Roundtable on Sustainable Palm Oil

New Planting Procedure

Summary of Assessement Reports and

Management Plans

PT. MITRA NUSA SARANA

Sintang District, West Kalimantan - Indonesia

Prepared by :

PT. Mitra Nusa Sarana, November

2020

Contents

Chapter 1

1. Overview and background

1.1 Area of New Planting and Development Plan

PT. Mitra Nusa Sarana (PT MNS) is located in Ketungau Hulu and Central Ketungau Sub District, Sintang District West Kalimantan Province. PT MNS has operational areas with Land Permit No. 525/1396/KEP-PERTANAHAN/2015 dated 16 June 2015, for 18,000 Ha published by Bupati Sintang and the Decree of the Regent of Sintang No: 525/1749 / KEP-DISHUTBUN / 2015 concerning Plantation Business Permit (IUP) covering an area of 18,000 ha. PT MNS obtained the last location permit extension from the Regent of Sintang with permit -No: 525/1192 / KEP-DPRP.C / 2019 concerning Amendments to the Decree of the Regent of Sintang Number 525/410 / KEP-DPRP.C / 2018 concerning the Extension of the Location Permit for PT Mitra Nusa Sarana Oil Palm Plantation covering an area of 18,000 ha. Currently there is a planting area at PT. MNS covering an area of 4,930 ha.

Permit area is located in a region that has been built and is a region that has been opened and managed and abandoned by the previous company. In addition to the settlements and agricultural land of the population, including the community's palm oil plantation is now dominated by scrubland, open land and secondary forest spots. Based on the status of the development of the land, the HCV assessment at PT MNS is conducted on an un-operated plantation, or 'green field' (the category of non-operating lands or new planting/new land clearing). By 2016, the company has not operating, but settlement and agricultural land found, including community palm plantations that now dominated by scrubland, open land and secondary forest spots.

The development plan of PT MNS palm oil plantation although managed according to the standard of sustainability, the scale of operation of its development plan with 18.000 ha of permit areas and adjacent to 28 hamlets in 9 villages in 2 sub-districts will certainly involve various parties and can be categorized in 'Large Scale'.

The development plan since land clearing using heavy equipment and operational plans from planting to harvest which also uses truck vehicles on a regular basis can be classified in 'Big Intensity' and 'High Risk. Although most of the clearance location areas are fragmented but still

leave secondary forest spots and 'tembawang umum' which are customary to be maintained and can also serve as the remnants of RTE species (Rare, Threatened and Endangered) that are heavily dependent on forest habitats .

Administratively, oil palm plantation PT MNS has 9 (nine) village area, i.e Empura, Suwak Medang, Sungai Bugau, Nanga Bugau, Sekaih, Mungguk Entawak, Embalih Mungguk Gelombang, Kubu Barangan on Ketungau Tengah and Ketungau Hulu Sub District, Sintang District, West Kalimantan. PT MNS geographically situated at 0°53'18" - 0°43'19" N and 111°07'39" - 111°26'29" E

A comprehensive and participatory independent Social Impact Assessment (SIA) and High Conservation Value (HCV) assessment which internal and external stakeholders were conducted by RSPO registered assessor from Remark Asia. For Analisis Dampak Lingkungan (AMDAL/ EIA) conducted by Intakindo. Based on decree of ministry of forestry, the location PT MNS is a part of land zoned for agriculture development (APL = Area Penggunaan Lain).

Based on the HCV Assessment in the PT MNS concession, the existing HCVs were identified, namely HCV 1, HCV 3, HCV 4, HCV 5 and HCV 6. Whereas HCV 2 was not found. So the total identified HCV area is 3,258.78 ha. The details of the HCV area can be seen in Table 3.3.b Summary of HCV and HCS area at PT MNS.

PT MNS will open a new area for oil palm plantations from 2020 to 2023. Based on HCV, SIA, and FPIC, the potential area for new planting of PT MNS is 7,392 hectares. New planting area consists of nucleus and plasma as mentioned in Table below and Figure 3 :

Table 1.1 New Planting PT MNS on 2020-2023

No	Plantation	Planted	New Planting Plan					Total	HCV/ HCS	Community Food Security	Grand Total
			2020	2021	2022	2023	Sub Total				
1	Nucleus	3,577	1,761	1,254	1,095	1,007	5,117	**8,694**	**4,338**	**1,341**	**18,000**
2	Smallholder	1,352	697	556	555	467	2,275	**3,627**			
Total		**4,930**	**2,458**	**1,810**	**1,650**	**1,474**	**7,392**	**12,322**	**4,338**	**1,341**	

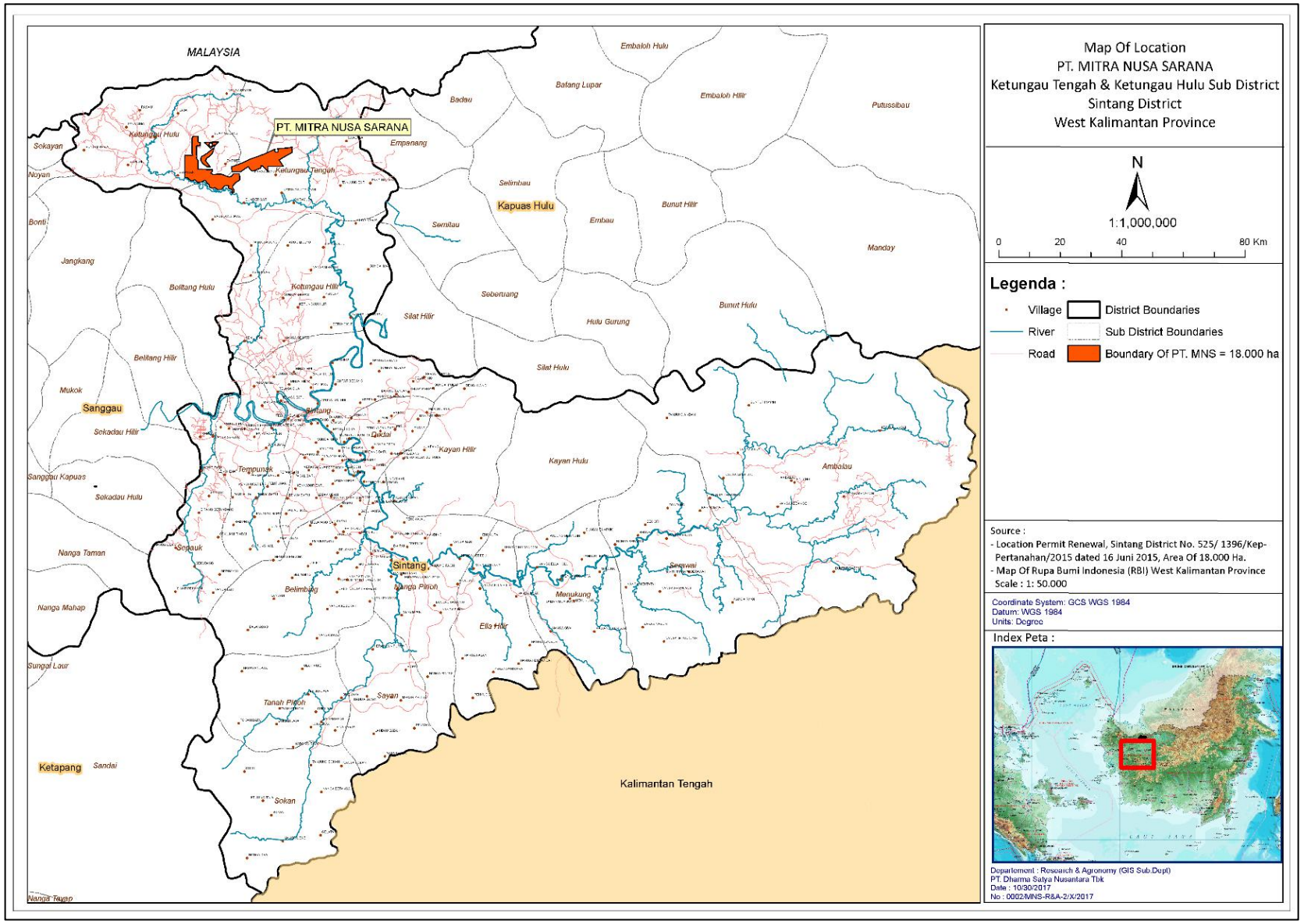


Figure 1. Location Map Level Regency of PT MNS

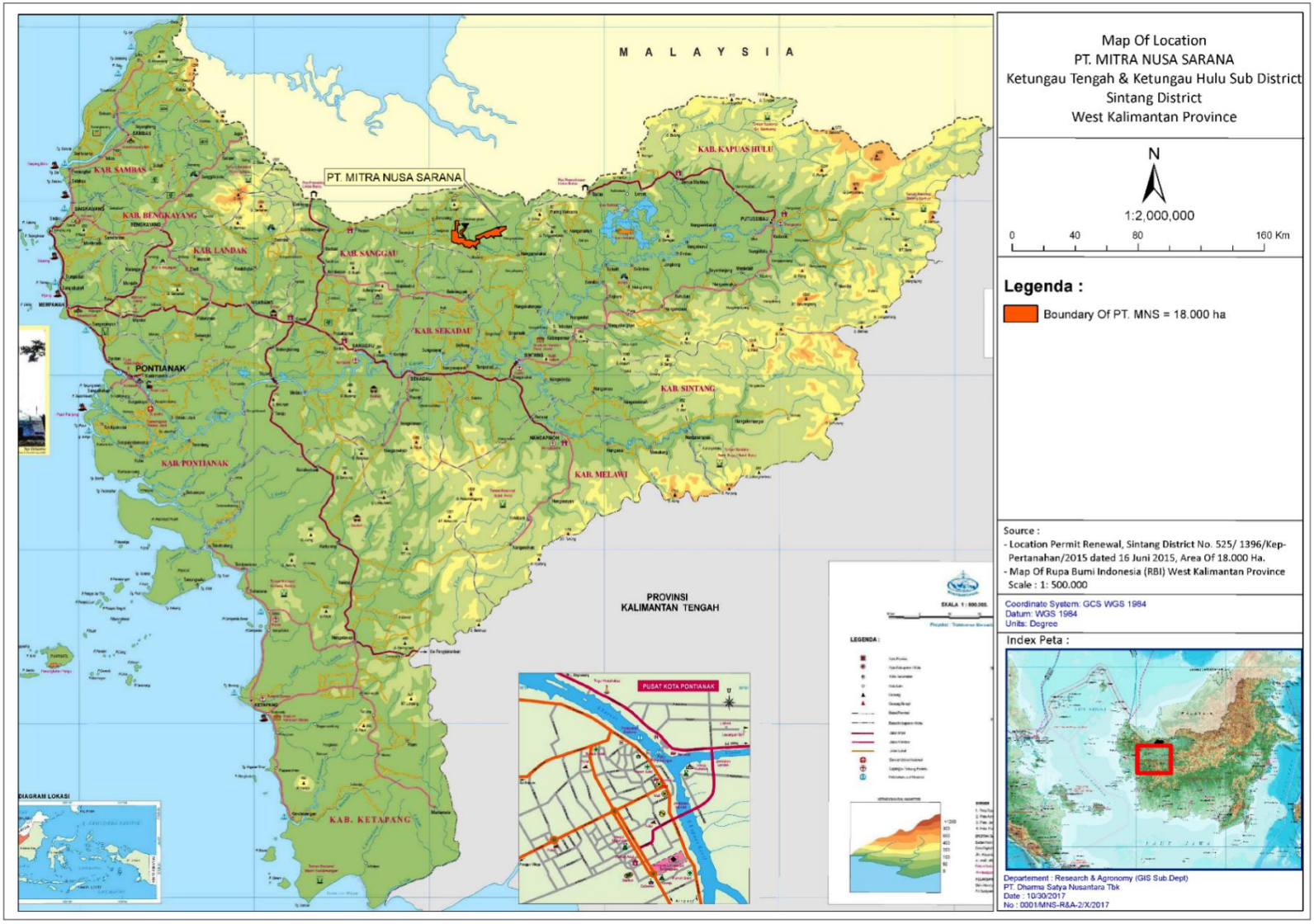


Figure 2. Location Map Level Province of PT MNS

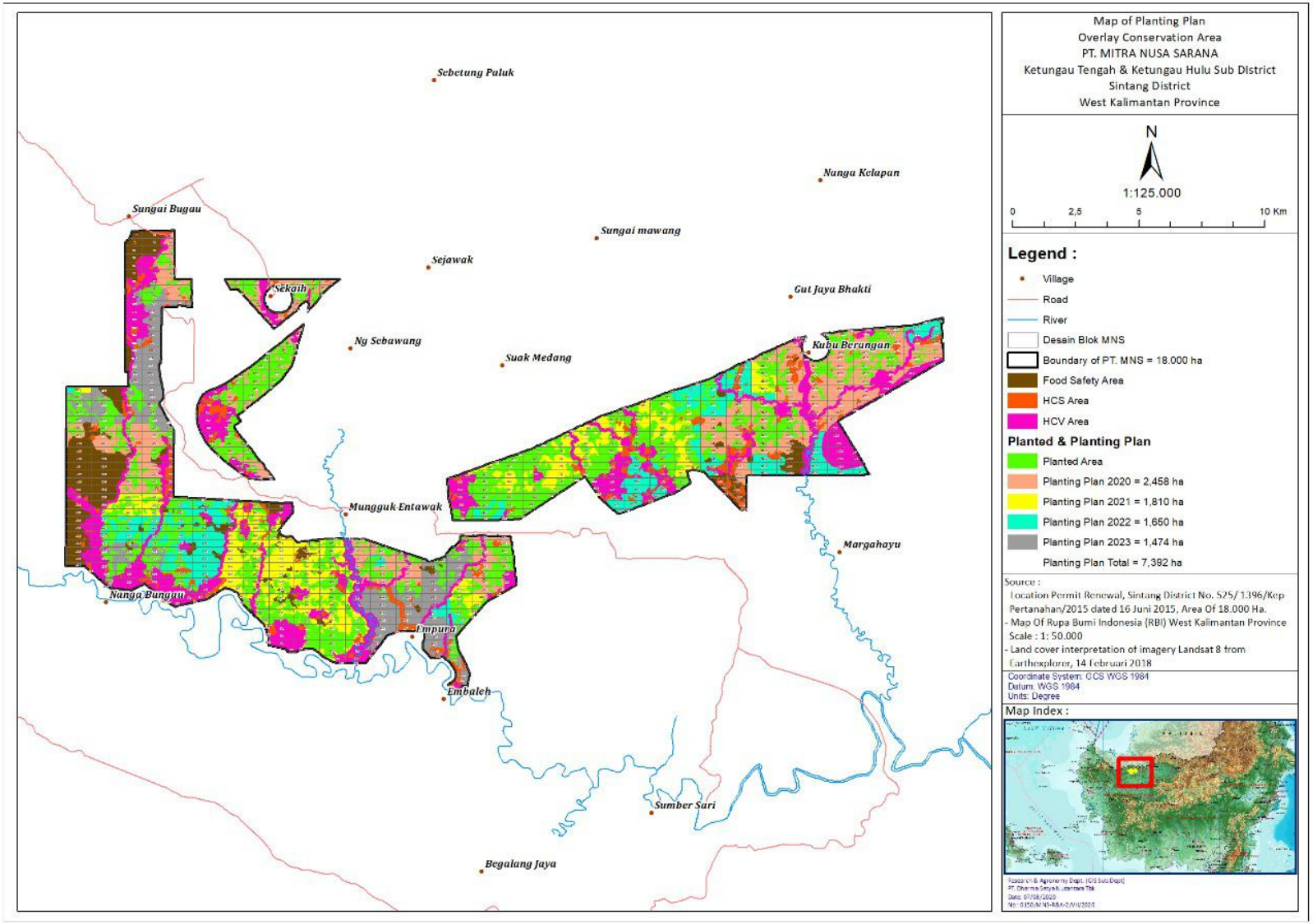


Figure. 3. Area new planting and time line for new planting of PT MNS

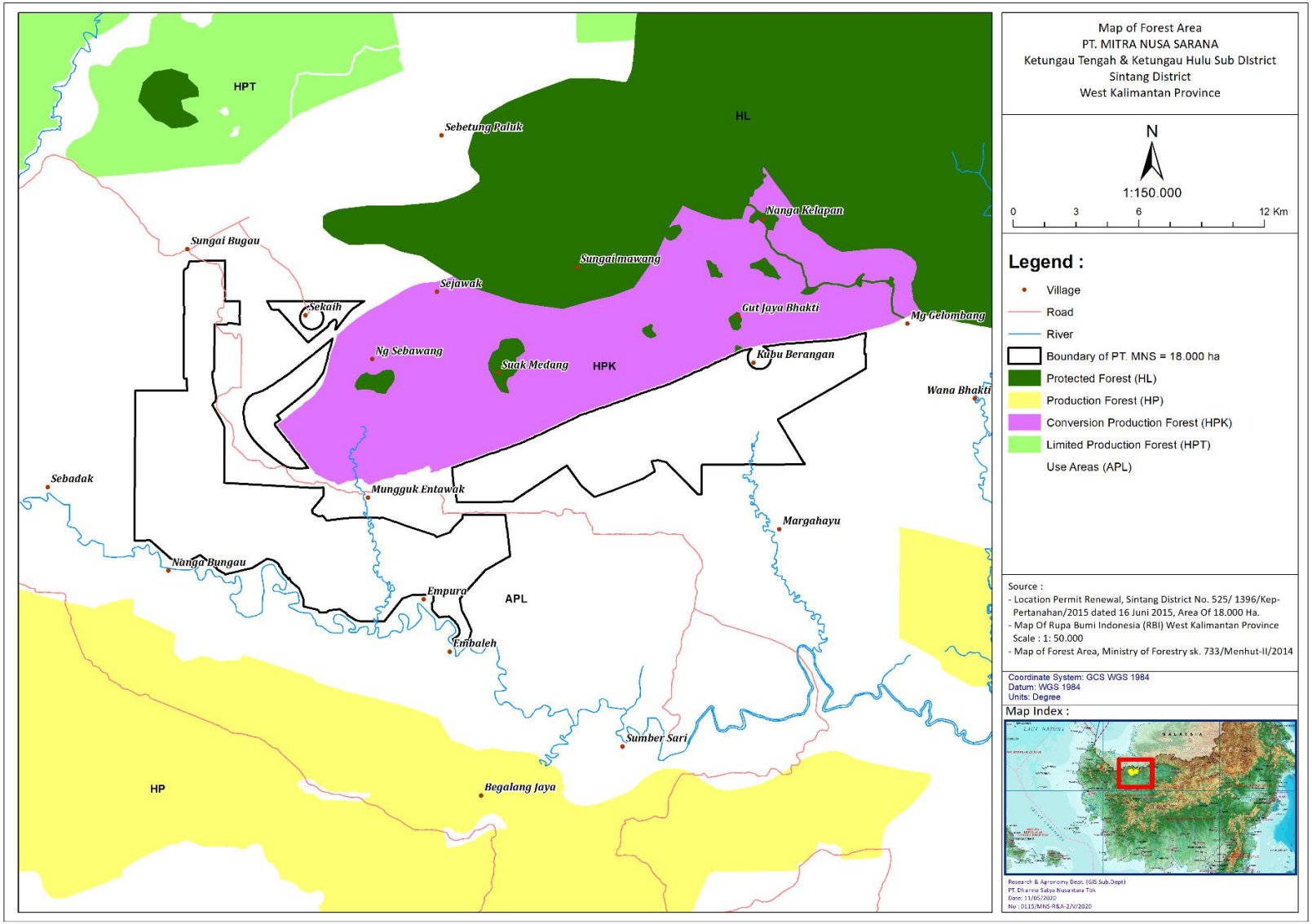


Figure 4. Forested Area in around PT MNS

1.2 Land Cover

Furthermore, land cover analyses were undertaken on certain period of times using Landsat Imagery on specific years. Based on Landsat imagery year 2016 on HCV Report, PT MNS permit area was dominated by shrubs accounted for 14,762.31 ha or about 82.01% from total area of PT MNS. This shrubs coverage in 2016 was higher compared to the condition in 2000 and 2008. In year 2000, secondary forests were found on 4,600.40 ha areas or about 25.56%, and fell into only 1,818.50 ha or about 10,10% by 2016, indicating that forest covers in PT MNS excessively plummeted during the last 8 years. Land cover as Figure 5 and Table 1. 2 below

Table 1.2 Land Cover PT MNS at 2000, Nov 2005, 2008 and 2017

Tutupan Lahan	2017		2008		November 2005		2000	
	Ha	%	Ha	%	Ha	%	Ha	%
Secondary Forest	1.258,37	6,99	4.287,21	23,82	4.403,30	24,46	4.600,40	25,56
Swamp Forest	-	-	68,84	0,38	68,94	0,38	92,67	0,51
Open Land	4.764.53	26,47	808,14	4,49	6.00,14	3,33	324,94	1,81
Oil Palm Plantation	52,00	0,29	-	-	-		-	-
Rubber	-	-	-	-	-		-	-
Schrub	2.559,39	14,22	12.812,76	71,18	12.931,94	71,84	12.956,01	71,98
Waterbody	-	-	23,05	0,13	23,08	0,13	25,97	0,14
Young Regeneration Forest	649,51	3,61	-	-	-	-	-	-
Mixed Agro-Forest Heavy	3.777,23	20,98	-	-	-	-	-	-
Mixed Agro-Forest Light	4.029,65	22,39	-	-	-	-	-	-
Agriculture	909,34	5,05	-	-	-	-	-	-
Total (Ha)	**18.000,00**		**18.000,00**		**18.000,00**		**18.000,00**	

1.3 Soil Map

Based on landsystem Soil Taksonomi System USDA, 1982 and based on Clasification System Soil Research System in Bogor, 1981, type of soil found in PT MNS can be classified into four (4) soil type association namely are (1) Inceptisol (*Tropaquepts dan Dystropepts*), (2) Entisol (*Tropaquents*), (3) Ultisol (*Tropudults dan Paleudults*) and (4) Histosol (*Tropohemist dan Troposaprist*). Characteristic of four soil type association in PT MNS as **Table 1.3.** Distribution map of soil types in PT MNS presented in Figure 6.

