

# **HCS APPROACH ASSESSMENTS REPORT**

*Version 2*

## **HCS Study Project Title:**

HCS Approach Assessment of PT. Menteng Jaya Sawit  
Perdana in Central Kalimantan, Indonesia.

**Organisation:** Kuala Lumpur Kepong (KLK) Group

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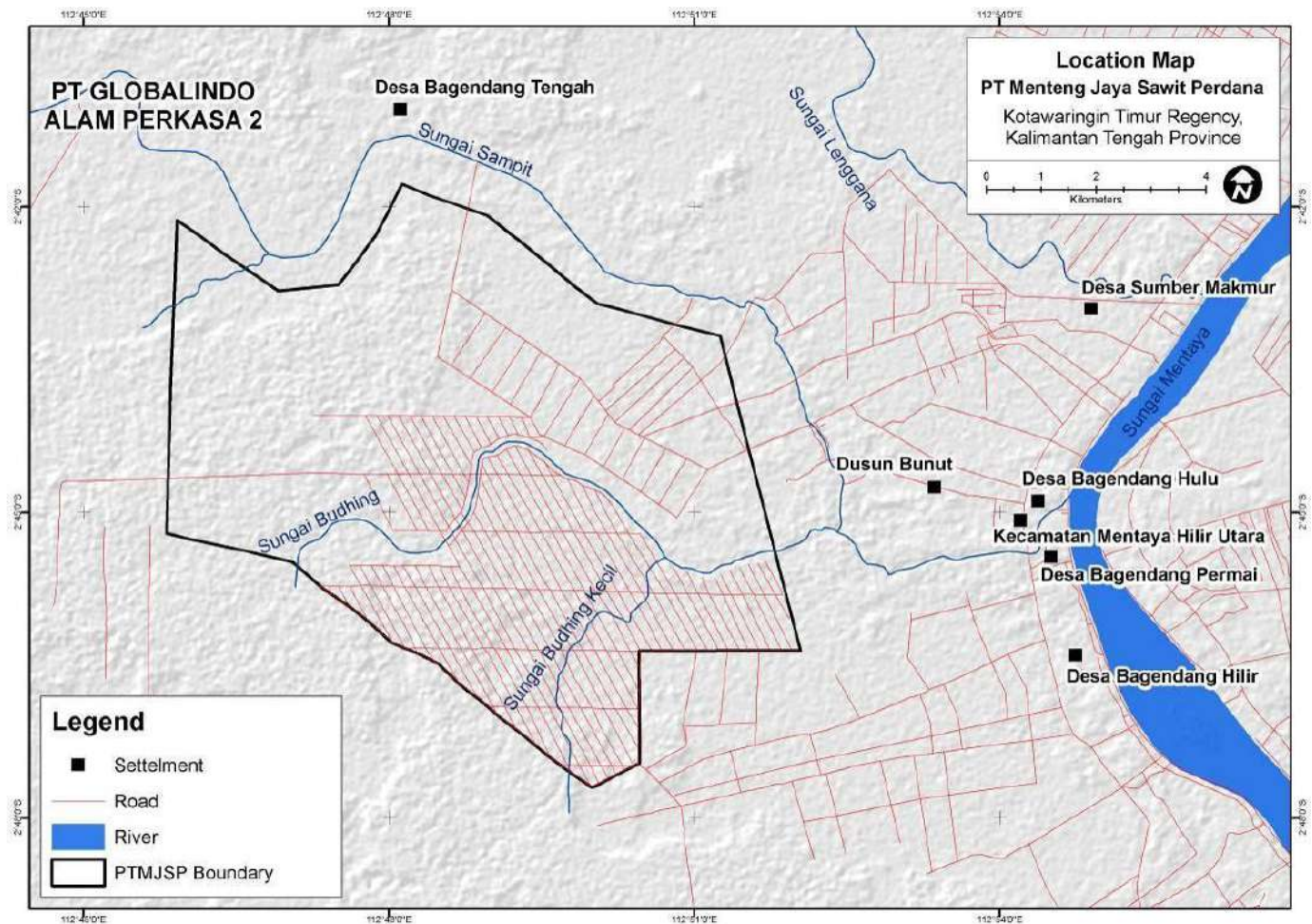
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# 1. Project description

## 1.1 Location and size of study area

The HCS Approach Assessment was conducted in concession of PT Menteng Jaya Sawit Perdana/ MJSP (in this document will be referred to as the company). The concession is located at 112°52'2.653"-112°45'49.227" West Longitude and 2°41'47.98"-2°47'42.411" South Latitude, administratively it is located in Bagendang Tengah Village (desa), Desa Bagendang Hilir Village (desa), and Desa Bagendang Hilir Permai Village (desa); in Mentaya Hilir Utara District (Kecamatan), Kotawaringin Timur Regency (Kabupaten), Kalimantan Tengah Province, Indonesia.



**Figure 1. Location map of the concession**

According to GIS analysis, size of the operational area of the company is 7,442.8 ha (100%). The land permit was firstly issued by the government of Kotawaringin Timur Regency in 2005. The permit to operate in the concession then was issued in 2007. During a time period between 2007 and 2012, the company has developed 2,458 .4 ha of its concession (33.0%) into oil palm plantation. The rest 67.1% of the area is now remain as its unplanted area (see Figure 2).

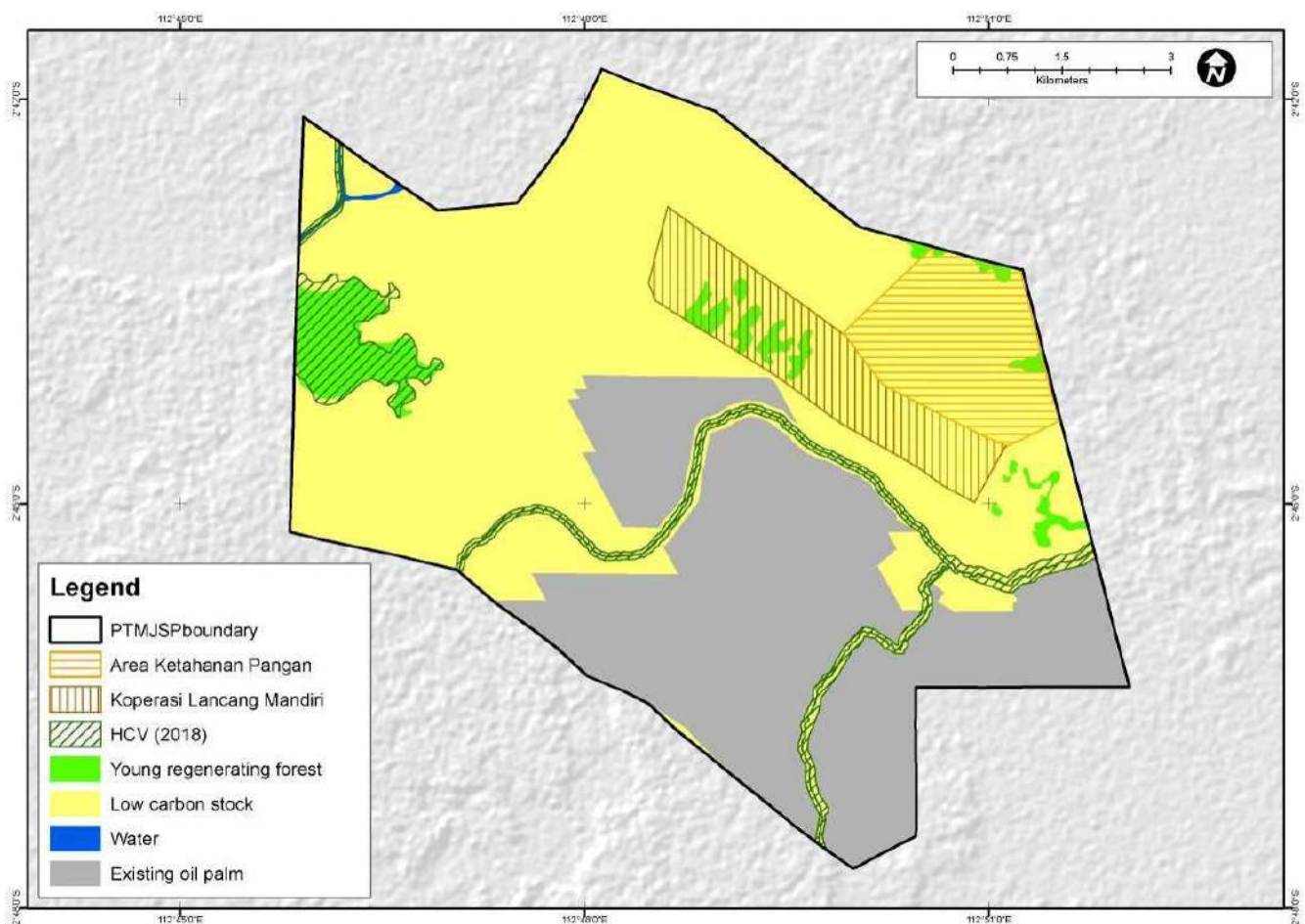




The company has engaged the government and the Ministry of Environment and Forestry to seek the resolution to the situation. In accordance with that process, the ministry has decided to set the area for Customary Plantation Forest (Hutan Tanaman Rakyat). It is related with the existing plantation in the yellow area, which is not in accordance with the regulations. As for the resolution, the ministry decided to prescribe that the company is allowed to maintain operation of the existing plantation but will not replant with oil palm after the productive cycle ends. Otherwise, the company is required to support the development of the customary plantation forest as the compensation of the nonconformity.

The company is also agreed to support development of community's business for future food security. In accordance with the status of the legal land use of the area, the food security would also be in form of forestry business, however it is still in preparation for the planning. The proposed area for community's future food security consists of two areas, (i) area of approximately 500 ha to be managed for regional's food security by Lancang Mandiri (a group of farmers) and (ii) another approximately 500 ha for expansion plan of the food security area and proposed area for the communities' timber plantation of 3,059 ha.

Though the company's commitment to support developments of the customary plantation forest and the food security program is not in form of new planting for oil palm, the company considered not to exclude the areas from its development plan land use preparation. It is also by reason of that all of the area is now still within the company's legal operational area (i.e. location permit).



**Figure 3. Existing land use and land cover map of the concession**

### 1.3 Description of surrounding landscape

The company's concession is located in a relatively low forest-covered landscape. It is surrounded with road and water access and anthropogenic activities such as settlements, oil palm estates, and industrial timber plantation. There are six villages located around the concession and a town district of (Kecamatan) Mentaya Hilir Utara, all are connected with road and water access.

The concession is bordering with settlements at its North-eastern border and oil palm plantations at its West, North-west, and East. At the South, it is adjacent with a forest production land use area, however, the Northern part of the forest production area which is adjacent with the concession has been deforested due to massive land fire occurred in 2015 (see **Figure 4**). There is no connectivity between relatively larger and intact forest provided in the study area, however, numbers of regenerating young forest patches at the Northern part of the concession are found connected with larger young regenerating forest at the settlements outside the North-western border of the concession (see **Figure 18**). There is also a relatively larger and compact young regenerating forest on peat swamp patch found at the Eastern boundary of the concession, however, it has no connectivity with other and/or larger forested area (see **Figure 18**).

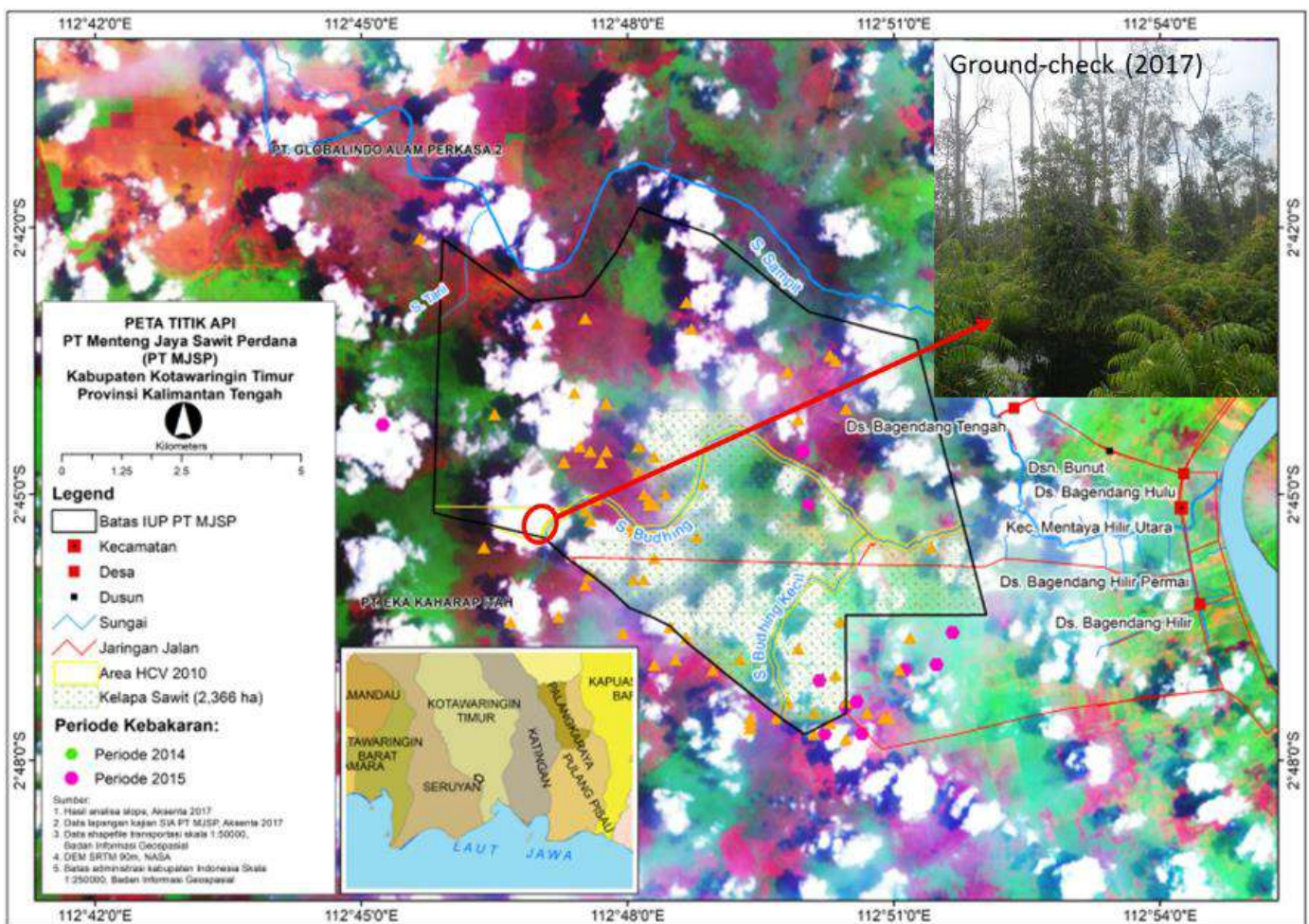


Figure 4. Satellite imagery depicting impacts from the land fire occurred in 2015

There are four types of land substrate identified, namely, (i) dry land, (ii) heath (sandy soil), (iii) fresh water swamp, and (iv) peat swamp. However, accordingly with their association with the land cover condition, there are only few areas found with relatively natural vegetation to be categorized as natural ecosystem with plant biodiversity values. Most of the area in the concession has been degraded due to traditional shifting cultivation and timber extraction and land fire. According to the field observation in this assessment in November 2017, there are only sporadic regenerating young forests patches can be found in the study area.

According to HCV assessment conducted in the concession in 2010, there were RTE species in the concession that meets the criteria of HCV 1 (1.2 and 1.3) and HCV 4 (4.2). They consist of 11 species of mammals, 3 species birds, and 10 species of plants.

The HCV in the concession then was reviewed and updated in 2017. The result shows that the RTE fauna species can still be found in the study area. According to the HCV review and update in 2017, the remaining young regenerating forests and riparian buffers with good condition in the study area are functioning as refugia for several RTE species in its surrounding landscape. It is also confirmed by the local community and the staff of the plantation that nine of RTE species can still be found in the remaining regenerating young forest and riparian areas (among others are *Pongo pygmaeus*, *Hylobates albibarbis*, *Sus barbatus*, *Cuora amboinensis*).

The concession is located in three village areas, namely Bagendang Tengah Village, Bagendang Permai Village, and Bagendang Hilir Village (further in this document will be referred to as villages in the study area). Accordingly, with historical interaction with the land in the concession, communities from the three villages in the study area are identified as the communities related with the lands in the concession. Ownership (right) on their land is originated from historical land use for shifting cultivation (further in this document will be referred to as garden land). The ownership is attached to the family and can be inherited. Ownership on the garden land is not limited to their interaction with the land, in other words, it is still valid though the owner has abandoned the land. Presents of rubber tree (*Hevea brasiliensis*) indicates that a land has been cultivated (owned by family).

Though shifting cultivation was once very massive as the main source of the communities' needs, livelihood of the communities has been shifted into economic based activities. Different with the generations before them, the communities now fulfil their needs with economic activity such as buy and sell and working to earn money. Furthermore, economic activities in the concession and the surrounding areas are also supported with accessibilities connecting all the villages and other company's concessions.



