

# **Summary Report Submitted for HCS Approach Peer Review Process**

**HCS Study Project Title:**

**HCS Identification in PT Karya Makmur  
Abadi**

**Company/Organisation:**

**PT Karya Makmur Abadi**

**Contact person:**

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**Date:**

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# 1. Project description

## 1.1 Location and size of study area

High carbon stock approach study was carried out in the Permitted Area of PT Karya Makmur Abadi (herein after will be referred to as PT KMA), located in two Districts (Kecamatan) namely Bukit Santuai District and Mentaya Hulu District, Kotawaringin Timur Regency, Central Kalimantan Province (Figure 1). Geographically, the concession is located at 2°38'02.06"- 2°42'28.63" South Latitude and East Longitude 110°55'39.12"- 111°03'57.39".

PT KMA obtain it's permitted area (Izin Lokasi) in 2013 according to the Provision of The Kotawaringin Timur Regent (Bupati) No. 118.45/359/Huk-BPN/2013. The size of the permitted area, according to the legal document, is 13,148.0 ha. There is a 233.3 ha difference between the size of the permitted area according the legal document and the available shapefile used in this study. The size of the permitted area (will be referred to as concession) according to the GIS analysis is 13,380.3 ha.

Management of the concession is divided into three divisions, namely, North KMA Division, Central KMA Division and South KMA Division. The size of the area of each division is 4,042.9 ha (30.2 %), 4,849.6 ha (36.2 %) and 4,487.9 ha (33.5 %), respectively.

There are ten settlements located along the Kuayan and Mentaya Rivers at the East Side from the PT KMA Concession. However, only seven of them were identified as the related communities to the land within the PT KMA Concession, based on the land tenure study. The relation between the communities and the concession can be classified as shown in the following table:

Table 1. Relation between communities and the land within PT KMA concession

No	Village Name	PT KMA Division Area
1	Tumbang Kaminting	North KMA
2	Tumbang Tilap	
3	Tumbang Sapiri	
4	Pemantang	Central KMA
5	Pahirangan	
6	Tangka Robah	South KMA
7	Kapuk	

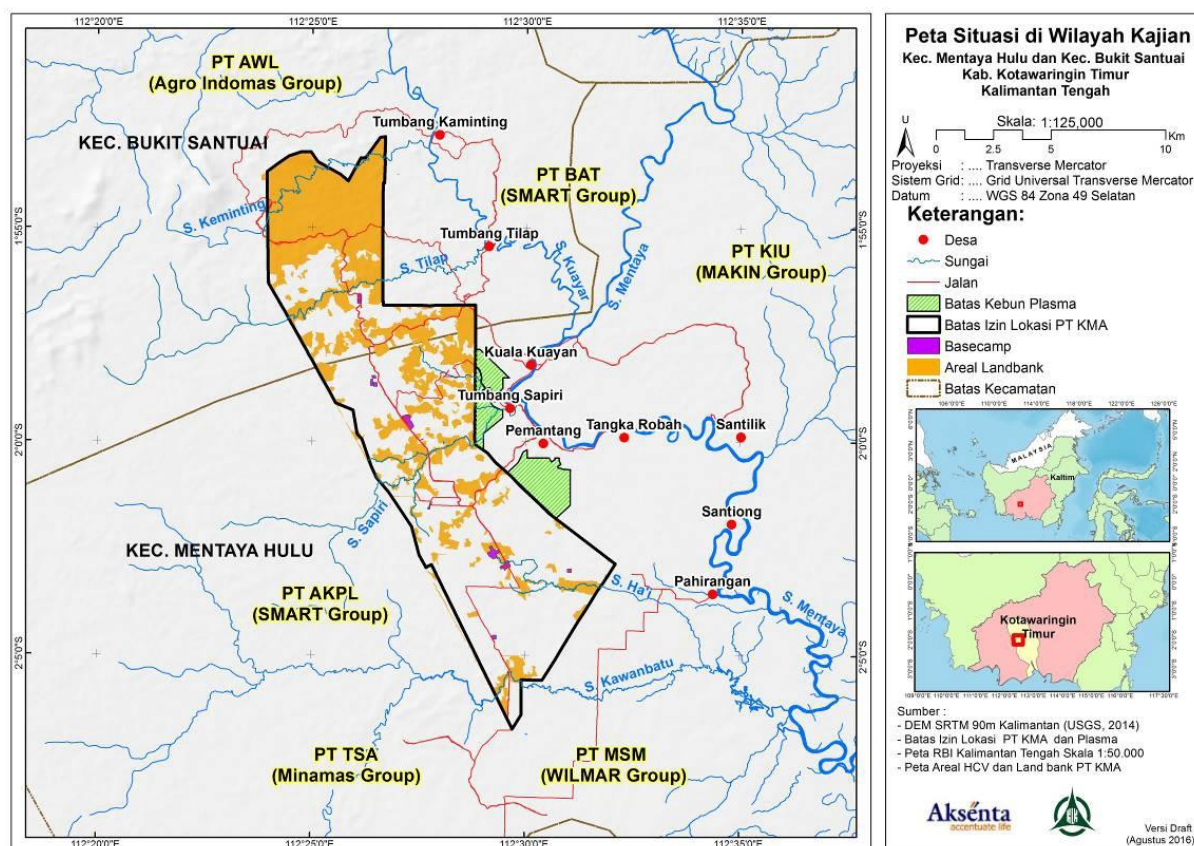


Figure 1. Study area of the Permitted Area of PT Karya Makmur Abadi

## 1.2 Overview of proposed plantation development

The proposed new development in the PT KMA concession is expansion plan of the existing oil palm plantation within the concession. Regardless the conservation land use and the land cover, there are 3,621.1 ha (27.1 %) potential area for new development (oil palm plantation expansion) while the other 9,759.3 ha (72.9 %) of the concession is the existing oil palm plantation.

In accordance with the RSPO P&C and the RSPO NPP requirements, several assessments were conducted regarding the new development proposal of the PT KMA concession, namely HCV Assessment in 2010, HCV Review and Update in 2016, Social Impact Assessment in 2016, Carbon Stock Assessment in 2016. In accordance with the HCS Approach Assessment, an FPIC Verification also has been conducted on the procedure of the land acquisition through the socialization.

According to the HCV Assessment in 2010, there are 138.9 ha HCV areas in the PT KMA concession. It consists of HCV 1, 3 and 4; located in the riparian of Kawan Batu River, Hai River and Sapiri River. In accordance to the RSPO NPP, PT KMA conducted a HCV Review and Update. It is required since the new development plan is proposed more than three years since the initial HCV Assessment was conducted. According to the HCV Review and Update in 2016, there are 529.0 ha HCV Area identified in the PT KMA concession including the HCV area identified in the initial HCV Assessment.

Socialization of the development plan of the company has been taken place since 2005 with the communities from the seven villages. The FPIC process has been conducted with the communities accordingly with the development plan which began with the South and Central KMA Division. All the community lands located in the Central and South KMA Divisions have been compensated. However, according to the HCV Review and Update in 2016, there are two areas which were not released by the community and were identified as HCV 6 in the area of the South KMA Division, namely the Rocky Hill (Bukit Batu) and Sandung Area (cemetery where the bones of the dead people

were kept) at the area of Kawan Batu River. Whereas, the FPIC process has not been completed regarding the communities' land in the North KMA Division. The communities have been informed about the development plan and are willing to give their consent on their land to the company's proposal. However, there is an area which the communities decide not to give their consent in the North KMA Division, namely the Sacred House (Rumah Keramat) which is also identified as HCV 6 according to the HCV Review and Update in 2016.

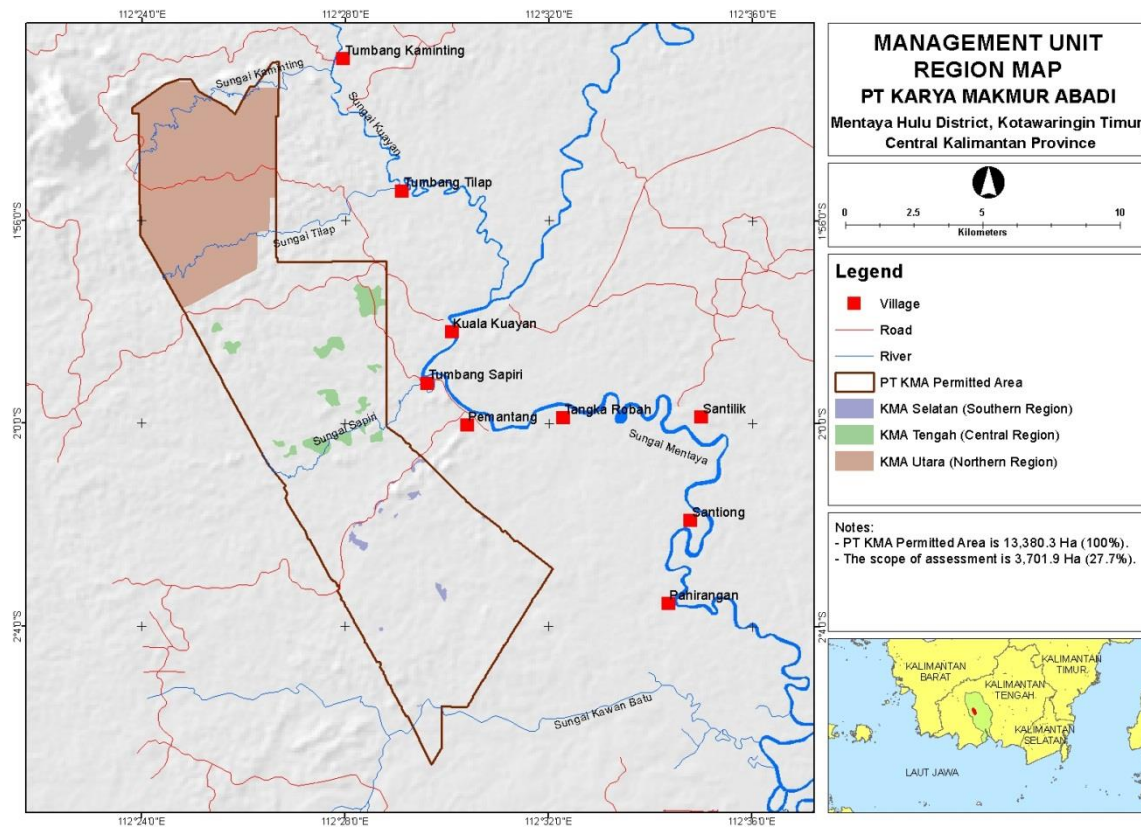


Figure 2. Map showing proposed plantation development in PT KMA Concession



### 1.3 Description of surrounding landscape

PT KMA concession is located in Kotawaringin Timur Regency, Central Kalimantan Province. According to the land cover map in the Central Kalimantan Province published by the Ministry of Forestry of the Republic of Indonesia, the concession is located in and is surrounded by the plantations land cover area (perkebunan) which is the largest land cover class within the Regency of Kotawaringin Timur (figure 3). Therefore, the low forest landscape (<30%) context was considered accordingly to the step 6 to 11 of the patch analysis decision tree. In addition, potential high risk was also taken into consideration for the Medium Priority Patches (step 7), due to highly accessible where the sites are surrounded by plantations.

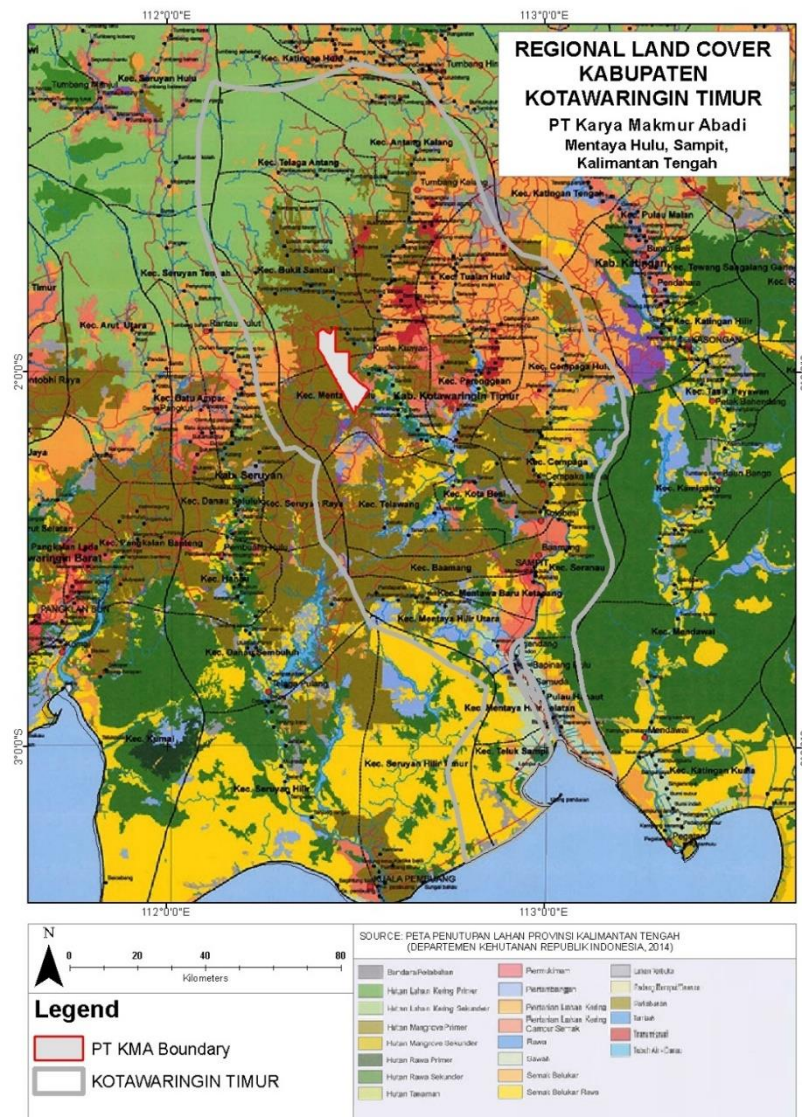


Figure 3. Map showing regional land cover of the Kabupaten Kotawaringin Timur (Ministry of Forestry of the Republic of Indonesia, 2014)

The nearest protected areas (Hutan Lindung) with the PT KMA concession is located in a larger patch of Hutan Lahan Kering Sekunder in the northern part of the Kotawaringin Timur Regency (figure 4). This protected forest areas are located approximately 50 km from the PT KMA concession. In the context of the regional landscape forest, according to the land cover condition, there is no presence of forested area connecting the PT KMA concession to the protected areas.