Table 1.3 . Characteristic Soil Type in PT MNS

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

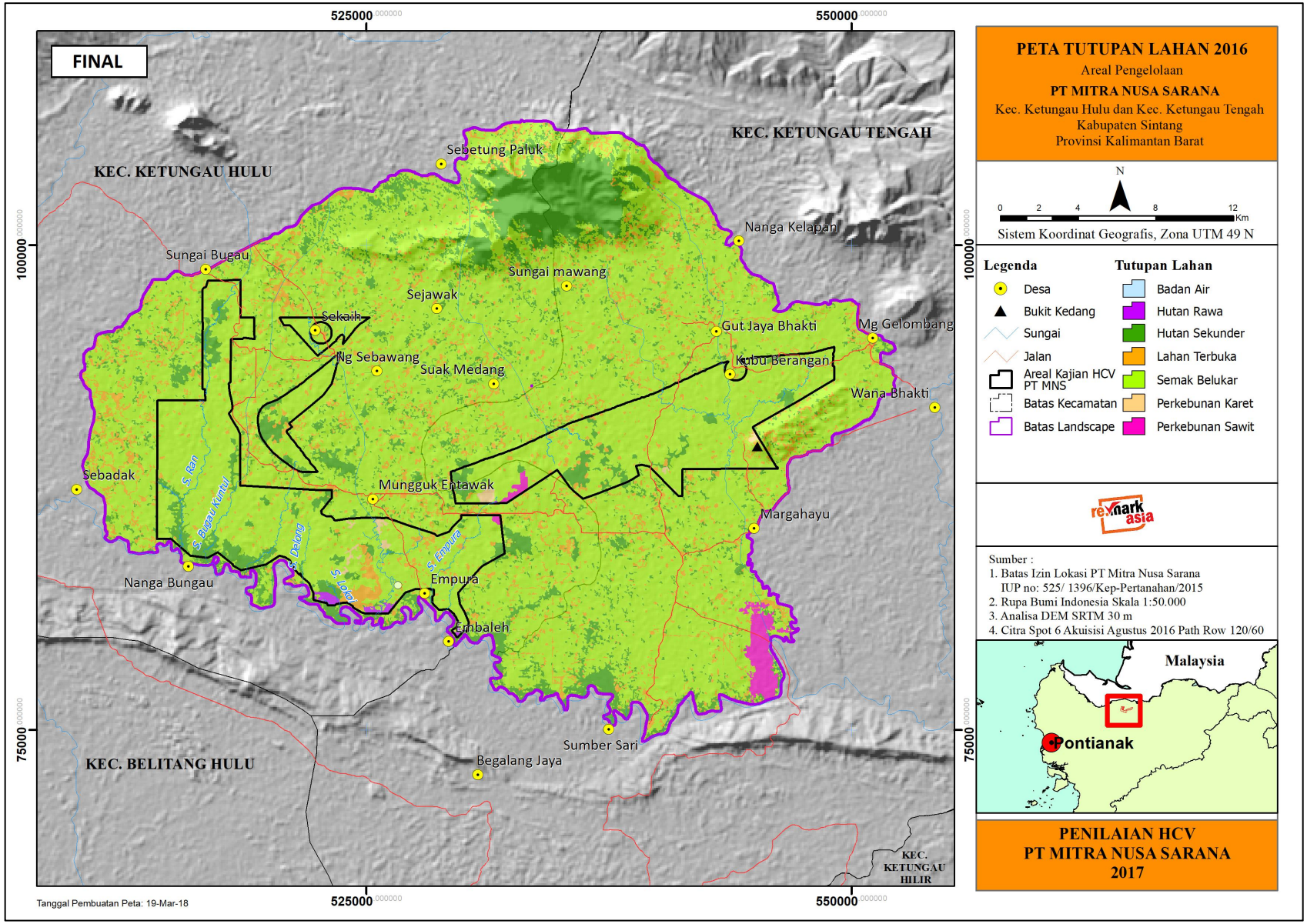


Figure 5 .Interpretation Result Satellite Imagery Landsat in PT MNS

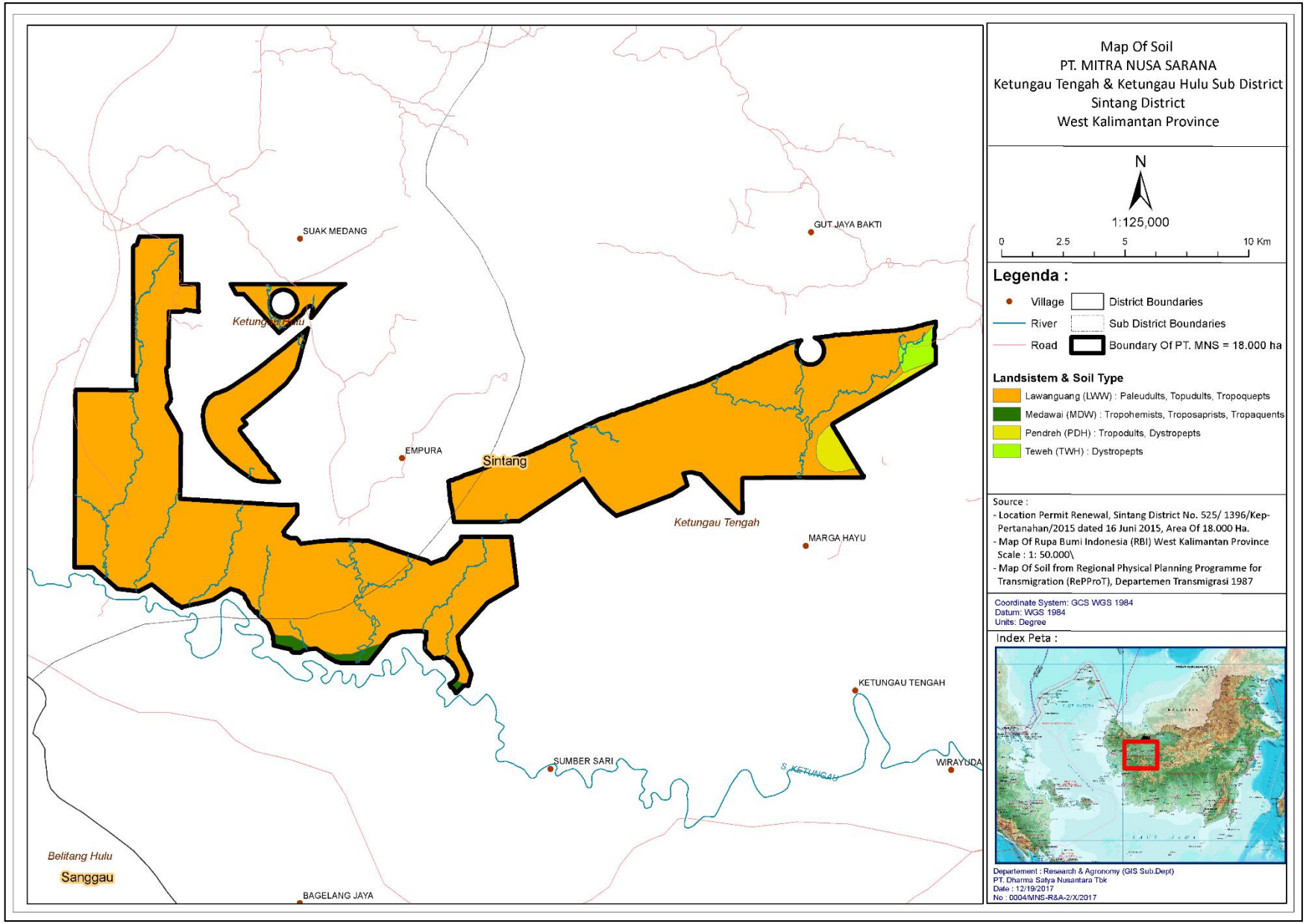


Figure 6. Maps of Soil Type PT MNS

Chapter 2

2. Assessment process and methods

2.1 SEIA Assessment

2.1.1 Assesor Credentials

a. AMDAL (Environtment Impact Assesment)

Composition team of AMDAL :	
Leader	**:** Ir. Iswan Dewantara, M.M.A
Physical chemistry	**:** Dr. Farahdiba, S. Hut, M.Si
	Ir. H. M. Idham, M. Si
Biology	**:** Dra. Siti Khotimah, M. Si
	Ir. Iskandar, AM. M. Si
Social, Economic and Cultural	: Ir. Erianto, MP
	Ilias, S.Pd. I
	Sri maryati, SE
	Zailani, B. Sc
Healthy Sociality	: Nurhayati, SKM
GIS	: Zuhry Haryono, S. Hut

b. SIA (Social Impact Assessment) conducted by :

Social Impact Assessment conducted by : PT Remark Asia

Address Jl Bantarjati Atas RT 002 RW 002 Kelurahan Bantarjati

Bogor Utara Sub District, Bogor District, West Java

Telp: 62-21- 8359766

Email:

Composition team :

1. **Sigit Pamungkas – Leader of Socio-cultural Assessment Team.**

   Sigit completed his Bachelor degree in Agricultural Science, Faculty of Agriculture, State University of Jember and experienced in 'Tobacco Growers Communities Development' since 1990 for Philip Morris Inc. Marlboro cigarette manufacturer. Since 2004, he has been active as an auditor for CAFÉ Practice Program in Indonesia and Papua New Guinea as well as Agriculture Marketing Specialist at NGO International for Rural Agro-enterprise Development (RAeD) program. Receive national and international training for Sustainable Organic, SCS-Starbucks CAFÉ Practice, Rainforest Alliance for Sustainable Agriculture, Forest Management

and Chain of Custody and from DOEN for Roundtable Sustainable Palm Oil and International Sustainability and Carbon Certification (ISCC) from Winrock Int'l . To date there have been several identifications such as "The Social Economic Study of Oil Palm, Social Impact Assessment, Social & Environmental Impact Assessment and High Conservation Value Assessment for several oil palm companies in Indonesia, Malaysia and Papua New Guinea and plantation companies in Indonesia. In 2010 it was accredited by the RSPO as an Approved NKT Assessor - Discipline Specialist for the Identification of HCV 5 and 6 in oil palm, HTI and HPH plantations and by 2015, obtaining ALS Provisional License at NKTRN. Contact: sigit.setyanto@gmail.com.

2. **Aslinda Nur Mazida –** Member of Social-cultural Survey Team

   Graduated from IPB at Faculty of Fisheries and Marine Sciences in 2002, then continued his Graduate School of Bogor Agricultural University in 2007 at Aquatic Sciences Faculty of Fisheries and Marine Sciences. During his college Semeru Mountain Expedition "Observing Water Biota and Water Quality Measures at Ranukumbolo Lake" and conducting the PEMILUKADA Survey of Bogor, West Java. As an Assistant Lecturer D III of Fish Reproduction Technology in Aquaculture Department, IPB and one of DIKTI research team "Aromatase Inhibitor on Maskulinisasi Nilem Fish". Started his career at a private company in 2008. December 2015 to date working as a staff member at PT Remark Asia. The Social Impact Assessment experience began in 2016 - now both in oil palm and HTI plantations located on the islands of Sumatra and Kalimantan.

2.1.2 Methodology

The EIA study was conducted on August 2015 and SIA was conducted on March – April 2017 with field visit on 22 March – 4 April 2017. Village assessment including Empura, Suak Medang, Sungai Bugau, Nanga Bugau, Sekaih, Mungguk Entawak, Embalih, Mungguk Gelombang, Kubu Barangan villages on Central Ketungau and Ketungau Hulu Sub District, Sintang District, West Kalimantan PT MNS. The study done in six methods are :

1) **Library Studies**; This method is used to gain an understanding of the social and environmental context of the identification area, carried out in the early stages prior to the field and at the stage of yield analysis;

2) **Dialogue;** This method is used to identify stakeholders, explore the issues that impact, explore expectations, ideas and aspirations to get a solution to the issues that occur, conducted through meetings both formal and non-formal and on specific topics (Focussed Group Discussion);

3) **Field Observation;** This method is used to directly understand the field facts which indicate the occurrence of social issues and impacts that occur;

4) **In-depth Interviews;** To explore and gain a deeper understanding of the issues raised by in-depth interviews with selected key figures who were respondents. Respondents' choice is based on the knowledge they have or the perpetrator or the direct feelings of an impact.

5) **Triangulation**; The above methods are done in an integrated way to verify each other against the issues, opinions, and emerging ideas.

6) **Social-Learning Cycle;** Social Impact Assessment is not a one-time linear process, but a cyclic process that serves as social learning processes to respond to the environmental changes that occur.

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

- **Study Preparation and Pre-assessment.** This activity aims to collect basic information (both spatial and non-spatial information), either in the form of information data sourced from publications (study reports, journals, books, statistical data, etc.) or through communications with parties deemed to have information , Knowledge, or experience related to social issues at the study site (socio-cultural of the local community, community history and demography, history of social conflict, regional development, government policies and plans, etc.).

  Activities identifying community profiles, identifying potential key stakeholders, defining the scope of the study, defining methods, and designing social surveys are conducted through a Focussed Group Discussion (FGD) process which is attended by all team members and headed by the team leader. If required, the team may invite related parties or other related parties as resource persons.

- **Field Activity.** This activity aims to collect data and information and examine the social impact directly in the field. The sequence of activities in the field is as follows:

  a) **Opening Meeting.** This activity is intended to convey the purpose of Social Impact Assessment, scoping, arranging field work teams, and agreeing on daily activity schedules.

In this activity also carried out basic training activities (introduction) about Social Impact Assessment: about the background, purpose and objectives, concepts and how to identify it.

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

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

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

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

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

- **Social Impact Assessment, Analysis and Prediction of Social Impact**. This activity aims to process and analyze more comprehensively and thoroughly on all field results and to confirm, clarify, and revise on special cases based on the opinion of employee and community around

PT MNS. The results are then re-presented PT MNS for inputs and improvements. Social impact analysis and prediction activities were conducted at the Remark Asia Office in Bogor. Whereas if necessary presentation / expose can be done in Company office.

- **Report Writing (Draft).** This activity is in the form of writing workshop, ie all members of the SIA Team meet, discuss, review together, and test the results of analysis and mapping, to then prepare a report. Reports are prepared in a format and systematics that can be accounted for, but also coherent and simple, accompanied by a visual presentation, so easy to read and understood by the Management Unit of the garden and company. The output of this stage is the Draft Report. Furthermore, Draft Reports are submitted to the Company for scrutiny, input and correction if there is any error in the data and information. Furthermore, this draft report document is sent back to the Remark Asia SIA Team to be refined.
- **Report Writing (Final).** This activity is focused on incorporating relevant suggestions from the company and from others considered important to be included as part of the Final Report. The output of this stage is the Final Report.

2.2 LUC Assessment

2.2.1 Assessor Credentials

Land Use Change conducted by :

PT Gagas Dinamiga Aksenta

Alamat Lindeteves Trade Center Lantai UG Blok A26 No. 2

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

Jakarta Barat DKI Jakarta

Composition team

1. Ryan Karida Pratama
2. Pungki Alim Febriani

2.2.2 Methodology

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

a. Choosen Relevant time of clearance period

The assessment was conducted over several cut-off period refers to the RSPO Remediation and Compensation procedures, namely (i) before November 2005 (RSPO Principles & Criteria was first applied), (ii) November 2007 (deadline for the trial of

RSPO Principles & Criteria implementation), (iii) January 2010 (the RSPO New Planting Procedure was effective), (iv) December 2012 (PT Dharma Satya Nusantara as holding company became a member of RSPO), and (v) Juni 2017 (interim report of HCV Assessment was received by PT MNS). Land cover change analysis was not done in the period where some subsidiaries of PT DSN obtained certificate of RSPO (March 2014), because it is beyond the cut-off of PT MNS HCV Assessment (Juli 2017)

b. Date of satellite image acquisition for each time of clearance period

Land use change analysis was done by using satellite images from several dates of acquisition. Ideally, the use of satellite image is acquired in the cut-off date (early November 2005, end of November 2007, early January 2010, end of November 2013). However, in some cases, the quality of satellite images in cut-off acquisition date did not qualify for land cover change analysis (eg the satellite image was dominated by cloud cover). So that the satellite image used was the nearest satellite image acquisition of cut-off date.

In the land cover change analysis, three types of satellite images were used, namely (i) Landsat 5 TM with 30 m spatial resolution and (ii) Landsat 7 ETM + with 30 m spatial resolution, and (iii) Landsat 8 OLI with 30 m resolution. Satellite images of Landsat 7 ETM + has a very high noise level, because there were pixels that were not interpreted due to stripping, so it took some satellite images as fillers.

c. Analysis Stages and Process

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

- Image Pre Processing
  - **Satellite image acquisition**. The process of downloading and ordering of satellite images.
  - **Rectification.** The process of geometric correction is done if satellite image with geometric shifting is found where the object's position on a satellite image is not the same as the position of the corrected image. The allowed

value of RMSE in this process is 0.05, where the RMSE value of the object's position in a satellite image overlaps with other.

- **Root Mean Square Error (RMSE) Classification.** Errors that may be done during classification, this value is obtained when the rectification on the satellite image is conducted.
- **Image Filling.** Inserting process on each satellite image noise that has stripping by using image filler with mosaic method.
- **Resolution Sharpening.** Performed only on the latest satellite images, which are the satellite images in 2014, using Landsat satellite image panchromatic band 8 with 15 m spatial resolution, generating multispectral satellite image with 15 m resolution.
- **Histogram Equalization**. Equalization of contrast and brightness on the entire satellite images used in the analysis.