## 1.4 Map of the site within the region

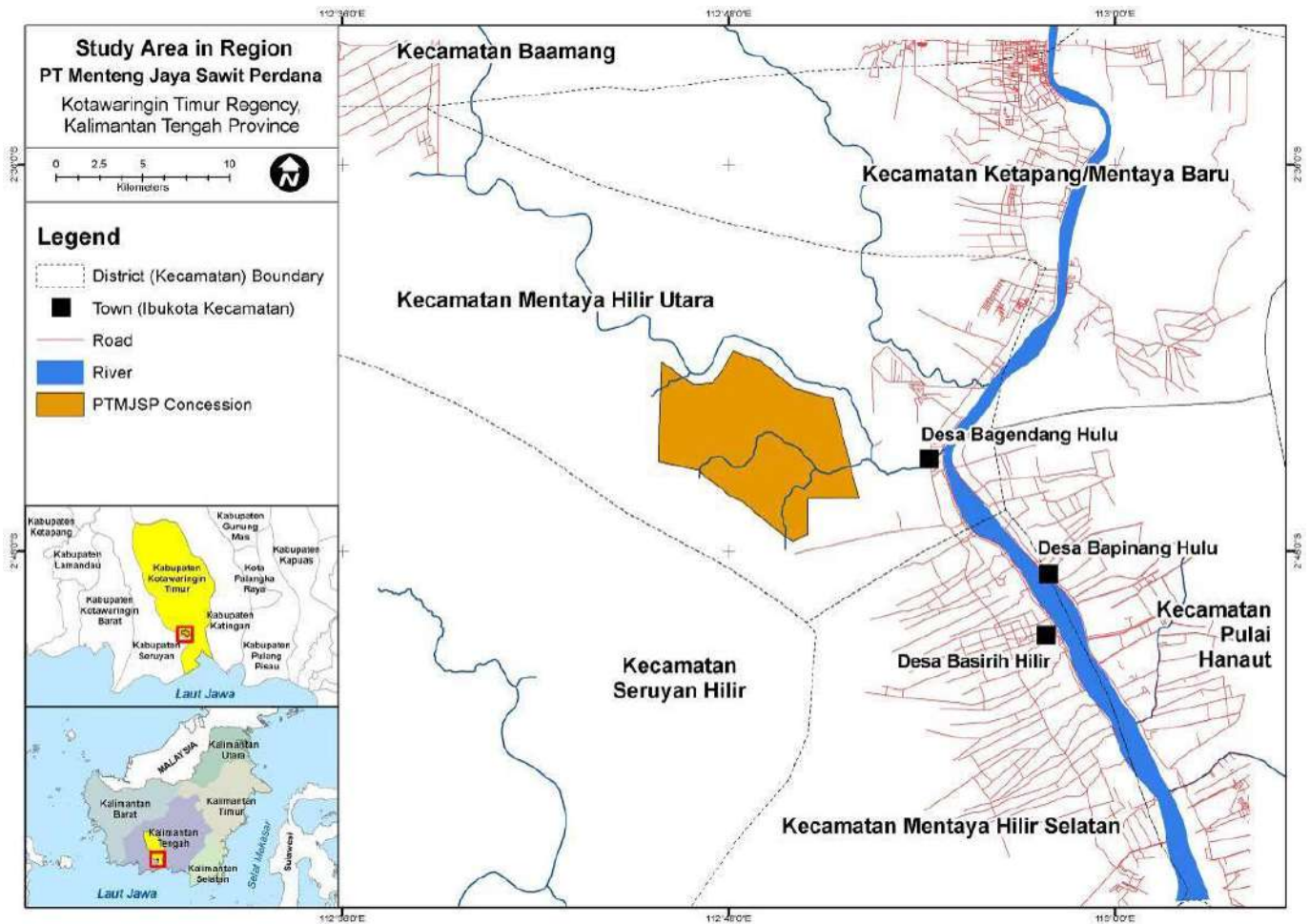


Figure 5. Location of the study area in the region

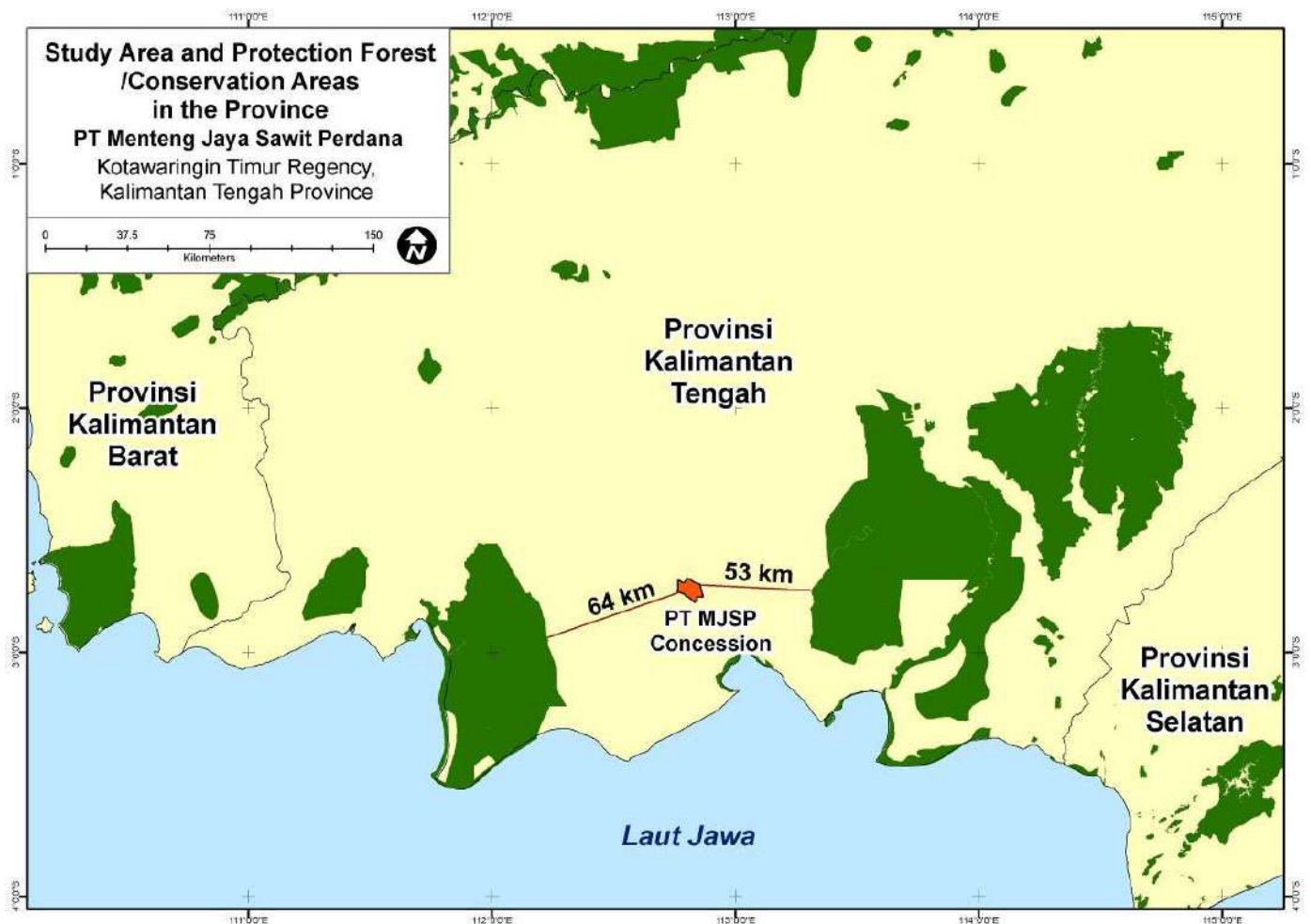


Figure 6. Protection areas (protection forest and conservation forest) in the region of the study area

## 1.5 Relevant data sets available

- Forest inventory data set and carbon stock assessment
- Satellite imagery
- Results of FPIC verification on land acquisition process and standard operational procedures
- HCV assessment
- Social impact assessment

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

- HCV assessment report (the HCV assessment was conducted in 2010, before the HCV ALS is launched)
- HCV review and update report (HCV review and update were conducted in order to comply with RSPO NPP)
- Social impact assessment report
- FPIC verification report

## 2. HCS assessment team and timeline

### 2.1 Names and qualifications

**Table 1. List of team members involved in the assessment**

Name	Qualifications/role in team
<b>Bias Berlio Pradyatma</b> (HCSA Registered Practitioner)	HCSA patch analysis, landcover classification
<b>Risa Desiana Syarif</b> (HCSA Registered Practitioner)	Landcover classification, GIS analysis, FPIC
<b>Muhamad Fakhrol</b>	Landcover classification, biomass carbon stock estimation, soil mapping
<b>Tengku Haikal</b>	Landcover classification, biomass carbon stock estimation, soil mapping
<b>Rahmat Darmawan</b>	Landcover classification, biomass carbon stock estimation, plant species identification, vegetation analysis
<b>Nurani Hardikananda</b>	Landcover classification, biomass carbon stock estimation, plant species identification, vegetation analysis

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

**Table 2. Time of the relevant studies**

Assessment	Time
HCV assessment	2010
HCV review and update	November, 2017
FPIC Verification	November, 2017
Social Impact Assessment	November, 2017
Forest inventory	November, 2017
Document of Environmental Management and Monitoring (Dokumen Pengelolaan dan Pemantauan Lingkungan)	

### 3. Community engagement/ FPIC

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

A baseline study which involves social and environmental aspects of the company's operation, namely Dokumen Pengelolaan dan Pemantauan Lingkungan (DPPL) has been carried out and approved by the Regent of Kotawaringin Timur in 2009<sup>1</sup>. DPPL is a mandatory of the Ministerial Regulation of the Ministry of Environment No. 12 Year 2007 for activities which would cause impacts to its environment and is a term to obtain its plantation operational license.

The study identified three groups of communities which are potentially affected by the operation of the company, namely the communities of Bagendang Tengah Village (desa), Bagendang Hilir Village (desa), and Bagendang Hilir Permai Village (desa). The three villages are located in the same district, namely Mentaya Hilir Utara. Demographic information of the three villages are provided in **Table 3**.

**Table 3. Demographic information of the villages**

Village	Area (km <sup>2</sup> )	Total population	Total household	Average of household's members
Kec. Mentaya Hilir Utara	725	17.237	5.001	3,45
Bagendang Tengah	198	1.917	456	4,20
Bagendang Hilir	82	1.781	458	3,89
Bagendang Permai	31	1.726	443	3,90

**Note:** Mentaya Hilir Utara District is 725 km<sup>2</sup> with total population of 17,237; total household of 5,001; and average household members of 3.45.

**Source:** *Central Bureau of Statistics of Kotawaringin Timur Regency (2017)*

According to the demographic data, the three villages have large areas that are potential as the community's natural capital. The large village areas can also be related with the cultural and traditional way of the Dayak Communities to utilize their land for shifting cultivation. According to the result of the social study, the shifting cultivation was also applying to the local communities in the study area as their main livelihood in the past.

Social baseline studies confirmed that shifting cultivation was once the main livelihood of the communities in the study area. However, along with the development of the social economic, the community has gradually left the shifting cultivation culture of food crops and rubber as the main source for livelihood to settled agriculture business. The community used their lands which have been cultivated in the past to set new agricultural crops consist of oil palm and rubber to earn money as their capital to fulfil their needs. The shift from traditional shifting cultivation to smallholder agricultural business was also supported by development of accessibility and economic in the area.

<sup>1</sup> DPPL PT MJSP was approved by the Regent Decree No. 514 Year 2009 on 30 September 2009.



The local community of the three villages are from the Dayak Sampit Ethnic. The Dayak Sampit is a sub-ethnic of the Dayak Ngaju. However, the Dayak Sampit is known to have changes in their cultural life from the Dayak Ngaju as they were more influenced by the religious teachings of Moslems. According to the history of the community, it is believed that the teaching of Moslem Religion has been adopted by the communities in the study area in three generations. It is also believed that the spread of the Moslem Religion was originated from Banjarmasin and reached the village areas by voyage from the Banjarmasin to Sampit River. Moreover, there are also members of the communities whom are settler from Banjar, Java, Sumatera, Sulawesi, Timor, and Flores.

In accordance with the influence of the Religious Teachings of Moslem, cultural values of the Dayak Sampit differ from the Dayak Ngaju. Baseline study in social cultural of the communities shows that there is no sites nor objects containing historical and cultural values as it is usually can be found in the other Dayak Ethnic (e.g. Tembawang, Pedukuhan, and forms of traditional ceremonies). Otherwise, site/object that has important historical and cultural values to the communities in the study area is a Tomb of Syeh Abdullah which is located at the Estuary of Budhing River.

Economic of the communities in the Mentaya Hilir Utara District depends on the agricultural sector. The main agricultural commodity in this region is oil palm and rubber. In addition to that, traditional slash and burn rice, logging, and rattan cultivation can still be found in partly-wise. Agricultural business supports the community's financial capital to fulfil their needs.

The Mentaya Hilir Utara District has its clean water distribution network which is managed by the PDAM. However, the network is not yet reach certain areas in the region. For the Bagendang Hulu Village, the clean water network has reached 86 households (20% of its total households) while for the other villages are not yet available. The communities whom have no access to the clean water network use the river, rain, and well as the sources of their clean water. In addition to there are also members of the communities who buy bottled water for the food and drink needs. Price of the bottled water is relatively affordable with a gallon of clean water is sold at price of Rp. 6,000.-.

Health facilities are available in the three villages. Each of the three villages has village midwife post (pondok bersalin desa) and branch health centre (puskesmas pembantu). All the health services centres in the three villages are integrals of the district health centre (puskesmas kecamatan) which is administratively located in the Bagendang Tengah Village but still accessible from the other two villages.

Educational facilities are accessible from the three villages. Each of the villages have two elementary schools. A junior high school is available in the Bagendang Hilir Village and the senior high school is available in the Sumber Makmur Village. The junior and senior high schools are accessible from the three villages by paved road.

Majority of the communities in the study area uses LPG for cooking while the others still use of firewood and kerosene. However, all of the sources of energy for cooking are obtained by the communities by buying. All of them are available in the shops in the village. In addition to that, electricity network is also available in 24 hours in the three villages. It is provided and managed by the PLN.

All the three villages are connected with the nearest major city, Sampit, by paved roads and river. Majority of the households in the three villages own a motor vehicle and some of them also own boat. In addition to that, there are also taxis travelling between Sampit and Kuala Pembuang via these three villages and car rentals. The Sampit City can be reached in around 1-hour travel on road and around 3 hours in river from the villages.

In order to ensure that the new development plan is respecting community rights (meet the FPIC principles), an FPIC verification was conducted on the company's land acquisition standard operational procedures and its implementation in the past for the developed area. The verification aims to identify compliance of the company's land acquisition procedure with the FPIC principles and to identify compliance of land acquisition process to its standard operational procedures.

The communities have acknowledged the presence and operation of the company. Accordingly, with the recommendations and agreements with the communities, company commits to set several areas aside from its plantation development. The set aside areas consist of (i) food security area for the villages in the region, (ii) another area for new development (expansion) of the food security, and (iii) area for community timber plantation. Other than that, the company also commits to develop oil palm plantation for the communities (20% of the company's nucleus plantation) and oil palm plantation for the village's incomes.

Meetings with the communities have been done since the time when the location permit was issued. The first meeting was held on 10 March 2005 to socialize company's license on its operational area. It was attended by the communities from the village around the concession and government service agencies of of Kotawaringin Timur Regency (forestry service/Dinas Kehutanan, agricultural service/Dinas Perkebunan, regional development plan agency/Bappeda, agency of cooperative/Dinas Koperasi, land use planning agency/Dinas Pertanahan, and other departments of the Kotawaringn Timur Region's secretariat). By the socialization, the parties acknowledged that the location permit was recommended for the operational area of the company. In addition, it was also acknowledged that part of the location permit is under production forest land use which at this time, has been developed into oil palm plantation.

The company also obtained recommendations from the Bagendang Tengah Village Government with Letter No. 09/II-7/URBANG/VII/2005 on 30 August 2005. The company was recommended to perform its operation in its operational area and to (i) provide compensation on lands where rights (ownership) and/or communities' land use occur based on the agreed compensation value/scheme, (ii) develop plantations for partnership scheme with the communities, with a total area of 20% if company's nucleus plantation, (iii) develop plantations for the villages incomes, and (iv) recruit the communities of the villages for its worker.

Besides the recommendations, there was also request from the communities to set aside an area of c.a. 500 ha which has been managed by a farmers group (kelompok tani) named Lancang Mandiri as land for food security and another c.a. 500 ha area for new expansion plan of the food security program. The company and the Lancang Mandiri have mapped the two requested areas and set the requested areas aside from the development plan.

Regarding with the area under production forest land use in its concession, the company commits to support development of communities' timber plantation (Further in this document will be referred to as hutan tanaman rakyat/HTR) in the production forest land use area within its concession. The commitment has also been agreed by the Ministry of Environment and Forestry through the Ministerial Decree No. 659/Menlhk/Setjen/PLA.2/8/2016 issued on 26 August 2016 regarding with land preservation for development of HTR in production forest land use (within the concession) in Kotawaringin Timur Regency with a total area of 3,509 ha. The company and the communities are now preparing the general work plan (Rencana Karya Umum) and the annual work plan (rencana kerja tahunan) for the management of the timber plantation.

Development plan of the HTR is divided into two stages. The first development is planned in the HTR area which has not been developed into oil palm plantation. The second development is planned in the HTR area which has been developed into oil palm after its production cycle ends (no replanting).

According to results of the verification, standard operational procedures of the land acquisition are in conformity with the FPIC principles. The standard operational procedure has a compensation scheme based on agreements between the land owners (person/family who have rights on their land) and the company. According to verification with the communities, who have had their land compensated, the land acquisition was done fairly. The company is open for any communication with land owners regarding with land acquisition (e.g. proposal to release land and claim of land ownership). Owners of the land were independently given their consent. Other than that, the communities also appreciate the company's commitments on the recommendations from the local governments and the requests from the communities.

Verification on land acquisition process shows that a total of 6,178.5 ha (at least 83% of the land in the company's concession) has been compensated through a Ganti Rugi Tanam Tumbuh compensation scheme. The land compensation scheme is carried out through a process which involves a proposal from the owner to release land or a claim of land ownership that is requested to be compensated, visit and measurement of the land in question, negotiation of compensation, and agreement.

### 3.2 Summary of Social Impact Assessment

Social impact assessment (further in this document will be referred to as SIA) on the company's operations was conducted on 11-20 November. The assessment aims to identify (i) social impacts (positive and negative), (ii) social risk, and (iii) social issues caused by the company's operations. The SIA was conducted as company's compliance to the RSPO principles and criteria. The SIA was conducted with document review, participatory observation, structured depth interview, and focused group discussion.

#### Following are summaries of the SIA:

Social impacts of the company's operation to the local communities are described using the aforementioned pentagon asset. The local's pentagon assesses affected by the company's operation is given in **Table 4**.

**Table 4. Social impact from the company's operation to the local communities**

Pentagon asset		Impact	Source of impact
Human Capital	Skills	(+) the locals would be able to learn palm farming and agriculture techniques	Recruiting and managing workers
	Education	(+) PT MJSP builds and subsidizes kindergarten education level and facilitates school transport for the children of the employees	Infrastructure development and workers management
	Health	(+) The company provides the state's health insurance program (BPJS) and builds a health clinic, which is managed by doctors and nurses.	Workers management and infrastructure development
Social Capital	Social interaction	(+) Local workers interact with non-local workers	Recruiting and managing workers
	Norms	(-) if the locals could not manage their finance properly	Land acquisition
Natural Capital	Land ownership	(-) Lost of land	Land acquisition
	Land utilization	Potentially (-) Areas that is the source for woods will be converted into a plantation	Land acquisition
	Vehicle ownership	(+) The number of car owners will increase	Land acquisition, workers recruitment, and business opportunities
	General infrastructure	(+) Improvement of road condition	CSR program
Financial Capital	Source of income	(+) New livelihood source from job openings at the company, rental services, and the increase of the locals' purchasing power.	Labor recruitment and partnership
	Savings	(+) Increase in saving is due to land compensation and the opportunity to work at the company and better business opportunities	Labor recruitment and partnership
	Credit access	No impact (o): the absence of partnership institution	Partnership



### Socio-economic impacts in respect of emergent communities

The company provides its employees with housings complete with electricity and running water, health services, child care centre, house of worship, and exercise venue. As such, employees of the company have better welfare than before they joined with the company.