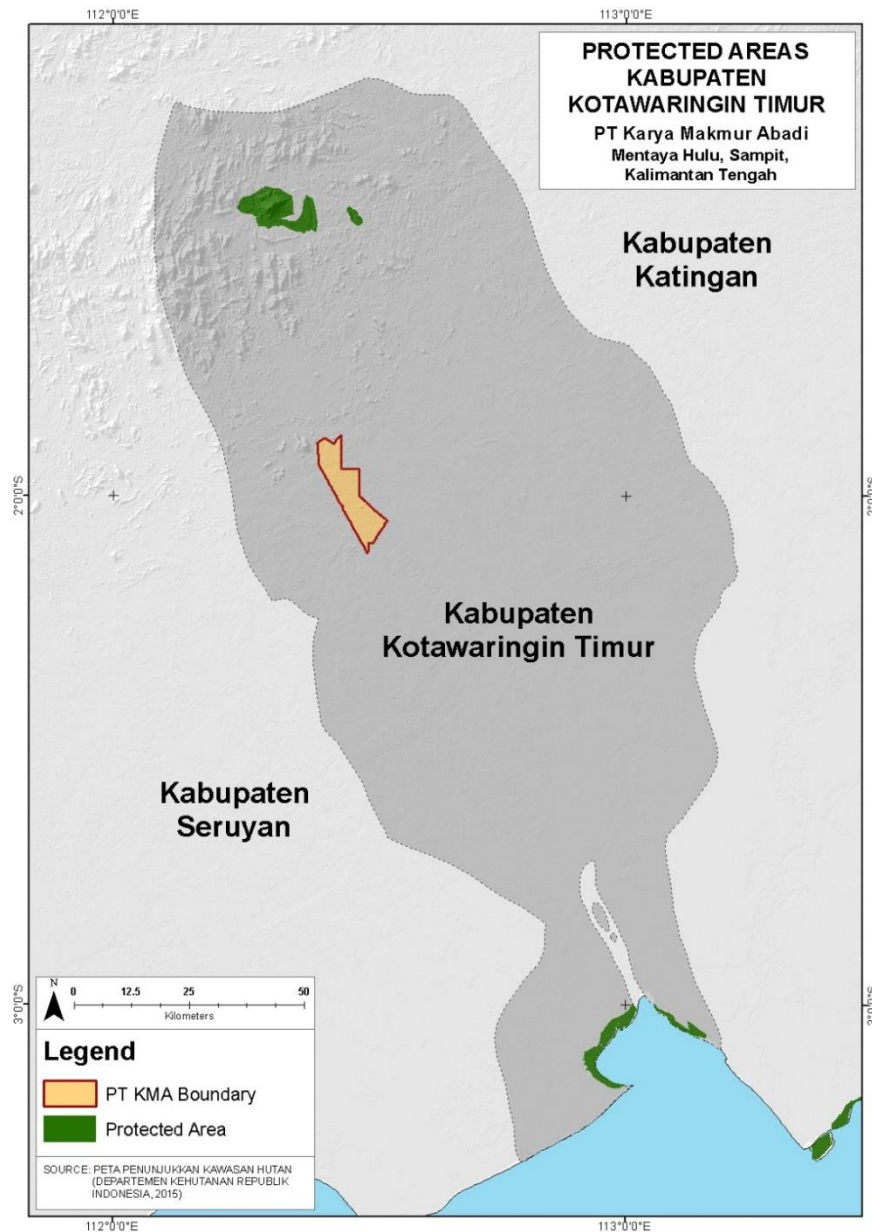


Figure 4. Map showing protected areas in the Kabupaten Kotawaringin Timur Region (Ministry of Forestry of the Republic of Indonesia, 2015)



In the smaller scope (figure 5), with high-resolution imagery and ground checking, most of the surrounding area of the PT KMA concession is covered by oil palm. However, forest corridors connecting forested areas within the concession and outside the concession were identified.

The forest patch in the riparian of Kaminting River located in the northern part of the PT KMA concession is connecting the riparian forest of Kuayan River located at the North East from the PT KMA concession and the forested area at the North West from the PT KMA concession (yellow mark in Figure 5). In addition, the riparian forest of the Tilap River is connected with the forested area at the West side from the PT KMA concession (purple mark in Figure 5).

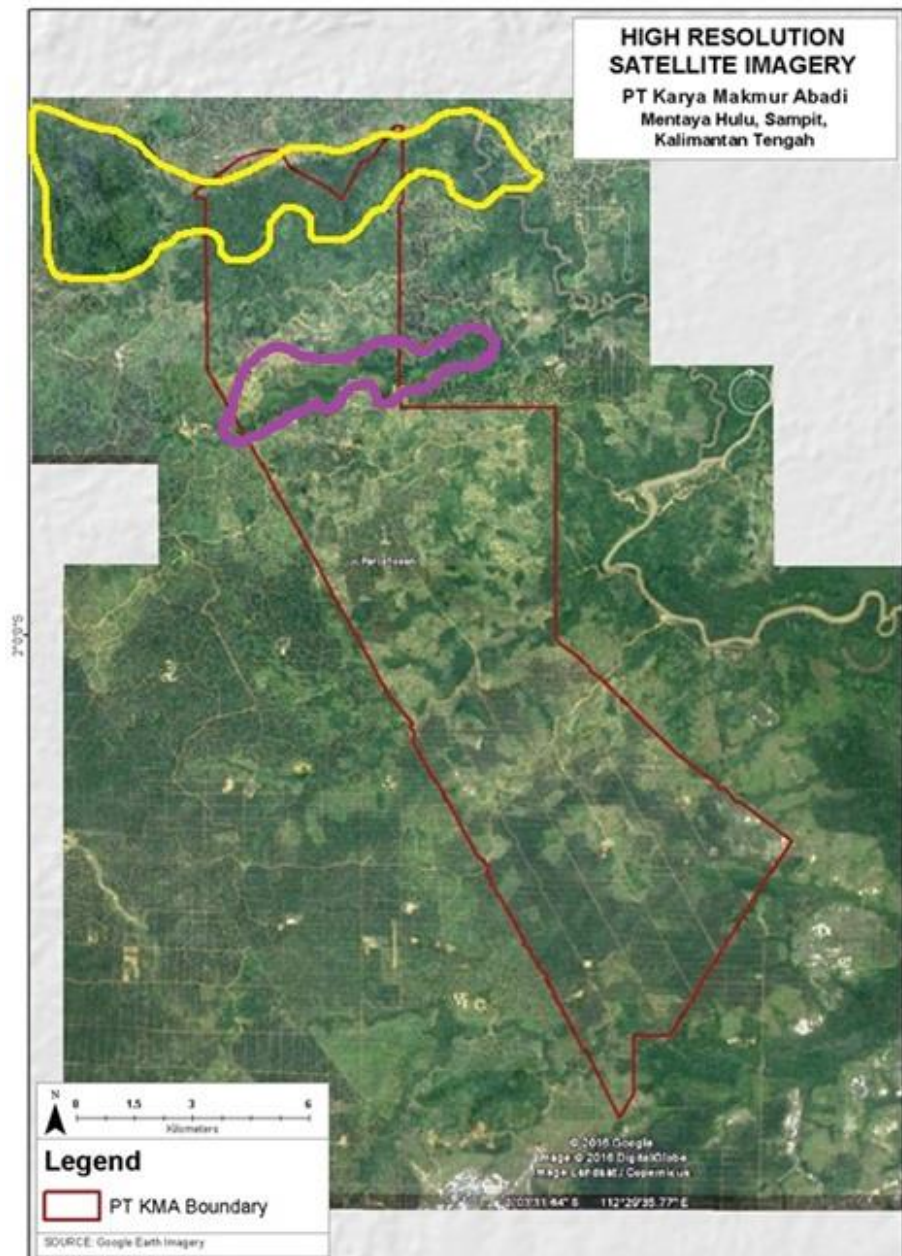


Figure 5. High resolution satellite imagery of the PT KMA Concession (Google earth satellite imagery, 2015)

## 1.4 Map of the site within the region

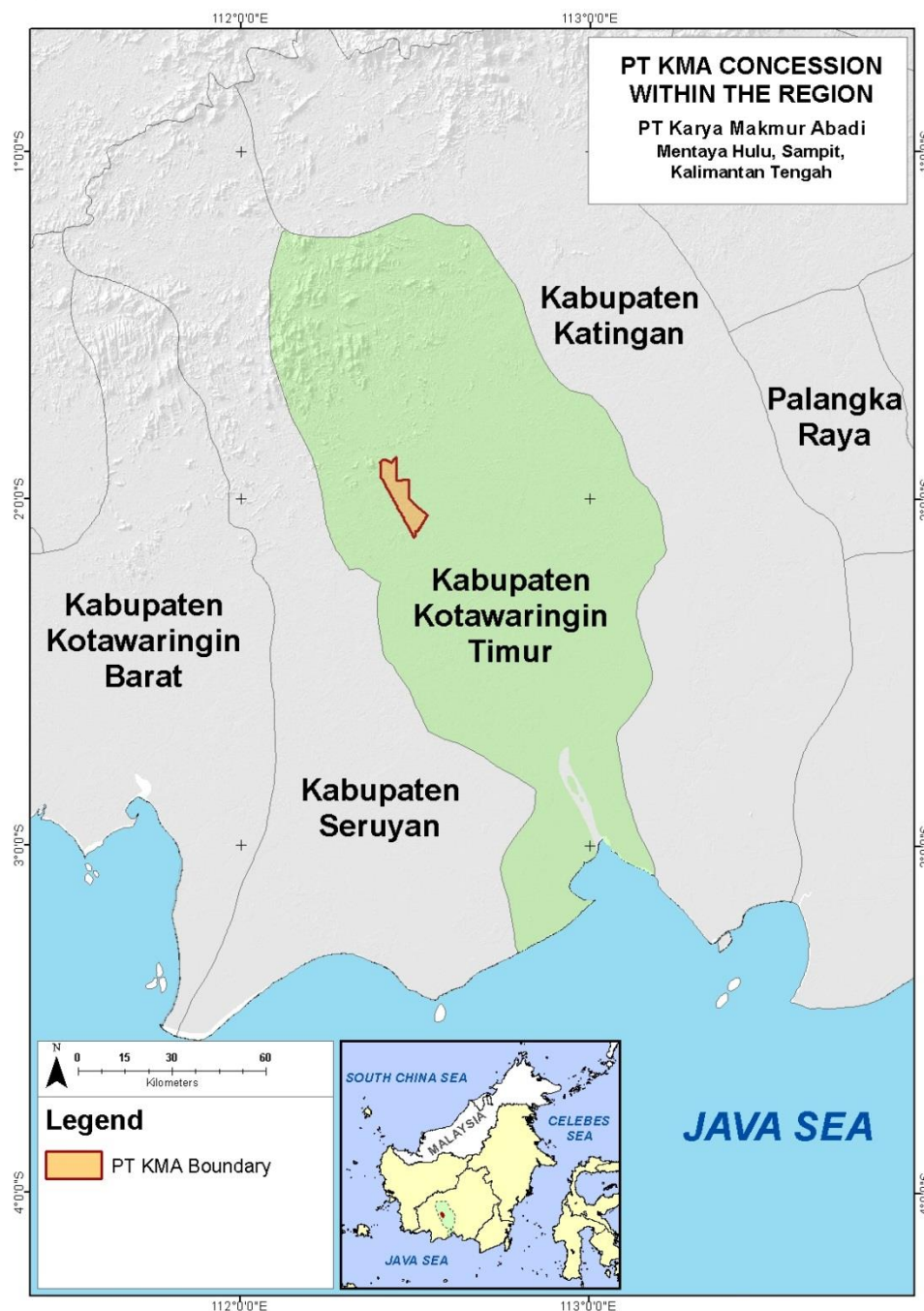


Figure 6. Map showing PT KMA concession within the region

## 1.5 Relevant data sets available

Relevant data sets used in the assessment are:

- Carbon stock (Carbon Stock Assessment)
- Community consent (FPIC Verification)
- Satellite imageries
- HCV area (HCV Assessment)
- Social impact information (Social Impact Assessment)

## 1.6 List of any reports/assessments used in the HCS assessment

- HCS Identification Report
- Carbon Stock Assessment Report
- HCV Review and Update Report
- Social Impact Assessment Report
- FPIC Verification Report

## 2. HCS assessment team and timeline

### 2.1 Names and qualifications

High Carbon Stock Identification was conducted by three experts specializing in HCS Approach Practice, Carbon Stock Estimation, FPIC, Social Studies, and HCV.