- Image Classification : Supervised Classification/ Visual Interpretation

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

d. Field & Verification

- Sampling Method

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

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

Where:

n = Number of samples

N = Number of populations

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

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

the field is known (Expert judgment).

e. Validating the land cover data

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

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

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

g. Identifying the loss of social HCVs

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

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

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

i. Vegetation Coefficients

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

2.3 Fragile Soil Assessment

2.3.1 Assesor Credentials

Fragile Soil Assessment conducted at the same time with High Conservation Value and Social Impact Assessment by :

PT. Remark Asia

Jl. Ciremai Ujung No. 17 A Rt 02/02

Kel. Bantarjati Kec. Bogor Utara (16153)

Bogor, Jawa Barat – Indonesia

Telp :0251 8359766, 085100954639

e-mail : re-markasia@re-markasia.com

Tabel 2.1 Composition team Fragile Soil Assessment

No	Name	Position	Skill
1	SIGIT BUDHI SETYANTO	Lead Assesor	Social Cultural Assesor (ALS15024BS)
2	FADHLI	Member of Team HCV	Social Cultural Assesor
3	DERA SYAFRUDIN	Member of Team HCV	Ecology Assesor
4	MARLAN	Member of Team HCV	Ecology Assesor
5	R.SUKASMIANTO	Member of Team HCV	Enviromental Assesor
6	DIAN PRATIWI	Member of Team HCV	GIS Assesor

2.3.2 Methodology

The assessment process described in this report is as follows:

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

2.4 GHG Assessment

2.4.1 Assesor Credentials

GHG Assessment based on Carbon Stock Assesment conducted by: Ata Marie

Name	Qualification	Position
Alex Thorp	B. For. Sc.	Project Manager
George Kuru	M. For. Sc.	Inventory Data processing
Dadan Setiawan	S. Hut	Senior GIS Engineer
Dadi Ardiansyah	S. Hut	Field forester responsible for carbon inventory and Participatory Land Use Mapping
Indri Amrita S	S. Psi	Community Engagement Leader
Dyah Ayu Putri Pertiwi	S. Hut	GIS Engineer
Ambriansyah	S. Pendidikan	Botanist

2.4.2 Methodology

2.4.2.1 Methods and Carbon Stock Assessment Procedures

1. **Approach**

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

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

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

a. **Stems per hectare**

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

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

b. **Tree Biomass**

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

$\mathbf{AGLB}_i = 0.0776[\rho_i D_{2i} H_i]_{0.940}$

Where: AGLB = Above ground live biomass in kilograms

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

H = Total tree height in metres

ρ = Specific gravity in grams per cubic centimetre

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

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

1. Global Wood Density Database. Chave J, Coomes DA, Jansen S, Lewis SL, Swenson NG, Zanne AE (2009), Towards a worldwide wood economics spectrum. Ecology Letters 12(4): 351-366.
2. Preference is given to wood density estimates from Indonesia and South-East Asia, in order of priority. IPCC (2006): 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 4. Table 4.13 – Basic Wood Density of Tropical Tree Species.
3. Where no wood density was available for the species, there were assigned a wood density value of 0.585 g/cm_3.
4. This figure was derived from the weighted average wood density of tree species in the forest inventory with identified wood density estimates.

c. **Palm Biomass**

The equation used for estimating palm biomass was:

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

For palms, specific gravity is assumed to be 0.247 tonne per green m_3

d. **Tree and Palm Carbon Content**

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

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

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

e. **Carbon Mass per Hectare**

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

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

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

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

Carbon Estimate Precision

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

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

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

Where: t is the Student's t value,

α determines the level of confidence

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

Significant Difference between Strata

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

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

Reff:

HCS Assessment Report of PT Mitra Nusa Sarana by Ata-marie, Sept 2017

2.4.2.2 Methods and procedures GHG assessment

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

i) Land clearing;

ii) Manufacture of fertilisers and transport to the plantation;

iii) Nitrous oxide and carbon dioxide resulting from the field application of fertilisers and mill by-products and other organic sources such as palm litter;

iv) Fossil fuel used in the field (mainly for collection of FFB);

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

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

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

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

ii) Carbon dioxide fixed by biomass in conservation areas;

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

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

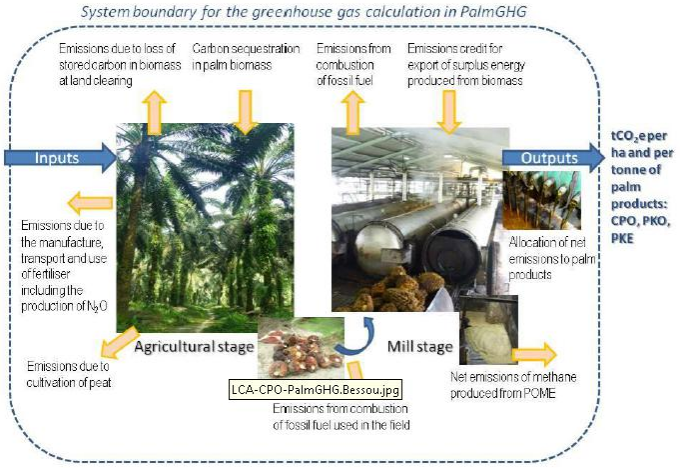


Figure 7. System Boundary of Palm GHG

2.5 HCV Assessment

2.5.1 Assesor Credentials

High Conservation Value and Social Impact Assessment were conducted by :

PT. Remark Asia

Jl. Ciremai Ujung No. 17 A Rt 02/02

Kel. Bantarjati Kec. Bogor Utara (16153)

Bogor, Jawa Barat – Indonesia

Telp :0251 8359766, 085100954639

e-mail : re-markasia@re-markasia.com

Tabel 2.2 Composition team HCV Assessment

No	Name	Position	Qualification
1	SIGIT BUDHI SETYANTO (ALS15024BS)	Lead Assesor	Expert in socio-cultural study, community development, conflict mitigation, participatory mapping, FPIC and CSR. Experienced in HCV and SIA assessments since 2008.
2	FADHLI	Member	Expert in socio-cultural study, community development, participatory mapping and FPIC
3	DERA SYAFRUDIN	Member	Expert in ecology and biodiversity assessment
4	MARLAN	Member	Expert in ecology and biodiversity assessment
5	R.SUKASMIANTO	Member	Expert in environmental services assessment
6	DIAN PRATIWI	Member	GIS Expert
7	RHAMA BUDHIANA	Member	Expert in ecology and biodiversity assessment
8	DWI BUDI SISWANTONO	Member	GIS Expert

2.5.2 Methodology

The assessment process described in this report is as follows:

1. **Pre Assessment.**

   In this phase, we identified data and information related to the assessment activities as follow: 1) socio-economics, 2) biodiversity, 3) environment, 4) demography, 5) bio-physical aspects, and 6) basic spatial data (e.g. village location, road networks, etc.).

According to these data, desktop analysis was then undertaken to identify potential areas considered as HCV areas. We refer to the 2008 Indonesian version of HCV Toolkit (*Konsorsium Revisi* HCV Toolkit Indonesia 2008) and 2013 HCVRN common guidance (Ellen Brown et al. 2013) as our guidelines in this HCV assessment. Result generated from this pre-assessment phase was used to determine Tier Rating and field work design.

To obtain an overview of land cover changes in the assessment area, spatial analysis was undertaken at pre-assessment by comparing past land cover using land cover and land use data from the Ministry of Forestry (Direktorat Jenderal Planologi Kehutanan 2014). For the latest land cover interpretation data use the best quality satelite image available for the assessment area using LANDSAT satellite images followed by further verification during field assessment.

2. Desk Study dan Field Exercise

Preliminary study was initialized with desk and documents review on the fourth week of March 2017 to determine the assessment areas, based on legal aspects, land covers, biodiversity, social condition, economy, and potential/existing conflicts. Discussions between PT Remark Asia and PT MNS were then conducted to reach a consensus on field work activities and total assessment area. From the scoping process, we identified an 18.000 ha-area of PT MNS as our assessment area.

3. HCV assessment – field work method

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

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

Identification of HCV 1, HCV 2 and HCV 3 was performed by determining the sample areas at the assessed location. A random sample stratification is determined by

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

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

In identifying and measuring threats to HCVs, it is conceptually conducted to look at the causal sequence of threats and spatially to see potential threat sites that have occurred as well as potential threats in the future. To understand the threats to identified HCVs is an important step in making management decisions to protect and/or enhance these values (Stewart et al., 2008). Source of threats can be identified from scientific references, determining their parameters and thresholds. Further, current and past threats were identified during field works, discussion with the company, and public consultation. Observation points during HCV identification activities within PT MNS permits area are presented in Figure 8.

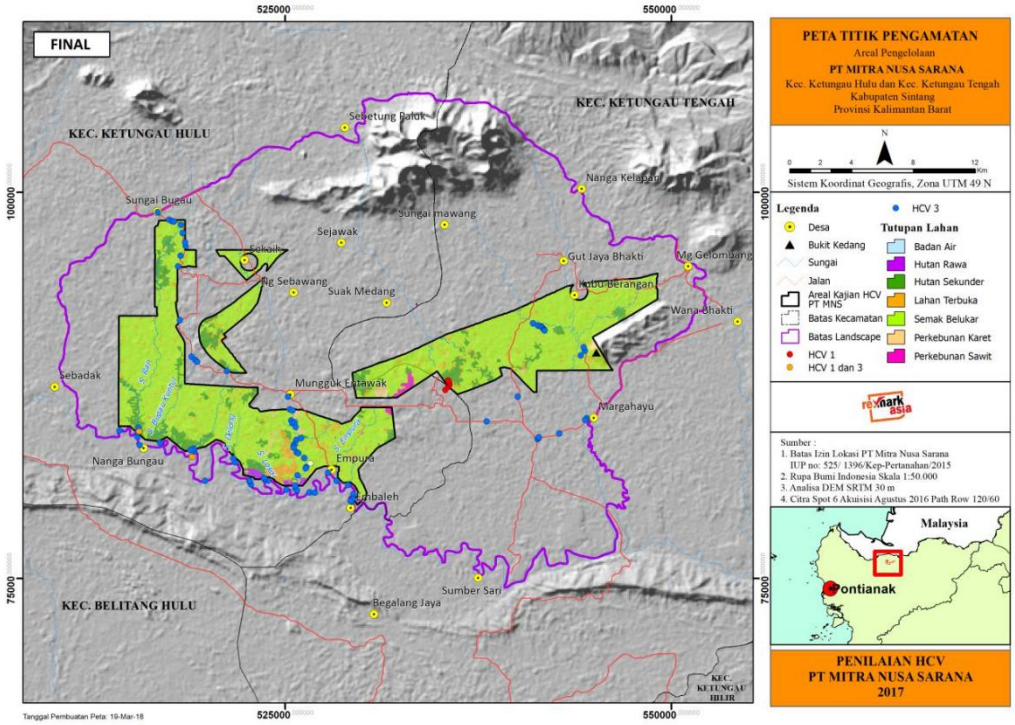


Figure 8. Map of Observation during identification of HCV Management Area in PT MNS

4. Potential threat

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

5. Reference

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

6. Public Consultation

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

For HCV 1-3 identification purpose, we consulted with local communities about the history of natural resource utilization, their current existence, locations and distribution of RTE species, and threats, HCV 4 identification, services provided by surrounding environment, directly used by local communities, and their utilization history were discussed. Also, discussion about regulation related to environmental services provision and protection was undertaken with the local authority/management unit and regarding HCV 5-6, consultations with local communities are utterly fundamental to identify and verify: land use history; sites and resources fundamental for satisfying basic needs for local communities; the origin; sacred and religious sites; archeological or historical significance for the traditional cultures; their past and current status; as well as their management planning in the future.

Summary of recommendations gathered from related stakeholders and approaches undertaken by the consultant team were presented on Table 2.3 below.

Table 2.3. Description of Stakeholders' Recommendations Related to HCV assessment processes

Stakeholder's Recommendations	Consultation Approach
Local communities as users of environmental services or ecosystem products, such as: collect fish from rivers or use water from rivers found in the identified HCV areas.	Interview during field survey. Present HCV result and discussion during formal meeting.
Institutions represent the local communities are: village governments (from 9 villages), sub-district governments (2 sub-districts), NGOs, Institute of Dayak Iban Ketungau and Dayak Embarak	Interview during field survey. Present HCV identification activities, preliminary results, followed by discussion on formal meeting.
Relevant government institutions are: Life Environment Agency, Crop Estate and Forestry Department.	Interview and discussion on preliminary results, followed by discussion on formal meeting.

The whole series of HCV assessment on PT MNS permit area was carried out from March to early April 2017, as follows :

Table 2.4. Time schedule HCV Assessment

Time schedule HCV Assessment PT MNS

Phase	Aim	Activity	Date
Pre-field			
Pre-assessment and Preparation	• Identify potential and indication of HCV attributes on the assessment areas • Identify areas that contain potential HCV indications. • Attain deep understanding about the assessed landscape • Analyze recent conservation issues and potential menaces towards HCV areas. • Determine method, survey plan, team member, and time frame.	• Collect preliminary data and information from the company side • Gather secondary data and information from existing reports, journals, books, statistics, basic maps and informants • Undertake data and spatial analysis	19-20 March 2017
Field work			
Opening meeting & Basic Training on HCV	• Deliver aims and objectives of HCV assessment • Acquire additional data and information related to plantation establishment and management • Develop common understanding with the company about HCV background, aims and objectives, concept, HVC types, attributes and key elements, and identification method • Establish a team work for HCV identification activities, including representations from the company side and reach an agreement about the timeframe	• Workshop with the company management unit • HCV training for the company management unit/staff	23 March 2017
Initial socialization	• Present the purpose and objectives of HCV	Socialize the desired goals and results of the HCV	23 Maret 2017

Phase	Aim	Activity	Date
(Scoping)	identification • Obtain data and information as well as major issues directly from community and government representatives • Verify information from desk study results. • Identify key issues that should be covered during the assessment • Make contact with stakeholders and community representatives and arrange visits to villages	assessment plan	
Participatory mapping	• Clarify potential HCV areas resulted from pre-assessment activity • Collect additional data and information related to HCV elements and attributes	• Workshop with key informants	25 March 2017
Field survey	• Verify the existence of HCV attributes and elements • Identify HCV areas being present, map the indicative HCV boundaries • Identify threats and potential threats for HCV areas	• Land cover ground checking • Field data collection • Interview and triangulation	25-31 March 2017
Stakeholder consultation	• Inform associated stakeholders (local governments, local communities, and local NGOs) about the HCV assessment results • Gather additional information and clarification about the presence of HCV attributes, elements and threats • Compile suggestions and recommendations, as well as options for HCV management and monitoring	• Meeting/workshop with key institutions/stakeholders • Focus Group Discussion (FGD) with related key stakeholders • Interview with key informants	3 April 2017
Closing meeting	• Inform the interim-results and report of HCV identification for company management unit	• Presentation and discussion • Submit interim-report	3 April 2017
Post field work			
Analysis and reporting	• Submit final HCV report, presented in a systematic and scientific writing style, that can be easily understood by users.	• Data analysis • Spatial analysis • Report writing	May 2017- Jun 2017
Peer review	Review process by other experts (experts) in order to meet the standards of disciplines and analysis and multi-disciplinary study.	Review and revised report	Sept – Nov 2017
Quality panel	Review process by Quality panel HCVRN	Review process and revised report	Nov – Dec 2017

2.6 FPIC Process

2.6.1 Assessor Credentials

FPIC Assessment were conducted by :

Dept. CSR of PT Mitra Nusa Sarana

Address : Gedung Sapta Mulia Center Jl. Rawa Gelam V Kav. OR/3B

Kawasan Industri Pulogadung

Telp: 62-21- 4618135

Email : agustinus.triwibowo@dsngroup.co.id

Composition Team :

1. **Imanuel Tibian**, Trained by LINKS
2. **Garis.** Trained by LINKS
3. **Mangin Christian**
4. **Jufry Ibrahim**
5. **Iyus Supirman**

For implementation of FPIC, DSN Team accompanied with Atamarie.

2.6.2 Methodology

The assessment process described in this report is as follows

A. Community Engagement Activities

Community engagement activities included the following

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

B. Opening meeting

The primary objectives of the Opening Meeting were:

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

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

Initial consultations were started with introductions and a dicussion about the HCS, HCV and SIA assessment processes, activities and outcomes, and the rights and roles of communities in the assessment process. This was followed by a question and answer session. After the initial discussion, FGD were held to collect information focussing on

land use, land tenure, food and water security, sacred site identification and concerns and expectations

D. Participatory mapping

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

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

The participatory mapping exercise included the following activities:

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

Chapter 3

3. Summary of findings

3.1 SEIA Findings and Results

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

- Positive Impact

  There is balance results for (potential) positive and negative impacts at PT MNS based on SIA Remark Asia studies, i.e

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

- Negative Impact

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

  a. The community concerns over declining forest area and conversion land to oil palm plantation will results the loss of full ownership of community land
  b. Concerns of pollution in river water
  c. Public perception if company has operating can decreasing empty land to be processed.
  d. The awareness of the existence of layoffs of local workers with the presence of workers from outside the village / outside Sintang because quality of workers

e. To bring in labor from outside the village can provoke emotion, social jealousy and weaken the bargaining position of some local people to become a workforce in the company
f. Concerns about the location of plasma far from village.
g. Community concerns about changes in farming patterns from rice cultivators, planters and rubber plantations to oil palm plantations
h. Negative attitudes towards CSR programs that have not been realized.
i. The community considers that the company has not been serious in handling programs that lead to the development, improvement of village physical facilities (roads, educational facilities, infrastructure, health, worship, etc.), although the community is aware that PT MNS is still in the process of preparing and has not operated the process development of oil palm plantations.

- *Public Expectations*

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

a. Educational programs (honorariums for elementary school teachers, assistance for teaching and learning tools, PAUD building assistance, kindergartens and facilitation of elementary education infrastructure facilities, awarding scholarships for outstanding students)
b. Health program (development assistance and facilities of polindes, guidance of posyandu, free medical treatment from company, assistance for clean water infrastructure).
c. Economic program (Plasma scheme).
d. Environmental programs, such as: support for the improvement of village facilities and infrastructure, such as (facilitation infrastructure, repair and maintenance of rural roads, making roads to other villages, building roads to community farms, facilitation of mini tower signal HP), facilitation settlement of border areas (facilitation of boundary resolution between Suak Medang Village and Embalih Village, between Kubu Berangan village and Gut Jaya Bhakti Village). Village support / activation concerns fire (the formation

of community teams concerning fire in each village). Agricultural support (fertilizer assistance for rice fields).

e. Programs of religion, culture, social and sport, such as (assistance of village events / PHBN and PHBA, if there is a problem between the community and the company then resolved with customs / respect the customs in the local area)

- *Company Social Activities*

  Social activities is a part invitation of PT MNS. Based on report company social activity over the past few years, the company's social activity programs are :

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

3.2 LUC Findings and Results

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

In 2004, there came the first oil palm company operating in this area, namely PT Makmur Jaya Malindo (PT MJM). However, due to the company's poor management (poor operation), conflict broke out between them and local community. For this reason, the company operation permit was revoked in 2010 by local government. However, the company cleared lands and planted oil palm in 2012 and 2014 in the compensated areas (54.0 ha), which belong to PT MNS Location Permit concession. At the time this assessment was carried out, the lands that previously had been released to PT MJM were already back to community possession, and some parts of PT MJM concession have been taken back by local governments.

Figure 8 to Figure 11 show plant cover maps from 2005, 2007, 2009, 2014, and 2017 according to interpretation satellite imagery. Table 3.1 shows the total results in Hectare (ha) for land cover in plantation for each date. The results interpretation satellite imagery to show areal concession of PT MNS indicated are follow as secondary forest, agroforest, shrubs, bareland, secondary swamp forest.