### Issues raised by stakeholders and assessors' comments

Issues raised by stakeholders were mostly related to plantation development activities such as acquiring permit, recruiting and managing labors, and partnership. The study area is still having its status as permanent forest production area (HP) and convertible forest production area (HPK). About 3,509 hectares of permanent forest production area had been converted into social forest (HTR). Convertible forest production area is in the process of having its status revoked. Some interviewees still perceive that recruitment by the company on the locals is still less than expected. However, in reality, staffs recruited locally is about 88% of all total staffs and that local workers make up about 71.8% of all total workers. Many villagers are hoping to participate in partnership plantation as previously had been socialized.

### Management and monitoring plan

Management and monitoring plan aims to reduce and/or eliminate and mitigate negative impacts, social risk, and social issues from the new development and management activities. In addition, it is also designed to improve the positive impact and benefits to the social. The management plan recommended based on the SIA refers to principles of social justice; human rights; and sustainability of the environment.

**Table 5. Social impact from the company's operation to the local communities**

Topic	Management	Person in charge
Social and legal risks of the overlapping areas in the concession with IUPHHK-HTR (license for community's timber plantation) and the food security area Social issues regarding with prohibition of land clearing using fire	<ul style="list-style-type: none"> <li>Facilitate the development of the community's timber plantation within the concession as company's contribution to social economic improvement.</li> <li>Facilitate the development of the food security program by forming a food crop business management unit to meet food needs of the workers.</li> <li>Continue cooperation with the villages (communities and government) to control and mitigate land fire.</li> </ul>	Head of plantation, CSR unit, and special partnership unit
Increase labor recruitment from the local communities	<ul style="list-style-type: none"> <li>Continuing the new development plan (plantation expansion) in the operational area</li> </ul>	Head of plantation and plantation management unit
Potential negative impact from decrease of timber stock and prohibition of encroachment	<ul style="list-style-type: none"> <li>Develop the communities' partnership unit, especially which is involving the impacted parties.</li> <li>Engagement with stakeholders, especially units which are bordering with the operational area.</li> </ul>	Head of plantation, CSR unit, and special partnership unit

Topic	Management	Person in charge
Lack of communication with the stakeholders and integration with the local development plan regarding with company's contribution to social development	<ul style="list-style-type: none"> <li>Integrate all of the activities related with social contribution into the main corporate social management plan. That includes the management of local supplier and contractor part of the social economic development.</li> </ul>	Head of plantation
	<ul style="list-style-type: none"> <li>Align the main social management plan with the company's social mission. For example: workshops attended by the management unit and key stakeholders (internal and external)</li> </ul>	Plantation management unit
	<ul style="list-style-type: none"> <li>Socialize contributions from the company and the partnership unit to the regional development, especially to the local communities, local government, villages, and the district.</li> </ul>	Management unit
	<ul style="list-style-type: none"> <li>Be involved in the forum of regional development plan, in order to be effectively involved in the regional development.</li> </ul>	Plantation management unit
	<ul style="list-style-type: none"> <li>Mitigation of the negative social impact and social risk and improvement of the positive social impact of the company.</li> </ul>	Plantation management unit
Inchoate of the SOPs	<ul style="list-style-type: none"> <li>Preparation, supplementation, endorsement, and implementation of the SOPs.</li> </ul>	Head of plantation
SOPs and documentations are not yet well organized, causing obstacles in certification process	<ul style="list-style-type: none"> <li>Endorsement the SOPs and improvement of the documentation system which referring to the main company's standard and RSPO standard.</li> </ul>	Plantation management unit
	<ul style="list-style-type: none"> <li>Gap assessment on company's situation to the RSPO standard.</li> </ul>	
	<ul style="list-style-type: none"> <li>Integration of all documents related with RSPO standard in the estate level to the top management level.</li> </ul>	
	<ul style="list-style-type: none"> <li>Complete the list of stakeholders in the oil palm industry.</li> </ul>	
Housings and supporting facilities which has not meet the sanitation standard, water supplies standard, and waste management standard; which	<ul style="list-style-type: none"> <li>Establish and implement sanitation and waste management standards.</li> </ul>	Plantation management unit
	<ul style="list-style-type: none"> <li>Improve the sanitation system.</li> </ul>	
	<ul style="list-style-type: none"> <li>Control and manage the quality of the workers housings.</li> </ul>	

Topic	Management	Person in charge
are effect on the workers productivity.	<ul style="list-style-type: none"> <li>Continue the workers housing development accordingly with the standards, equipped with water supplies and electricity.</li> </ul>	
Workers which are not yet equipped with personal protective equipment, causing risk of accidents and problems in production activity.	<ul style="list-style-type: none"> <li>Providence of personal protective equipment with sufficient quantities.</li> </ul>	Head of plantation and plantation management unit
	<ul style="list-style-type: none"> <li>Encouraging the importance of personal protection equipment and occupational health and safety</li> </ul>	
The company don't yet have cooperation organization	<ul style="list-style-type: none"> <li>Facilitation of the workers organization (cooperation organization)</li> </ul>	Head of plantation
The company don't yet have labor union organization	<ul style="list-style-type: none"> <li>Facilitate development of labor union organization in order to improve the worker's welfare.</li> </ul>	Plantation management unit
	<ul style="list-style-type: none"> <li>Increase the frequencies of meetings and communication with the workers.</li> </ul>	

Along with the implementation of the management plan, the company is recommended to group the components of the management plan into three programs. The programs is planned to be implemented in time period between 2017 and 2019. The three programs are as follows:

**1. Preparation of general plan of social management**

- Preparation of the general social management in accordance with the standard social management of the KLK Group. It includes CSR and partnership programs, labour management and its social environment. The plan is referring to the principles of social justice; human rights; and sustainability of the environmet.
- Programs of consolidation of the licensed area and operations.

**2. Preparation of social management in the surroundings area. The main strategy of this program is to strengthen the relationship (partnership) with the communities as part of the CSR.**

- Establishment of positive relation with stakeholders
- Participation to social development
- Parnership program and facilitation of the development of community's timber plantation.
- Parnership program and facilitation of the development of community's food security area through a crop business management unit.

**3. Preparation of social management plan in labour and residents in housings in the company's operational area. The strategy of this program is to improve the professionalism and welfare of the labour and management.**

- Coaching of communication and social relation involving all of the labour and housings residents
- Improvement of the labour's and management's welfares
- Improvement of the labour's and managemengt's professionalism

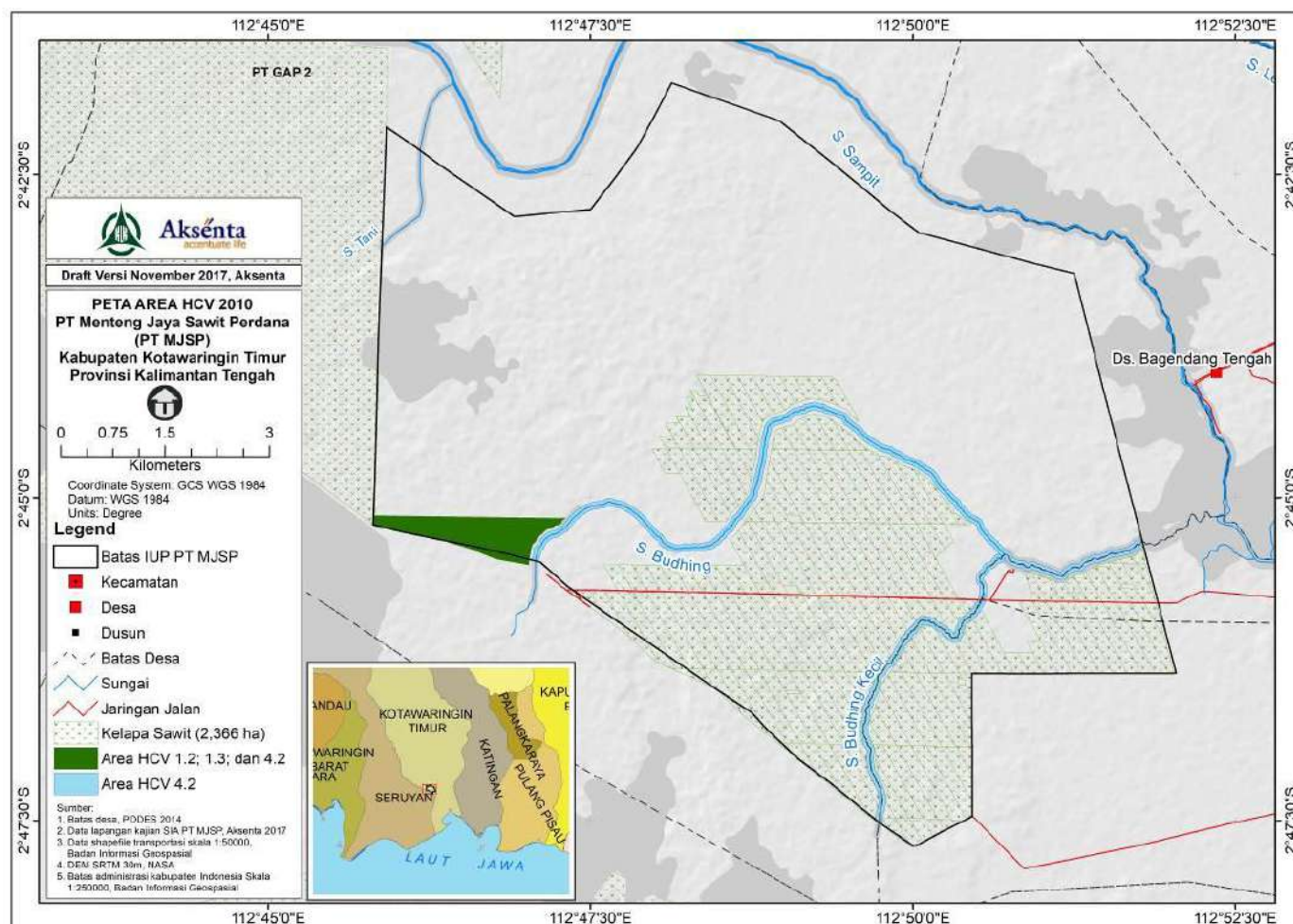
Monitoring aims to evaluate the implementation of the management plan, achievement of the targets, and effectivity of the implemmmentations regarding with the available resources. Outputs of the monitoring would be used to adjust the management plan for the next implementations. Monitoring will be conducted in participatory involving beneficiaries of the programs, which is the communities. Monitoring would be conducted periodically along the implementation of the management plan as part of it.



## 4. High Conservation Value assessment

### 4.1 Table summary of HCVs present and link to public summary report

HCV areas identified by Jump Consulting in year 2010 contained HCV 1 and HCV 4 (**Figure 7**). Key elements of HCV coincided in Budhing River and its riverbank, which includes forest fragment in the upstream of Budhing River. Total size of HCV area in year 2010 as identified by Jump Consulting was 143.0 ha (**Table 6**).



**Figure 7. Map of indicative HCV areas from year 2010 assessment**

**Table 6. Size of HCV indicative area in year 2010**

HCV	Location	Size (Ha)
<b>HCV 1</b>		
HCV 1.1	-	0
HCV 1.2	Upstream of Budhing River ( <i>enclave</i> )	143
HCV 1.3	Upstream of Budhing River ( <i>enclave</i> )	143
HCV 1.4	-	0
<b>HCV 2</b>		
HCV 2.1	-	0

HCV	Location	Size (Ha)
HCV 2.2	-	0
HCV 2.3	-	0
<b>HCV 3</b>	-	0
<b>HCV 4</b>		
HCV 4.1	-	0
HCV 4.2	Upstream of Budhing River (enclave)	143
HCV 4.3	-	0
<b>HCV 5</b>	-	0
<b>HCV 6</b>	-	0

All HCV areas identified in year 2010 could still be found during field verification in November 2017. The company had preserved buffer zones of Budhing River, Budhing Kiri River, and upstream of Budhing River as HCV area. In HCV Identification report published in 2010, there were no explicit statements stating the widths that must be preserved in both of those rivers. Nevertheless, the company preserved around 50 m in width for Budhing Kiri River and 100 m for Budhing River.

In the span of time between 2010 and 2017, land cover in HCV areas has undergone some changes. Land cover in upstream of Budhing River and some parts of buffer zone of Budhing River had degraded in quality. The land cover that was previously secondary forest and old shrubs had become shrubs or young shrubs. The degradation was caused by land fires occurring in year 2015 and log exploitation by the locals. Meanwhile, land cover in buffer zone of Budhing Kiri River had improved from bushes into young shrubs.

HCV areas review and update assessment identifies the presence of HCV 1, HCV 3, and HCV 4; whereas, HCV 2, HCV 5, and HCV 6 are found to be absence in the study area. Total size of HCV indicative area found in 2017 is 410.8 ha (**Table 6**). Map showing the identified HCV areas in 2017 is given by **Figure 8**.

The decision on the absence of HCV 2 in the study area is based on the absence of natural vegetation, the absence of corridor connecting the study area with important areas outside of the study area, and the fact that the study area is relatively near to settlements ( $\pm 4.7$  km) and is surrounded by palm plantations.

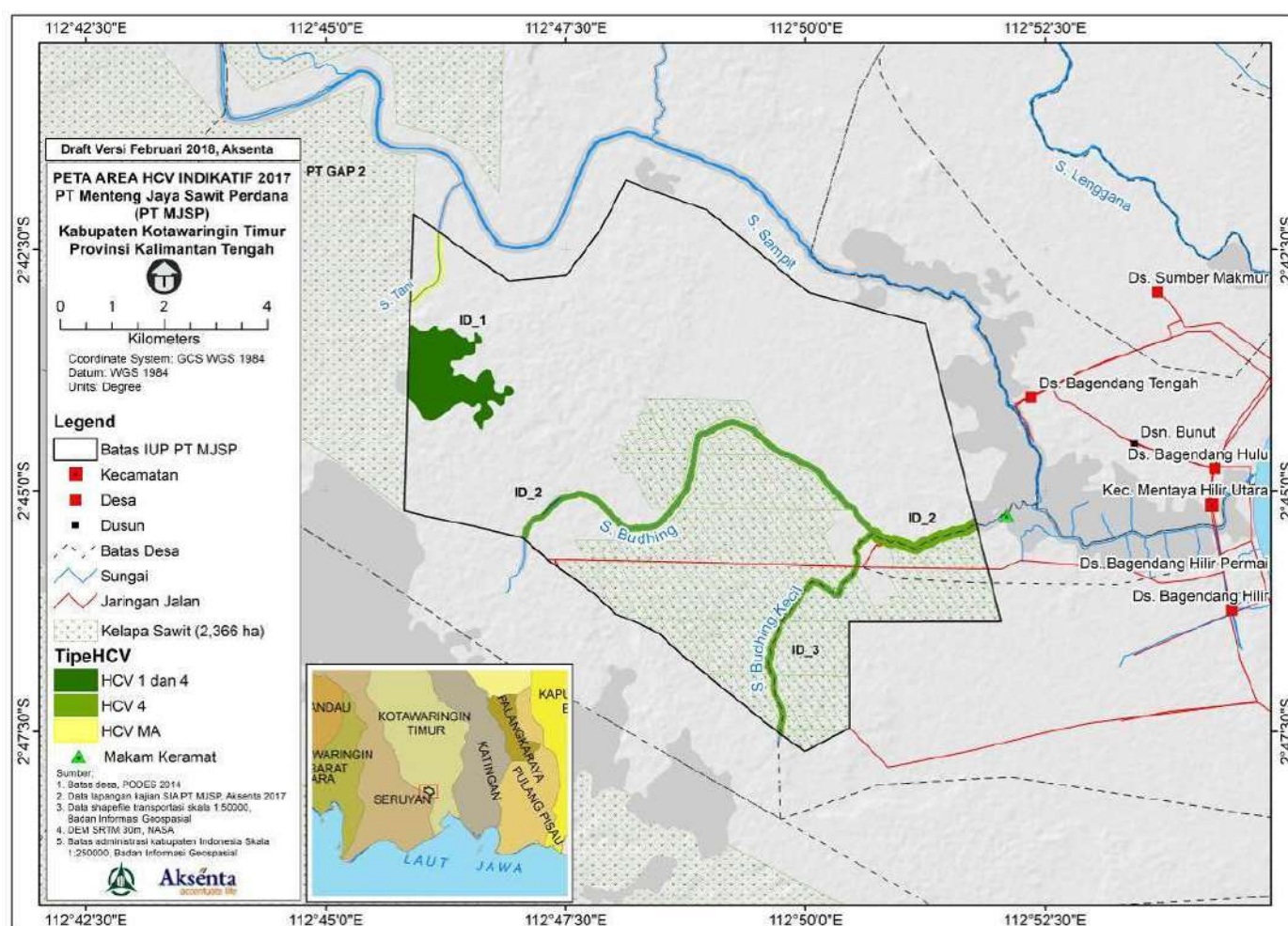
The decision on the absence of HCV 5 in the study area is due to the presence of basic infrastructures, the capability of the locals in accumulating wealth from various sources, the fact that the locals are no longer extract necessities from nature, and the fact that the study area is a brown field.

The absence of HCV 6 in the study area is due to the fact that more than 95% of the locals are practicing Islam, thus they have abandoned their ancestors' belief, and the absence of sacred burial ground.

**Table 7. Size of HCV area in the study area**

ID	Location	HCV type in 2010	Size of HCV in 2010 (ha)*	HCV type in 2017	Size of HCV in 2017 (ha)*	Description
<b>ID_1</b>	Peat swamp forest.	-	-	HCV 1, 3, and 4	209.4	Additional HCV areas are degraded peat swamp forest that was not identified in 2010
<b>ID_2</b>	Buffer zone of Budhing River		118.417	HCV 4	128.4	Size of buffer zone area of Budhing River was not stated in 2010 assessment and included in the HCV table. However, in the discussion on HCV 4 findings, it was stated that buffer zone of Budhing River was around 50 m.
	Buffer zone of Budhing River (old shrubs)	-		HCV 1 and 4	2.4	
	Water body of Budhing River	-		HCV 1 and 4	6.6	
<b>ID_3</b>	Buffer zone of Budhing Kecil River		55.2758	HCV 4	61.6	Size of buffer zone area of Budhing River was not stated in 2010 assessment and included in the HCV table. However, in the discussion on HCV 4 findings, it was stated that buffer zone of Budhing River was around 50 m.
	Water body of Budhing Kecil River	-		HCV 1 and 4	2.2	
<b>MA</b>	Water body of Tani River	-		HCV MA	0.5	Not identified in 2010 HCV assessment. Newly identified area is due to the modified river shape.
	Buffer zone of Tani River	-		HCV MA	15.8	
-	Enclave in upstream of Budhing River	1.2; 1.3 and 4.2	100.8	HCV 1 and 4	-	Loss of HCV is due to the difference between the size written in the report and the size in shapefile. In HCV area review and update assessment, peat swamp forest situated in the upstream of Budhing River has been degraded.
<b>Size of HCV area</b>			274.5		410.8	
<b>Size of operational area</b>			7442.8		7442.8	
<b>%HCV to operational area</b>			3.7%		5.5%	
<b>HCV MA</b>			-		16.3	

\* Based on GIS calculation



**Figure 8. Map of HCV indicative area based on review and update assessment in 2017**

Stakeholder consultation regarding review and update of HCV area was conducted on Wednesday, January 31, 2018. **Table 8** below provides summary of inputs from the participants.