Table 2. Team conducting the HCS Assessment

Name	Relevant Expertise
Bias Berlio Pradyatma	Forestry, biodiversity conservation, GIS, remote sensing, carbon stock estimation, HCS Approach Practice (Team leader)
Afwan Afwandi	Community Forestry, Social Impact Assessment, Social Survey, Community Socio-economic, FPIC, Participatory Mapping

### 2.2 Time period for major steps in the study

Table 3. Relevant studies for HCS Identification

Assessment	Timeline (Field Visit-Reporting)	Assessor
High Conservation Value Assessment	2010	Jump Consulting
High Conservation Value Review and Update*	November, 2016-January, 2017	Aksenta Led by: Iwan Setiawan (ALS15039IS)
Social Impact Assessment	November, 2016-January, 2017	Aksenta
Carbon Stock Assessment	June-August, 2016	Aksenta
FPIC Verification	June-August, 2016	Aksenta
HCS Identification	June, 2016-January, 2017	Aksenta

*According to the RSPO New Planting Procedure (2015), HCV review and update is required when the HCV assessment is older than three years at the time of NPP Submission.*

### **3. Community engagement/ FPIC**

#### **3.1 Summary of community engagement, FPIC, participatory mapping**

Communities related to the company's proposal were engaged by Aksenta as an independent assessor to verify the compliance of the agreement making with the FPIC principles. It is acknowledged that most of the land in the concession has been compensated and developed. However, verifications were also carried out in the process of land acquisition related to the new development plan as well.

In order to verify the overall process of the land acquisition, two activities were undertaken, which are the examination on the land acquisition procedures toward the FPIC principles and verification on the actual land acquisition process towards the procedures and FPIC principles. Verifications were conducted through the documents checking and interviews with the communities. "Free, Prior and Informed Consent Guide for RSPO Members (2015) and HCS Approach Toolkit (2015) were used as the reference in the verification process.

Three documents were checked to verify the compliance of the company's land acquisition procedures towards the FPIC principles, namely, "The Standard Operating Procedures in Land Dispute Countermeasure" (SOP PT KMA No. 26), "The Standard Operating Procedures in Land Acquisition" (SOP PT KMA No. 27) and examples of "The Land Compensation Documents". The Standard Operating Procedures (herein after will be referred to as SOP) consist of detailed list and flowchart of actions to be taken for each subject, whereas the land compensation document contains information of the land owner identity, the location and the size of the land (with coordinates and map), the foregoing utilization on the land, the agreements and the receipts of the compensation.

The land dispute countermeasure SOP were designed to address the situation of building agreements regarding stakeholder's consent on their land and when a concerned party filed an objection against agreements agreed upon. Discussion with the concerned parties will be taken in the first place to address the problem and involvement of independent surveyor will be taken as well if the necessity is considered. Furthermore, negotiation to obtain agreement will be taken when the information gathered regarding the objection from the three sides of the parties are sufficient. It is mentioned that agreement should be reached with free, prior and informed consent basis and the parties should attend the on field participatory mapping and demarcation when agreement is obtained. The information of the land location and size would be needed for the further process if the concerned party give their consent or withhold their consent for the company's proposal as well.

Otherwise, if the negotiation failed to develop agreement and the information gathered are not sufficient to support the objection, the company will propose involvement of the government, specifically the Department of Agrarian under the National Land Agency of the Republic of Indonesia, de jure procedures will be taken thenceforth and the concerned party are free to choose their representative for this process. However, negotiation will still be acceptable for the company when the concerned party choose to. Sufficient time will be given for the concerned party to make up consent regarding the process.

The land acquisition SOP were designed to address overall process including the preliminary survey regarding the status of the land and land tenure, engagement with the community including initial socialization to the agreement and application of the development proposal to the government. The activities relevant with FPIC context in this SOP is the company must engage the communities related to the proposed area for the development plan and identify the community land ownership. Furthermore, the company must organize meetings with stakeholders including the communities to



socialize and obtain recommendations on the proposal. The further process of land acquisition regarding the community's ownership is referred to the land dispute countermeasure SOP.

Once the agreement between company and the land owner is reached, both parties will document the agreement and proceed with the compensation process. The land compensation document contains the agreements and information regarding the land and the owner as mentioned above. It includes the coordinates of the land to define the size and the location.

In context of the FPIC verification, according to the interviews with the communities which their lands have been compensated and developed, they acknowledged that they have been informed about the development plan of the company before, it includes the information that the development must follow certain regulations regarding the RSPO certification schemes, compliance to the legal aspect and the impacts of the development to the communities.

The community were given time to consider their consent. According to the interview with the communities, the process of socialization and negotiation to obtain agreement took approximately three years. The communities acknowledged that the time period of socialization and negotiation was sufficient for them to decide their consent and it also covers the chance for them to negotiate to obtain the agreed compensation for their lands.

According to the interview with the communities which their land is still under the development plan, the communities gave positive response for the company's proposal on their land. They have been informed that the development must be halt due to certain regulations that must be fulfilled by the company and the potential impact from the development to the communities. However, they are waiting and willing to give their consent for the proposal since they acknowledged that the development would bring them the improvement on their livelihoods.

In addition, most of the communities currently are working as workers in oil palm companies around their villages. The communities have started leaving the traditional land utilization such as hunting and shifting land cultivation since 1950's. They shifted their livelihoods to conventional gold mining after 1950's and then to log productions since 1971 to 2000. In 1998, the first oil palm company began its operation in this area. According to the information from the communities, traditional shifting cultivation have been totally left in 2010 and replaced with settled field/farm because of the land fire prohibition.

Land clearing with fire is the most efficient way that hereditary done by the communities in their traditional shifting cultivation. Limited source of the community to replace fire to clear land to open new field brought the communities to leave their shifting cultivation. Hence, in order to maintain and gain their livelihoods, the communities gave their consent on their lands to company's proposal for development beside working in the oil palm companies in that area, working in government agencies and doing grocery business. The communities also acknowledged that they have left their fields since they job opportunities are offered. Make living by working brought them better livelihood, especially since their rubber field is no longer profitable because of the declining price.

Legally certified land ownership was not found in the study area. The existing community land ownership was formed by the traditional land cultivation in the past. Land owned by a person expands as the shifting cultivation goes on. The land ownership is not pass off when the owner has their seasonal crops harvested and move to another area to open new field, instead, the ownership still occur. Presence of rubber and fruit trees and/or field hut indicates that a land is owned and have been cultivated by someone.



Most of the cultivated lands are located along the river. According to the interview, the community shifting cultivation is done in the range of 100-150 meter from the river. River was the main transportation means in that time. River was still used as the main transportation when the conventional gold mining occurred in this area. The use of river as main transportation started to decline when log production taken place and roads were built and expanded in that area. The communities acknowledged that using road access is more efficient in cost and time as compared to river.

All of the villages are located along the river at the East side of the concession. The land ownership based on the villages the land owner lives can be classified according to the company's management unit. According to the company's management unit location, following are the locations of communities' land of each village (Table 3).

Table 4. Community relation to the land within the PT KMA operational division

No	Village	Management Area of PT KMA
1	Tumbang Kaminting	North KMA
2	Tumbang Tilap	
3	Tumbang Sapiri	Central KMA
4	Pemantang	
5	Pahirangan	South KMA
6	Tangka Robah	
7	Kapuk	

### 3.2 Summary of Social Impact Assessment (if any)

There are ten villages located around PT KMA concession, namely Kuala Kuayan, Tumbang Sapiri, Pemantang, Tangka Robah, Santilik, Sationg, Pahirangan, Kapuk, Tumbang Tilap and Tumbang Kaminting. Though land ownership were not identified from the communities of all ten villages, the location of the ten villages are relatively near to the concession, along the rivers that the upstream are passing through the concession. Therefore, the social impact assessment covers all ten villages as the scope of the study.

In accordance with the condition, the potential impact from the existing plantation operation and the new development plan are divided into two types of impact, namely the social impacts and the environmental impact for the communities. However, this section will explain the social impacts while the environmental impact will be explained in section 5.

Status of the operations in PT KMA concession can be divided into two different status, namely the existing oil palm plantation which is located in the Central KMA Division and South KMA Division and the proposed development plan which is located in the North KMA Division. The social impact studies identified different conditions of the communities and the potential impacts as well, in which area/division the communities are related to.

Accordingly, with the situation of the new development in North KMA Division, following are the important points:

- The community from Tumbang Tilap and Tumbang Kaminting villages are waiting for the development, since they are related to the area of North KMA where the new development is proposed.
- New development plantation will contribute to the communities' financial capital from the job opportunity, especially for Tumbang Tilap and Tumbang Kaminting communities.

- Potential social conflicts regarding the negotiation and land compensation should be addressed. The company should preserve the transparency and fairness through the whole process.
- Potential social conflicts regarding the workers requirements and quota in the recruitments should be addressed.
- Asset loss from the monetary land compensation is also a significant potential risk to the communities if their financial management is not proper.

Accordingly, with the other communities related to the existing oil palm plantation, following are the important points:

- The communities have welcomed the presence of PT KMA in their area.
- The communities acknowledged that the operations of PT KMA have contribution in gaining their livelihoods especially through the partnership plantation (plasma), job opportunity and CSR. However, the three programs could also bring in potential social conflicts through social discrepancy. The company have to maintain the fairness and the system in implementing the CSR and workers recruitment.
- Conflicts between workers are also a potential risk to be addressed since the workers come from different background with different ethnics.

### 3.4 Details of meetings held and findings

Interviews, Focused group discussions and field visits were held with the staff of PT KMA as internal potential impact receiver, the local communities around PT KMA and the local government (Kepala Desa, Lurah dan Camat) (Table 5).

Table 5. Details of meetings held

Date	Description
Wednesday, 23-08-2016	<ul style="list-style-type: none"> <li>• Discussion with PT KMA field management</li> <li>• Field visit with staff of PT KMA and local communities</li> </ul>
Thursday, 24-08-2016	<ul style="list-style-type: none"> <li>• Meeting and field visit with representatives of the community of Desa Tumbang Tilap</li> <li>• Meeting and field visit with representatives of the community of Desa Tumbang Keminting</li> <li>• Meeting with staff of PT KMA</li> </ul>
Friday, 25-08-2016	<ul style="list-style-type: none"> <li>• Meeting with local government of Kecamatan Mentaya Hulu</li> <li>• Meeting and field visit with representatives of the community of Desa Tumbang Sapiri</li> </ul>
Saturday, 2-08-2016	<ul style="list-style-type: none"> <li>• Meeting with local government and representatives of the community of Desa Pahirangan and Desa Kapuk</li> <li>• Meeting with local government and representatives of the community of Desa Tangka Robah and Desa Pemantang</li> <li>• Meeting with local government of Kelurahan Kuala Kuayan and representatives of the community of Desa Santilik</li> </ul>
Sunday, 27-08-2016	<ul style="list-style-type: none"> <li>• Field visit and meeting with staff of PT KMA</li> </ul>