Tabel 3.1 Land Cover condition in concession HGU PT MNS period 2005, 2007, 2009 2014, 2015, 2017 and 2020

Land cover	November 1, 2005	December 1, 2007	January 1, 2010	May 9, 2014	June 16, 2015	September 28, 2017	March 27, 2020
Secondary Forest	4,810.60	4,363.80	3,756.30	2,884.30	2,593.20	2,154.60	1,691.50
Old Shrub	677.9	767	320.6	145.9	120.5	188.2	185.5
Agroforest	9,644.00	9,124.60	8,357.10	9,177.20	8,534.00	7,795.50	4,985.00
Young Shrub	1,576.30	1,552.40	2,545.50	1,505.70	1,384.90	3,353.70	4,011.60
Bush	-	1,136.20	1,495.00	2,689.20	3,191.30	2,405.10	1,297.80
Bare Land	1,300.70	1,065.50	1,534.90	1,553.10	2,131.50	2,058.30	677.4
Water Body	17.8	17.8	17.8	17.8	17.8	17.8	17.8
Oil Palm	-	-	-	54	54	54	5,160.60
Total	**18,027.20**						

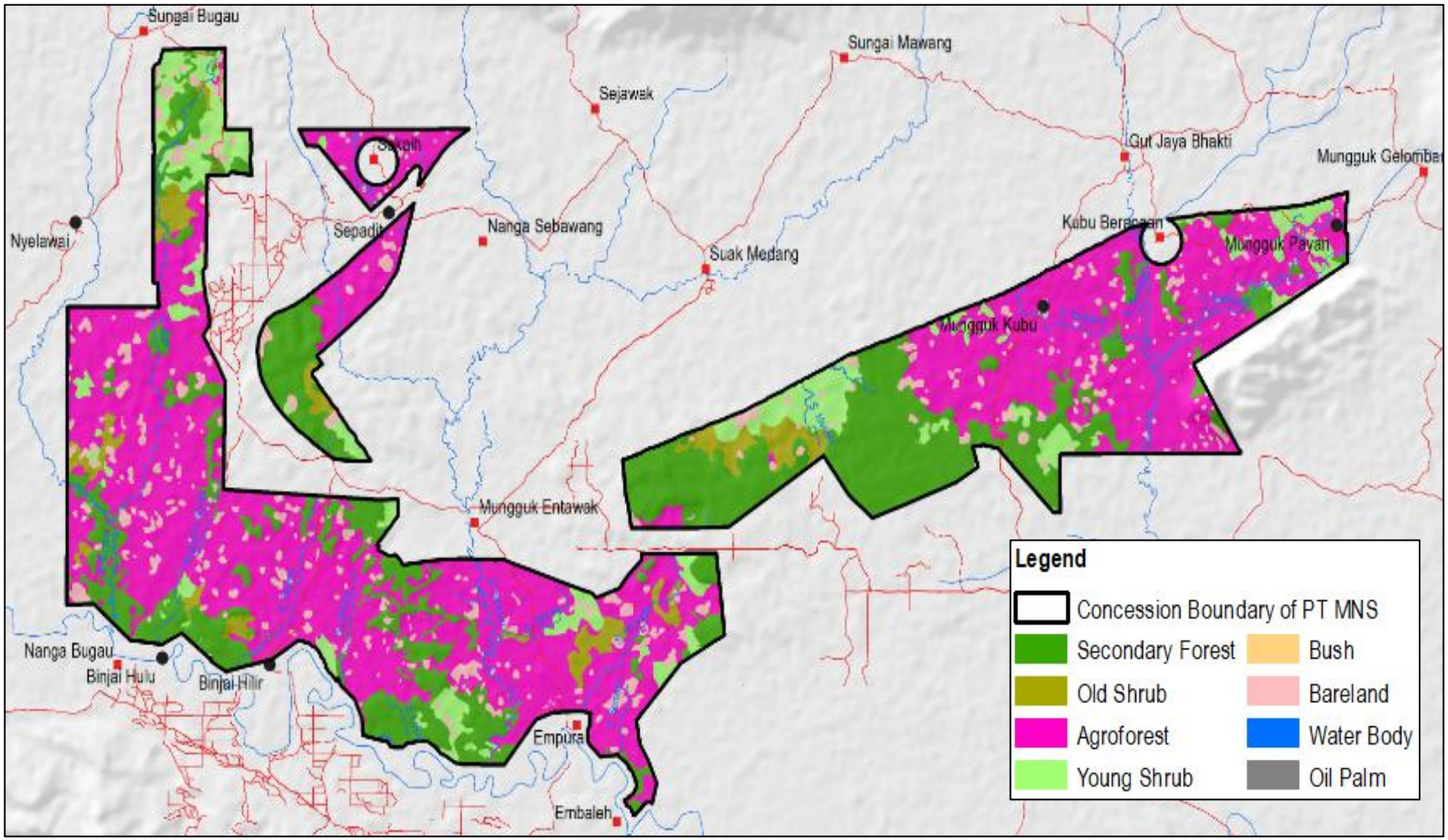


Figure 8. Interpretation Land Cover 2005

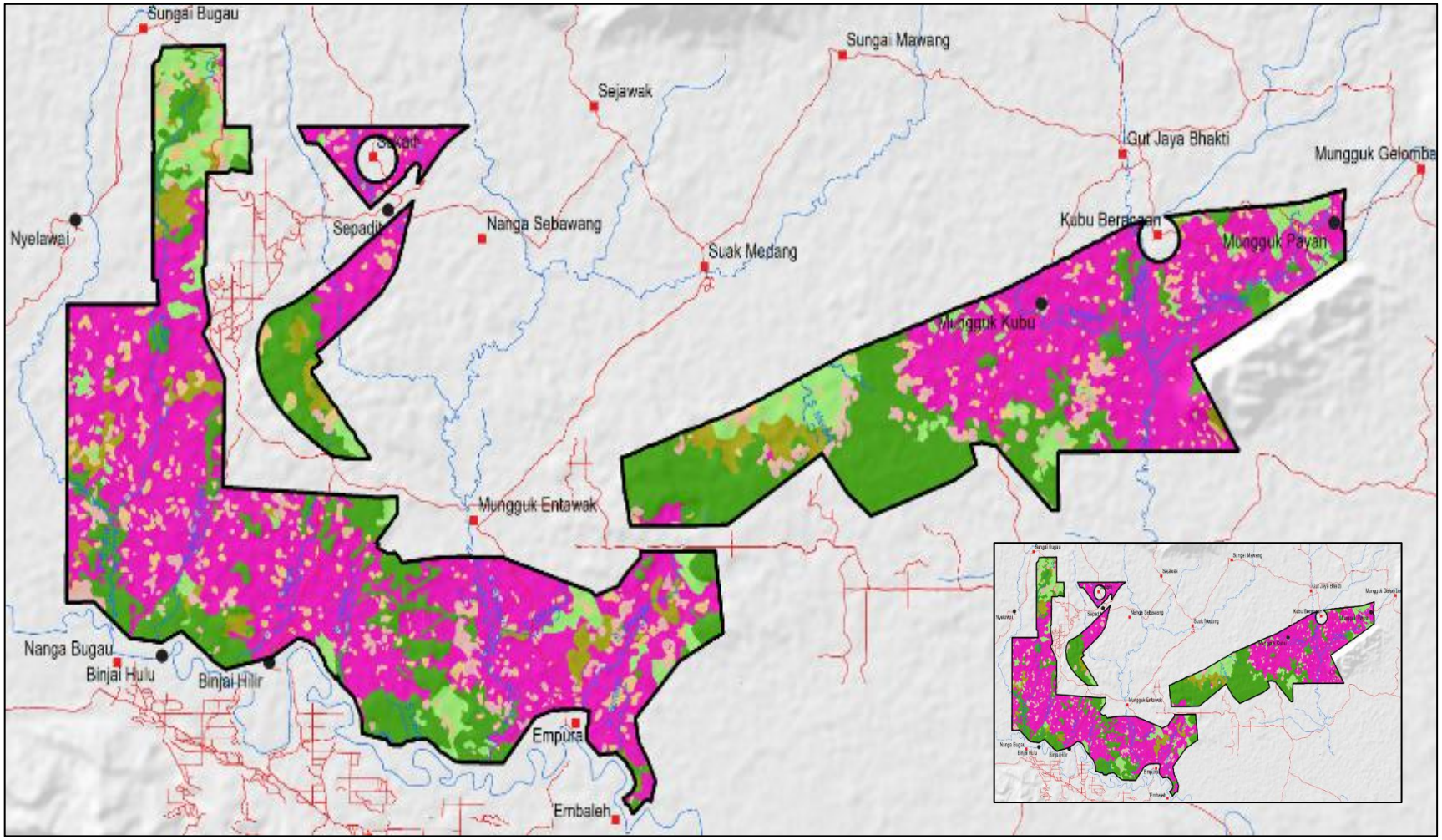


Figure 9. Interpretation Land Cover 2007

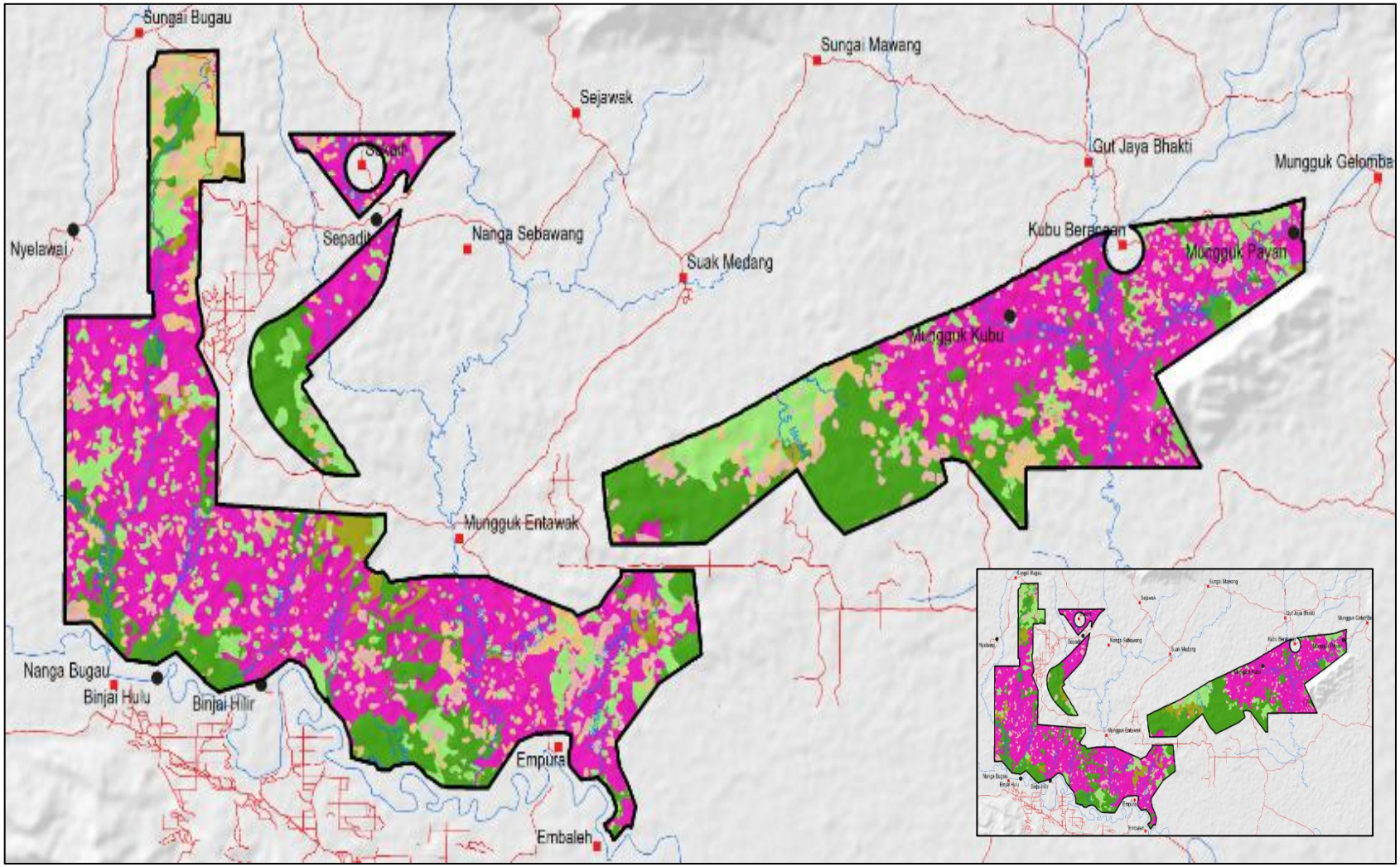


Figure 10. Interpretation Land Cover 2010

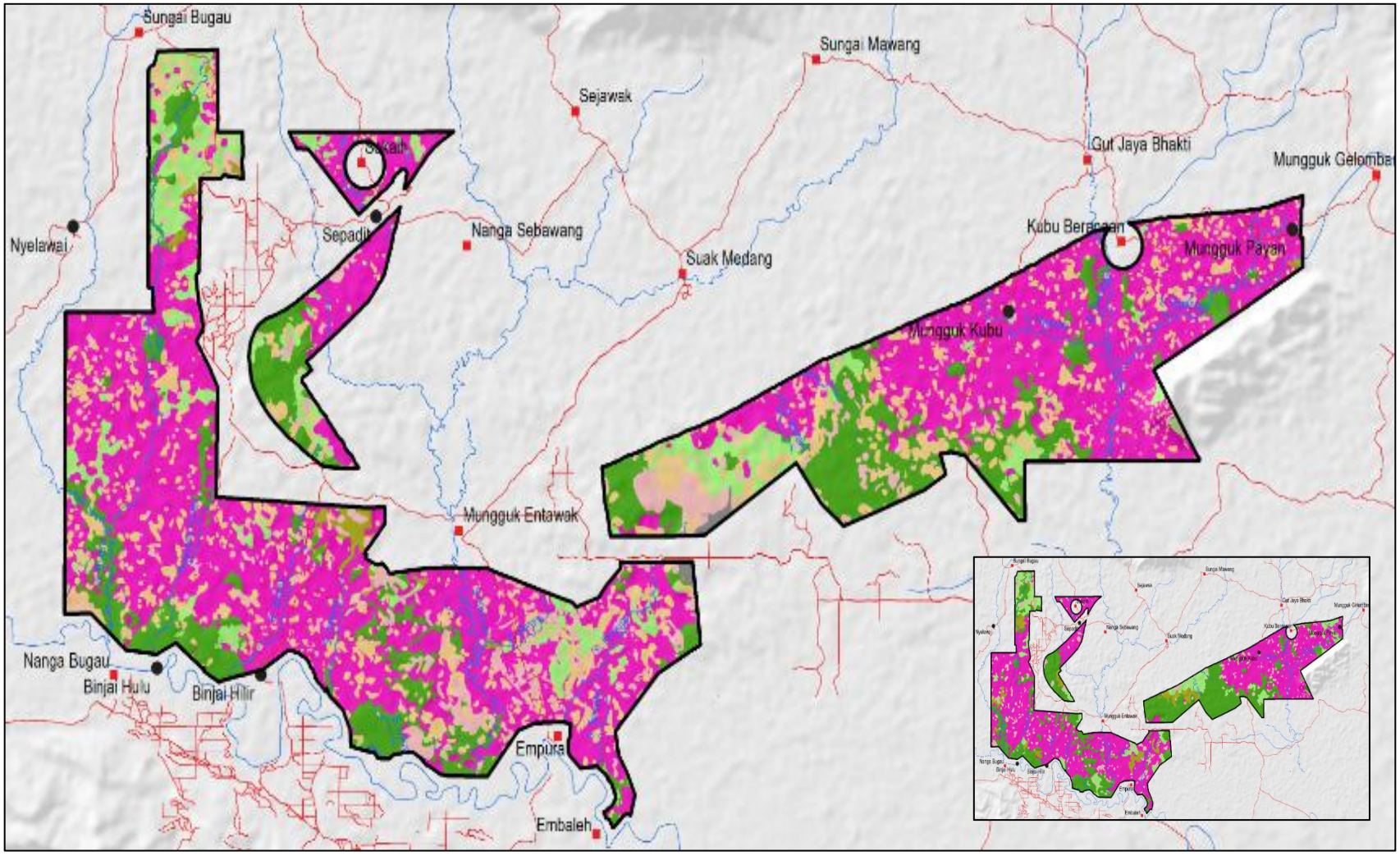


Figure 11. Interpretation Land Cover 2014

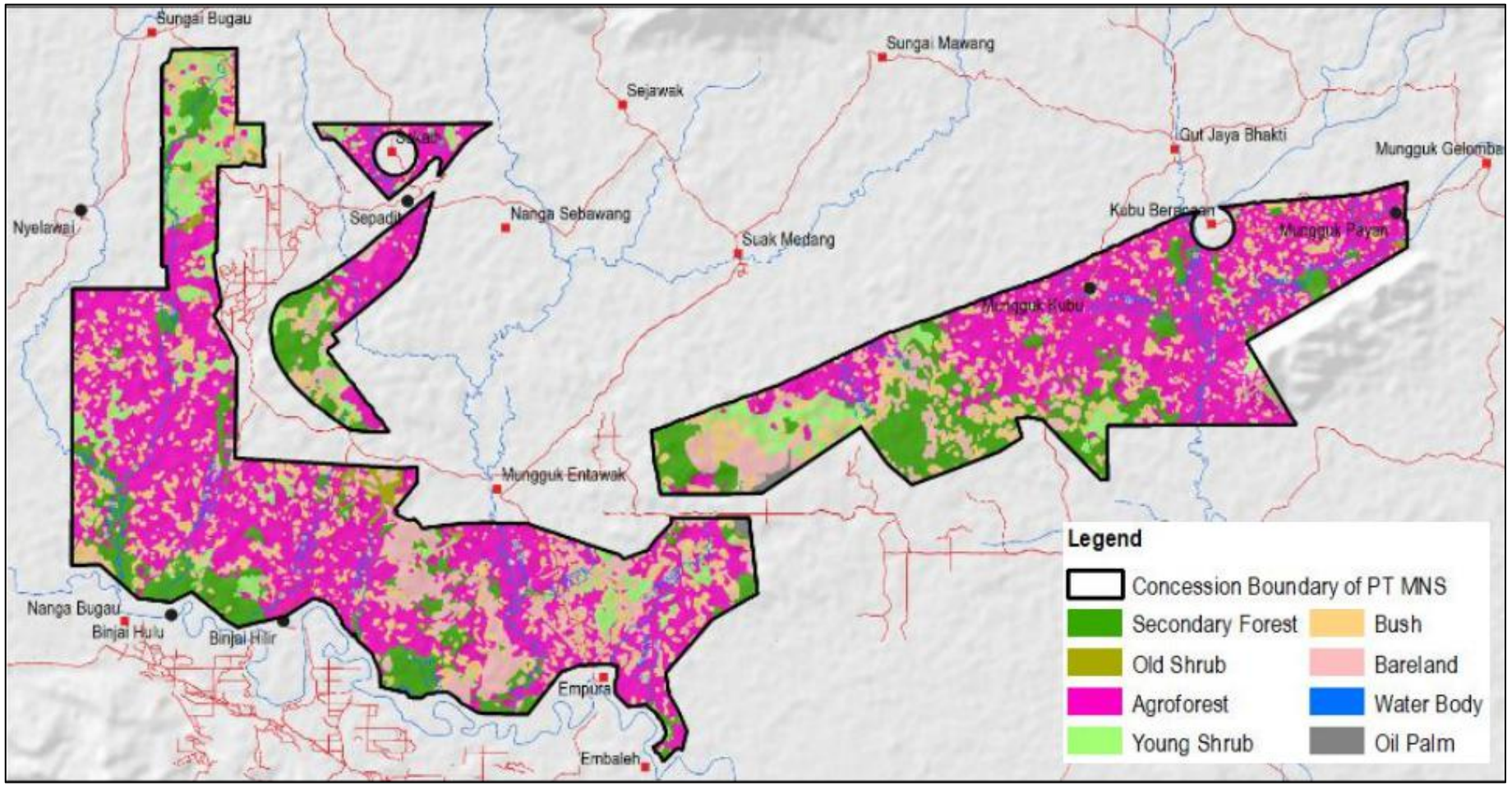


Figure 12. Interpretation Land Cover 2015

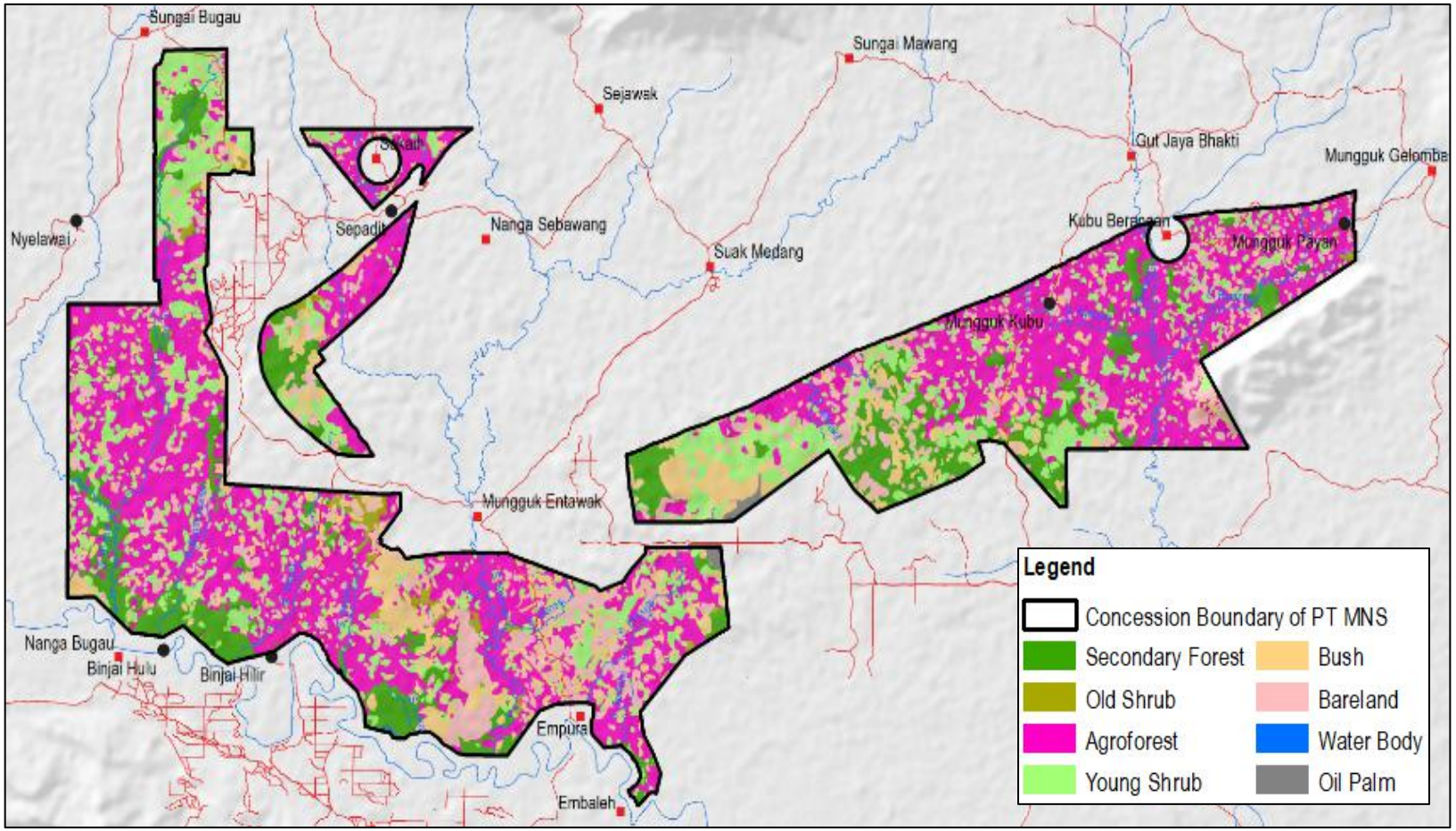


Figure 13. Interpretation Land Cover 2017

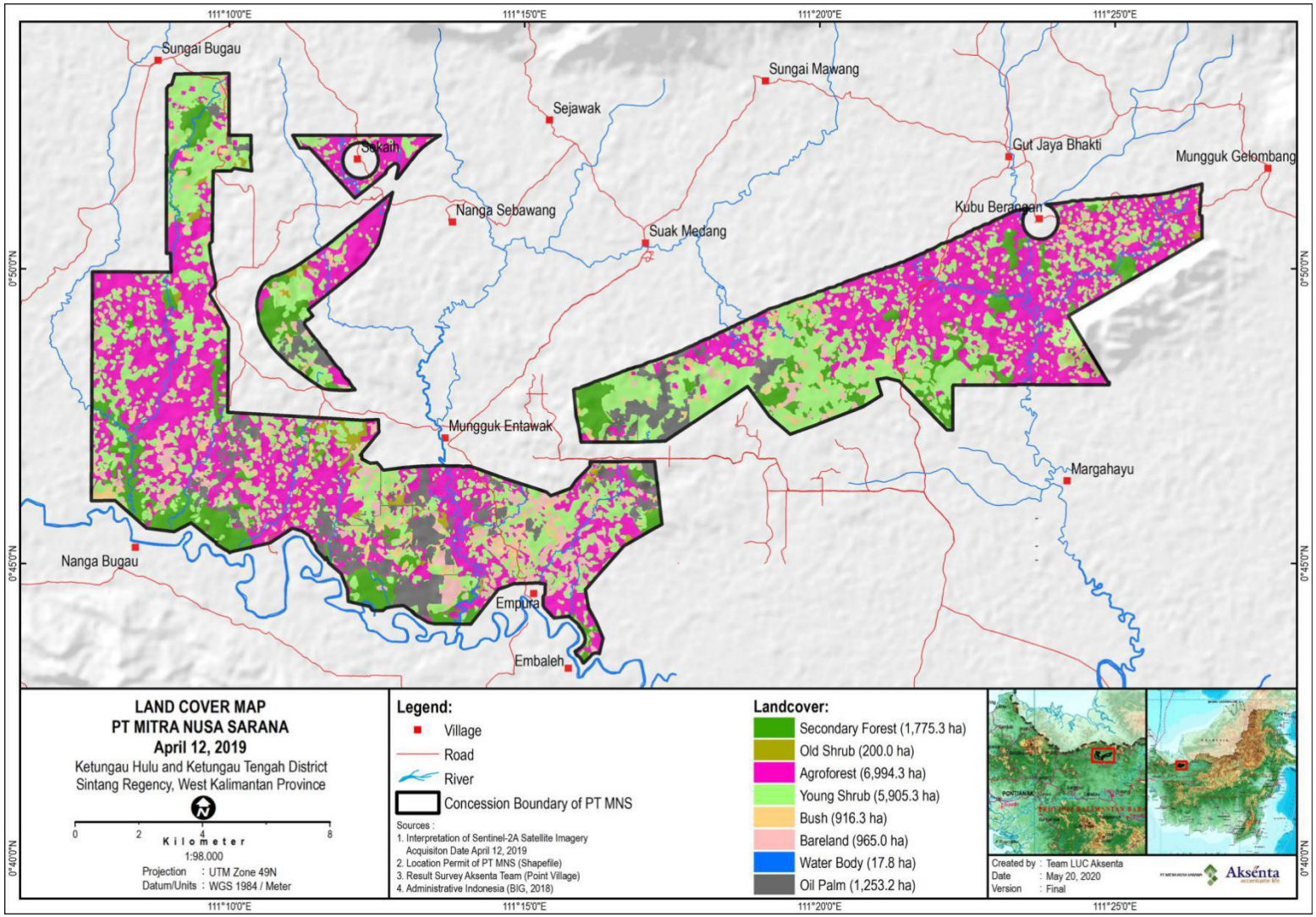


Figure 14. Interpretation Land Cover 2019

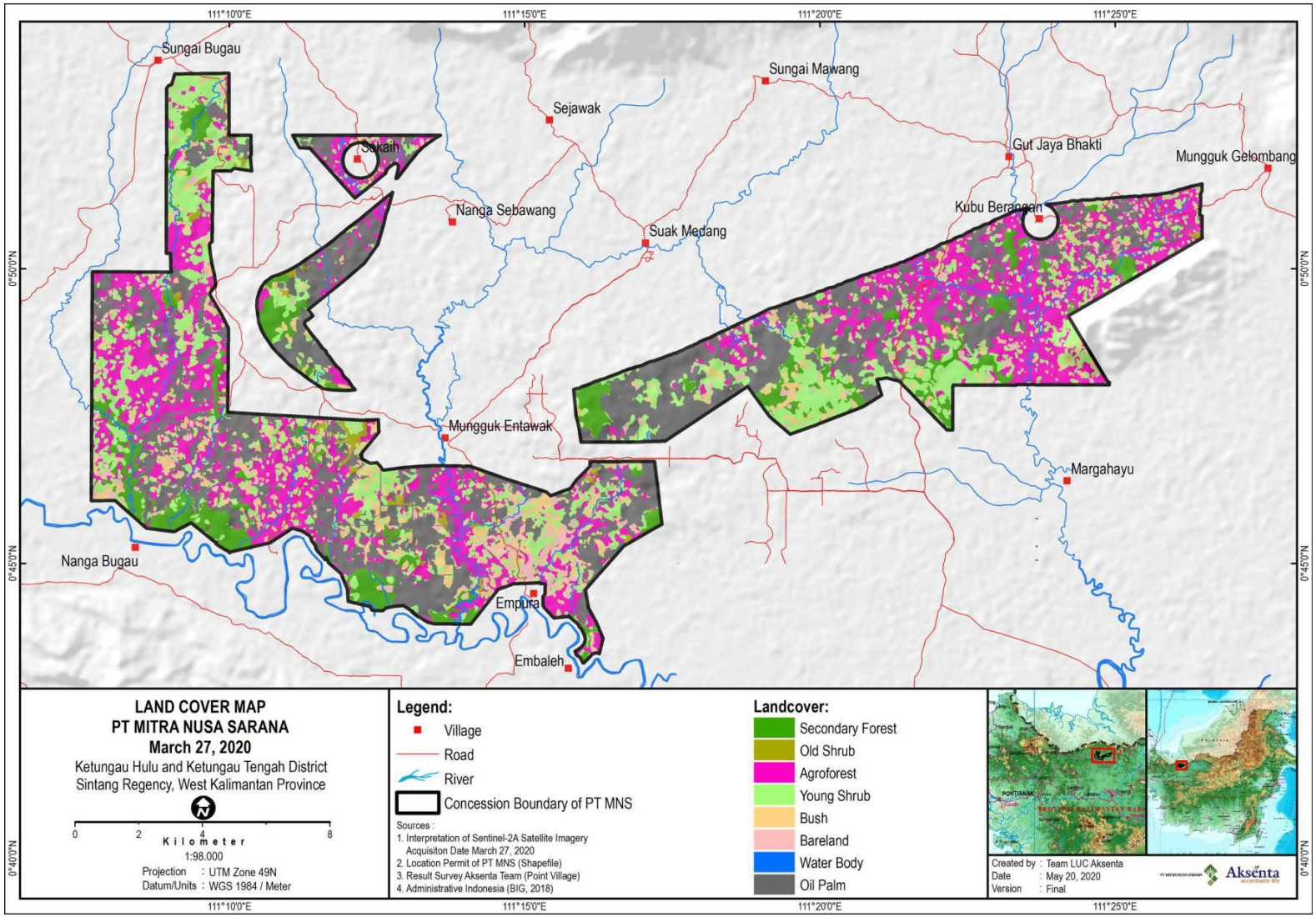


Figure 15. Interpretation Land Cover 2020

3.3 HCV Assessment

3.3.1 Finding and decision on the absence of HCV

National and Regional Context

The HCV assessment for the permit area of PT MNS was located on Kalimantan Island, well known as the world's third largest island, and distributed into three countries, Indonesia, Malaysia and Brunei Darussalam. About 73% of Kalimantan belongs to Indonesia, concentrated on its central to the southern side, populated by approximately 16 million people in total (12 million live in Indonesia, 4 million in Serawak and Sabah, and 300 thousands of Brunei Darussalam's citizens).

In the last decades, Kalimantan was dominantly covered by tropical rainforests, but now, the forest covers have been continuously declining. In 1968, the forests covered about 70% of Borneo, fell to 63% in 1990, and eventually plummeted to 35% only in 2008 (WWF, 2009).

About 225 mammal species are recorded in Kalimantan, of which 44 are endemics (Payne et.al., 2000); 639 bird species with 37 species of the birds are endemics (MacKinnon et.al., 2000); 208 reptiles, 113 amphibians, and 394 freshwater fish species of which 149 are also endemics (MacKinnon et.al., 1996). Some unique species are also found in Kalimantan, such as orangutan (*Pongo pygmaeus*), Kalimantan gibbon (*Hylobates sp*), proboscis monkey (*Nasalis