**Table 8. Inputs from stakeholder consultation**

Name	Title/ Role	Organization/social ground	Main concern and recommendation/team's response
Abdurrahman Hakim	Head	KKPH	<ul style="list-style-type: none"> <li>Spatial border of HCV area is necessary</li> <li>Preserving buffer zone/riverbank is already available in RKU draft for social forest expansion and hope to be in-line with the presence of HCV area resulted from this assessment.</li> </ul> <p>Team response:</p> <ul style="list-style-type: none"> <li>The input is in accordance with the team's recommendation on conducting delineation and demarking HCV area.</li> </ul>
Ichlas	Head of	Agriculture Agency	<ul style="list-style-type: none"> <li>There exists Governor's Regulation number 41 year 2014</li> </ul>

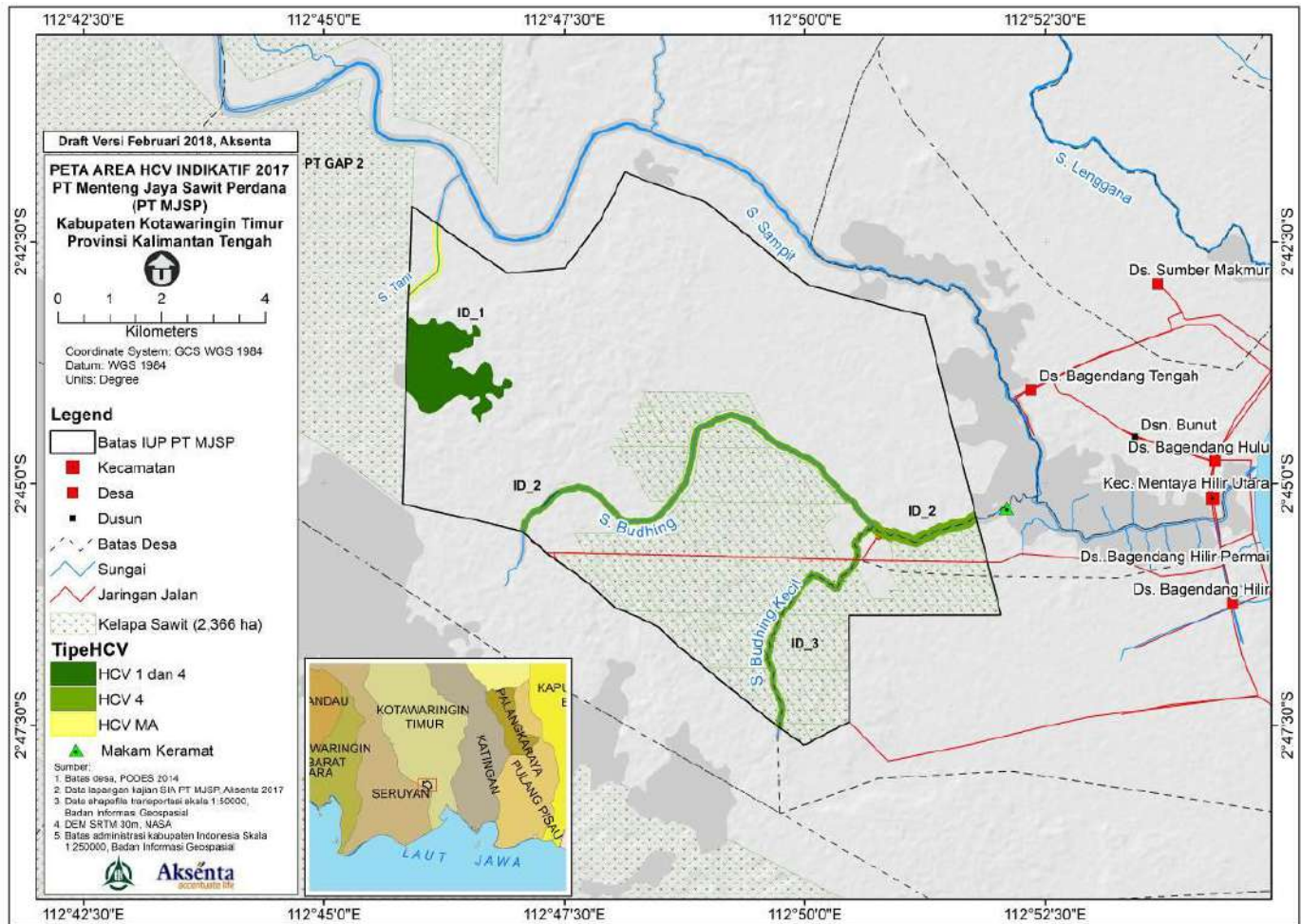


Name	Title/ Role	Organization/social ground	Main concern and recommendation/team's response
Semesta	plantation division	of Kotawaringin Timur Regency	<p>(Pergub No 41 tahun 2014) regarding managing HCV area in plantation area. The company is expected to make regular report regarding managing and monitoring of HCV areas. The report can be submitted to Agriculture Agency in conjunction with plantation operation expansion.</p> <ul style="list-style-type: none"> <li>• What kind of river management has been conducted? Preserving buffer zone is expected to follow the rule, which would be 100 m of big rivers and 50 m for small rivers.</li> <li>• What is the recommended quantity of dams in ditches of peat land? Is one dam required for each block?</li> <li>• What is the best proportion of HCV area to the size of concession area? In other companies, HCV area could reach thousands of hectares. Is there standard minimum on the size of HCV area?</li> </ul> <p>Team response:</p> <ul style="list-style-type: none"> <li>- The company has preserved buffer zone of river in accordance with the regulation.</li> <li>- Technically, water surface height in ditches of peat land must be maintained at 50 to 80 cm. Generally, one dam for each block is sufficient, but requires deeper assessment regarding water management in peat land.</li> <li>- Width of buffer zone for HCV area is assessed based on its function, thus the size to be preserved is not fixed at 50 m or 100 m. Nevertheless, this assessment does not reduce the company's responsibility to obey the existing regulations.</li> <li>- There is standard minimum on the proportion of HCV area. HCV area identification is conducted based on the presence or absence important values during assessment.</li> </ul>
Junaidi	-	BKSDA of Kotawaringin Timur Regency	<ul style="list-style-type: none"> <li>• The company is expected to make report continuously, especially report on flora and fauna monitoring.</li> </ul> <p>Team response:</p> <ul style="list-style-type: none"> <li>- Proposal will be recommended to the company.</li> </ul>
Ade Suharso	Country Manager	Orangutan Foundation – UK	<ul style="list-style-type: none"> <li>• The company has cooperated with OF-UK regarding orangutan management, which includes relocation conducted in year 2017.</li> <li>• Nest survey currently is the approach conducted to survey individual orangutan.</li> <li>• Map of orangutan distribution from year 2016 should be used as a reference in this assessment.</li> </ul>

Name	Title/ Role	Organization/social ground	Main concern and recommendation/team's response
			<ul style="list-style-type: none"> <li>• Regarding fires management, the company is hoped to make land dryness index or fire danger index.</li> <li>• Should explain how open accessibility factor becomes an indicator on the absence of HCV 5. Open access should be one of the threats, thus HCV area must be preserved</li> </ul> <p>Team response:</p> <ul style="list-style-type: none"> <li>- The company has installed information board regarding fire danger index.</li> <li>- Open access is an indication that the locals' dependency in utilizing natural resources for necessities is relatively low. Therefore, the potential presence of HCV 5 area is also relatively low. However, such parameter may not necessarily in-effect for other HCV types.</li> </ul>
Khilmi Zuhromi	Instructor	STIKIP Muhammadiyah Sampit	<ul style="list-style-type: none"> <li>• Would building a dam in peat land could simply utilize wood materials?</li> <li>• Ideally, HCV assessment is conducted prior to actual operation. What kind of method is used by Aksenta's Team in order to know the locals' old way of live prior to the presence of the company's operation?</li> </ul> <p>Team response:</p> <ul style="list-style-type: none"> <li>- Material for dams can utilize the readily available materials or relatively easy to be acquired and can be adjusted accordingly to water surface height. For instance, during peak rainy season, height of dam in areas with flooding potential must be lowered, so that planting area will not be submerge in water.</li> <li>- Method conducted is triangulation from in-depth interview with cultural figure and community figure.</li> </ul>
Agus Priadi	Village Secretary	Bagendang Tengah village	<ul style="list-style-type: none"> <li>• There have been reports by the locals whom have seen orangutan within the company's concession area in the last two months. What must be conducted by the locals or village officials when such sighting later occurs?</li> </ul> <p>Team response:</p> <ul style="list-style-type: none"> <li>- Communicate with the company and coordinate with the local government (districts, police sector, and military sector base) and BKSDA.</li> </ul>

### Elements to be included in the HCV management and monitoring activities

HCV Management and monitoring object consists of two things. First is the area or location and second is the element. HCV management area is given by **Figure 9**. The map is HCV map that has gone through delineation processes by the company, verification by Aksenta, and endorsement by the company. HCV management and monitoring elements are given in **Table 8**.



**Table 9. HCV Management according to elements and size**

No_ID	HCV location	HCV type	HCV size (ha)	Description
ID_1	Peat swamp shrubs.	HCV 1, 3, dan 4	209.4	Degraded peat swamp shrubs
ID_2	Riverbank of Budhing River	HCV 4	128.4	Around 50 m of Budhing River's riverbank.
	Riverbank of Budhing River (Shrubs)	HCV 1 dan 4	2.4	
	Water body of Budhing River	HCV 1 dan 4	6.6	
ID_3	Riverbank of Budhing Kecil River	HCV 4	61.6	Around 50 m of Budhing River's riverbank.
	Water body of Budhing Kecil River	HCV 1 dan 4	2.2	
MA	Water body of Tani River	HCV MA	0.5	River has been modified
	Riverbank of Tani River	HCV MA	15.8	
-	Enclave at upstream of Budhing River	HCV 1 dan 4	-	Upstream of Budhing River has degraded land cover, which is peat swamp shrubs.
<b>Size of HCV area</b>			410.8	
<b>Size of operational area</b>			7442.8	
<b>%HCV area size to operational area</b>			5.5%	
<b>HCV MA</b>			16.3	

Identified threats to HCV resulted from HCV Review and Update are:

1. Land fire – Based on hotspot data from 2010 to 2017, land fires that occurred in 2015 had severely damaged HCV areas endorsed in year 2010. Land fire has a high intensity of occurrence.
2. Infrastructure construction – Available road constructed by the company has enabled many of the locals to cut down existing trees in the concession area. Such activities have high intensity in the concession area.
3. Land clearing and land preparation and planting that are not in accordance with Good Agriculture Practices – the company has implemented GAP in every land clearing and land preparation.
4. Illegal logging and wood utilization by the locals – Due to strict law enforcement, the intensity of those activities is low.

Monitoring will be focused on evaluating achievement on every target or indicator of program/activity. Monitoring will be conducted periodically. HCV Management and Monitoring Plans provides details on HCV management and monitoring activity plans in the concession area.

## 5. Environmental Impact Assessment

### 5.1 Summary table of key EIA findings

Environmental impact assessment was conducted as a mandatory assessment on Decree of Kotawaringin Timur Regent No. 514 year 2009 documented as Dokumen Pengelolaan dan Pemantauan Lingkungan/DPPL (Document of Environment Management and Monitoring). The document consists of four chapters, namely (i) Introduction, (ii) Scope of the study, (iii) Evaluation of the on-going operation and future operation, and (iv) Environment management and monitoring plans.

The introduction chapter elaborates profile of the company and backgrounds of the assessment. The second chapter elaborates description of the on-going operations including the main and supporting activities, stages of operations (development and management of the plantation), on-going environment management and monitoring, other activities occurred around the concession, environmental components, biological components, and economic, social, and cultural components. The third chapter elaborates environmental impact occurs and evaluation on the impact. The fourth chapter elaborates environment management and monitoring plan.

In the development plan, certain conditions are identified as explained below:

1. According to a data set between 2001 and 2007, annual rainfall in the study area ranges between 96.9-463.0 mm, with average of 269.9 mm.
2. Relative humidity in the study area ranges between 75% and 88%.
3. According to results of observation on secondary data, concentration of dust (PM10), SO<sub>2</sub>, CO, NO<sub>2</sub>, and O<sub>3</sub> in the study area are still below the standard threshold as it is regulated in the Government Regulation No. 41 Year 1999 regarding with control on air pollution.
4. According to the Standard Index of Air Pollution (Indeks Standar Pencemaran Udara/ISPU), the concentration of PM10 in the study area is categorized in Scale 4, which is in Good Category.
5. According to analysis on noise intensity from heavy equipment, electricity generator, and vehicles, the noise intensity in the study area is below the standard threshold as required by in the regulations.
6. According to results of laboratory observation, soil texture in the study area is dominated by dust, clay, and sand.
7. Soil structure in the study area categorized as crumbly (remah), according to sample test within 1-20 cm depth. It is caused by the land cover in the study area that is in relatively good condition.
8. Result of observation shows that the soil chemical properties in the study area is categorized in Scale 2, which means low.
9. Estimation of soil erosion shows that the average amount of soil erosion in the study area is 35/6 ton/ha/year. According to the Government Regulation No. 150 year 2000, the average amount of soil erosion in the study area is categorized in scale 2 (low).
10. According to the pollution index, water quality in the Budhing River, which across the study area, is categorized in scale 5 (meet the quality standard).
11. According to result of assessment, quality of the ground water in the study area is categorized in Scale 4 (good quality).

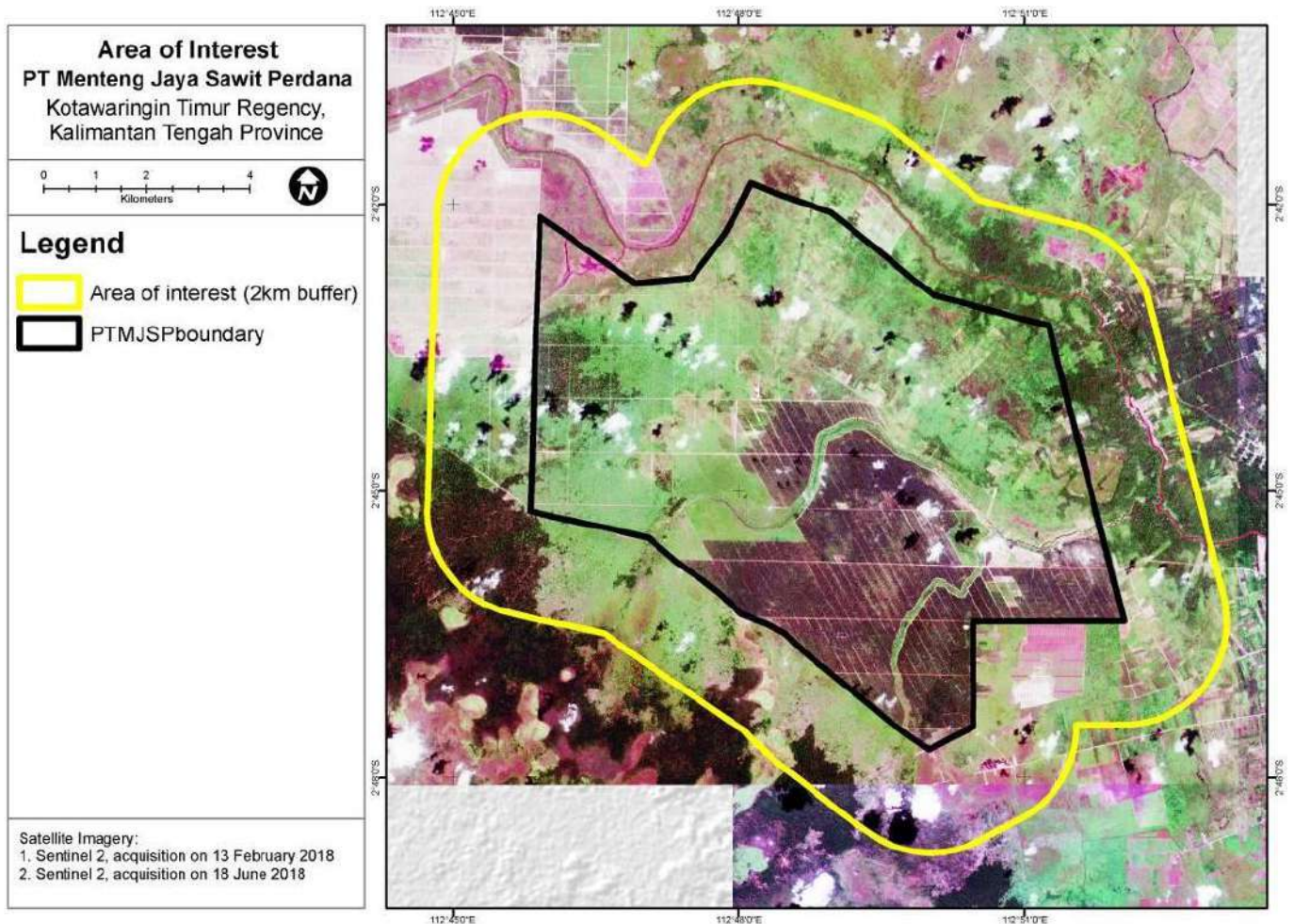
According the elaborations in the DPPL, operations in the concession has certain impacts to the environmental components, however, environment management and monitoring would be continuously implemented to control and minimize the impacts.



## 6. Land cover image analysis

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

Land cover analysis was conducted in the company's concession and its surrounding area within a buffer of 2 km. The surrounding buffer of 2 km is considered sufficient as the AOI as it covers the extent of forested (HCS) areas outside the company's concession. Moreover, the buffer also covers 5 km distance between the forested areas outside concession as it will be analysed in the Patch Analysis Decision Tree Step 12 to identify provision of potential forest linkage (corridor) in the wider/landscape context of the study area.