## 4. High Conservation Value assessment

### 4.1 Summary and link to public summary report

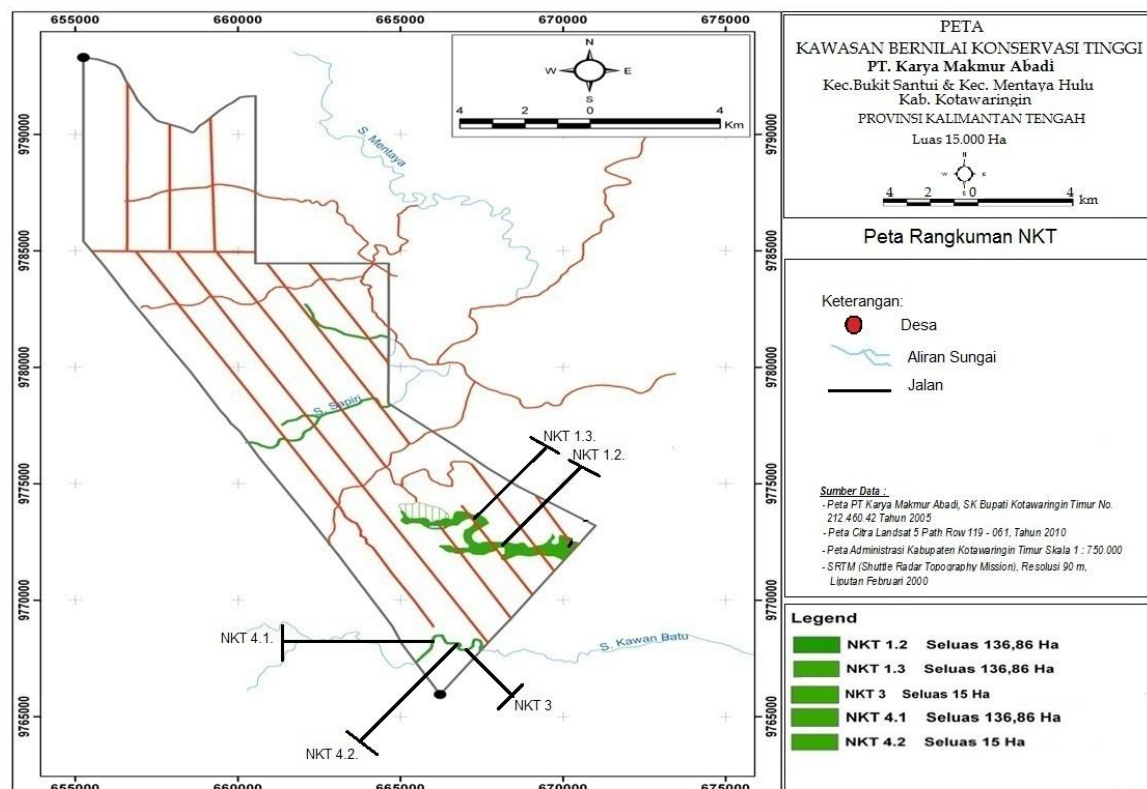
HCV assessment in PT KMA concession was conducted in 2010 by Jump Consulting. According to the new development plan (oil palm plantation expansion) in the concession in 2016, HCV Review and Update was carried out and conducted by Aksenta. HCV Review and Update is a requirement from RSPO NPP to make sure that the new development does not eliminate new potential HCV area and to review the existing HCV area and to update if the necessity is considered. The HCV Review and Update report will be submitted as part of the RSPO NPP requirements.

The initial HCV Assessment was using the “Panduan Identifikasi Kawasan Bernilai Konservasi Tinggi di Indonesia” published by the Consortium of the Indonesia HCV Toolkit Revision in 2008. Several differences were found between the toolkit used in this assessment and the Common Guidance for the Identification of HCV published by HCVRN in 2013. However, HCV Review and Update according to the RSPO NPP requirement have been conducted as well to guarantee the new development plan will not cause any threat and/or eliminate potential new HCV area.

The initial HCV Assessment identified 136.68 ha of HCV area, consists of HCV 1.2, HCV 1.3, HCV 3, HCV 4.1 and HCV 4.2. According to the report, each types of the identified HCV represents presence of endangered species, habitat of endangered or protected species or species with limited distribution; presence of rare ecosystem of endangered ecosystem; unique water source for daily use; important area to prevent erosion and sedimentation. Detailed information of the identified HCV areas and the map are presented in Table 6 and Figure 7.

Table 6. Details of the HCV Areas according to the initial HCV Assessment in 2010

No	HCV	Location	Area (Ha)
1.	<b>HCV 1</b>		
	HCV 1.2 Presence of endangered species	Enclaved Area of Kawan Batu River	136.86
		Area of Hai River 91,86 Ha	
		Riparian of Sapiri River 30,00 Ha	
	HCV 1.3 Habitat of endangered or protected species or species with limited distribution	Pada kawasan enclave Sungai Kawan Batu 15,00 Ha	136.86
		Pada Kawasan Sungai Hai 91,86 Ha	
		Pada kawasan sepanjang sempadan Sungai Sapiri 30,00 Ha	
2.	<b>HCV 2</b> Large landscape level forest where viable population of the natural species occur		0
3.	<b>HCV 3</b> Presence of rare ecosystem or endangered ecosystem	Enclaved area of Kawan Batu River 15,00 Ha	15
4.	<b>HCV 4</b>		0
	HCV 4.1 Unique water source for daily use	Pada kawasan enclave Sungai Kawan Batu 15,00 Ha	136.86
		Pada Kawasan Sungai Hai 91,86 Ha	
		Pada kawasan sepanjang sempadan Sungai Sapiri 30,00 Ha	
	HCV 4.2 Important area to prevent erosion and sedimentation	Pada kawasan enclave Sungai Kawan Batu 15,00 Ha	15
5.	<b>HCV 5</b> Important area to fulfil community's fundamental needs		0
6.	<b>HCV 6</b> Important area related to social cultural identity		0



**Figure7. Map of the HCV Areas according to the initial HCV Assessment (2010)**

According to the HCV Review and Update, the existing HCV areas of 136.68 ha were still in the good condition and recommended to be maintained as HCV Areas. However, the HCV Review and Update also identified new HCV Areas and HCV Management Areas. The total HCV Areas including the initial HCV Assessment is 529.9 ha while the HCV Management Areas is 567.1 ha. The detail information of the updated HCV Areas and HCV Management Areas in the concession are presented in Figure 8 and Figure 9.

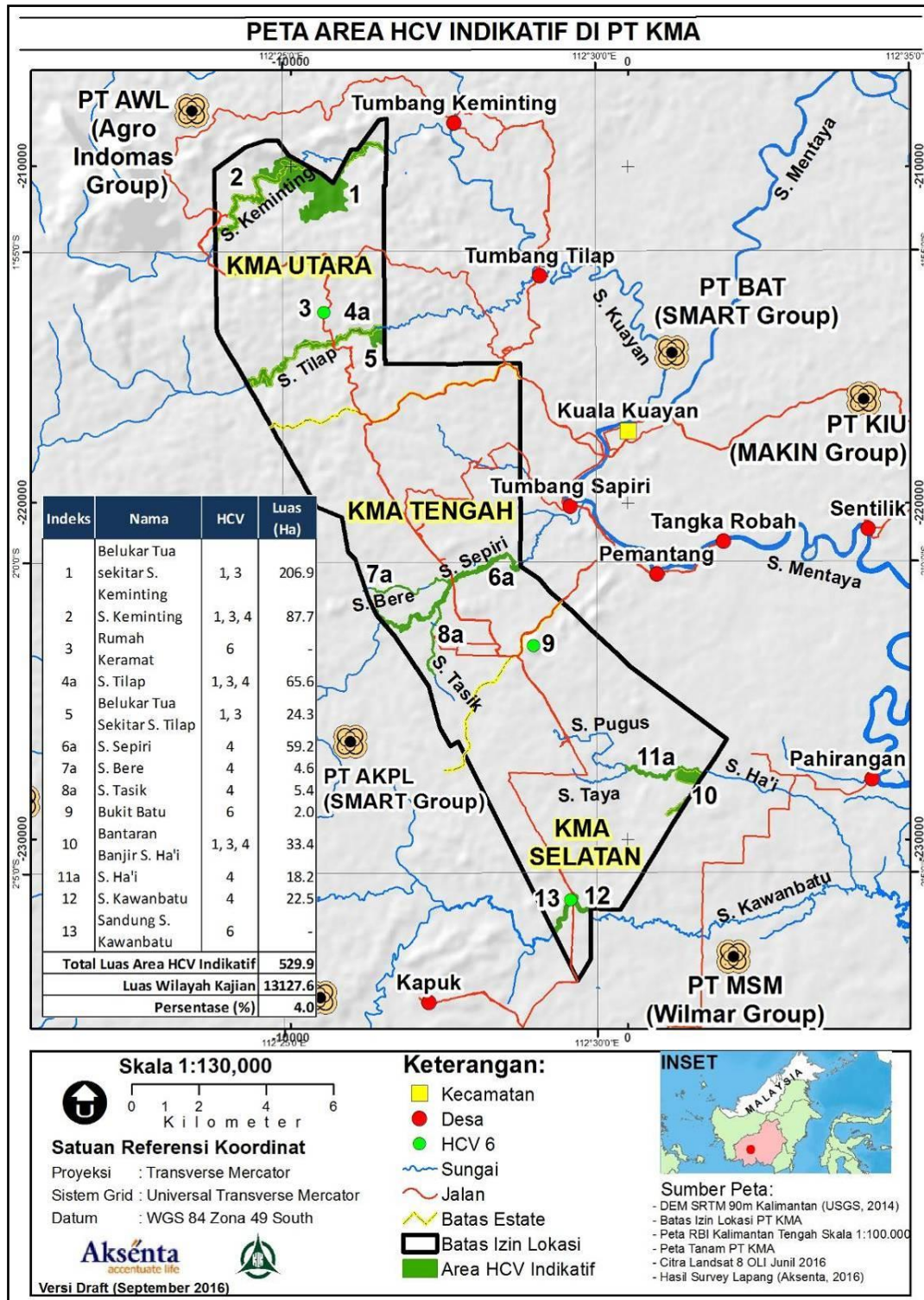


Figure 8. Map of the HCV Areas according to the HCV Review and Update (2016)



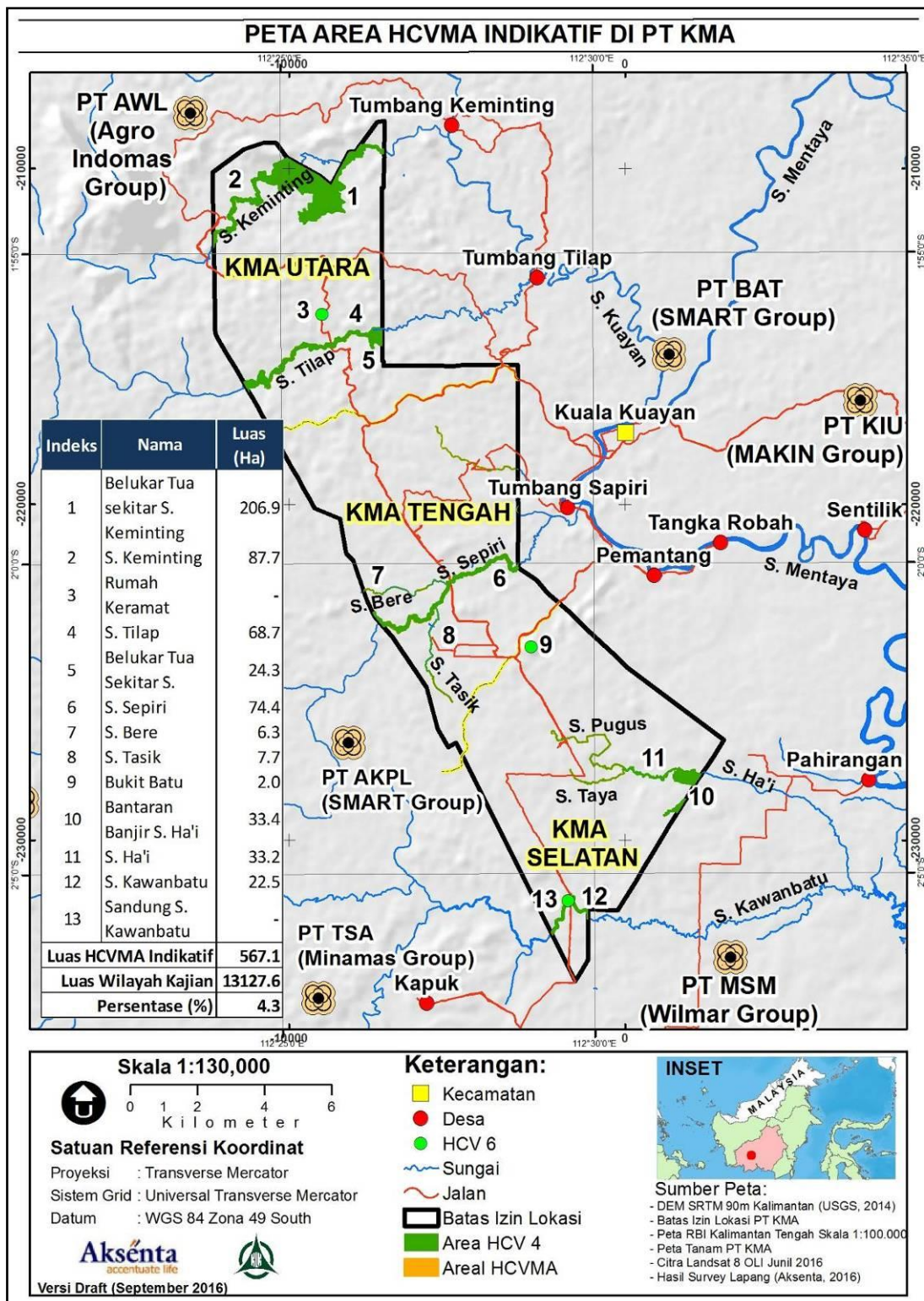


Figure 9. Map of the HCV Management Areas according to the initial HCV Assessment

## 5. Environmental Impact Assessment

### 5.1 Summary

Environmental impact assessment in PT KMA was reported in “Dokumen Pengelolaan dan Pemantauan Lingkungan (DPPL)” in 2009. The document is one of the regulation from the Ministry of Environment of the Republic of Indonesia No. 12, 2007 and the provision of the Kotawaringin Timur Regent No. 660/21/BLH.ADH/I/2009.