larvatus*), Malayan sun bear (*Helarctos malayanus*), sunda clouded leopard (*Neofelis nebulosa*), whiteshouldered ibis (*Pseudibis davisoni*), storm's stork (*Ciconia stormi*) and bulwert's pheasant (*Lophura bulweri*). In total, 3,000 tree species are also found in Kalimantan, including 267 dipterocarps species, 58% endemic species, more than 2,000 orchid species, and 1,000 fern species. The endemic level of Bornean floral reaches 34% from all the existing plant species (MacKinnon et.al., 1996).

According to the official West Kalimantan's provincial spatial planning, the total area of Cultivation Areas on Non-Forested Land (Kawasan Budidaya Non Kehutanan or KBNK) is 6,520,622.73 ha, of which 4.7 million ha are potential for oil palm plantation designation, whilst 0.61 million ha will be designated for other crop estates. By now, permits for crop estate establishment have been granted for 285 private companies, accounted for 3,193,508.46 ha, where the soil and agro-climatic conditions are suitable for oil palm plantation. Increase on oil palm plantation areas and productivity are followed by escalation of local migrants, including from other islands.

Landscape Context

Permit area of PT MNS is situated in Schwaner Mountain ecoregion, spread from the east to north-west (Figure 16). According to map of forest and water land use zone of West Kalimantan Province, referred to Ministry of Forestry Decree No.: 733/Menhut-II/2014, dated on 2 September 2014, PT MNS permit area is located on Other Land Uses (Area Penggunaan Lain or APL). Furthermore, based on Indicative Map of Suspended New Permit Area (PIPPIB), revision XI, the assessment area is not located on the moratorium areas (Figure 17 and Figure 18).

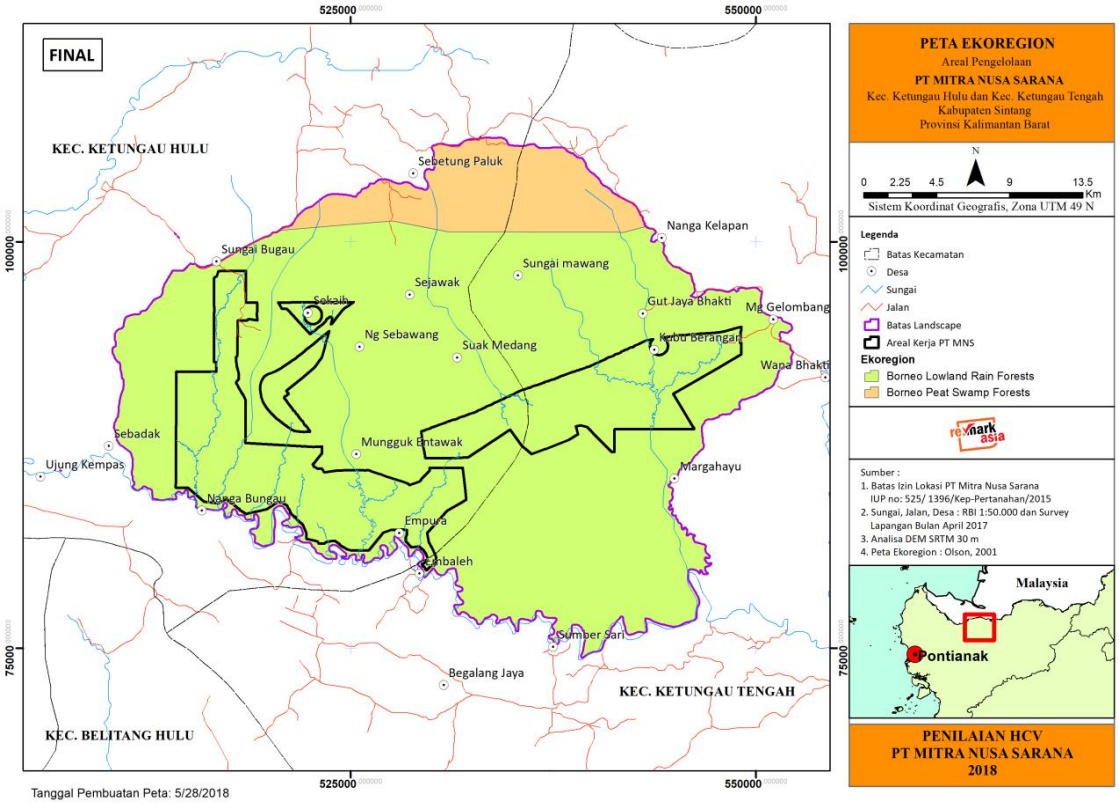


Figure 16. Map of ecoregion areas of PT MNS

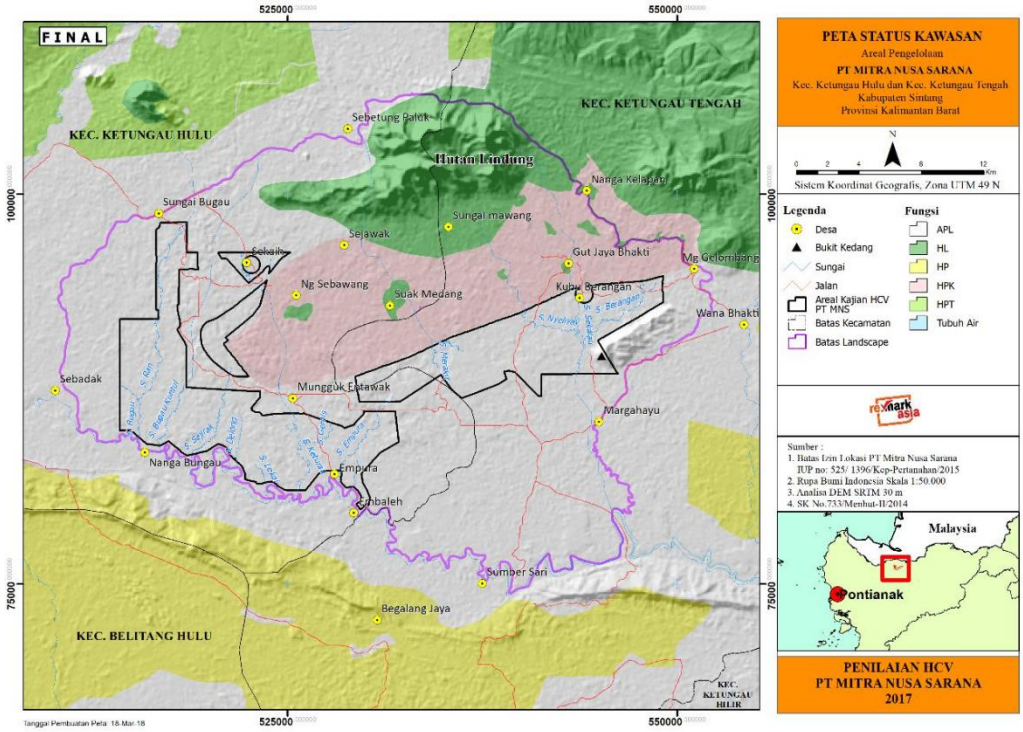


Figure 17. Map of land/forest zone status of PT MNS

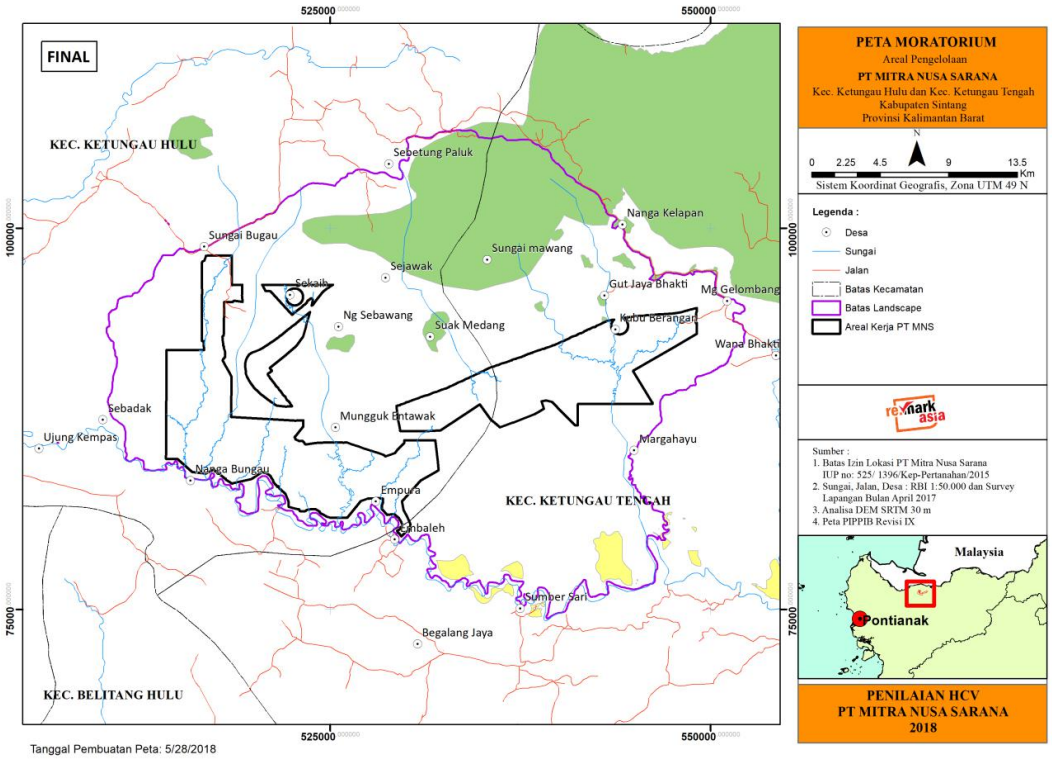


Figure 18. Indicative Map of Suspended New Permit Areas (PIPIB), revision XI on PT MNS permit area

Furthermore, land cover analyses were undertaken on certain period of times using Landsat Imagery on specific years. Based on Landsat imagery year 2016, PT MNS permit area was dominated by shrubs accounted for 13,793.59 ha or about 76.25% from total

area of PT MNS. This shrubs coverage in 2016 was higher compared to the condition in 2000 and 2008. In year 2000, secondary forests were found on 4,205.22 ha areas, and fell into only 1,875.83 ha by 2016, indicating that forest covers in PT MNS excessively plummeted during the last 8 years. Detailed information on land cover analysis results 2016 in the location permit area of PT MNS are presented in Figure 19.