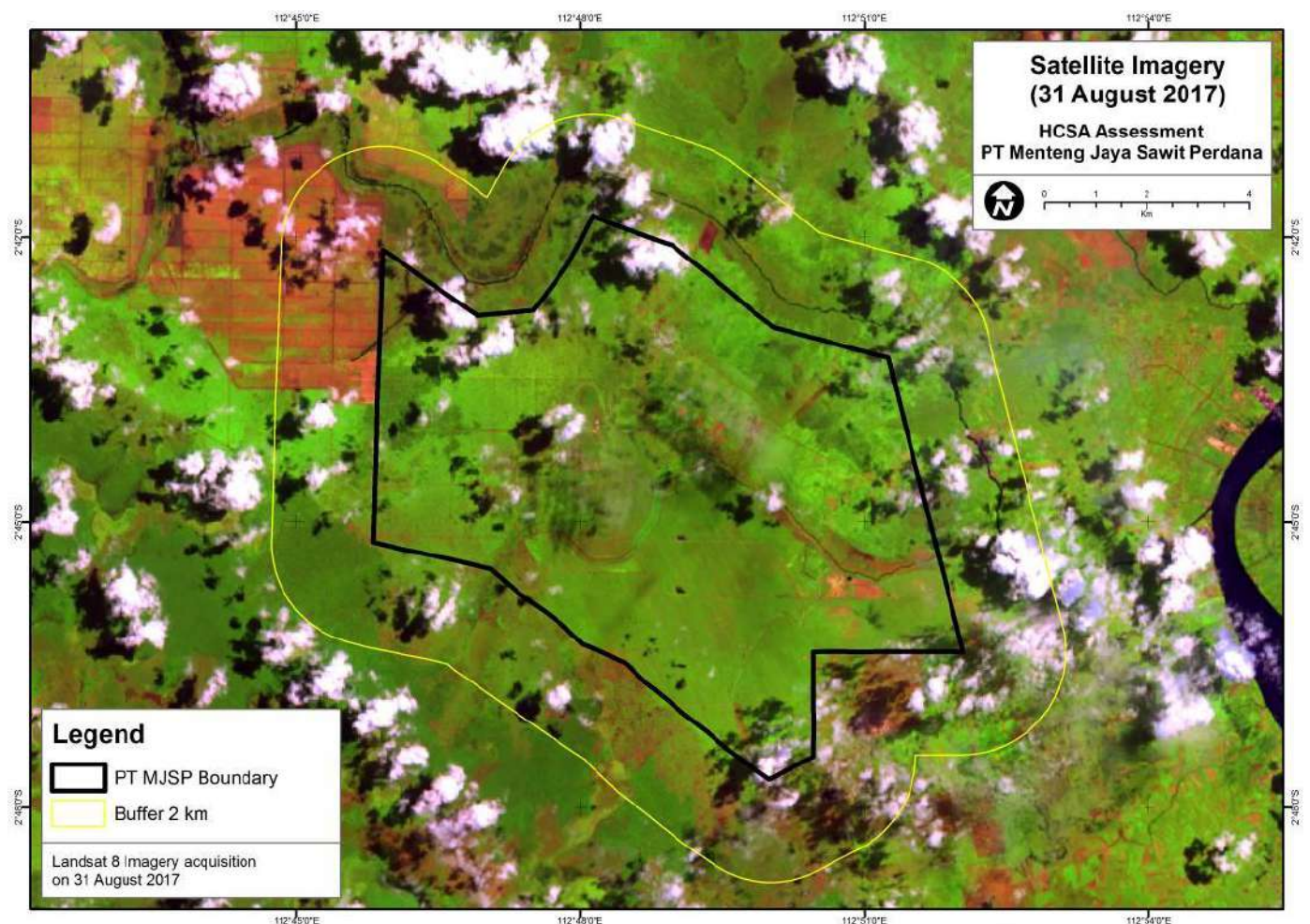
**Figure 10. Area of interest in the assessment**

## 6.2 Description of images used for classification

Land cover classification in the assessment was based a set of satellite imagery, (i) Landsat 8 satellite imagery acquisition on 31 August 2017 was used as reference in the pre-assessment step, (ii) Sentinel 2 imagery acquisition on 13 February 2018 supplemented with (iii) Sentinel 2imagery acquisition on 18 June 2018 to cover the whole AOI. The Landsat imagery has approximately 30% cloud cover, while the Sentinel 2 has less than 10%. Therefore, image correction (i.e. cloud masking) is considered not necessary.

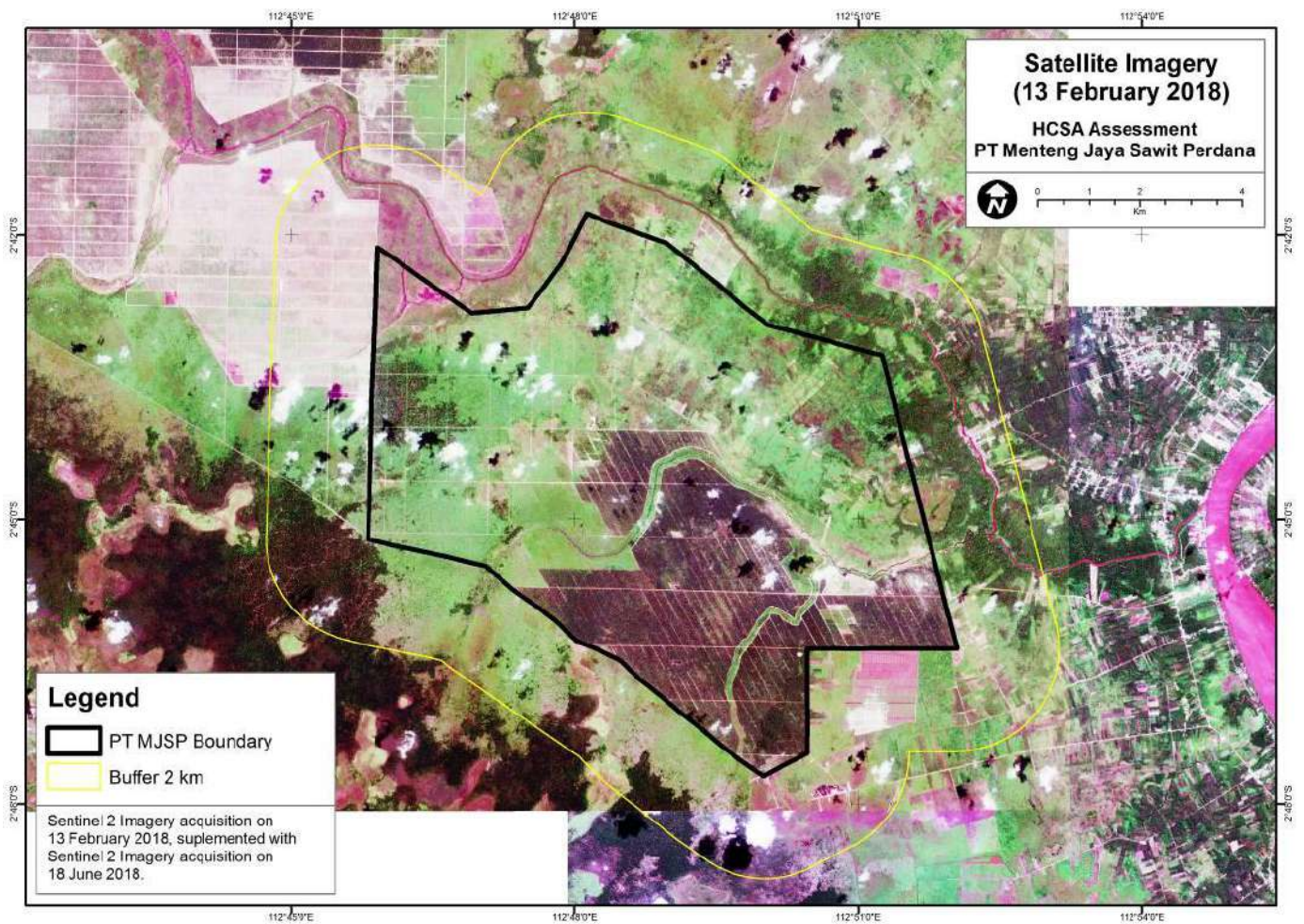
Image preparation was using ArcMap Software. The preparation for the Landsat 8 Imagery involves a composite process of band 6, 5, 2 and for the Sentinel 2 Imagery involves a composite process of band 11, 8, 4.

## 6.3 Sample image



**Figure 11. Landsat 8 satellite imagery acquisition on 31 August 2017**



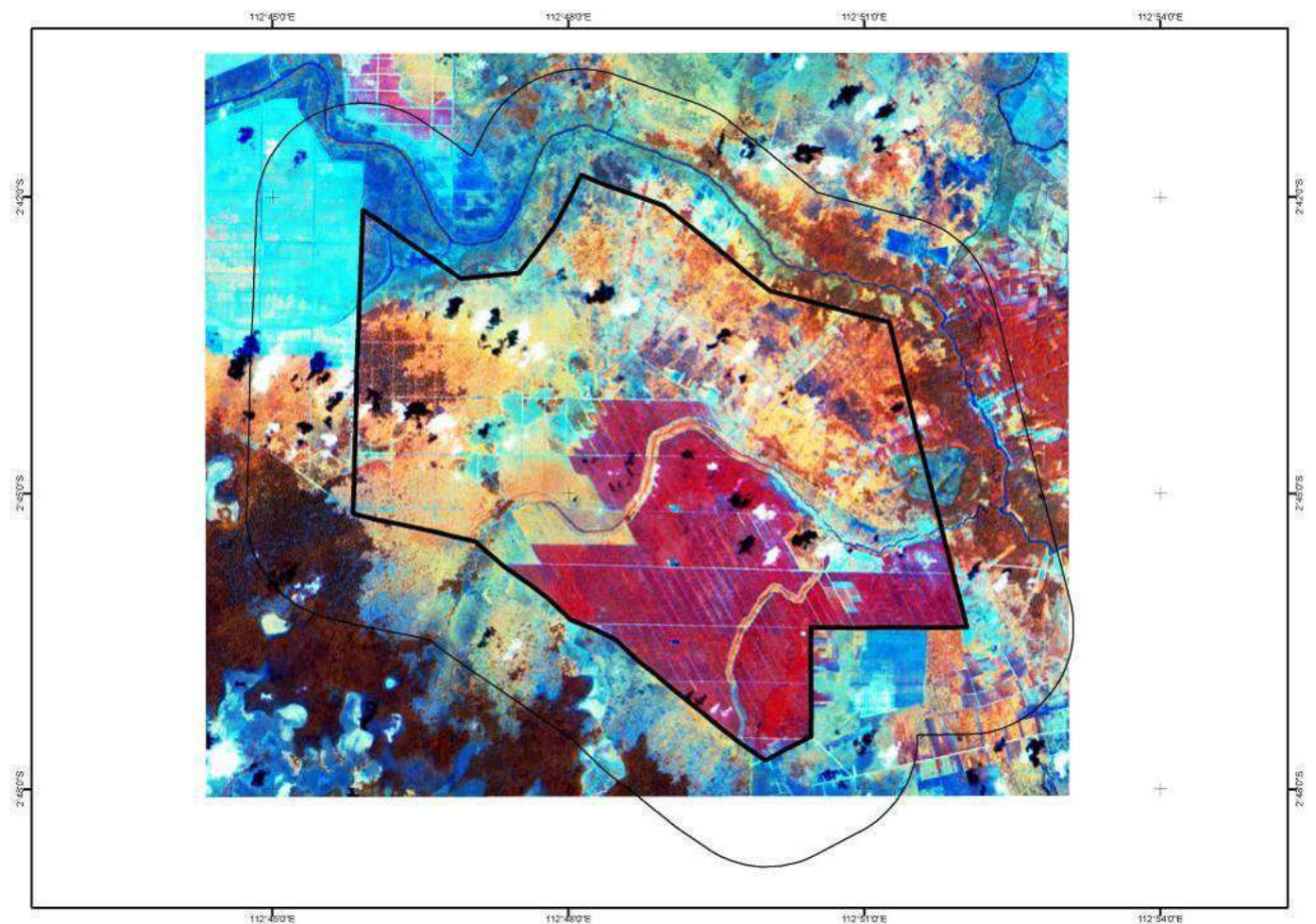


**Figure 12. Sentinel 2 imagery acquisition on 13 February 2018 (supplemented with Sentinel 2 imagery acquisition on 18 June 2018)**

## 6.4 Method of stratification and software used

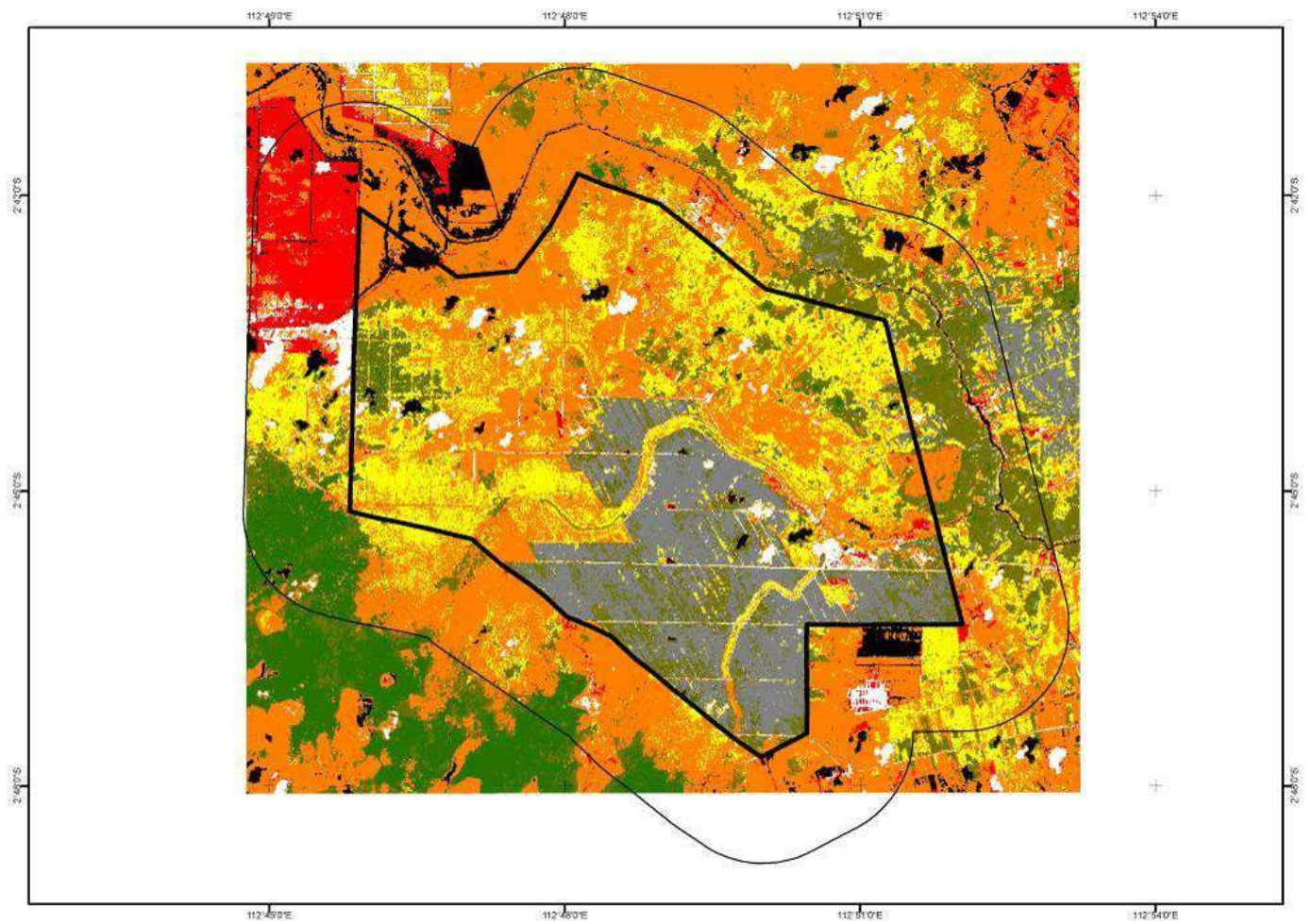
Image classification was conducted in two stage, the first stage was initial classification on the Landsat 8 imagery based on visual classification. The initial classification was used as basis of field verification and forest inventory.

The second stage was land cover reclassification based on field survey data and satellite imagery with higher quality. Image based reclassification was conducted on vegetation analysis-band combination of Sentinel 2 imagery with unsupervised classification. The classification then was verified with data from the forest inventory.



**Figure 13. Vegetation analysis band combination of Sentinel 2 imagery**





**Figure 14. Unsupervised classification on vegetation analysis band combination of Sentinel 2 imagery**



## 7. Forest inventory results

### 7.1 Inventory sample design and plot rational

Forest inventory sample plot was distributed purposively based on visual observation of the land cover in the field. The determination of location for sampling followed key criteria which are representing the characteristics of each land cover class. The criteria include (i) condition of the vegetation, density of the trees, avoidance of access and human activity (applies only for sampling in the forested area), and avoidance of ecotone area.

Each of the criteria used in the determination of sampling location is related with the characteristic of each land cover class. In practical terms, for forested area, sampling plot was located in particular area where the visual observation shows that the area is most accurately representing the characteristic as forest and not affected by any factors that would cause bias, such as association with pioneer species as can be found in forest edge (ecotone) and in moderately-severely degraded forest. For non-forested areas, sampling was obviously located in areas where forest cover is absence.

It is acknowledged that the purposive distribution of the sampling location has significant potential of subjectivity, while systematic sampling is considered more independent to such factor. However, the criteria followed for the determination is quite clear that the sampling was intended to avoid bias of the data. Moreover, results of the forest inventory show that the data distribution of each class is independent to each other. There is no data distribution of a land cover class that intersects with the data distribution of the other class.

