosystem.	1. Make intensive human intervention in the process of regeneration of previously burning areas.	1. On a regular basis (monthly), carry out monitoring in areas where revegetation is being carried out.	PT BAS	Conservation Staff	2021-2022	Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
		2. Prepare plant seedlings to enrich habitats to unique species of karst ecosystem. 3. Ensure that seedlings planted in the ecosystems are old enough and ready to be planted in the locations	2. On a regular basis (every 6 months), establish PSPs to monitor vegetation and biomass growth trend.	PT BAS	Conservation Staff	2021-2022	Every 6 month (Jan & Jun)
HCV 4							
Hydrological functions in major rivers: Karangan and Muara Bulan rivers, including their border areas	1. Logging 2. Land conversion on riverbanks	1. Socialization of the existence and important functions of rivers and their boundaries 2. Collaboration and cooperation with the community, government (from village to regional level), other companies, and NGOs related to river border and conservation programs 3. Installation of a sign board regarding the prohibition of logging and opening fields / gardens on riverbanks 4. Identifying communities that carry out logging and implementing community empowerment programs	1. Documenting meetings with stakeholders 2. Periodically (at least every 6 months), monitoring the boundaries of the river boundaries that become the HCV area 3. Making minutes of sign board installation 4. Accompanying the LC contractor and making minutes of land clearing	Concession PT BAS Concession PT BAS Concession PT BAS Concession PT BAS	Conservation staff, CSR Estate Head Conservation staff, Estate Head Estate Head	2021-2022 2021-2022 2021-2022 2021-2022	Every year (Jan) Every 6 month (Jan & July) Every Year (Jan) Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
		5. Marking the bufferzone area boundaries according to the width of the boundaries of each river					
Hydrological functions in tributaries and other water bodies (springs, lakes, reservoirs), including their border areas	Agrochemical residues carried by surface runoff	1. Installation of a sign board and socialization on the prohibition of using agrochemicals on riverbanks 2. Performing manual weeding in river border areas in the form of oil palm plantations 3. Marking the boundaries of the bufferzone area according to the width of the boundaries of each river	1. Documenting outreach with stakeholders; 2. Making minutes of sign board installation 3. Check the water quality periodically (at least once every 6 months) at water monitoring points, namely river inlets within the study area, the inspection is carried out both visually and in laboratory tests.	Concession PT BAS & Villages around PT BAS Concession PT BAS Concession PT BAS & Villages around PT BAS	Estate Head Estate Head SHE	2021-2022 2021-2022 2021-2022	Every year (Jan) Every year (Jan) Every 6 month (Jan & July)
	Converting river borders for plantation and fields	1. Collaboration and cooperation with the community, government (from village to regional level), other companies, and NGOs in relation to river conservation and protection programs	1. Documenting meetings with stakeholders 2. Periodically (at least every 6 months), monitoring the boundaries of the river boundaries that become the HCV area 3. Accompanying the LC contractor and making minutes of land clearing	Concession PT BAS & Villages around PT BAS Concession PT BAS Concession PT BAS	Estate Head Estate Head Estate Head	2021-2022 2021-2022 2021-2022	Every year (Jan) Every 6 month (Jan & Jul) Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
		2. Socialization to LC contractors regarding river boundaries to avoid over-clearing; 3. Not replanting in the river boundary area according to the bufferzone width of each river 4. Strengthening river banks that are prone to landslides by means of civil technical means 5. or enrichment of vegetation (it is recommended enrichment with native tree species and / or those with deep and strong roots and thick canopy) 6. Construction of sediment traps / gully plugs in streams or tributaries within the study area, especially in areas with undulating slopes	4. Monitor the condition of technical civil buildings and document them; and / or vegetation growth (% growing)	Concession PT BAS	Estate Head, Conservation Staff	2021-2022	Every year (June)
The function of environmental services in the KT Rantau Pakis area and in the	1. Logging 2. Forest and land fires	*See sections HCV 2 and HCV 3*	*See sections HCV 2 and HCV 3*	Concession PT BAS & Villages around PT BAS	Estate Head, CSR, SHE, Conservation Staff	2021-2022	Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
karst area							
Erosion management area	Land conversion without management	1. Prepare SOP for soil and water conservation activities 2. Making bench terraces or individual terraces to suit the specific situation at each location. In areas that are slightly steep, vetiver grass can be planted to strengthen the terrace cliffs 3. Construction of silt pits in the planting area and on either side of the road (road side pit) 4. Construction of sediment traps / gully plugs in streams or tributaries within the study area, especially in areas where the slopes are wavy 5. Planting legumes (Legume Cover Criop / LCC) in newly planted areas	1. Monitoring TSS at the main river inlet and outlet and documenting it (every 6 months) 2. Maintenance of technical civil buildings, including terraces, rorak, and sediment traps (once every 6 months) 3. Monitoring and maintenance of the LCC so that it does not pass through the planting block or cover the plants 4. Documenting soil and water conservation activities that are implemented	Concession PT BAS & Villages around PT BAS Concession PT BAS Concession PT BAS Concession PT BAS	SHE Dept Estate Head Estate Head SHE, Conservation staff,Estate Head	2021-2022 2021-2022 2021-2022 2021-2022	Every 6 month (Jan & July) Every 6 month (Jan & July) Every month (Jan-Dec) Every month (Jan-Dec)
HCV 5							
Sungai Karangan and Muara Bulan	*See section HCV 4*	*See section HCV 4*	*See section HCV 4*	Concession PT BAS	Conservation Staff, SHE,	2021-2022	Every month (Jan-Dec)