The result of land cover analysis based on Landsat image 2016, from the extent of permit area PT MNS is dominated by increasing shrubs with secondary forest loss. Area of shrubs in 2016 covering 14.762,31 ha or about 82.01% increase in area compared to 2000, 2005 and 2008. Secondary forest area in 2000 covering 4,600.40 ha or 25.56% decreased to 1,818.50 ha or 10.10% in 2016 accompanied by an increase in open land and land cover in the form of community palm oil plantations of 98.17 Ha or about 0.55% developing after the year 2008. Based on information by head of the village, large open area that created shrubs were caused by fire. The information are validated using spatial analysis hotspot image TERRA MODIS.

PT MNS permit area is not part of biodiversity priority areas of Borneo, confirmed by overlay between the permit area and maps of Borneo biodiversity hotspots such as: map of Ramsar Site , map of Important Bird Area (IBA) , Endemic Bird Area (EBA), The Heart of Borneo (HoB) and Intact Forest Landscape4) . On regional landscape level of Kalimantan, the assessment areas are also situated outside the Ramsar Site. The nearest Ramsar Site is Danau Sentarum National Park, located about 54 km away from the assessment area. Moreover, PT MNS new permit area is situated far-off IBA-EBA areas. The nearest distances from IBA, EBA, and HOB areas are 54 km (Danau Sentarum IBA); 17.7 km (EBA Bornean Mountain); and 75.80 km, respectively. Maps of Ramsar Site, IBA, EBA, IFL and HoB are presented on Figure 20. Four ecosystem types were present on PT MNS permit area: 1) lowland forests, found within secondary forests inside the permit area, and scattered to each other, 2) freshwater swamp areas, positioned next to riverbanks, 3) river ecosystem, found on rivers that stream inside PT MNS permit area, and 4) riparian ecosystem (riverbanks), located along the left and right sides of small and big river which flow through PT MNS permit area.

Approximately 112 plant species from 47 families are found within PT MNS permit area. According to the Government Regulation (Peraturan Pemerintah, PP) No. 7/1999, these species are protected by national regulation: kayu majo/majau (Shorea palembanica), tengkawang rambai *(Shorea pinanga/S. compressa*), and kantung semar/antuyut (*Nepenthes ampullaria*). The iron wood, or locally known as ulin (*Eusideroxylon*

zwageri), is also listed in CITES Appendix 1, means that international trading on this timber species is prohibited.

Moreover, we identified other RTE flora species recorded on IUCN Redlist as Critically Endangered (CR) as follow: keruing (*Dipterocarpus cornutus*), kayu amang (*Hopea mengarawan Miq*), meranti putih (*Shorea accuminatissima*), and kayu tekam (*Shorea foxwarthyi*). Mersawa (*Dipterocarpus crinitus*) is also found in the assessment area and considered as Endangered (EN), whilst meranti batu (*Shorea uliginosa*) and ulin (*Eusideroxylon zwageri*) are classified as Vulnerable (VU).

In the context of wildlife diversity, we identified 112 species from 56 families, broken down into: 20 mammal species from 13 families, 75 bird species from 33 families, 13 reptile species from 7 families, 4 amphibian species from 3 families, and 8 fish species from 6 families, of which 25 species (from 8 mammal species and 17 bird species) are under national legal protection as stated on Government Regulation No. 7/1999. Furthermore, 1 mammal species is listed into Appendix I CITES, 18 species (7 mammals, 7 birds, and 4 reptile species) under Appendix II CITES, and 1 mammal species in Appendix III CITES. Pangolin (*Manis javanica*) and sun bear (*Helarctos malayanus*) are classified as CR and VU, respectively. Also, we identified 1 species as Critically Endangered, another 1 species as Endangered, and other 5 species as Vulnerable based on IUCN categories.

Moreover, the permit area of PT MNS is slightly overlap with fragmented distribution areas of Orangutan kalimantan (*Pongo pygmaeus*) according to map of habitat of orangutan from Wich et al., 2008 and IUCN (serge et al., 2016) (Figure 19). However, we did not find indication of orangutan occurrence during our field works. Local communities also confirmed that orangutan has no longer been sighted long time ago because of the habitat is no longer exist.

In general, rivers in PT MNS permit area are varied in size from big to small rivers, developed from wide and narrow topographical gaps, meet into water flows and eventually creating river streams. The existence of river streams is important, due to their function for water supply and water catchment areas. In total, there are 13 big and small rivers flow through PT MNS area, comprise 733,87 ha and distributed across several villages and hamlets in Ketungau Hulu and Ketungau Tengah Sub-district.

In correspond to map of geological formation of Kalimantan Island, we identified two geological formation on the assessment areas: Ketungau formation, contributed for 17,714.57 ha (98.27%) and Sintang Intrusion Formation for 311.43 ha (1.73%).

The permit area of PT MNS is located within 50 – 300 m above sea level (masl), where Bukit Kendang area is positioned within 150 – 2300 masl. From physiographical point of view, the concession area is situated on flat physiography (17,947.30 ha or 99.56%) and low hill environment (78.70 ha or 0.44%). The elevation classes of PT MNS concession area are classified into five classes of slope: slope class 0-8% on 15,280.37 ha (84.77 %); 8-15% on 2,478.43 ha (13.75%); class 15-25% on 242.41 ha (1.34%); class 25-40% on 24.79 ha (0.14%); whilst very steep slope > 40% are not found within PT MNS area.

Based on Map of Macro Scale of Land System (RePPProt 1990), land systems associated with soil type on PT MNS permit area are: (1) Lawanguwang (LWW) land system with Paleudults; Tropudults, and Tropoquepts soil types for 17,406.51 ha (96.56%), (2) Mendawai (MDW) with Tropohemists, Troposaprists, and Tropaquents soil types, contributed for 176.56 ha (0.98%), (3) Pendreh (PDH) with Tropudults and Dystropepts soil type for 273.20 ha (1.52%) and (4) Teweh (TWH) with Tropudults; Paleudults and Dystropepts soil types for 170.93 ha (0.95%).

Administratively, the permit area of PT MNS is located in Ketungau Tengah and Ketungau Hulu Sub-district, Sintang District. Villages in the assessment area contributed for 639.5 km2 or about 3.0% from the district total area, populated with 7,408 people (1,786 households) or only 1.0% from the total district population. The main livelihoods of 1,699 households (91.2%) in these villages depend on natural resources utilizations. Map of villages distribution in the surrounding area of PT MNS is presented on Figure 10. Majority of residents in both sub-districts are Christian, of which about 60% are Protestan/Christian and 40% are Catholic. Moreover, about 15% of population in 7 villages in Ketungau Hulu sub-district are Moslem, concentrated in Nanga Bungau and Empura village, whilst the rests are Christian (40%) and Catholic (45%).

Customary law is still implemented. Sanction or penalty is given for those violate or disobey the customary law, even if he/she is a visitor, to maintain the execution of this traditional law and local community life order. Forests, lands, and rivers have been considered as important elements in Dayak Iban's identity and tradition since centuries ago. The original agricultural system of Dayak Tribe is swidden agriculture (rotational farming) with specific fallow period to let the soil recover/regenerate after a few years of cultivation.

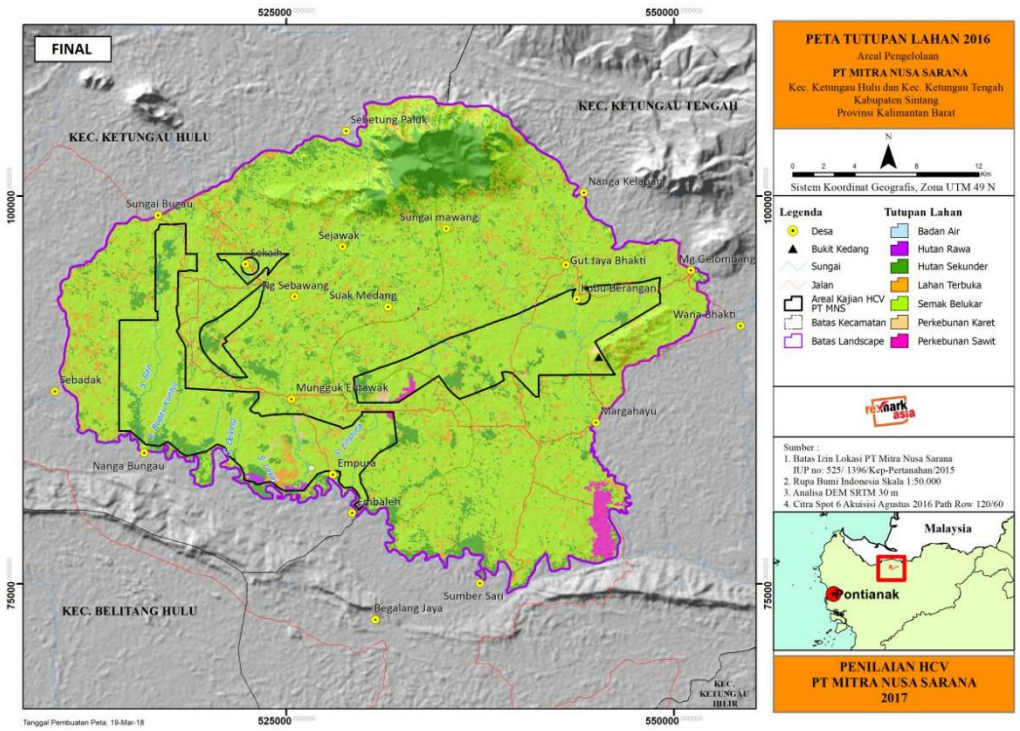


Figure 19. Detailed information on land cover analysis results in 2016 in the location permit area of PT MNS

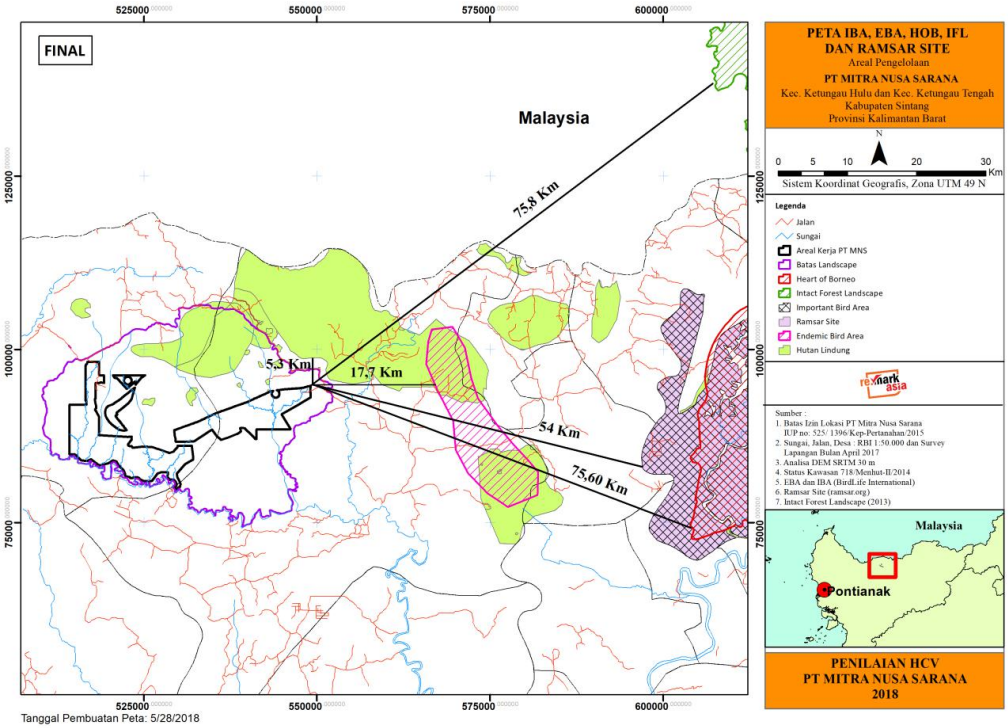


Figure 20. Map of The Heart of Borneo (HoB), Intact Forest Landscape (IFL), Important Bird Area (IBA), Endemic Bird Area (EBA) and Ramsar Site distribution relative to PT MNS permit area

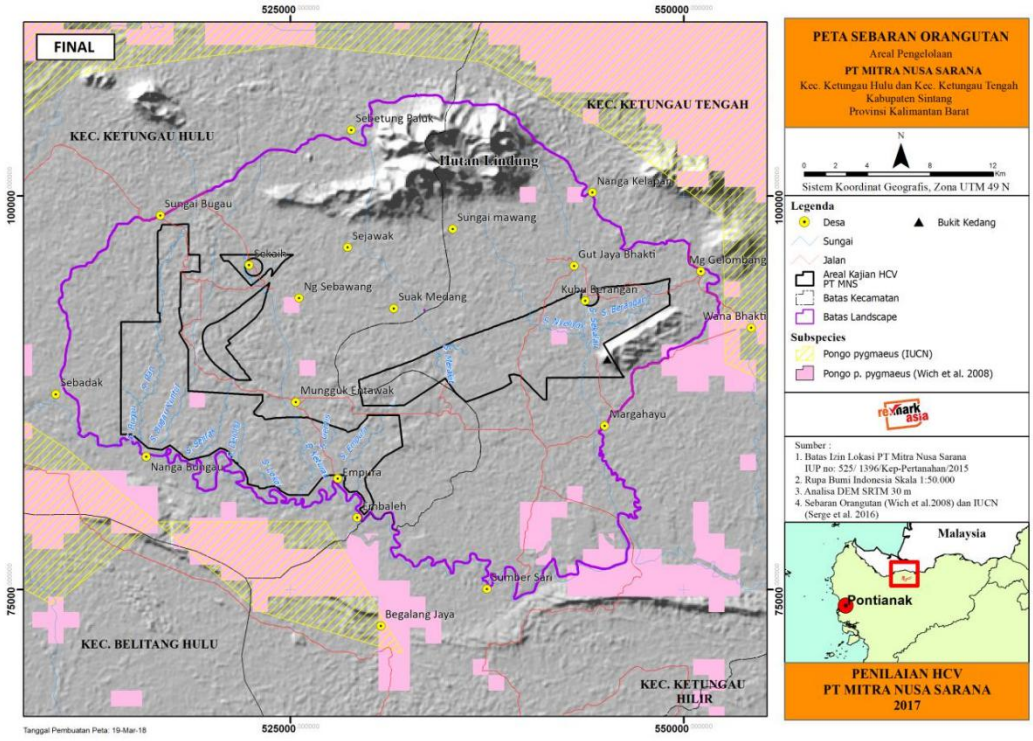


Figure 21. Map of orangutan distribution based on Wich et al., 2008

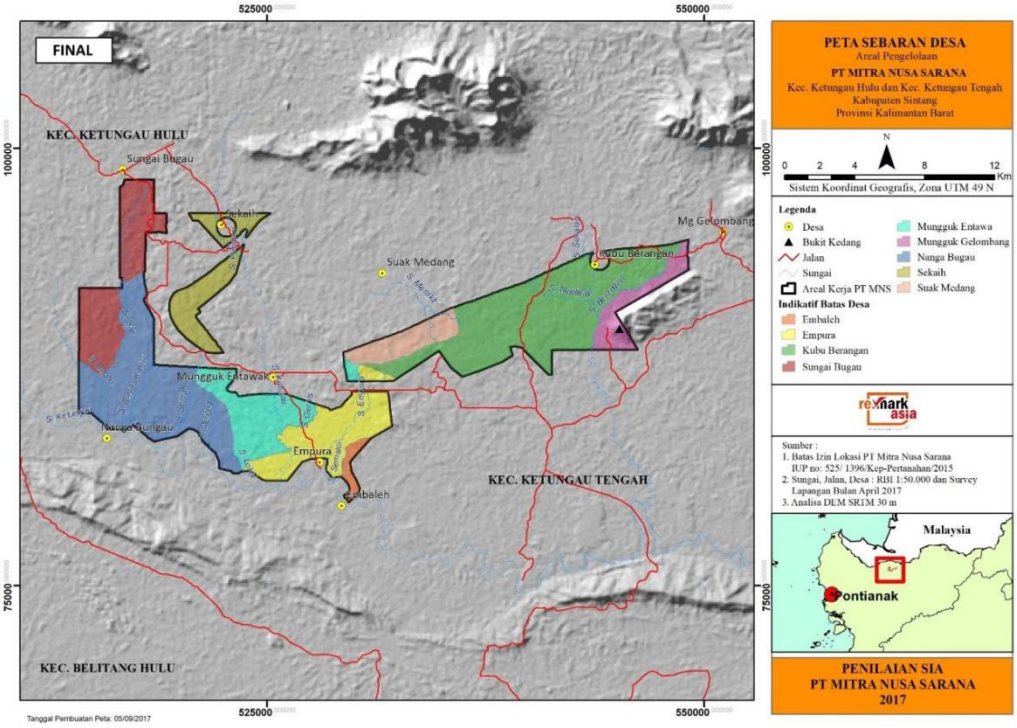


Figure 22. Map of villages location situation and distribution in area of PT MNS

Result and Justification

Based on HCV assessment in the concession area of PT MNS, there are found five HCVs, such as HCV1, HCV3, HCV4, HCV5, and HCV6. A summary of the findings is presented on Table 3.2

Table 3.2 Summary of HCV areas found at PT MNS permit area

HCV	Definition	Descriptive Summary and Justification		
		Present	Potential	Absent
1	**Concentrations of biological diversity including endemic species, and rare, threatened or endangered (RTE) species that are significant at global, regional or national levels.**	Endemic and RTE flora-fauna are present, inhabit several forested areas within PT MNS permit area.	-	-
2	**Large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.**	-	-	The location is away from IFL as well as other important biodiversity areas such as IBA, EBA, and HoB. The surrounding area is already fragmented, forest are patched, and not included in the landscape or mosaic of important ecosystems .
3	**Rare, threatened, or endangered ecosystems, habitats or refugia**	We identified the presence of swamp forests, submerged with water throughout the year. These areas are located next to the riverbanks within PT MNS permit area.	-	-
4	**Basic ecosystem services in critical situations including protection of water catchments and control of erosion of vulnerable soils and slopes.**	Riverbanks, lake, secondary forests and swamp forests within PT MNS permit area play important roles in protecting water catchment, controlling erosion, preserving ecosystem services in critical situation, regulating hydrological system, and providing important water source for fire suppression.	-	-
5	**Sites and resources fundamental for satisfying the**	Rivers and riverbanks function as water	-	-

HCV	Definition	Descriptive Summary and Justification		
		Present	Potential	Absent
	basic necessities of local communities or indigenous peoples (for example for livelihoods, health, nutrition, water), identified through engagement with these communities or indigenous peoples.	resources and place to collect fish for basic necessities and additional income. *Tembawang* are also present as cultivation areas and source of livelihoods.		
6	**Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples**.	*Tembawang* are present possibly contain old tomb/grave yard with cultural and historical values, important for traditional cultures.		