## 7.2 Map indicating plots

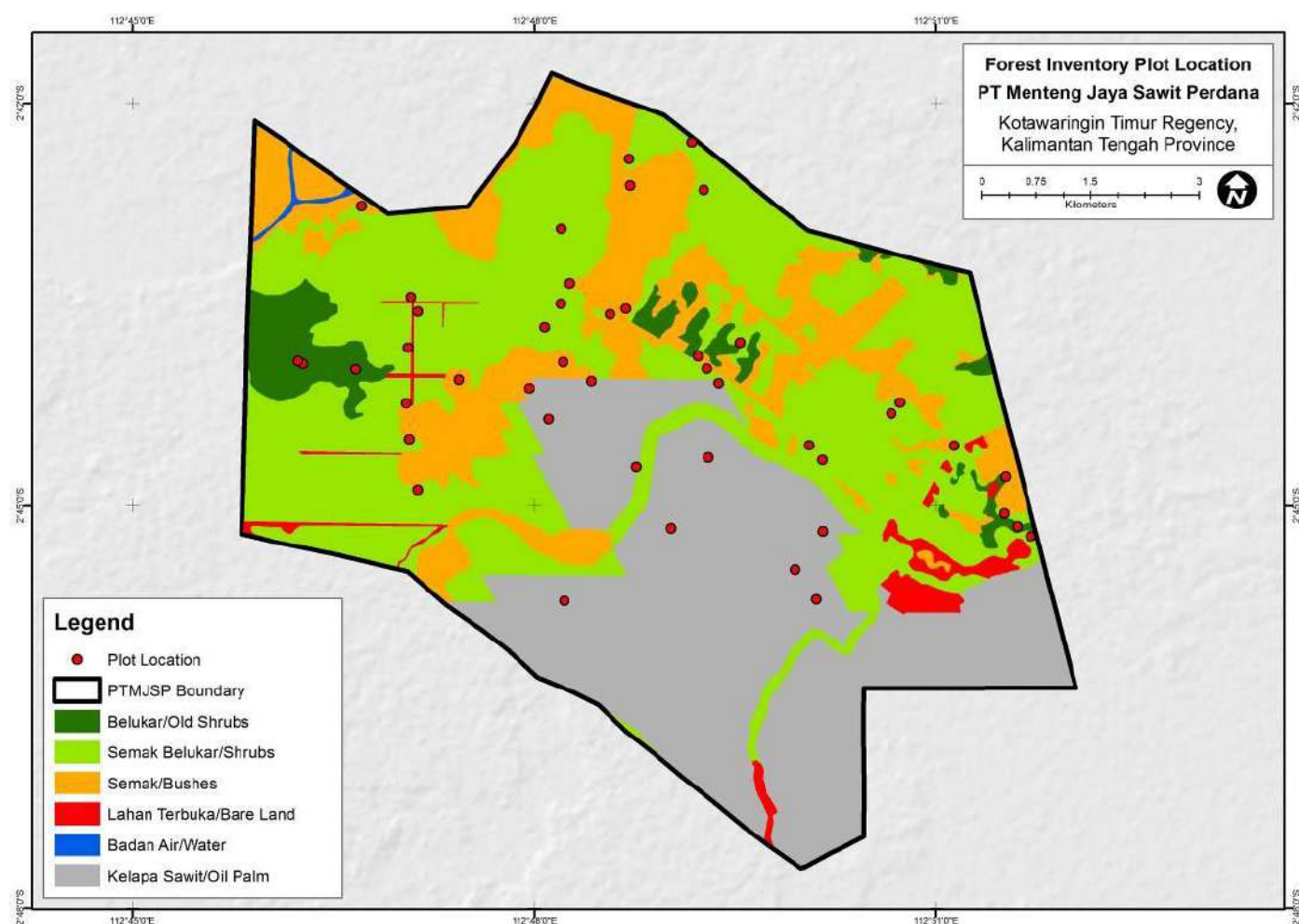


Figure 15. Location of sampling plots

### 7.3 Forest Inventory Team

**M. Fakhrul** – A bachelor from the Department of Geophysics and Meteorology, Faculty of Mathematics and Natural Sciences, Bogor Agricultural University. Expert in agro-climatology, spatial analysis and remote sensing, and land cover carbon estimation. Experienced in carbon studies related with oil palm plantation new development plan and land use change analysis in the certification scheme for oil palm plantation (i.e. RSPO NPP) in Indonesia and Malaysia. In the forest inventory, he was involved in tree measurement, biomass and carbon analysis, and mapping.

**Tengku Haikal** – A bachelor from the Department of Geophysics and Meteorology, Faculty of Mathematics and Natural Sciences, Bogor Agricultural University. Expert in spatial analysis and remote sensing, and land cover biomass carbon studies. Experienced in carbon studies related with oil palm plantation new development plan and land use change analysis in the certification scheme for oil palm plantation (i.e. RSPO NPP) in Indonesia. In the forest inventory, he was involved in tree measurement, biomass and carbon analysis, and mapping.

**Rahmat Darmawan** – A bachelor from the Department Forest Management, Faculty of Forestry, Bogor Agricultural University. Expert in forest ecology, forest inventory, vegetation analysis, and carbon studies. In relation with carbon studies for oil palm plantation development, he specializes in conducting plant identification and ecological analysis. In the forest inventory, he was involved in tree measurement, plant identification, and ecological vegetation analysis.

**Nurani Hardikananda** – A bachelor from the Department Forest Management, Faculty of Forestry, Bogor Agricultural University. Expert in forest ecology, forest inventory, vegetation analysis, carbon studies, and biodiversity studies. In the forest inventory, he was involved in tree measurement, plant identification, and ecological vegetation analysis.

### 7.4 Methodology used for forest sampling

Nested square plots sampling was used in the forest inventory. Though it is different with the suggested sampling plot in the HCS Approach Toolkit, 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 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 sub-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.

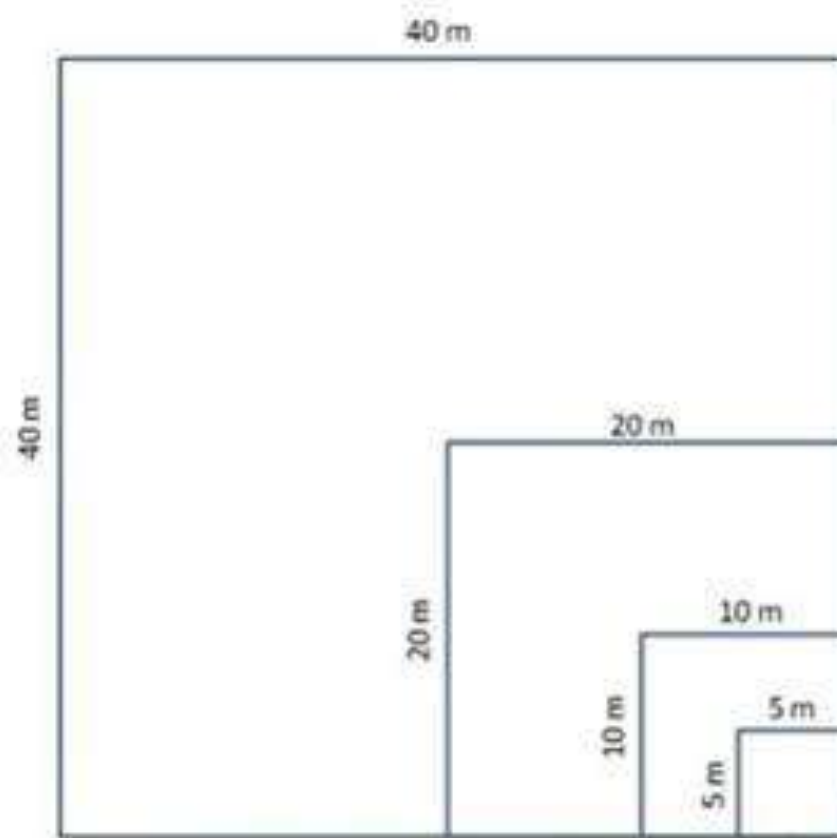


Figure 16. Design of the nested square plot used in the forest inventory

Table 10. Details of the trees dbh classes measured in each sub-plot

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

Biomass carbon stocks were derived from empirical data collected in the forest inventory. Process of the carbon calculation can be divided into several stages, namely (i) field data collection, (ii) plant identification, (iii) biomass calculation, and (iv) carbon calculation.

Field data collection involves a forest inventory in each sampling location as described in the previous sub-chapter. The forest inventory collected data information consists of visual verification of the land cover, tree DBH, and the identification of the tree species. In case when the identification cannot be done in the field, sample of the tree (i.e. photograph of the tree, leave, flower, fruits, seed, etc.) would be taken for further identification.

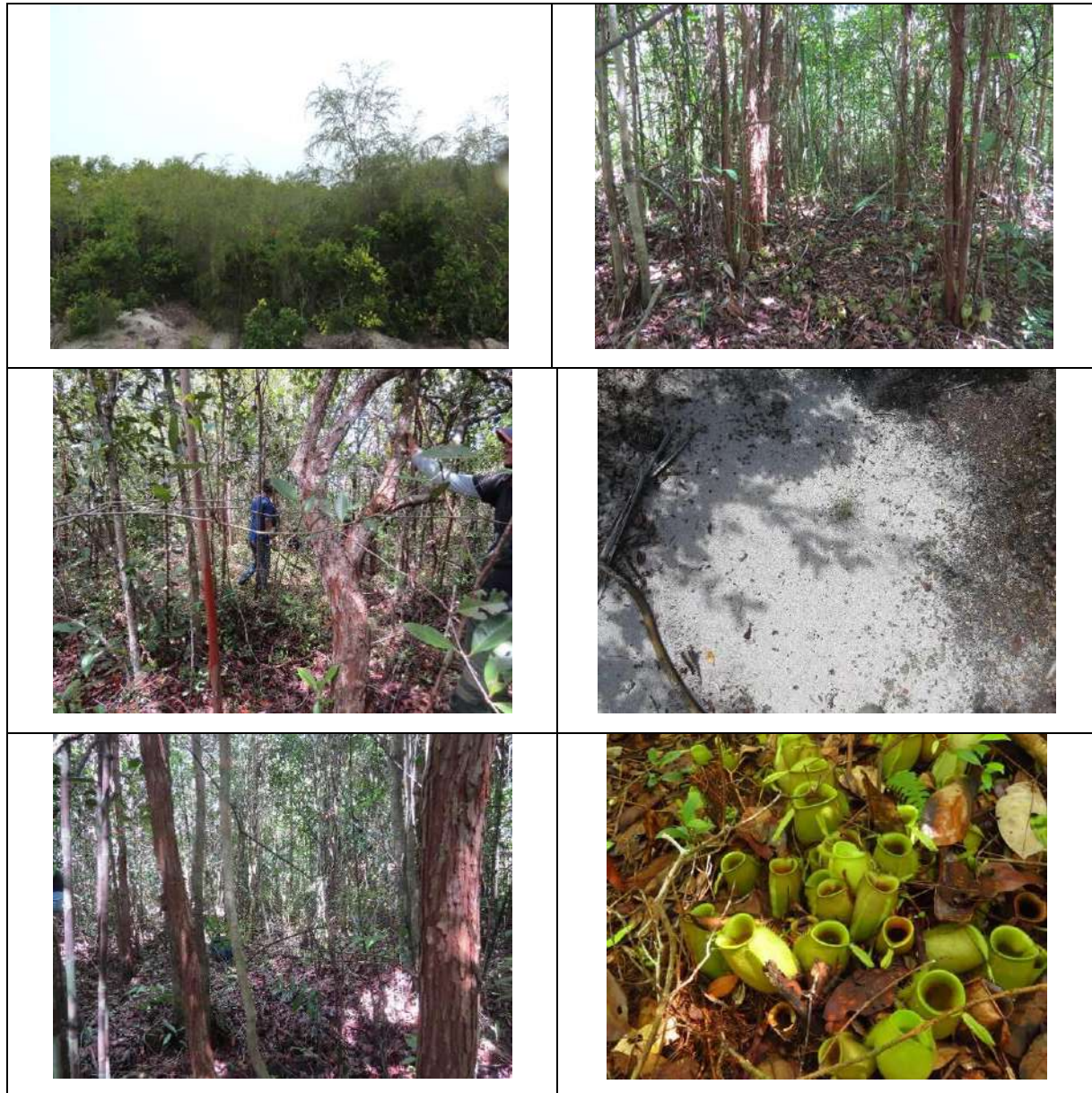
The collected field data (DBH and species identification) then were used for the biomass calculation. Biomass calculation was conducted using species allometric model as described in the next sub-chapter. Biomass values from the calculation then were converted into biomass carbon using the carbon stock-biomass ratio according to the IPCC (2006), which is 0.47.



## 7.6 Indicative photos of each vegetation class



Figure 17 (a). Land cover on dry land on mineral soil ecosystem



**Figure 17 (b). Land cover on sandy soil ecosystem**





**Figure 17 (c). Land cover on fresh water swamp ecosystem**



Figure 17 (d). Land cover on peat swamp ecosystem





**Figure 17 (e). Land cover condition in bare land**



**Figure 17 (f). Existing oil palm plantation**



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

The tree biomass was calculated with allometric equations referring to the compilation models in the “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 researches in Indonesia. It includes allometric equations for numbers of species in regions and ecosystems in Indonesia. Use of this reference was considered to improve accuracy of the biomass calculation based on specified allometric equation for certain species. For the species which the allometric equation is not provided in the book, allometric equation of another species from the same genus or family with the highest accuracy was used as alternative.

**Table 11. List of allometric model used**

Reference	Allometric model	R <sup>2</sup>	Species
Ketterings et al. (2011)	$\ln W = -2.75 + 2.591 \ln D$	0.95	Camptosperma auriculatum
			Garcinia rigida
			Alstonia scholaris
			Baccaurea bracteata
			Baccaurea minor
			Baccaurea sumatrana
			Calophyllum soulattri
			Calophyllum teysmannii
			Diospyros maingayi
			Dyera polyphylla
			Pentace laxiflora
Adinugroho (2009)	$W = 0.19999 \cdot (DBH^{2.14})$	0.98	Barringtonia reticulata
			Chaetocarpus castanocarpus
			Cyathocalyx sp.
			Elaeocarpus griffithii
			Gluta wallichii
			Ilex cymosa
			Litsea firma
			Litsea tuberculata
			Maasia hypoleuca
			Macaranga conifera
			Macaranga pruinosa
			Madhuca motleyana
			Mallotus sp.
			Mangifera sp.
			Melicope lunu-ankenda
			Nephelium maingayi
			Oreocnide rubescens
			Parastemon urophyllus
			Phoebe canescens
			Polyalthia lateriflora

Reference	Alometric model	R2	Species
			Polyalthia rumphii
			Popowia pisocarpa
			Pternandra caerulescens
			Quercus sp.
			Vitex pinnata
			Xylopia fusca
Anggraeni (2011)	$\ln W = -2.246 + 2.482 \ln D$	0.98	Dillenia suffruticosa
H Krisnawati et al. (2012)	$\ln W = -1.861 + 2.528 * \ln(D)$	0.99	Cratoxylum arborescens
			Cratoxylum glaucum
			Cratoxylum sumatranum
I Heriansyah et al. (2012)	$W = 0,0726 * D^{2,378}$	0.98	Shorea leprosula
			Shorea sp.
			Shorea teysmanniana
Salim (2005)	$W = 0.459 * D^{1.366}$	0.95	Tetramerista glabra
Widyasari (2010)	$W = 0,153108 D^{2,40}$	0.98	Baeckea frutescens
			Eugenia speciosa
			Gymnacranthera farquhariana
			Melaleuca leucadendra
			Myristica villosa
			Rhodomyrtus tomentosa
			Syzygium chloranthum
			Syzygium densinervium
			Syzygium incarantum
			Syzygium lineatum
			Syzygium longiflorum
			Syzygium muelleri
			Syzygium sp.
			Syzygium sp.2
			Trstaniopsis obovata

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

Table 12. Summary of statistical analysis of carbon stock results per vegetation class

Land cover class	Number of Plots	Stems per hectare (ind/ha)	Basal Area (m <sup>2</sup> /ha)	Average Carbon Stocks (ton C/ha)	Standard error of the mean	Confidence limits (90%)	
						Lower	Upper
Bush (semak)	6	-	-	12.8	1.2	11.6	14.0
Scrub (semak belukar)	18	6,391	18.4	35.2	4.2	31.0	39.4
Young Regenerating Forest (belukar)	6	5,750	28.8	62.0	3.8	58.2	65.8

## 7.9 Forest inventory results

**Table 13. Forest inventory class**

Land cover class	Average carbon value (tonC/ha)	Physical description of the land cover, e.g. species mix, forest type (pioneer, regenerating, primary etc.), diameter distribution, structural indices, maturity indices, etc.
Bush (semak)	12.8	Consists of bushes on sandy soil, fresh water swamp, peat swamp, and dry land on mineral soil. The dominant vegetation in these land covers are species of grass, ferns, and herbaceous plants.
Scrub (semak belukar)	35.2	Consists of shrubs on sandy soil (heath), shrubs on fresh water swamp, shrubs on peat swamp, and shrubs on mineral dry land. Largest trees in these land covers are found in dbh class of 10-20 cm. However, in general, bush and grass vegetation are found more dominant compare to trees in these land cover. <i>Melaleuca leucadendra</i> are found as dominant trees in the scrub land cover group except on the sandy soil. The dominant species found in scrub on sandy soil are <i>Syzygium incanatum</i> , <i>Quercus sp.</i> , <i>Tristanopsis obovata</i> .
Young Regenerating Forest (belukar)	62.0	Consists of YRF in mineral dry land and peat swamp. Both on mineral dry land and peat swamp, the biggest tree found are in dbh class 20-35 cm. Dominant species on mineral soil consists of <i>Melaleuca leucadendra</i> and <i>Macaranga sp.</i> , while in peat swamp are <i>Tetramerista glabra</i> , <i>litsea firma</i> , and <i>Nephelium maingayi</i> which are species of peat swamp ecosystem. Both are pioneer species especially found in vegetation succession process in a disturbed/degraded land/forest.

## 8. Land Cover Classification

### 8.1 Land cover class description

Analysis has identified six land cover classes in the study area, namely (i) young regenerating forest (old shrub/belukar), (ii) shrub (semak belukar), (iii) bush (semak), (iv) open land (bare land/lahan terbuka), (v) water (badan air), and (vi) oil palm. Each class of the classification (as also presented in **Section 7.9**) was resulted from grouping from several vegetation and substrate (soil) associations found in the study area. The grouping was conducted in order to simplify the vegetation and substrate associations to match the land cover classification based on satellite imagery. However, associations of vegetation and substrate are also taken into account in the discussion as follows.

#### Dry land on mineral soil

Land cover classification found in this substrate consists of bush, shrub, and young regenerating forest. According to field observation and information from the communities, all area on dry land has been severely degraded due to massive land clearing for shifting cultivation, timber harvesting, and land fire. However, some areas have been through longer vegetation succession that resulted denser land cover with relatively bigger trees (higher biomass) while the others are still in the earlier stage of vegetation succession. *Melaleuca leucadendra* and *Macaranga sp.* are found as dominant species in the young regenerating forest land cover on dry land mineral soil. Both are pioneer species that are tolerant to direct sunlight during its growth. Dominations of these species indicates that the area once in the past were severely degraded and/or cleared.

#### Sandy soil (heath)

Small patches with sandy soil are found sporadically in the study area especially within the larger area of peat swamps. This type of association is common in peat swamp ecosystem. Sandy areas were found as small hills in the peat swamp area, it is in Kalimantan locally known as natai pasir. Due to its characteristic, the natai is usually classified as part of peat swamp ecosystem as a unit. However, though it is part of the peat swamp ecosystem, it has different types of vegetation. According to the field observation and sampling plots, dominant species found in the sandy soil in the study area consists of *Syzygium incanatum*, *Quercus sp.*, *Tristanopsis obovata*, and *Cratoxylum arborescens*. All are tree species able to grow on sandy soil. In addition, due to its condition that is poor in nutrient, only certain species are able to grow on this type of soil and the growth is relatively slower compare to vegetation growth on mineral soil. The biggest trees found in the sandy soil in the study area is in dbh class of 10-20 cm.

#### Freshwater swamp

Freshwater swamp found in the study area is formed in the basins on mineral soil. The freshwater swamp in the study area is located at the Northern part, where it has the lowest land elevation and mineral soil underneath. The dominant vegetation species found in these areas consists of *Echinochloa atagnina* (grass), *Ficus retusa*, and *Melaleuca leucadendra*.

#### Peat swamp

Peat soil are found in the whole Southern part of the study area. As also mentioned before, hills of sandy soil (natai pasir) can be found in the peat swamp area as part of it. According to field verification and sampling plots, dominant species found in young regenerating forest on peat swamp area consists of *Tetramerista glabra*, *litsea firma*, and *Nephelium maingayi* with the largest trees are in dbh class of 20-35 cm. Both are species of peat swamp



ecosystem. In the bushes on peat swamp area, *Macaranga pruinosa* found as the dominant species, followed with *Baccaurea bracteata* as the co-dominant. The largest trees in this land cover is in dbh class of 2-10 cm.