There are three stages of oil palm plantation operation occurred in the management of the PT KMA oil palm plantation, namely pre-construction stage, construction stage and operation stage. Accordingly, the pre-construction stage and the construction stage occurred in the new development plan while the operation stage occurs in the existing plantation in the concession. The environmental impact from the management of PT KMA were divided accordingly into three stages. Following are the details of the identified environmental impact and the monitoring plan of each impact from the operation of PT KMA:

Table 7. Identified environmental impact from the operation of PT KMA and the management of the impact

Stage	Activity	Impact	Aim	Indicator to be monitored
Pre-construction	Socialization and land compensation	Social conflicts and claim	Optimal socialization and reduce impact	Number of claims and conflict occur during socialization and land compensation process
Construction	Labour recruitment	Social conflicts and claim	Optimal labour recruitment	Number of claims and conflict
	Heavy equipment and material mobilization	Traffic accident and road degradation	Mobilization process improvement	Number of accident and road degradation during the mobilization process
	Infrastructure building	Job opportunity for the community around the plantation	To ensure the process become the job opportunity to the community	Number and type of job will be open for recruitment
	Land Clearing	Land fire and erosion	Effectiveness of the environmental management to prevent erosion and land fire	Level of land fire and erosion
	Nursery	Eutrophication	To ensure the amount of fertilizer use is optimal	Amount of fertilizer used in the nursery
Operation	Planting	Land clearing and planting in riparian area	To ensure the planting process not taken place in riparian area	Land clearing in riparian area and other water resources
	Pre-productive crop nursing	Eutrophication	To ensure the amount of fertilizer use is optimal	Amount of fertilizer used for productive crop
	Productive crop nursing	Eutrophication	To ensure the amount of fertilizer use is optimal	Amount of fertilizer used for productive crop
	FFB harvesting	No significant impact		
	FFB mobilization	Business opportunity and fatality	To ensure the compliance of health and safety principles and to evaluate the business opportunity	Number of fatality, number and type of business opportunity
	Infrastructure	Pollution of	To ensure the optimal	Volume of the waste and

Stage	Activity	Impact	Aim	Indicator to be monitored
	maintenance	hazardous waste	management of the hazardous waste	criteria of the hazardous waste containment
	Community development	Community perception	To improve the community development program	Number of claim and social issue
	Health and safety	Staff productivity improvement	Evaluation and to improve the acknowledgement of the staff about health and safety at work	Number of fatality at work

## 6. Land cover image analysis

### 6.1 Area of Interest and how it was defined

The area of interest of the assessment covers the concession of PT KMA and additional 1 km buffer beyond the concession boundary. There are seven land cover classes identified in the AOI. The HCS land cover classes identified are secondary forest which was only identified in the 1 km buffer and thickets (Young Regenerating Forest) which was found in the 1 km buffer and in the concession.

The first planting in the concession was taken place in 2010 and the development was halt in 2015. Oil palm plantation is the largest land cover in the concession. The existing oil palm plantation in each division respectively is 60.6% in North KMA Division, 65.8% in Central KMA Division and 90.7% in South KMA Division. However, the development and management of the oil palm plantation in North KMA Division was halt due to company's policy since 2015. The condition of the oil palm plantation in the North KMA Division at the time of the assessment was covered by bushes.

Abandoned rubber trees were also found in several undeveloped patches in the AOI. Though the presence of rubber trees indicates that these areas were fields cultivated by community in the past, these areas were classified as shrubs because the areas were already overgrown by pioneer trees such as macaranga.

The HCS land cover in the AOI consists of secondary forest (Low Density Forest) which was found outside the concession and thickets (Young Regenerating Forest) which was found in the concession and in the 1 km buffer. In addition, wider forest connectivity was also identified located at the Riparian of Kaminting River (yellow mark in figure 8) and the Tilap River (purple mark in Figure 10). These forest corridors are the potential high priority forest patch for conservation. In addition, some part of the both patches were also identified as HCV Areas according to the HCV Review and Update.



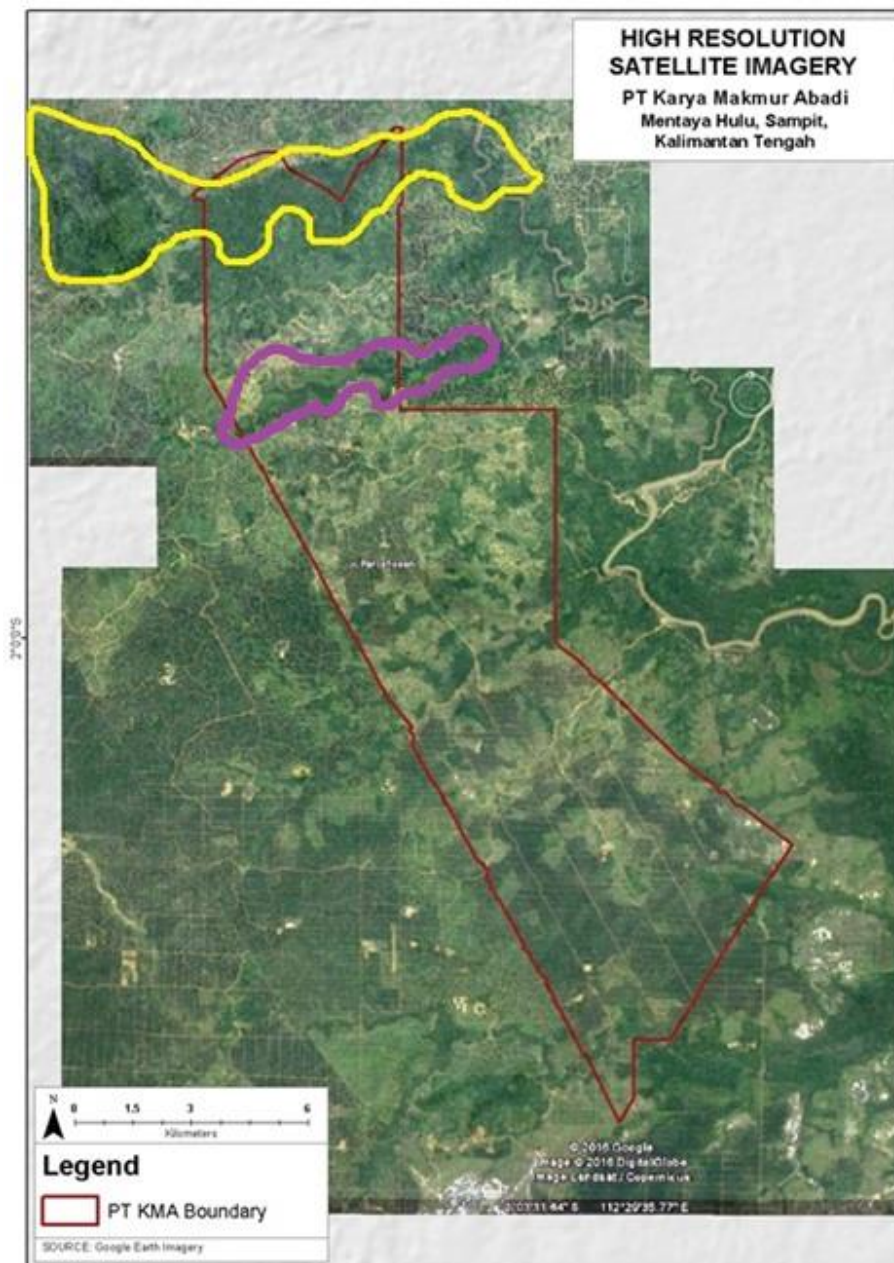


Figure 10. Potential HCS land cover corridor and connectivity in PT KMA concession (Google earth satellite imagery, 2015)

## 6.2 Description of images used for classification

Land cover classification was conducted based on landsat 8 satellite images path 119 and row 61 acquired on April 22<sup>nd</sup> and July 27<sup>th</sup>, 2016. In addition, the result of final classification was verified with google earth imagery (2016) and above ground carbon stock distribution (Carbon Stock Assessment in 2016). These imageries were used as the basis of the analysis during the assessment period. However, land cover classification was revised using the latest available landsat 8 imagery acquired on March 24<sup>th</sup>, 2017.

The image used for the final stratification has clear cloud and haze cover. Therefore, image correction was not conducted during the image preparation.

### 6.3 Sample image

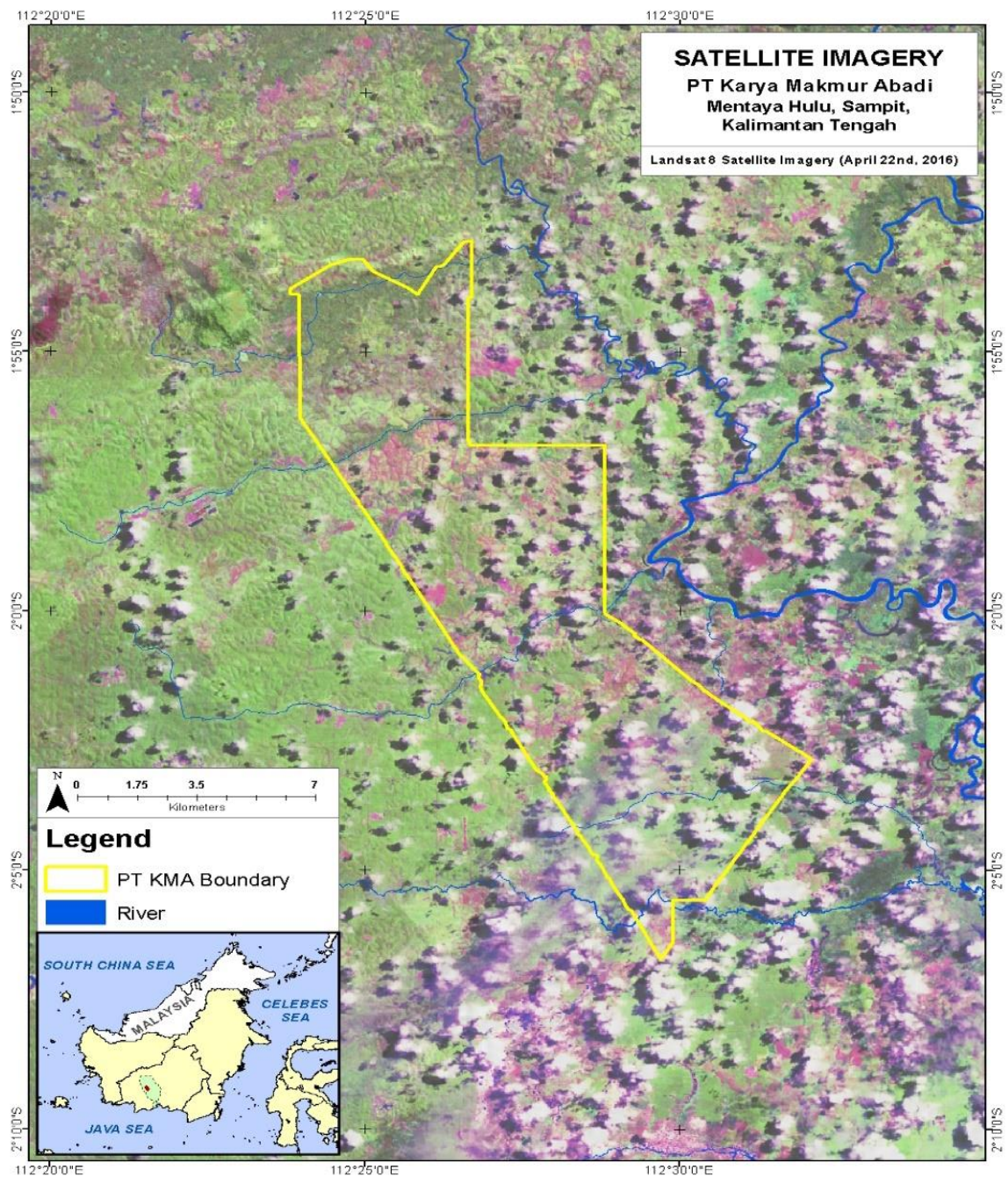


Figure 11. Landsat 8 Satellite Imagery of the AOI on April 22<sup>nd</sup> , 2016 in PT KMA Concession