The absence of HCV 2 is indicated by the landscape of identification areas away from IFL as well as other important biodiversity areas such as IBA, EBA, and HoB. The surrounding area is already fragmented, forest inside lanscape boundary of PT MNS is fragmented, and not included in the landscape or mosaic of important ecosystems. The nearest IFL from PT MNS boundary is 75.8 km away.

Total and Distribution Area of HCV and HCV Management Areas

In total, five HCV categories were found in PT MNS permit area. The important element of **HCV 1** is the existence of endemic and RTE flora and fauna species. Plants classified as endemic, and listed as **Critically Endangered (CR)** on IUCN red list are: *keruing (Dipterocarpus cornutus), kayu amang (Hopea mengarawan Miq), meranti putih (Shorea accuminatissima),* and *kayu tekam (Shorea foxwarthyi).* These species, that are also found in the assessment area, are classified as **Endangered (EN)**: *mersawa (Dipterocarpus crinitus),* and **Vulnerable (VU)**: *meranti batu (Shorea uliginosa)* and *ulin (Eusideroxylon zwageri).* According to Government Regulation No. 7/1999, *kayu majo/majau (Shorea palembanica), tengkawang rambai (Shorea pinanga/S. compressa),* and *kantung semar/antuyut (Nepenthes ampullaria)* are under national protection status. *Ulin (Eusideroxylon zwageri)* is also listed into Appendix 1 CITES.

Moreover, these RTE species: pangolin or *trenggiling (Manis javanica)* and sun bear or *beruang madu (Helarctos malayanus)* are catalogued as **CR** and **VU**, respectively.

For **HCV 3**, it is attributed to the presence of swamp forest that is a natural ecosystem submerged with water throughout the year. Based on landsystem, soil, geology, and forest cover layer analysis and compared with RePPROT data, found 3 types of ecosystem, Peat Swamp forest, Mixed dipterocarp forest on alluvium, Mixed or hill dipterocarp forest on sedimentary rock.

Important elements for **HCV 4** are riverbank areas present in these rivers: Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliai, Sekalau, Empura, Lokoi, Delong, Bugau Puntul, Berangan, Sejirak, Aji and Meringat river; as well as catchment areas in the surrounding Sejirak Lake, Aji Lake and Meringat Lake. Secondary forest borders including Tinting Medang forest, Mungguk Kunyuk forest, forested areas along the riverbanks, and swamp forests.

These areas function as important Protected Areas for Water catchments as well as protection of soil erosion, protect ecosystem services in critical situations, and provide the function of regulating the flow of water in a catchment area, vital functions as a water source to extinguish the fire if there were fires in vulnerable areas. Based on the provisions in Keppres no. 32 of 1990 on the Management of Protected Areas, PP. 38 Year 2011 on River, NKT Toolkit Indonesia 2008, Common Guidance HCVRN 2013, and consideration of scientific rules, then the rivers contained in the permit area of PT MNS including categories of large rivers and small rivers.

Furthermore, these rivers (Peturau, Bugau, Gernis, Semaloi, Pendam, Nyeliai, Sekalau, Empura, Lokoi, Delong, Bugau Puntul, Berangan, Sejirak, Aji and Meringat river), water catchment in vicinity to Sejirak, Aji and Meringat Lake and forest borders at Tinting Medang forest, Mungguk Kunyuk forest, and swamp forests, are also attributed to **HCV 5**. These areas of HCV 5 function as source of water for consumption of local communities. Along the river has been identified the holes (lubuk-lubuk) as a place to 'fish breed' which is a source of protein and additional income of society, as well as the existence of Swamp Forest which also became a place to 'fish breed' temporarily.

The important elements for **HCV 6** are the existance of the Tinting Medang forest and Mungguk Kunyuk forest (tembawang) areas present in the form of the existence of ancient tomb or graves which are sacred and respected, and potential of HCV 6 areas is

likely present, in the form of the existence of ancient tomb or graves within *tembawang* areas that have not yet been identified, as many other local communities also possess their own piece of land of private tembawang. Location and indicative total areas of HCV and HCVMA on PT MNS permit area are presented on table below.

Management of HCV conducted on HCVs which were find within and around the permit area of PT MNS; on the other hand HCV monitoring conducted on several monitoring locations which represent several HCV areas. Total area size of HCV management in the area is 2,389.71 ha or 13.28%, with overlap area is 156.85 Ha as shown in **Table 3.3**

Table 3.3.a Area size of management of HCV within and around the permit of PT MNS

No	Location/Name	HCV	Buffer (m)	Wide (m)	Broad (Ha)	
					HCVA	HCVMA
1	Secondary forest	1, 3, 4	0	-	1,380.20	1,380.20
2	Kubu Berangan Secondary forest	1, 3, 4	0	-	143.10	143.10
3	Peat Swamp forest	1, 3, 4, 5	0	-	125.03	125.03
4	Mungguk Kunyuk Secondary forest	1, 3, 4, 4, 6	0	-	165.90	165.90
5	Tinting Medang Secondary forest	1, 3, 4, 5, 6	0	-	119.89	119.89
6	Wildlife corridor and enrichment	1	0	-	0	512.0
7	Bukit Kedang (hill)	4	0	-	276.53	276.53
8	Bugau riverbanks	4, 5	100	10-20	35.72	35.72
9	Keturau riverbanks	4, 5	100	10-20	247.11	247.11
10	Bugau Kuntul riverbanks	4, 5	50	5-6	37.10	37.10
11	Gernis riverbanks	4, 5	50	5	30.85	30.85
12	Semaloi riverbanks	4, 5	50	5	22	22
13	Lokoi riverbanks	4, 5	50	7-15	2.15	2.15
14	Pendam riverbanks	4, 5	50	2-5	9.57	9.57
15	Merakit riverbanks	4, 5	50	4-5	48.60	48.60
16	Ran riverbanks	4, 5	50	5	125.68	125.68
17	Meringat riverbanks	4, 5	50	5	11.22	11.22
.18	Delong riverbanks	4, 5	50	5	30.82	30.82
19	Sejirak riverbanks	4, 5	50	5	50.75	50.75
20	Nyeliyay riverbanks	4, 5	50	5-10	59.17	59.17
21	Berangan riverbanks	4, 5	50	5-7	103.23	103.23
22	Sekalau riverbanks	4, 5	100	10-20	151.89	151.89
23	Empura riverbanks	4, 5	50	3-6	74.91	74.91
24	Sejirak lake	4, 5	50	-	1.61	1.61
25	Meringat lake	4, 5	50	-	2.31	2.31
26	Aji lake	4, 5	50	-	2.93	2.93
Total HCV Areas (Ha)					**3,258.78**	**3,770.78**
PT MNS Permit areas (Ha)					**18,000**	
HCV area to PT MNS (%)					**18.10 %**	**20.59 %**

Table 3.3.b Summary of HCV and HCS Area at PT MNS

HCV & HCS PT MNS	Broad (ha)
HCV 1	**1,911.33**
HCV 2	**-**
HCV 3	**1,911.33**
HCV 4	**3,000.56**
HCV 5	**2,893.80**
HCV 6	**285.16**
HCS	**313**

1) HCV 1.1 – Biodiversity Species

Based on the results of the analysis and examination in the field, in concession of PT MNS, there are still biodiversity population and it can be concluded there are HCV areas 1. HCV 1 is a secondary forest such as a forested area in Tingting Kedang, a forested area in Mungguk Kunyuk, a forested area in a riparian river such as the riparian of Nanga Bugau, riparian of Kedang and riparian Danau Aji. Area HCV 1 is determined by deliniation areas of polygon that still have forest cover conditions, by maintaning an existing forest area of sufficient size to provide life-supporting capacity or habitat for wildlife, and based on finding endemic and RTE species at forested area, riparian areas by way of deliniation based on regulation and field survey HCV 4. Complete information on the location and indicative area of HCV 1 is presented in Table 3.4 and Map of HCV 1 is presented in Figure 23.

Tabel 3.4. Location HCV1 area in PT MNS

No	Temuan	Luas KBKT (Ha)	Luas KPNKT (Ha)
1	Secondary Forest	1366.72	1372.70
2	Kubu Berangan Secondary Forest	142.92	144.02
3	Swamp forest	116.53	116.53
4	Mungguk Kunyuk Secondary Forest	119.86	119.86
5	Tinting Medang Secondary Forest	165.30	165.90
Total (Ha):		**1911.33**	**1919.01**

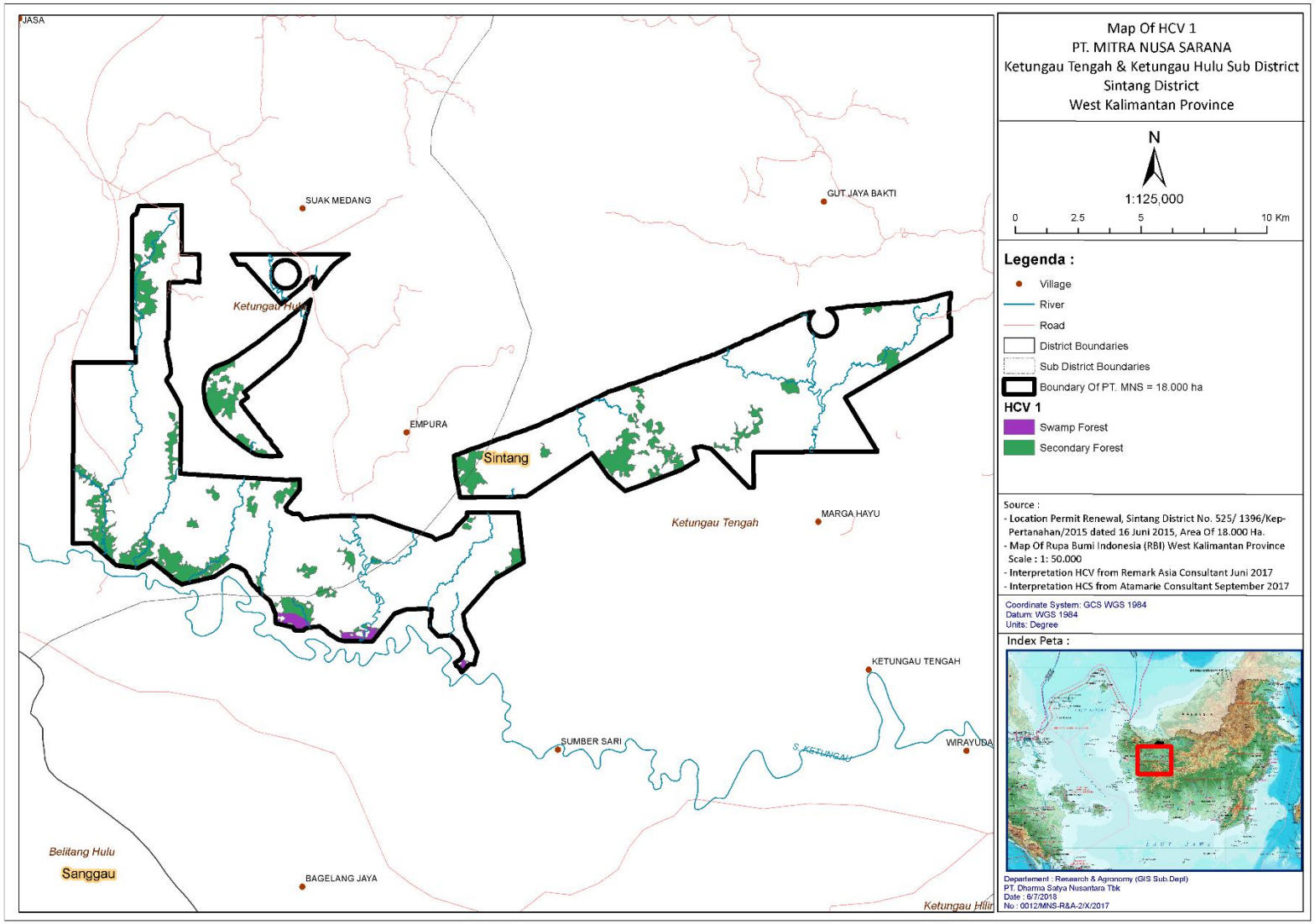


Figure 23. Location HCV 1 of PT MNS

2) HCV2. Ecosystem and Mosaic in Landscape Level

Based on field survey results show that in general the identification area is not a provider of key landscape or area corridor functions, the explanation of the conditions in the location permit area related to HCV 2 criteria, as follow :

a. Based on the results of field observations, it shows that the landscape of the current identification area generally consists of areas of shrubs, community cultivation lands and secondary forest that are not large (small spots). Areas of shrubs are formed from fields that have been abandoned from community activities such as planting rice and rubber gardens. Small spot areas of the jungle forest have also been opened by the community. In general the landscape at the identification site is not a natural landscape anymore.
b. Based on the analysis of landscape and maps in field survey, the allocated area is far from IFL (*Intact Forest Lanscape*) and other areas such as *Ramsar Site*,*Important Bird Area* (IBA), *Endemic Bird Area* (EBA), and *The Heart of Borneo (*HoB). Surrounding area is fragmented and not available in space or mozaic, different ecosystem, so there is not HCV2 area at concessions PT MNS.

3) HCV3. Rare or Endangered Ecosystems

Identification of HCV 3 in the field leads to ensuring the presence or absence of a naturally occurring natural ecosystem within concessions PT MNS. Based on the analysis of the map biophysiographic, concession area locations including the area ecoregion Schwaner Mountains, while based RePPProT (1990) most of the area permits the location of a land system Lawanguwang (LWW) and a small portion pendreh (PDH), Teweh (TWH) and Mendawai (MDW). LWW, PDH and TWH land systems are lowland forest ecosystems of sandstone and MDW is a high conservation value peat swamp ecosystem.

The peat soil in PT MNS have a depth between 51-200cm. Soil pH on top layer because it contains many mineral and the lower layer is low. Contents KDD at top layer is low and content KDD at low layer is medium. Content P available at top and low layer. Sulfid Acid on depth 0-25 cm. In general, the main physiography belonging to this group alluvial, marine and peat dome. Rivers that flows through PT MNS area are pear swamp ecosystem. Based on identification HCV 3 with Precautionary Approach, it can concluded that HCV 3 in PT MNS area of swamp forest. Complete information on the location and indicative area of HCV 1 is presented in Table 3.5

and Map of HCV 1 is presented in Figure 24.

Table 3.5. Location of HCV3 in PT MNS

No	Finding	HCV Area (Ha)	HCVMA Area (Ha)
1	Ekosistem Hutan Dataran Rendah di atas Tanah Aluvial	1794.80	1802.49
2	Ekosistem Hutan Rawa Gambut	116.53	116.53
Total (Ha)		**1911.33**	**1919.02**

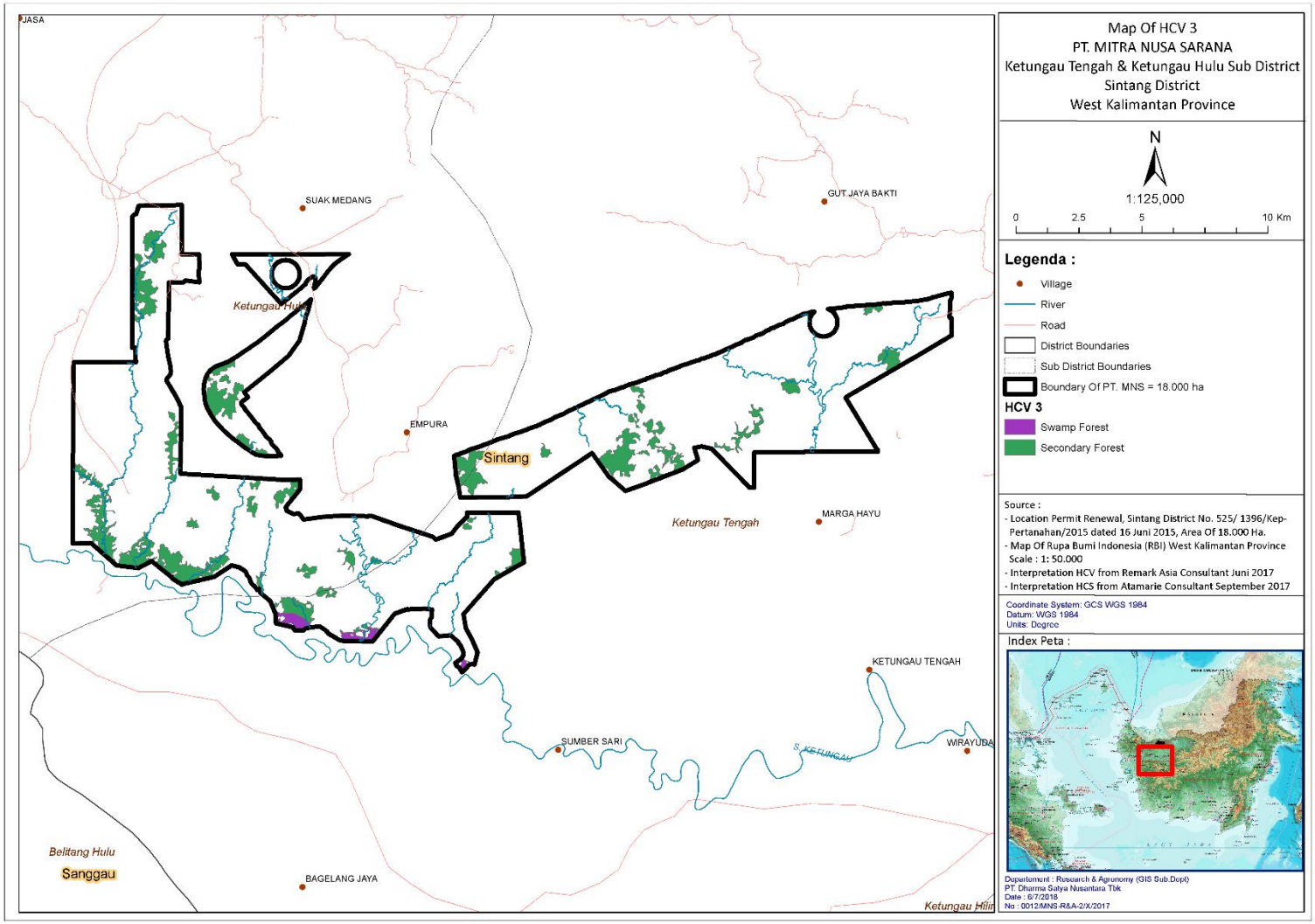


Figure 24. Location HCV 3 of PT MNS

4) HCV4. Areas providing basic services of nature

Based on the findings and analysis, Important elements for HCV 4 are riverbank areas present in these rivers: Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliai, Sekalau, Empura, Lokoi, Delong, Bugau Puntul, Berangan, Sejirak, Aji and Meringat river; as well as catchment areas in the surrounding Sejirak Lake, Aji Lake and Meringat Lake. Secondary forest borders including Tinting Medang forest, Mungguk Kunyuk forest, forested areas on observation point No. 9, forested areas along the riverbanks, and swamp forests, are accounted for 3,000.56 hectare.