## 8.2 Land cover map with title, date, legend and any HCS forest patches identified

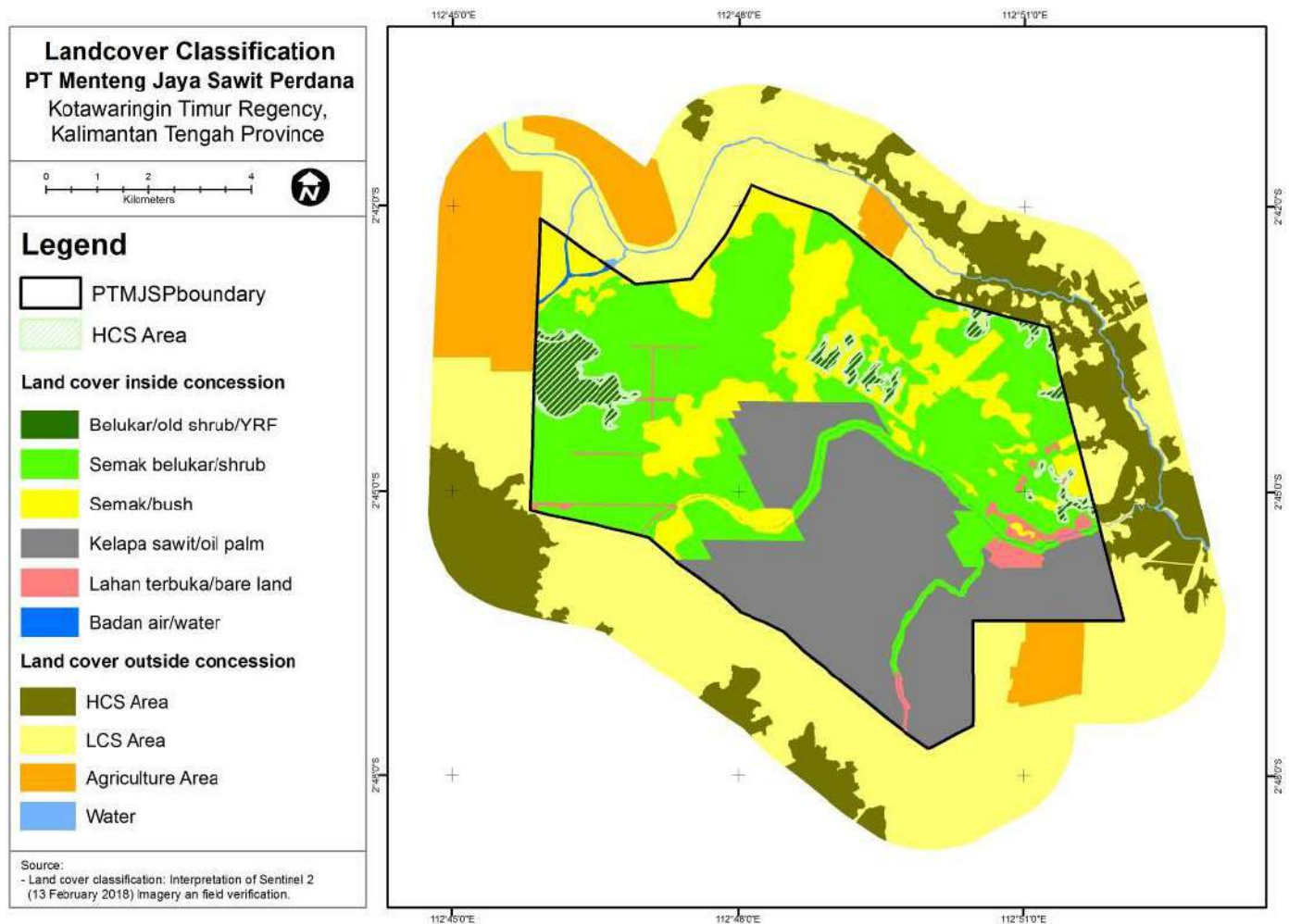


Figure 18. Land cover classification in the AOI

### 8.3 Table of hectares per land cover class

Table 14. Hectares per land cover class

Land cover class	Number of Hectares*	% of total concession
<b>Potential HCS classes:</b>		
Young Regenerating Forest (old shrub/belukar)	353.3	4.7
<b>Sub-total</b>	353.3	4.7
<b>Non-HCS classes, e.g.:</b>		
Scrub (semak belukar)	3,116.3	41.9
Bush (semak)	1,324.5	17.8
Open Land (lahan terbuka)	155.0	2.1
Water (badan air)	23.0	0.3
Mines, smallholder agriculture, plantation, etc.	2,470.7	33.2
<b>Sub-total</b>	7,089.5	95.3
<b>TOTAL (hectares of the concession)</b>	<b>7,442.8</b>	<b>100.0</b>

*\* Hectares were calculated for the land cover classification in the concession*

## 9. Patch Analysis Result

### 9.1 Results of Decision Tree

Table 15. HCS patch number and results of decision tree

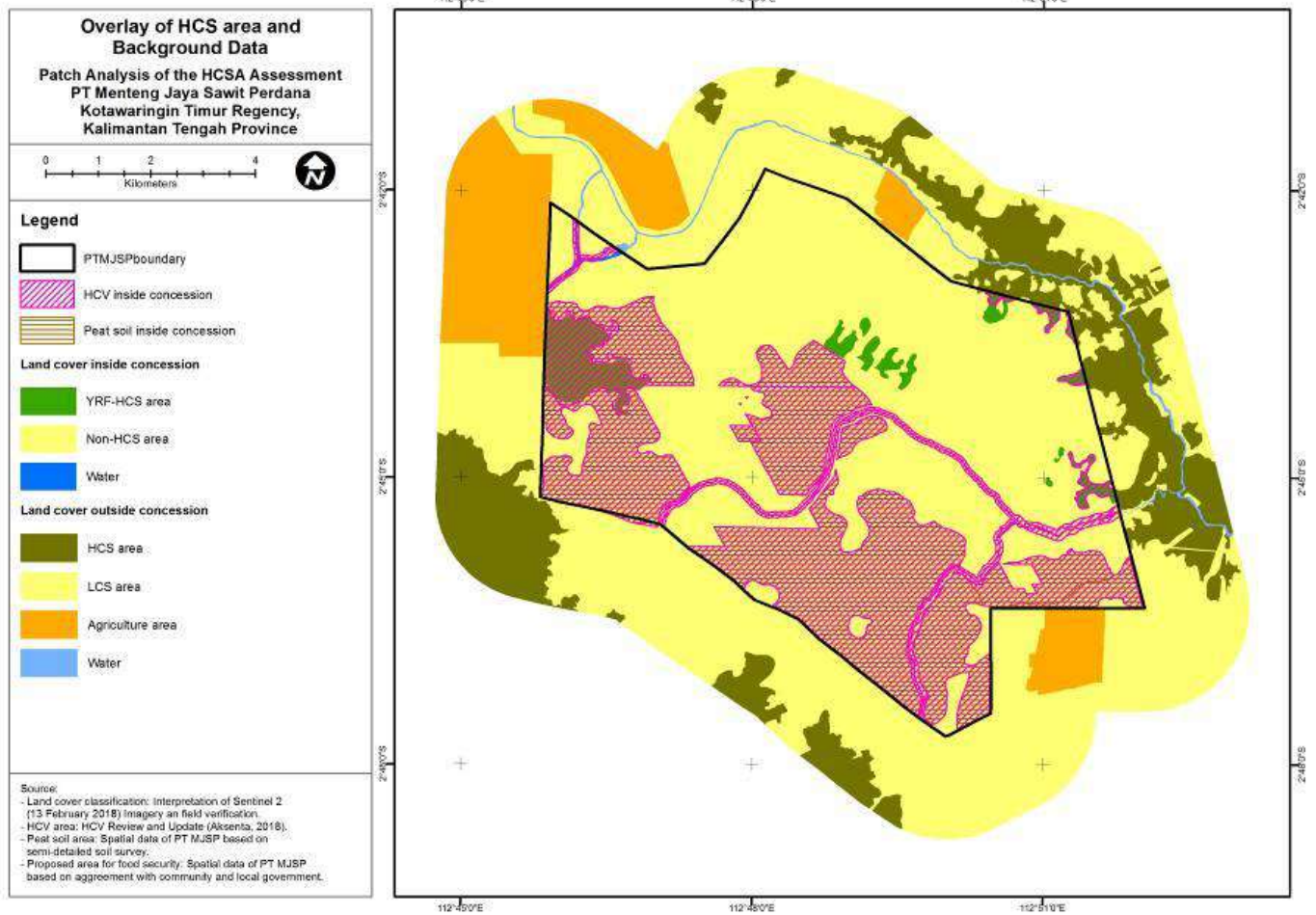
No Patch	Ha of Core	Patch Priority	Connectivity with HPP, HCV, Peat	Pre-RBA and RBA	Decision	Ha of Patch
1	0.0	Low w/o core	LPP-no connectivity	No impediment for operation; patch is surrounded by more viable potential corridor and stepping stone, thus not significant for biodiversity	Potential for development	1.9
2	0.4	Low	HPP-overlapping with HCV	not relevant	Conservation	29.0
3	0.0	Low w/o core	HPP-connected with HPP patch #2	not relevant	Conservation	2.6
4	0.3	Low	HPP-overlapping with HCV	not relevant	Conservation	9.3
5	0.0	Low w/o core	HPP-connected with HPP patch #8	not relevant	Conservation	11.2
6	0.4	Low	HPP-connected with HPP patch #8	not relevant	Conservation	14.2
7	0.0	Low	HPP-connected with HPP patch #8	not relevant	Conservation	13.4
8	1.7	Low	HPP-connected with peat	not relevant	Conservation	21.8
9	0.0	Low	HPP-connected with HPP patch #8	not relevant	Conservation	5.3
10	128.4	High	HPP-overlapping with HCV	not relevant	Conservation	208.6
11	0.0	Low w/o core	HPP-overlapping with HCV	not relevant	Conservation	4.6
12	0.0	Low	HPP-overlapping with HCV	not relevant	Conservation	10.7
13	1.2	Low	HPP-overlapping with HCV	not relevant	Conservation	20.8



Figure 19. HCS patch identification number

## 9.2 Discussion on Decision Tree outcome

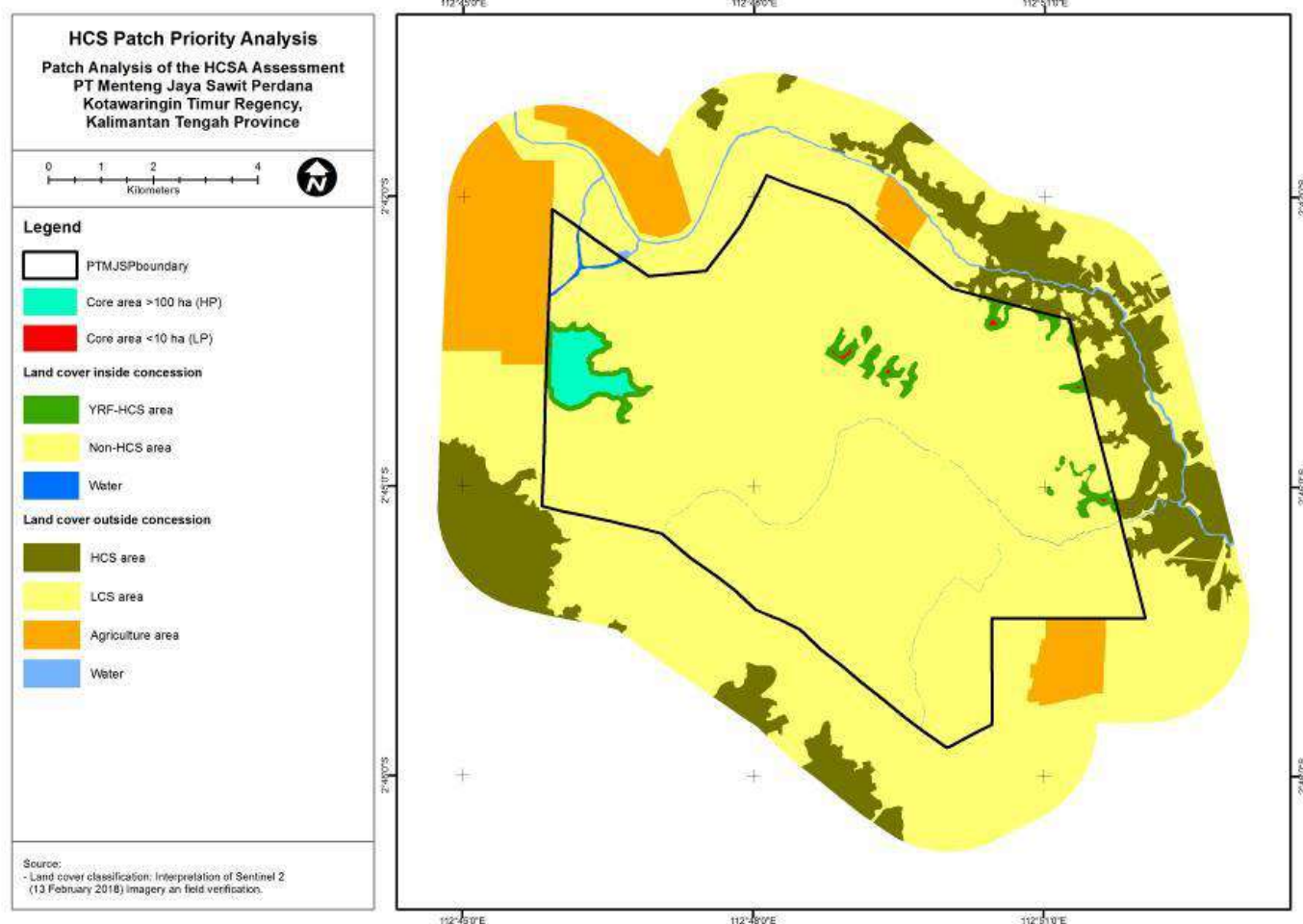
Patch analysis were carried out to the HCS patches identified in the study area as described in the **Section 9.1**. HCS patches in the study area are areas with old shrub/young regenerating forest land cover. It consists of 13 patches with a total hectare of 353.3 ha. Overlay of the HCS patches and other basic data for the patch analysis shows that several patches are overlapping with HCV and peat area, adjacent with HCV and peat area, and physically connected with larger HCS areas outside the concession. The other HCS patches are found as standalone.



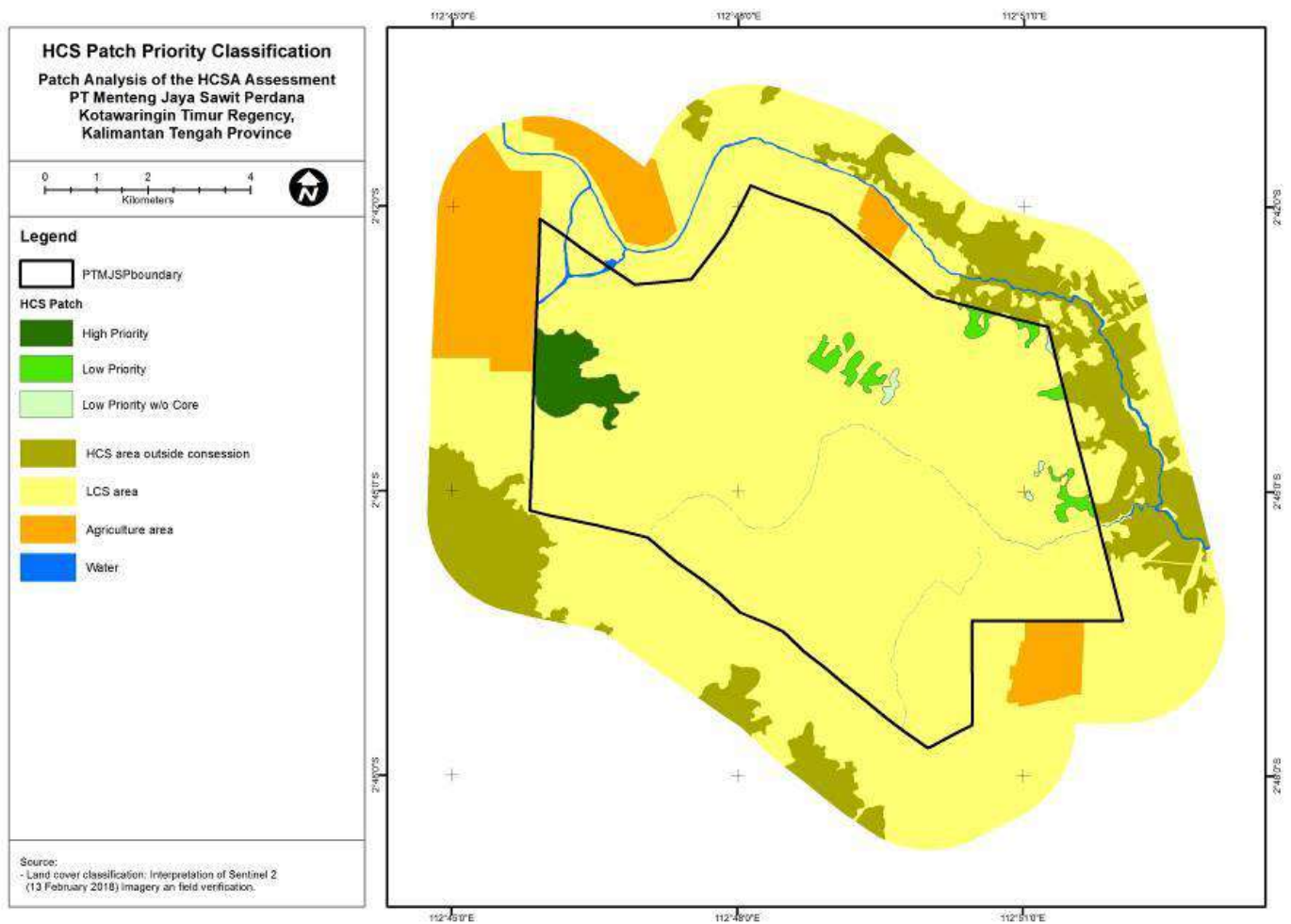
**Figure 20. Overlay of HCS patches with basic data for patch analysis**

Patch priority analysis based on the size of the core of the patch shows that there are only two from the three patch priority classes found in the study area, namely the high priority and the low priority patches. The high priority patch is located in the Eastern part of the study area while the rest of the HCS patch, which are low priority are found scattered in the North-Western half of the study area. The high priority patch is 208.6 ha and the total of the low priority patches is 144.7 ha.