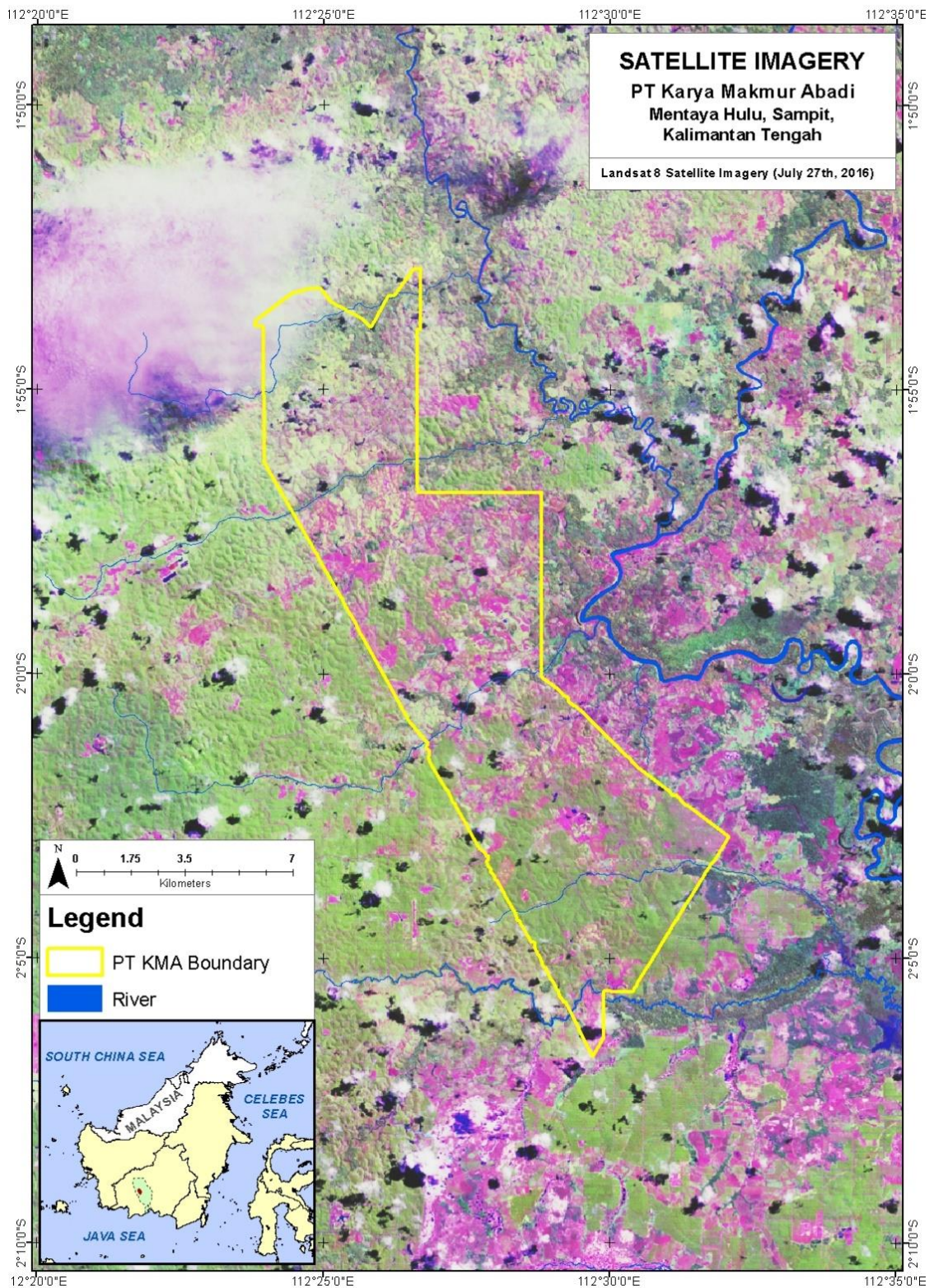


Figure 12. Landsat 8 Satellite Imagery of the AOI on July 27<sup>th</sup>, 2016 in PT KMA Concession



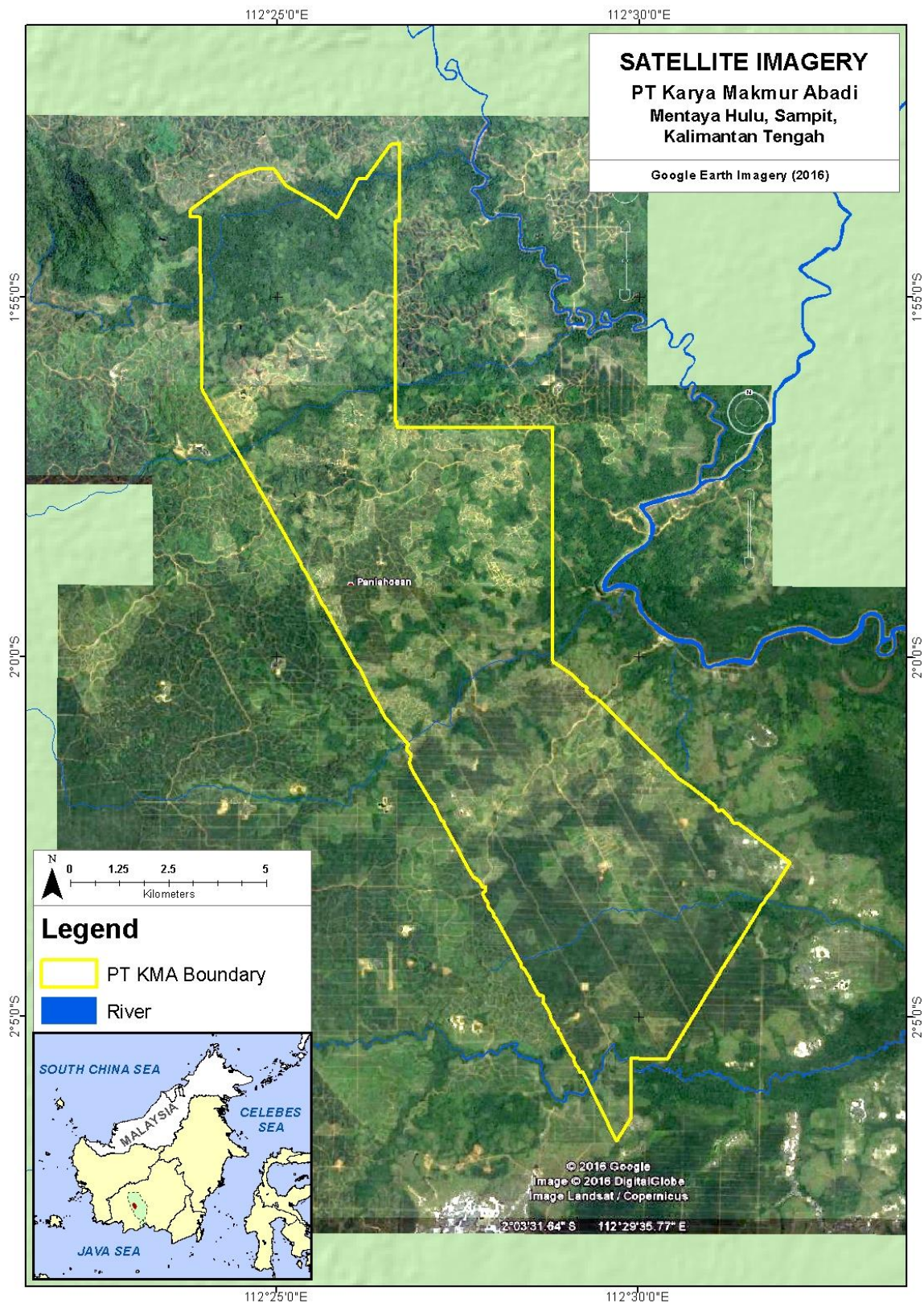


Figure 13. Google earth imagery of the AOI in 2016 in PT KMA Concession



## 6.4 Method of stratification and software used

Land cover stratification during the initial analysis was conducted using manual visual interpretation based on the satellite imageries. ArcMAP 10.1 was used in conducting the land cover stratification. Land cover stratification was conducted again during the analysis process to produce the final stratification using supervised classification method and corrected with manual visual interpretation. ArcMAP 10.1 was also used for the final stratification.

## 6.5 Map of initial vegetation classes, with legend

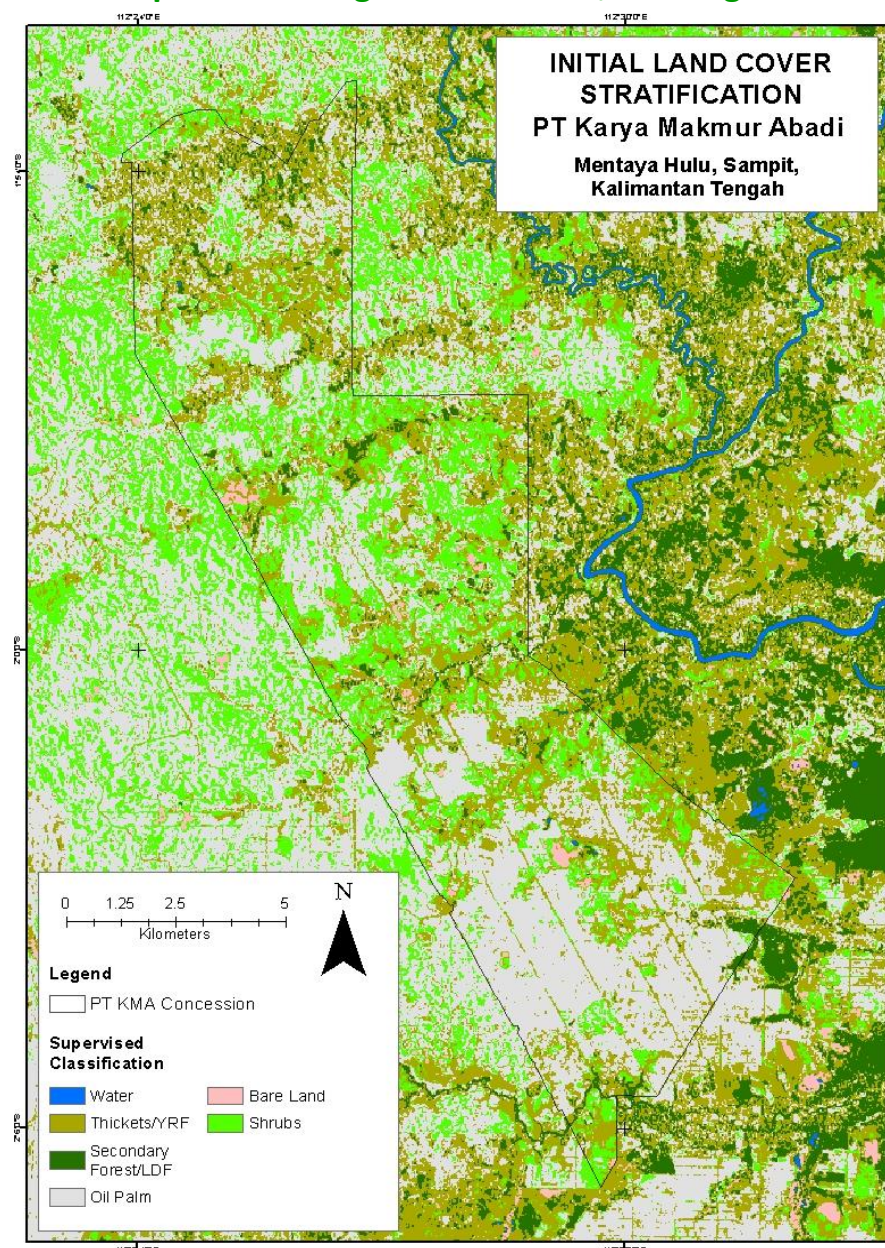


Figure 14. Initial land cover classification in PT KMA Concession

## 6.6 Table of total hectares per vegetation class

Table 8. Size of each land cover class in the PT KMA concession

Land cover class	Number of Hectares	% of total concession
Potential HCS classes:		
High Density Forest	-	-
Medium Density Forest	-	-
Low Density Forest (Secondary Forest)	-	-
Young Regenerating Forest (Thicket)	1,708.4	12.8
Sub-total	1,708.4	12.8
Non-HCS classes, e.g.:		
Shrubs	979.4	7.3
Bushes	490.7	3.7
Open Land	441.0	3.3
Oil Palm	9,759.3	72.9
Water	1.5	0.0
Sub-total	11,671.9	87.2
TOTAL	13,380.3	100

hectares of the analysis are according to GIS Analysis

## 6.7 Summary of which areas are potential HCS forest, subject to further analysis

Thickets (young regenerating forest) is the potential HCS land cover in the PT KMA concession. Small patch of secondary forest was also identified in the 1 km buffer outside the concession and it is connected to HCV area located at the South part of the concession.

The largest patches of thicket (young regenerating forest) were found in the riparian area of Kaminting River and Tilap River. Both are connected to thickets (young regenerating forest) located outside the concession. According to the size of the patch and the function of connectivity, thickets (young regenerating forest) in both riparian areas are potential high priority conservation area.