HCV	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
as water sources and fishing grounds					CSR, Estate Head		
HCV 6							
Caves that have potential pre-historic value	Potential damage to the cave area due to vandalism	1. Promote the importance of the cave as a historical place 2. List of stakeholders related to HCV elements. 6 (3) Maintain communication with stakeholders 3. Encourage the preparation of a management plan to conserve the area cave in a participatory manner	Meetings annually to record progress on management of HCV elements and document each meeting	Concession PT BAS	Conservation Staff, SHE, CSR, Estate Head	2021-2022	Every year (Jan)

Note: The monitoring plan referred to above is a monitoring plan during land clearing

Chapter 5

5. References

- Gagas Dinagima Aksenta. 2020. *Laporan Kajian HCV HCSA Terpadu PT. Bima Agri Sawit. Karangan Sub District, East Kutai District, East Kalimantan.* Final Report
- Bioref. 2017. *Laporan Kajian SIA (Social Impact Assessment) PT. Bima Agri Sawit Karangan Sub District, East Kutai District, East Kalimantan.* Final Report
- CITES. 2014. Protected Species. <www.cites.org>. didownload pada 26 Juli 2014
- IUCN. 2014. IUCN Red List Categories. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland.
- Roundtable on Sustainable Palm Oil Remediation and Compensation Procedures Related to Land Clearance without Prior HCV Assessment. Endorsed by RSPO Board of Governers for staged implementation on December 1, 2015.
- Gunarso, P., Hartoyo, M., Agus, F., and T. Killeen. 2013. Oil Palm and Land Use Change in Indonesia, Malaysia and Papua New Guinea. Reports from the Technical Panels of the 2nd Greenhouse Gas Working Group of the Roundtable on Sustainable Palm Oil (RSPO). Published November 2013 at www.rspo.org

6. Internal Responsibility

The oil palm grower signs to confirm that the necessary assessment have been done and completed in accordance to the relevant RSPO procedure.

Signed for and on behalf of PT Bima Agri Sawit

PT. BIMA AGRI SAWIT

Agung Pramudji
President Director
Date : Oktober 2020

Signed for and on behalf of PT Gagas Dinamiga Aksenta

Aksénta
accentuate life

Idung Risdiyanto
Team Leader of HCV & HCS PT Bima Agri Sawit
Date : October 2020

6.2. Organizational information and contact persons.

Contact details of the company are as follow :

Company Name	:	PT Bima Agri Sawit (PT BAS)
Address	:	Gedung Sapta Mulia, Jl. Rawa Gelam V, Kav. OR 3B, Kelurahan Pulogadung, Jakarta
Location for proposed NPP	:	Karangan Sub District, Kutai Timur District East Kalimantan
Telp/ Fax	:	021 – 4618135/ 021 – 4606942
Contact Person	:	Agustinus Triwibowo
Position	:	Management Representative
Email	:	agustinus.triwibowo@dsngroup.co.id

6.3. List of Legal Document for process New Planting Procedure (NPP)

Table 62 List of Legal Document for process New Planting Procedure (NPP)

Tahun	Tanggal dan Nomer Dokumen	Perihal
2005	24 Oktober 2005 Nomor 352/02.188.45/HK/X/2005	Izin lokasi untuk keperluan perkebunan kelapa sawit kepada PT Bima Agri Sawit seluas ± 6.476 ha yang terletak di Desa Baay Kecamatan Sangkulirang Kabupaten Kutai Timur
2008	5 Mei 2008 Nomor 14-HGU-BPN RI-2008	Pemberian Hak Guna Usaha atas nama PT Bima Agri SawiT atas Tanah di Kabupaten Kutai Timur, Provinsi Kalimantan Timur
2016	8 November 2016 Nomor525.26/208/EKO.1-XI/2016	Revisi Izin Usaha Perkebunan (IUP) PT Bima Agri Sawit
2019	1 Februari 2019 Nomor 9120204220919	NIB PT Bima Agri Sawit