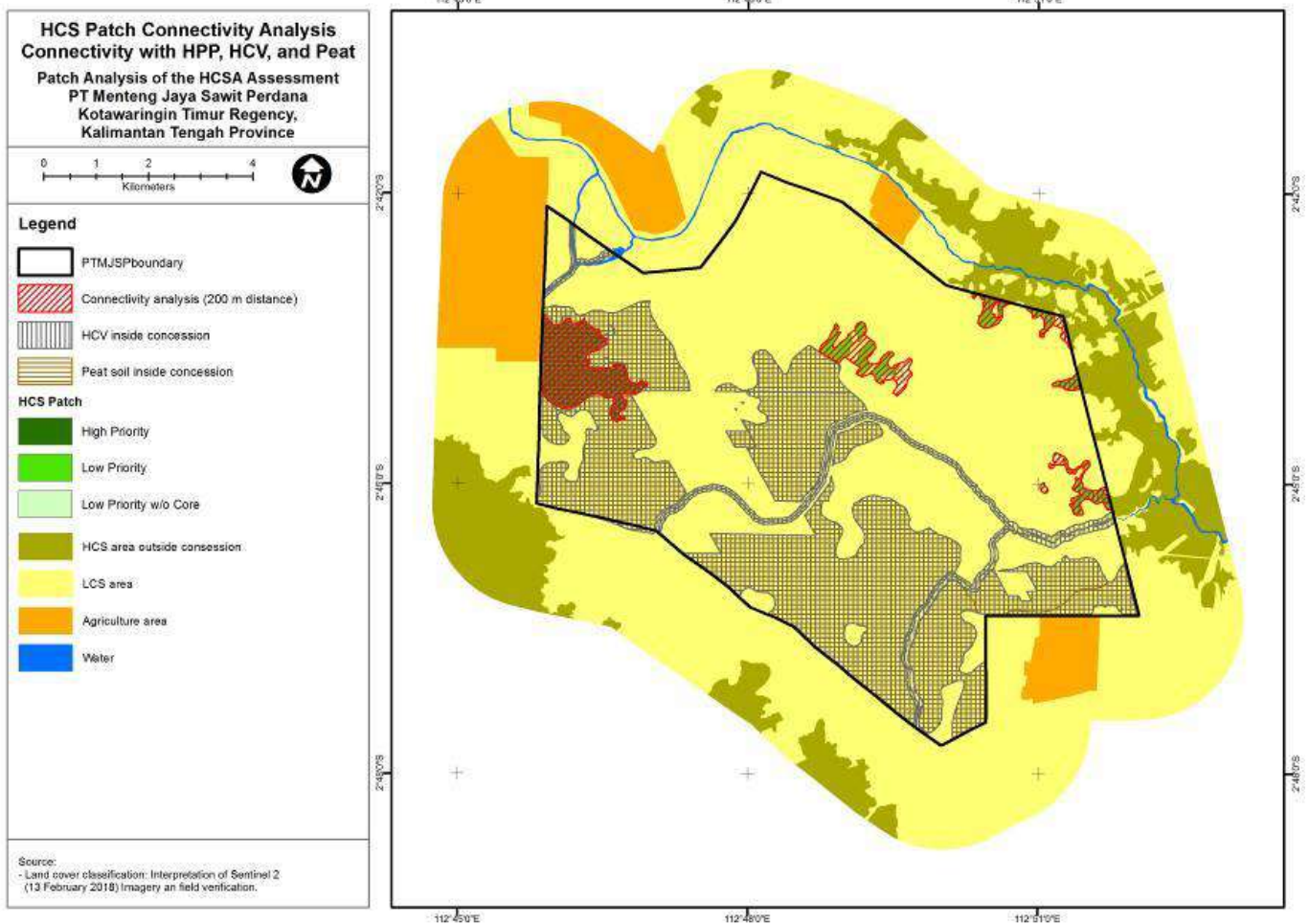


**Figure 21. HCS patch core analysis**



**Figure 22. HCS patch priority classification**

Connectivity analysis to the HCS patches, HCV and peat areas shows that particular HCS patches have connectivity to important areas for conservation, namely patch number 2, 4, 8, and 10-13. Those patches are then categorized as high priority for its connectivity. Moreover, aggregate analysis (200 m distance) then were taken to identify other patches which potentially connected to the high priority patches. The aggregate analysis shows that the rest of the patches are connected (separated within 200 m distance) with the high priority patches except for the patch number 1. All of the patches which have connectivity with the high priority patch then were categorized as high priority (see **Table 15** for details of the connectivity analysis). The patch number 1 which does not have connectivity stays as low priority and to be analysed further in the next steps of the decision tree.



**Figure 23. HCS patch connectivity analysis**

Accordingly, with the decision tree, the low priority patch was set for Pre-RBA and RBA. Pre-RBA assessment shows that the patch is suitable for plantation development. There is no physical characteristic that is considered as operational impediments (i.e. steep slope, swamp, and river) and need to be conserved in the patch. Moreover, spatial analysis of the wider context (within the AOI) shows that the low priority patch is not sufficient for biodiversity. The patch is a standalone small patch (<2 ha) and surrounded by other patches and corridors which are more viable for connectivity for biodiversity, i.e. stepping stone of patches number 2-9 and 11-13 and the riparian HCV. Therefore, the low priority patch is set as the indicative for development.

Following in the patch analysis is adjustment of the conservation areas. The adjustment involved the HCS patches, HCV and peat area, and the aggregation area previously used in the connectivity analysis. The indicative conservation areas in the study area consist of scattered patches, though all of them have been classified as high priority. In order to derive compact and manageable conservation areas, the aggregation areas were used as the basis to fill in the gaps between the scattered indicative conservation areas. Total of the adjusted HCS patches (integrated with the aggregation areas) is 379.6 ha. In other words, the adjustment has added 26.3 ha of non HCS area for conservation.

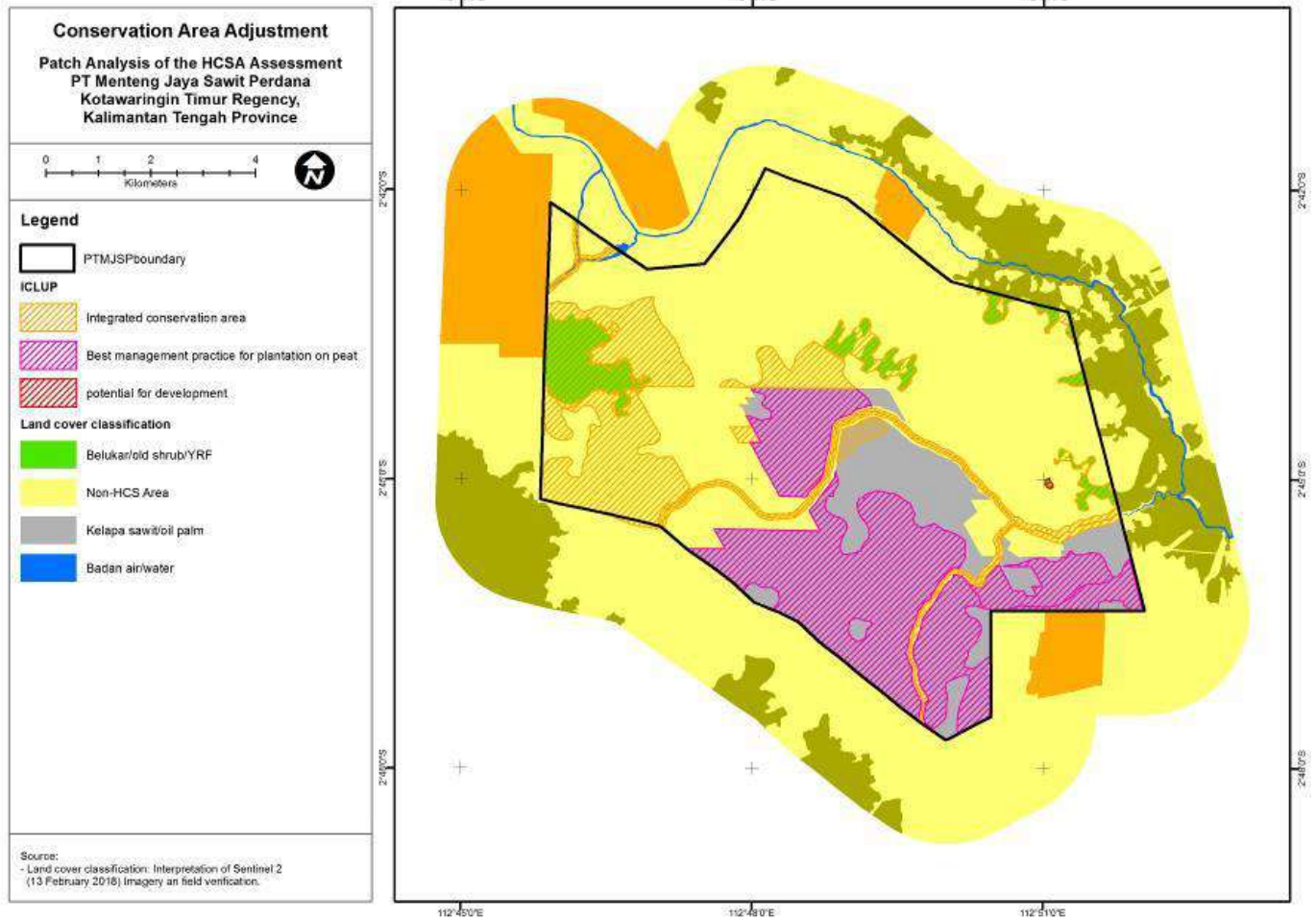


Figure 24. Adjustment of the indicative conservation



## 10. Indicative Land Use Plan

### 10.1 Summary of results of final ground verification

Ground verification (e.g. field delineation and demarcation) of the conservation land use plan have not been conducted. Moreover, a timeline for activities required under company's compliance to new planting procedures (i.e. RSPO NPP) would be prepared. It will include timeline for the further socialization and participatory mapping with the community for the proposed area for food security. In addition to that, preparation of the timeline is still in wait due to the review and evaluation process of the HCV Review and Update.

### 10.2 Final HCS map



Figure 25. Land use plan in the concession



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

Conservation areas in the concession can be divided based on its type (e.g. presence of peat, land cover, ecosystem and the FPIC status of the area), namely (i) forested area on mineral soil, (ii) forested area on peat, (iii) riparian, (iv) non forest in peat area, and (v) existing plantation in peat area. In addition to that, lands which are proposed for community's food security are also included as part in the management and monitoring as several conservation areas are located within it, thus specified measures in relation with the community land use have to be taken into account.

Recommendations for the conservation management and monitoring can be divided into two categories, namely (i) general measures and (ii) specified measures. General measures include all activities that is applied to implementation of conservation in general and could be integrated under the operational management as a whole. The second recommendations, namely specified measures, are the more technical approach that would also require a special team to its implementation.

#### **Recommendation of activities to be included in the general management and monitoring measures are:**

- Ground verification which include delineation and demarcation of the definitive conservation area.
- Preparation of the conservation management and monitoring plan.
- Installation of sign board of the conservation areas.
- Socialization to the workers regarding with conservation management.
- Water table management for the existing plantation in peat area.
- Coordination and corporation with external stakeholders (i.e. government, community, and other relevant stakeholders).
- Monitoring and prevention of wildfire.

#### **Recommendation of activities for the specified management and monitoring measures are:**

##### **A. Forested area on mineral soil**

- To safeguard the forest in the conservation areas and prevention of its potential threats (i.e. logging, hunting, fire).
- To safeguard the wildlife especially the important species which inhabit the conservation area and prevention of its potential threats (i.e. logging, hunting, and fire).
- Frequent monitoring of the condition of the forest and wildlife population in the conservation area.

##### **B. Forested area on peat**

- To safeguard the peat conservation value in the area (i.e. maintain the water table level in the conservation area) and to prevent its threats i.e. logging and fire).
- Integrate the water table management of the forested peat conservation area and the operational plantation in peat area. Existing swamp drainage in the operational plantation in peat area may linked and have effect to the water table in the forested peat area, thus the water table in both areas should be integrated.

- To refer to relevant guidance to management and rehabilitation of peat area (RSPO Manual on BMPs for Rehabilitation of Natural Vegetation associated with Oil Palm Cultivation and RSPO Manual on BMPs for Existing Oil Palm Cultivation on Peat).
- Coordination with government and/or governmental bureau in peat rehabilitation (i.e. Badan Restorasi Gambut) regarding with peat conservation in the concession.
- To safeguard the forest in the conservation areas and prevention of its potential threats (i.e. logging, hunting, fire).
- To safeguard the wildlife especially the important species which inhabit the conservation area and prevention of its potential threats (i.e. logging, hunting, fire).
- Frequent monitoring of the condition of the forest and wildlife population in the conservation area.

#### **C. Riparian and river**

- To safeguard the riparian function by monitoring the land cover. The riparian should be covered by natural vegetation. In certain case, riparian rehabilitation and/or tree species enrichment might be needed.
- To maintain and improve the quality of water by safeguarding the riparian function.
- To refer to relevant guidance to riparian best management practice (i.e. RSPO Riparian Management Guidelines).
- To involve other stakeholders relevant with the protection of riparian and rivers to the protection of riparian and rivers.

#### **D. Non-forested peat areas**

- To maintain the water table of the peat area.
- To prevent fire.
- Integrate the water table management of the peat conservation area and the operational plantation in peat area. Existing swamp drainage in the operational plantation in peat area may linked and have effect to the water table in the non-plantation peat area, thus the water table in both areas should be integrated.
- To refer to relevant guidance to management and rehabilitation of peat area (RSPO Manual on BMPs for Rehabilitation of Natural Vegetation associated with Oil Palm Cultivation and RSPO Manual on BMPs for Existing Oil Palm Cultivation on Peat).
- Coordination with government and/or governmental bureau in peat rehabilitation (i.e. Badan Restorasi Gambut) regarding with peat conservation in the concession.

#### **E. Existing oil palm plantation in peat area**

- To maintain the water table of the peat area.
- To prevent fire.
- Integrate the water table management of the plantation area on peat and the non-plantation peat area. Existing swamp drainage in the operational plantation in peat area may linked and have effect to the water table in the non-plantation peat area, thus the water table in both areas should be integrated.
- To refer to relevant guidance to management and rehabilitation of peat area (RSPO Manual on BMPs for Rehabilitation of Natural Vegetation associated with Oil Palm Cultivation and RSPO Manual on BMPs for Existing Oil Palm Cultivation on Peat).

#### F. Forest conservation in community's proposed area for food security

- To socialize the conservation plan in the study area, especially for which is located inside the proposed area for the community's food security.
- To seek the FPIC through engagements and consultation with the communities regarding with the company's conservation plan.
- To involve the community's (stakeholder in charge of the management of the proposed food security area) in an active manner in the protection
- To respect community's decision especially for the proposed area for food security regarding with the conservation plan. In case that the community decides not to agree on the conservation plan, a reconciliation and resolution should be sought and achieved, it includes a possibility of enclave the proposed area for food security from the legal operational area of the company.

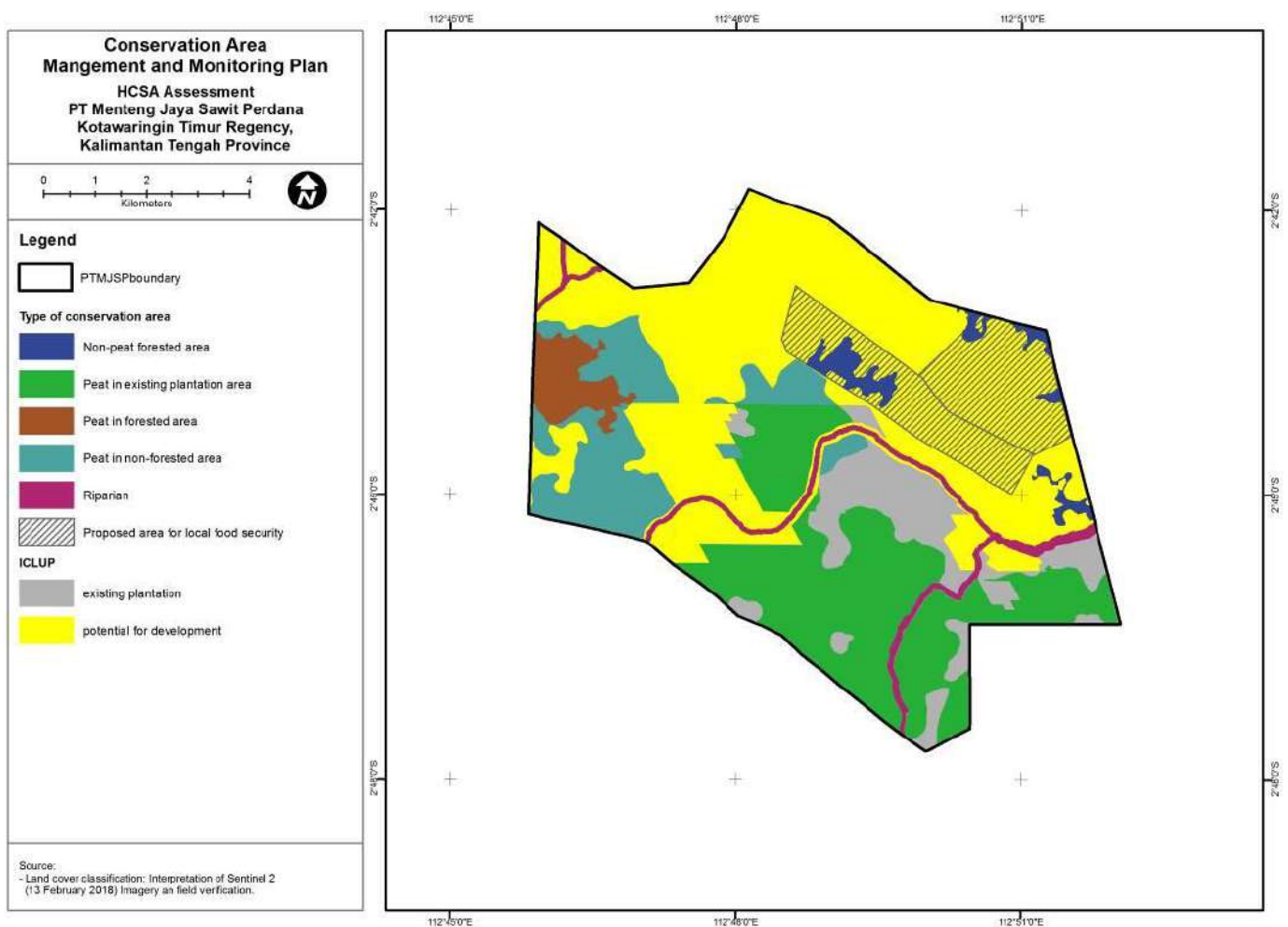


Figure 26. Types of the conservation area

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

- Ground truth to verify the definitive conservation area.
- Socialization and consultation with workers, community, government, and other stakeholders on the conservation plan.
- Socialization and consultation to seek FPIC on the conservation area in the proposed area for community's food security.