Other thickets (young regenerating forest) patches were found sporadically. All of them consists of the medium and low priority patches according to the size of the patch core. However, some of the medium and low priority patches were potential conservation by reason of connectivity function (connectivity analysis) and presence of water stream (Pre RBA step). The other smaller patches with no connectivity and impediments for development will proceed for RBA check.

## 7. Forest inventory results



## 7.1 Inventory sample design and plot rational

Sampling plots are randomly distributed in each land cover type. However, it is acknowledged that the number of sampling points were not proportional to the land cover types. The sampling determination was focusing on the thickets as the high carbon stock land cover such as secondary forest and thickets. Forest inventory took place in June, 2016.

Table 9. Number of the forest inventory plots per each land cover class

Land Cover	Number of Sample Plots
Thicket	22
Shrubs	6
Rubber Area	3
Bushes	2
Total	31

## 7.2 Map indicating plots

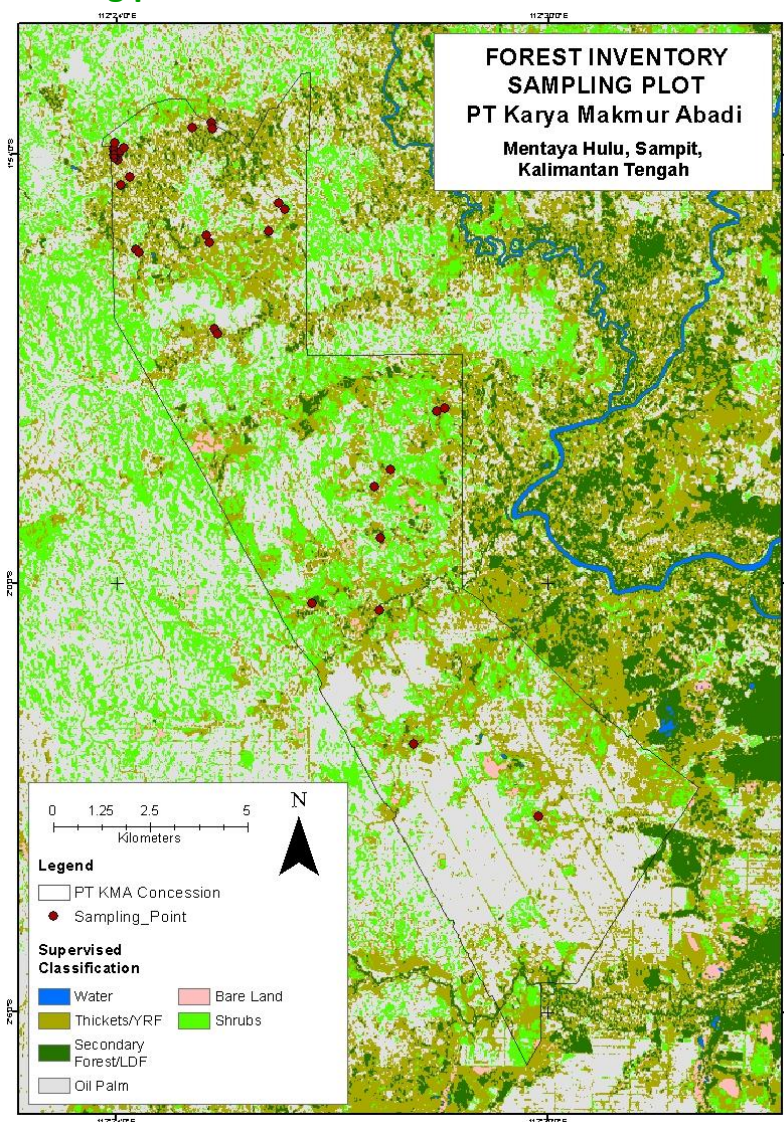


Figure 115. Forest inventory sampling plot in PT KMA Concession



### 7.3 Forest inventory team members and roles

**Risa Desiana Syarif.** Bachelor of forestry. Experienced in remote sensing and spatial analysis, land use change analysis and carbon stock estimation.

Role: Vegetation measurement, land cover analysis

**Pramitama Bayu Saputro.** Bachelor of forestry. Experienced in biodiversity research, forest ecology, land use change analysis and remote sensing.

Role: Vegetation measurement, vegetation analysis

**Heidei PH.** Bachelor of agriculture science, majoring in Agroclimatology. Experienced in land use change analysis, soil physical properties research with remote sensing and carbon stock estimation.

Role: Vegetation measurement, carbon stock modeling and extrapolation and GIS analysis.

**Bias Berlio P.** Bachelor of forestry. Experienced in carbon stock estimation and plant identification.

Role: Vegetation measurement, vegetation analysis

### 7.4 Methodology used for forest sampling

Nested square plots sampling was used in the forest inventory. It is acknowledged that the sampling technique used is different with what is suggested in the HCS Approach Toolkit. However, the nested square plots were considered more practical to be used in the forest inventory, especially due to the variation of the tree DBH in sampling site. This technique is considered adequate to be used because it has the same principle in context of the data interpolation with the circular plots as suggested in the toolkit. The subtle difference between both is instead of measuring all trees in one sample plot, trees from each class of certain DBH range were measured in different plots in the nested square plots sampling. The sampling plots specialization aims to avoid poor accuracy due to the variance of the tree density in each DBH class while the practicality is improved.

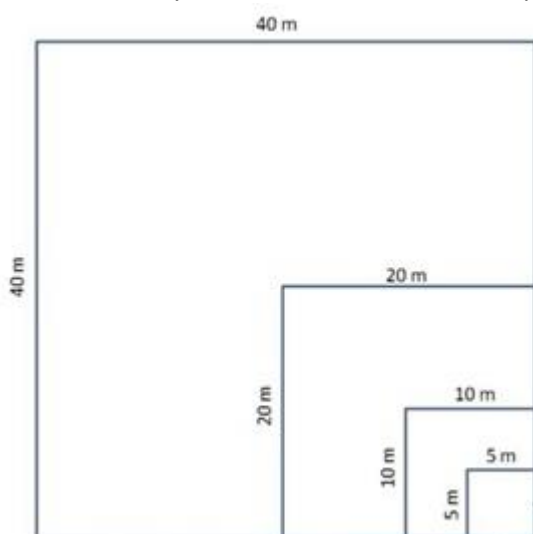


Figure 16. Forest inventory sampling plot design

Table 10. Details of the measured trees in each square subplot

Sub-plot Size	Tree DBH to Measure
5 x 5 m <sup>2</sup>	Bushes-Shrub and sapling vegetation stage with 5-10 cm of DBH
10 x 10 m <sup>2</sup>	Thicket and pole vegetation stage with 10-20 cm of DBH
20 x 20 m <sup>2</sup>	Thicket and tree with 20-35 cm of DBH
40 x 40 m <sup>2</sup>	Trees with > 35 cm DBH

## 7.5 Methodology used for carbon calculations

Vegetation carbon stock is calculated with tree carbon stock-biomass ratio, the carbon stock-biomass ratio is 0.47 (IPCC, 2006).

## 7.6 Indicative photos of each vegetation class



Figure 17. Secondary forest



Figure 18. Thicket





Figure 19. Shrubs



Figure 20. Bushes



Figure 21. Rubber area



Figure 22. Open land and oil palm

## 7.7 Statistical analysis (allometric used, confidence tests, justification)

The tree biomass was calculated with allometric equations according to “Monograf Alometrik untuk Pendugaan Biomassa Pohon pada Berbagai Tipe Ekosistem Hutan di Indonesia” (Krisnawati *et al*, 2012). This book contains collection of allometric equations based on several researches in Indonesia. This book presents collection of tree biomass allometric equation for several species, region and ecosystem. This reference was used in consideration to improve the accuracy of the biomass calculation since it has specified allometric equation for certain species. For the species that the allometric equation is not provided in the book, the allometric equation of another species from the same genus or family with the highest accuracy was used.

## 7.8 Summary of statistical analysis of carbon stock results per vegetation class

Table 11. Summary of statistical analysis of carbon stock results per vegetation class

Land cover class	Number of Plots	Stems per hectare	Basal Area (m <sup>2</sup> /ha)	Average Carbon Stocks	Standard error of the mean	Confidence limits (90%)	
						Lower	Upper
Rubber Area	3	1,117	487.08	25.84	5.01	17.59	34.08
Shrubs	6	2,913	598.75	13.63	2.06	10.31	17.77
Young Regenerating Forest/Thickets	22	1,910	627.11	42.58	19.05	35.90	49.26

## 7.9 Forest inventory results

Table 12. Forest inventory class (Carbon stock and description of each land cover class)

Land cover class	Average carbon value (ton/ha)	Physical description of the land cover, e.g. species mix, forest type (pioneer, regenerating, primary etc.), diameter distribution, structural indices, maturity indices, etc.
Rubber Area	25.48	These areas are used to cultivated as monoculture rubber plantation by the community in the past. Most of the trees found in these areas are rubber ( <i>Hevea brasiliensis</i> ), but already overgrown by bushes as natural vegetation succession. Found as sporadic small patches, therefore, these areas are classified in shrubs land cover classification. The 10-20 cm DBH class trees have the most basal area. There is no trees with DBH greater than 35 cm in these land cover class.
Shrubs	13.69	Early step of the vegetation succession. These areas once were cleared in the past but were not followed with any development. <i>Macaranga</i> species are dominant in these areas, while according to the DBH class, the 5-10 cm trees have the greatest basal area. There is no trees with DBH greater than 35 cm in this land cover class.
Young Regenerating Thickets (YRF)	42.58	Found as logged over areas. This land cover is dominated with macaranga trees, however, there are also forest trees species found in this land cover class such as dipterocarpaceae and Myrtaceae species. 5-10 cm DBH class trees are dominating with the largest basal area, however the greater DBH class trees up to >35 cm DBH are also found in this land cover class.



## 8. Land Cover Classification

### 8.1 Refined land cover map with title, date, legend and any HCS forest patches identified

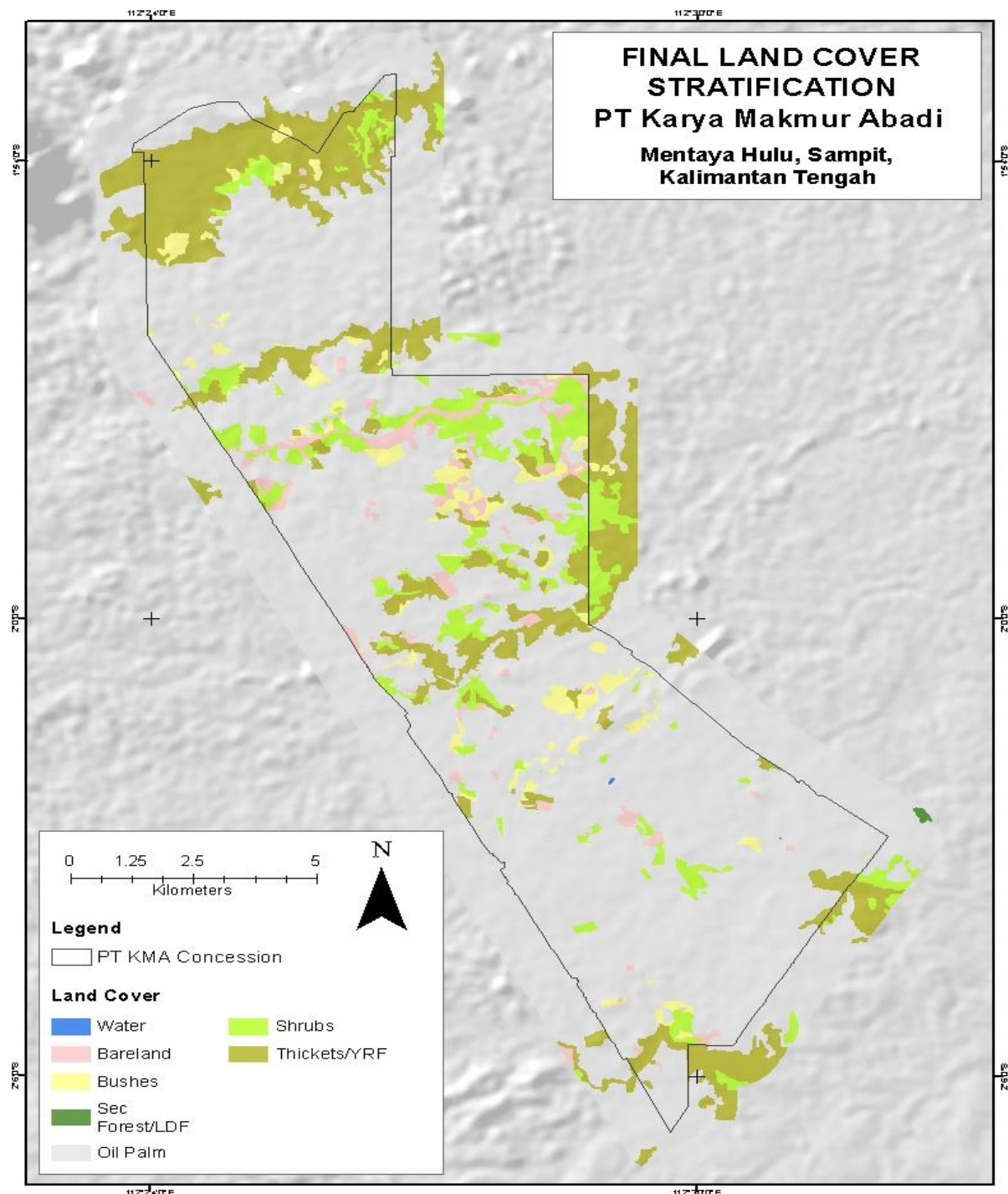


Figure 23. Refined land cover classification

## **9. Patch Analysis Result**

### **9.1 Results of Decision Tree**

Attached at the end of this document

### **9.2 Comments on Decision Tree outcome**

There are 1,799.6 ha (13.4%) indicative area for conservation consists of HCS and HCV, conservation with mitigation and RBA check areas. However, these hectares may be changed as the results of the RBA check and the final boundary adjustment. Most of the HCS conservation areas are the high priority HCS patches that are overlapping with HCV areas and connected with the HCS land cover outside the concession. Both of those high priority patches are located in the Riparian of Keminting River and Tilap River.

The HCS conservation with risk mitigation were sporadic smaller HCS patches that were found near and/or crossed by river. The presence of river in those patches were considered as the urgencies to determine the patches to be conserved to protect the quality of the river. However, since the entirety of the study area is highly accessible, these patches were considered to be conserved with risk mitigation.

The RBA patches are the medium and low priority patches found sporadically spread in the Central and South KMA Divisions. These patches need further field visit to determine the land use plan of these patches.

Low density forest/secondary forest were only found outside the PT KMA boundary. However, these areas were included within the AOI by the 1km extension buffer of the study area. Though these areas were not within the company's boundary and not under the management of the company, the current condition of these secondary forests are considered as HCS areas, and all the HCS patches that are connected with these secondary forests were determined to be conserved.

## **10. Indicative Land Use Plan**

### **10.1 Summary of results of final ground verification (if any)**

Final ground verification has not been carried out yet. This activity will be carried out once the RBA check is done and the decision on RBA patches has been made. However, further adjustment may be occurred and may results slight change on the land use plan due to the actual forest condition on the field (e.g. the forest patch edges).

## 10.2 Final HCS map

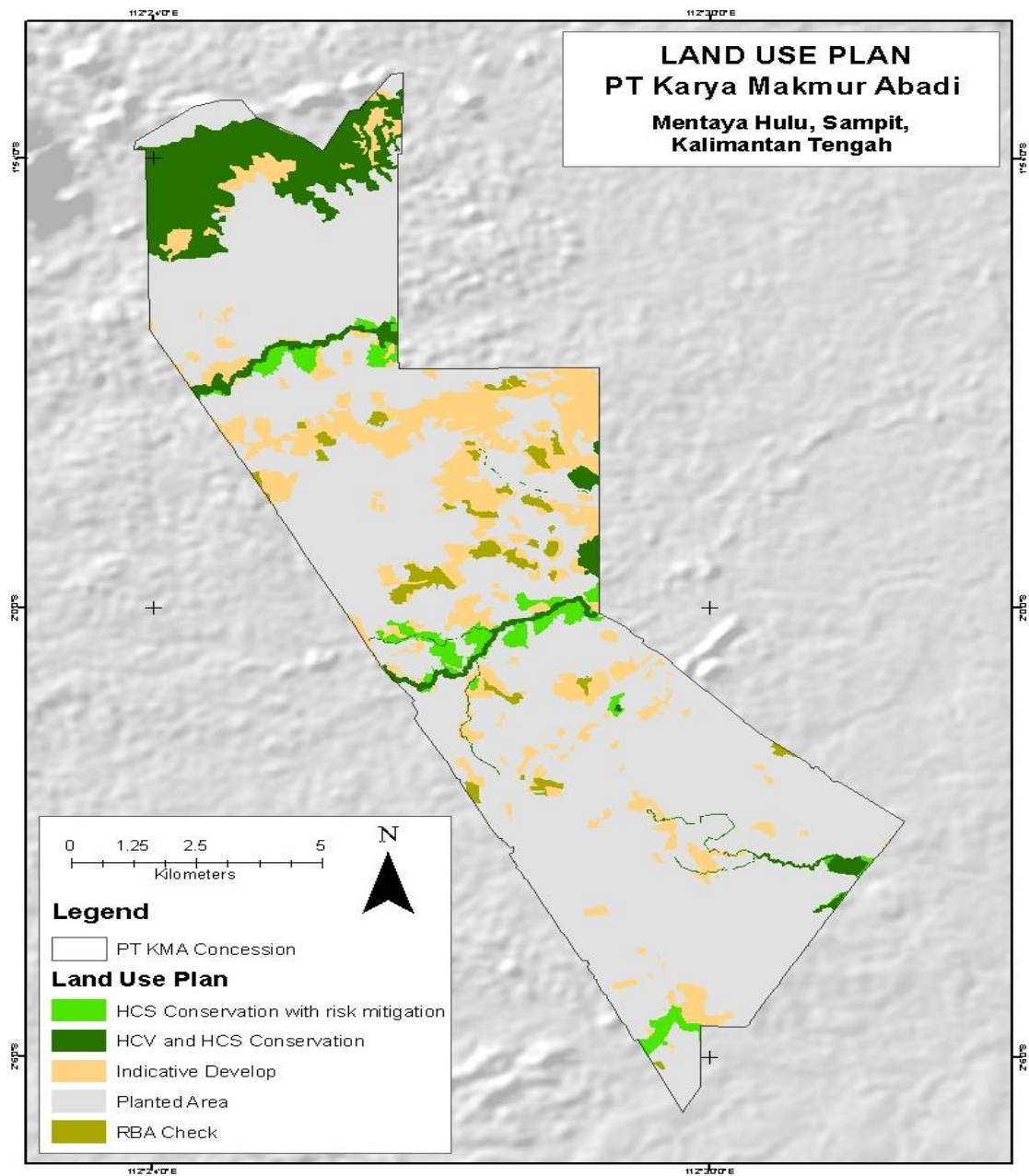


Figure 24. Land use plan in PT KMA Concession

### 10.3 Overview of forest conservation management and monitoring activities to be included in the Conservation and Development (land use) Plan

HCS conservation management and monitoring plan will be developed and integrated in accordance with the HCV and the Environment Management and Monitoring Plan (RKL and RPL). Most of the conservation areas are located in the same places and occurred in the same forest patches. Therefore, to integrate the management and monitoring plan of each conservation areas will enable more practical and efficient implementation.

List of activities to be included are:

- Field demarcation of the conservation area
- Setting up information board of the conservation areas including the warning and prohibition
- Frequent monitoring of the conservation area
- Prevention and management of conflicts
- Fire prevention and fire fighting
- Special monitoring at the conservation with risk mitigation

### 10.4 List of activities still to be carried out before Conservation and Development Plan can be finalised

- RBA Check
- Socialization of the indicative land use plan to the communities
- Final ground verification
- Field delineation and demarcation of the definitive land use plan

#### Results of Decision Tree

FID	Luas	Tuplah	HCSLC	Priority	Decision
0	88.3	Belukar	YRF	High Risk MP, Presence of River	Conserve with risk mitigation
1	3.1	Belukar	YRF	High Risk MP, Presence of River	Conserve with risk mitigation
2	600.1	Belukar	YRF	HCS Patches with connectivity	Conserve
3	9.5	Belukar	YRF	High Risk MP, Presence of River	Conserve with risk mitigation
4	6.3	Belukar	YRF	High Risk MP, Presence of River	Conserve with risk mitigation
5	3.8	Belukar	YRF	High Risk MP, Presence of River	Conserve with risk mitigation
6	8.0	Belukar	YRF	MP and LP RBA Check	RBA Check
7	171.8	Belukar	YRF	High Risk MP, Presence of River	Conserve with risk mitigation
8	50.6	Belukar	YRF	MP and LP RBA Check	RBA Check
9	8.5	Belukar	YRF	MP and LP RBA Check	RBA Check
10	19.1	Belukar	YRF	MP and LP RBA Check	RBA Check
11	1.8	Belukar	YRF	MP and LP RBA Check	RBA Check
12	2.9	Belukar	YRF	HCS Patches with connectivity	Conserve
13	2.6	Belukar	YRF	MP and LP RBA Check	RBA Check
14	14.6	Belukar	YRF	MP and LP RBA Check	RBA Check
15	0.9	Belukar	YRF	MP and LP RBA Check	RBA Check



FID	Luas	Tuplah	HCSLC	Priority	Decision
16	7.3	Belukar	YRF	MP and LP RBA Check	RBA Check
17	12.9	Belukar	YRF	MP and LP RBA Check	RBA Check
18	3.7	Belukar	YRF	High Risk MP, Presence of River	Conserve with risk mitigation
19	15.1	Belukar	YRF	MP and LP RBA Check	RBA Check
20	2.9	Belukar	YRF	MP and LP RBA Check	RBA Check
21	31.3	Belukar	YRF	HCS Patches with connectivity	Conserve
22	3.5	Belukar	YRF	MP and LP RBA Check	RBA Check
23	12.5	Belukar	YRF	MP and LP RBA Check	RBA Check
24	2.6	Belukar	YRF	MP and LP RBA Check	RBA Check
25	11.2	Belukar	YRF	MP and LP RBA Check	RBA Check
26	5.0	Belukar	YRF	MP and LP RBA Check	RBA Check
27	4.3	Belukar	YRF	MP and LP RBA Check	RBA Check
28	1.8	Belukar	YRF	MP and LP RBA Check	RBA Check
29	5.0	Belukar	YRF	MP and LP RBA Check	RBA Check
30	1.8	Belukar	YRF	MP and LP RBA Check	RBA Check
31	24.7	Belukar	YRF	HCS Patches with connectivity	Conserve
32	8.5	Belukar	YRF	MP and LP RBA Check	RBA Check
33	14.8	Belukar	YRF	MP and LP RBA Check	RBA Check
34	10.3	Belukar	YRF	MP and LP RBA Check	RBA Check
35	2.5	Belukar	YRF	MP and LP RBA Check	RBA Check
36	10.6	Belukar	YRF	MP and LP RBA Check	RBA Check
37	0.0	Belukar	YRF	MP and LP RBA Check	RBA Check
38	51.7	Belukar	YRF	High Risk MP, Presence of River	Conserve with risk mitigation
39	9.1	Belukar	YRF	High Risk MP, Presence of River	Conserve with risk mitigation
40	7.2	Belukar	YRF	MP and LP RBA Check	RBA Check
41	6.7	Belukar	YRF	MP and LP RBA Check	RBA Check
42	9.2	Belukar	YRF	MP and LP RBA Check	RBA Check
43	5.4	Belukar	YRF	MP and LP RBA Check	RBA Check
44	47.9	Belukar	YRF	HCS and HCV overlapping area	Conserve
45	0.1	Belukar	YRF	HCS and HCV overlapping area	Conserve
46	0.2	Belukar	YRF	HCS and HCV overlapping area	Conserve
47	40.4	Belukar	YRF	HCS and HCV overlapping area	Conserve
48	16.6	Belukar	YRF	HCS and HCV overlapping area	Conserve
49	83.3	Belukar	YRF	HCS and HCV overlapping area	Conserve
50	0.0	Belukar	YRF	HCS and HCV overlapping area	Conserve
51	1.8	Belukar	YRF	HCS and HCV overlapping area	Conserve
52	2.0	Belukar	YRF	HCS and HCV overlapping area	Conserve
53	4.5	Belukar	YRF	HCS and HCV overlapping area	Conserve
54	0.0	Belukar	YRF	HCS and HCV overlapping area	Conserve
55	18.5	Belukar	YRF	HCS and HCV overlapping area	Conserve
56	4.5	Belukar	YRF	HCS and HCV overlapping area	Conserve
57	23.2	Belukar	YRF	HCS and HCV overlapping area	Conserve
58	7.0	Belukar	YRF	HCS and HCV overlapping area	Conserve

FID	Luas	Tuplah	HCSLC	Priority	Decision
59	180.5	Belukar	YRF	HCS and HCV overlapping area	Conserve
60	3.9	Belukar	YRF	HCS and HCV overlapping area	Conserve
61	0.8	Belukar	YRF	HCS and HCV overlapping area	Conserve
62	0.0	Belukar	YRF	HCS and HCV overlapping area	Conserve
63	0.0	Belukar	YRF	HCS and HCV overlapping area	Conserve
64	0.0	Belukar	YRF	HCS and HCV overlapping area	Conserve
65	0.0	Belukar	YRF	HCS and HCV overlapping area	Conserve