Based on the provisions in Keppres No. 32 of 1990 on the Management of Protected Areas, PP No. 38 Tahun 2011 on River, HCV Toolkit Indonesia 2008, Common Guidance HCVRN 2013, and consideration of scientific rules, then the rivers contained in concession area of PT MNS include categories of major rivers and streams, river names and the determination of border values are presented in Table 3.7 and presented in Figure 25.

Table 3.6 List of rivers name flow at PT MNS Area

No	River Name	Area in Concession (ha)	Width Field (m)	Riparian/ Buffer (m)	Location
1	Riparian River Keturau	258,27	45	100	Desa Mungguk Entawak dan Desa Sekaih
2	Riparian River Bugau	104,18	35	100	Desa Nanga Bugau
3	Riparian River Gernis	36,93	5	50	Desa Mungguk Entawak dan Desa Empura
4	Riparian River Semaloi	22,00	20	50	Desa Embaleh
5	Riparian River Pendam	9,57	7	50	Desa Sekaih
6	Riparian River Nyeliyai	64,60	10	50	Dusun Mungguk Kubu
7	Riparian River Sekalau	155,98	35	100	Desa Kubu Berangan
8	Riparian River Empura	74,91	15	50	Desa Empura
9	Riparian River Lokoi	17,44	18	50	Desa Empura
10	Riparian River Delong	36,93	22	50	Desa Nanga Bugau
11	Riparian River Bugao Puntul	60,04	25	50	Desa Nanga Bugau
12	Riparian River Berangan	100,33	20	50	Desa Kubu Berangan
13	Riparian River Merakit	48,62	7	50	Desa Suak Medang
14	Riparian River Meringat	11,22	5	50	Desa Mungguk Entawak
15	Riparian River Ran	170,53	5	50	Desa Sungai Bugau dan Muara Bugau
16	Riparian River Sejirak	74,59	6	50	Desa Muara Bugau
	TOTAL	**1.246,14**			

Table 3.7. Location HCV4 in PT MNS

No	Finding	Buffer (m)	Width (m)	HCV Area (Ha)	HCVMA Area (Ha)
1	Secondary Forest	0		1366.72	1372.70
2	Secondary Forest Kubu Berangan	0		142.92	144.02
3	Swamp Forest	0		116.53	116.53
4	Secondary Forest Mungguk Kunyuk	0		119.86	119.86
5	Secondary Forest Tinting Medang	0		165.30	165.90
6	Hill of Kedang	0		42.04	42.04
7	Hill of > 40%	0		1.98	1.98
8	Riparian River Bugau	100	10-20 m	35.55	35.55
9	Riparian River Keturau	100	10-20 m	246.60	246.60
10	Riparian River Bugau Kuntul	50	5-6 m	37.10	37.10
11	Riparian River Gernis	50	5 m	30.85	30.85
12	Riparian River Semaloi	50	5 m	21.89	21.89
13	Riparian River Lokoi	50	7-15 m	2.04	2.04
14	Riparian River Pendam	50	2-5 m	9.46	9.46
15	Riparian River Merakit	50	4-5 m	48.60	48.60
16	Riparian River Ran	50	5 m	125.67	125.67
17	Riparian River Meringat	50	5 m	11.22	11.22
18	Riparian River Delong	50	5 m	30.70	30.70
19	Riparian River Sejirak	50	5 m	50.66	50.66
20	Riparian River Nyeliyay	50	5-10 m	59.17	59.17
21	Riparian River Berangan	50	5-7 m	103.23	103.23
22	Riparian River Sekalau	100	10-20 m	151.54	151.54
23	Riparian River Empura	50	3-6 m	74.42	74.42
24	Lake of Sejirak	50		1.38	1.38
25	Lake of Meringat	50		2.31	2.31
26	Lake of Aji	50		2.83	2.83
Total (Ha)				**3000.56**	**3008.24**

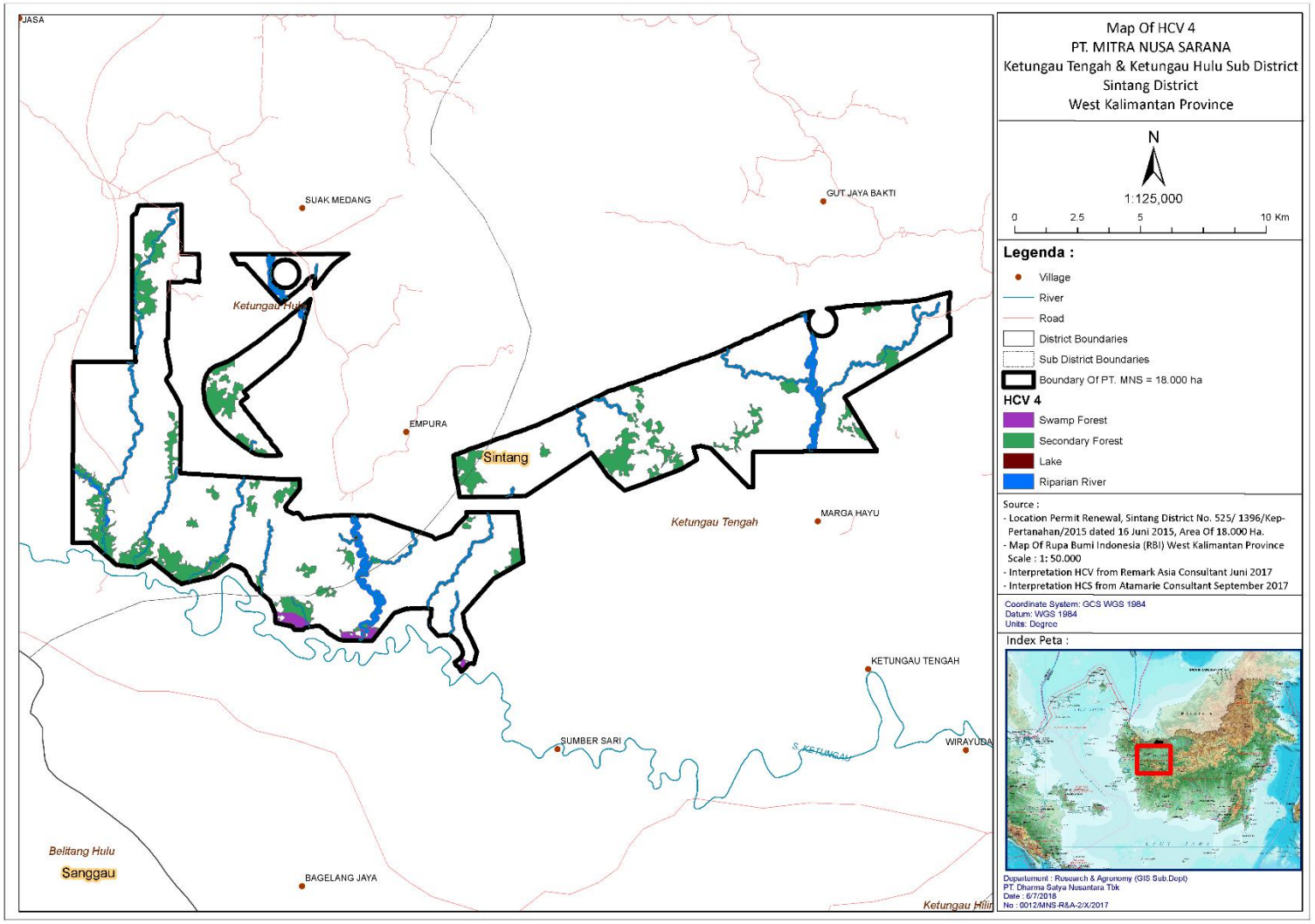


Figure 25. Location HCV 4 of PT MNS

5) *HCV5.* Critical Natural Resources for Meeting Basic Needs of Local People

Based on interviews / discussions with resource persons / stakeholders in the villages in the area identifying the existence of HCV 5 areas in rivers (Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliai, Sekalau, Empura, Lokoi, Delong, Bugau Puntul, Berangan, Sejirak, Aji and Meringat river), water catchment in vicinity to Sejirak, Aji and Meringat Lake, and forest borders at Tinting Medang forest, Mungguk Kunyuk forest, forested areas on observation point No. 9, forested areas along the riverbanks, and swamp forests. There is HCV 5 in concession PT MNS area in the form of swamp forest area connected to the river as a breeding ground for fish, secondary forest in the form of tembawang which still exist "lalau" or honey tree and rivers where there are holes where fish reproduces during rainy seasons. The existence of HCV 5 in concession PT MNS area is presented in Table 3.8 and Map of HCV presence is presented in Figure 26. The 'draft' map status in HCV 5 is due to several HCV 5 areas in concession area still in community status. HCV's still require fuher discussion and agreement.

Tabel 3.8 Location HCV 5 in PT MNS

No	Finding	Location	HCV Area (Ha)	HCVMA Area (Ha)
1	Swamp forest	Desa Nanga Bugau, Desa Mungguk Entawak, Desa Empura, Desa Embaleh	116.53	116.53
2	Secondary Forest Tembawang Umum Mungguk Kunyuk	Desa Mungguk Entawak, Desa Suak Medang, Desa Empura	119.86	119.86
3	Secondary Forest Tembawang Umum Tinting Medang	Desa Sekaih	165.30	165.90
4	Riparian River Bugau	Desa Nanga Bugau	35.55	35.55
5	Riparian River Keturau	Desa Sekaih	246.60	246.60
6	Riparian River Bugau Kuntul	Desa Nanga Bugau	37.10	37.10
7	Riparian River Gernis	Desa Empura	30.85	30.85
8	Riparian River Semaloi	Desa Empura	21.89	21.89
9	Riparian River Lokoi	Desa Nanga Bugau	2.04	2.04
10	Riparian River Pendam	Desa Sekaih	9.46	9.46
11	Riparian River Merakit	Desa Kubu Berangan	48.60	48.60
12	Riparian River Ran	Desa Nanga Bugau	125.67	125.67
13	Riparian River Meringat	Desa Mungguk Entawa	11.22	11.22
14	Riparian River Delong	Desa Nanga Bugau	30.70	30.70
15	Riparian River Sejirak	Desa Sekaih	50.66	50.66
16	Riparian River Nyeliyay	Desa Kubu Berangan	59.17	59.17
17	Riparian River Berangan	Desa Kubu Berangan	103.23	103.23
18	Riparian River Sekalau	Desa Kubu Berangan	151.54	151.54
19	Riparian River Empura	Desa Empura	74.42	74.42
20	Lake of Sejirak	Desa Nanga Bugau	1.38	1.38
21	Lake of Meringat	Desa Mungguk Entawak	2.31	2.31
22	Lake of Aji	Desa Sekaih	2.83	2.83
23	Tembawang Umum Silung	Sebelah Barat Sungai Berangan	1446.90	1447.50
Total (Ha)			**2893.80**	**2895.01**

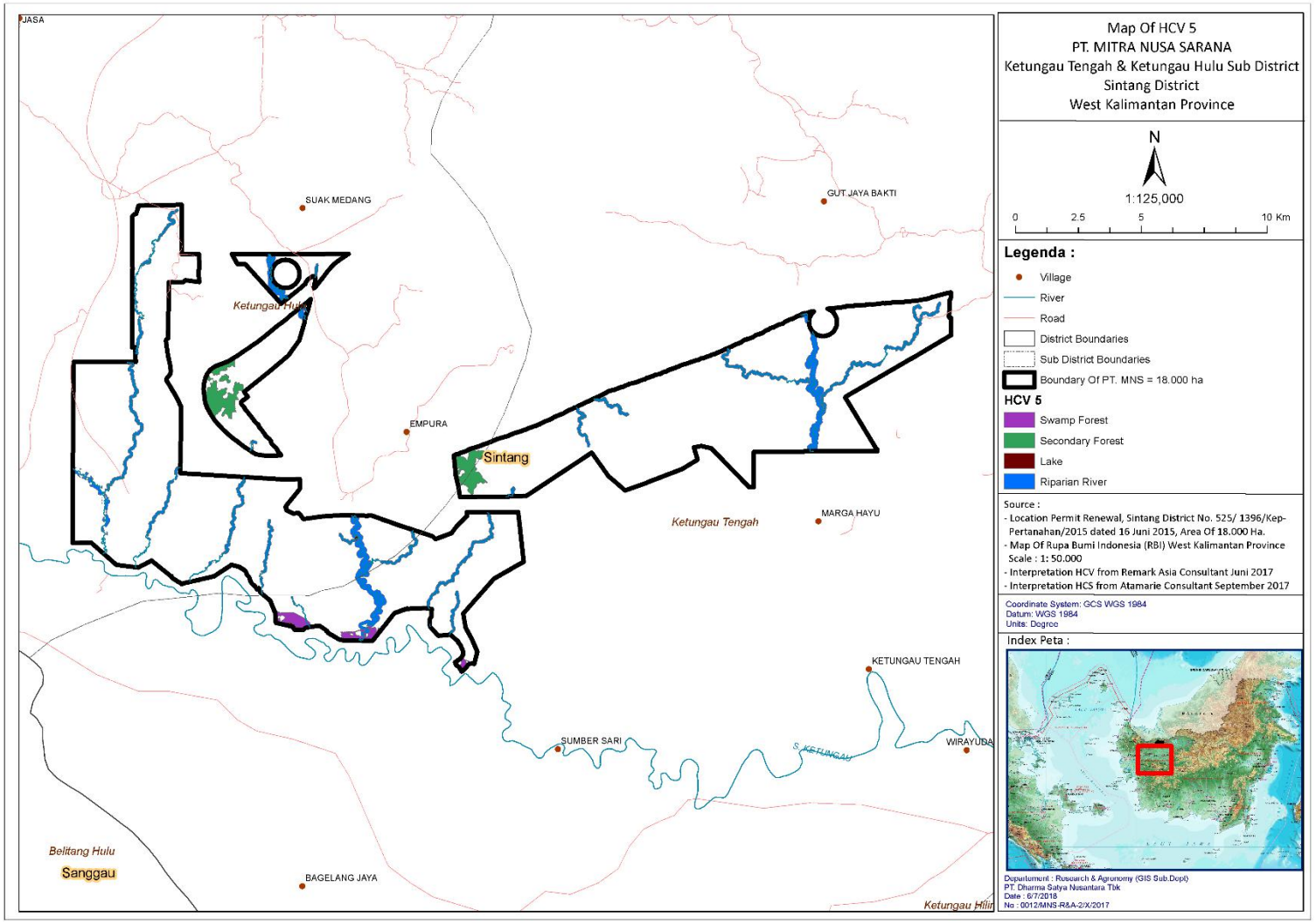


Figure 26. Location HCV 5 of PT MNS

6) *HCV6. Areas and Species critical to local communities' traditional cultural identity*

Important elements and potential of HCV 6 areas is likely present, in the form of the existence of ancient tomb or graves within *tembawang* areas that have not yet been identified, as many other local communities also possess their own piece of land of private *tembawang.* Identification HCV reference with principal of Free Prior Informed and Consern (FPIC) show that there is still value as HCV 6 in "Tembawang Umum – Tembawang Tingting"and "Mungguk Kunyuk" where tembawang still keep potential needs of the community has been in HCV5 also there is still "kuburan/ makam" sacred and are still respected and designated as HCV6 areas.

The potential existence of HCV 6 is a remedy concerning the existence of places that have a religious or sacred history such as 'pendam' or old tombs are located inside Tembawang Tinting Medang has been deliniated into tembawang. Based on description it can be concluded that there is found or existence of HCV6 in concession PT MNS. The existence of HCV 6 in concession PT MNS area is presented in Table 3.9 and Map of HCV presence is presented in Figure 27. The 'draft' map status in HCV 6 is due to several HCV 6 areas in concession area still in community status. HCV's still require fuher discussion and agreement.

Tabel 3.9. Location HCV6 in PT MNS

No	Finding	HCV Area (Ha)	HCVMA Area (Ha)
1	Secondary forest of Mungguk Kunyuk	119.86	119.86
2	Secondary forest of Tinting Medang	165.30	165.90
3	Tomb "Makam Keramat (Pendam Anak Tungkat)"	0	0
Total (Ha)		**285.16**	**285.77**

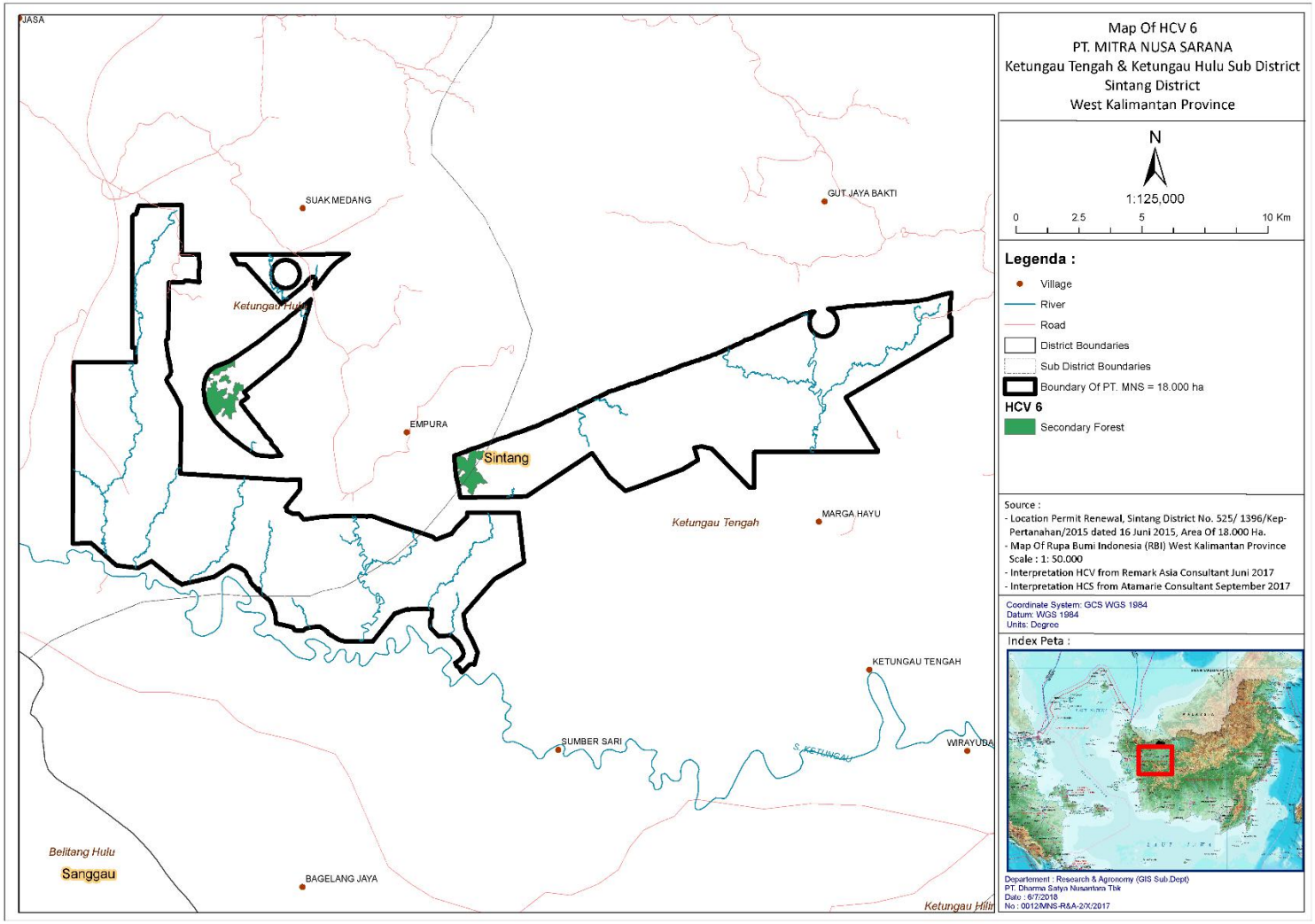


Figure 27. Location HCV 6 of PT MNS

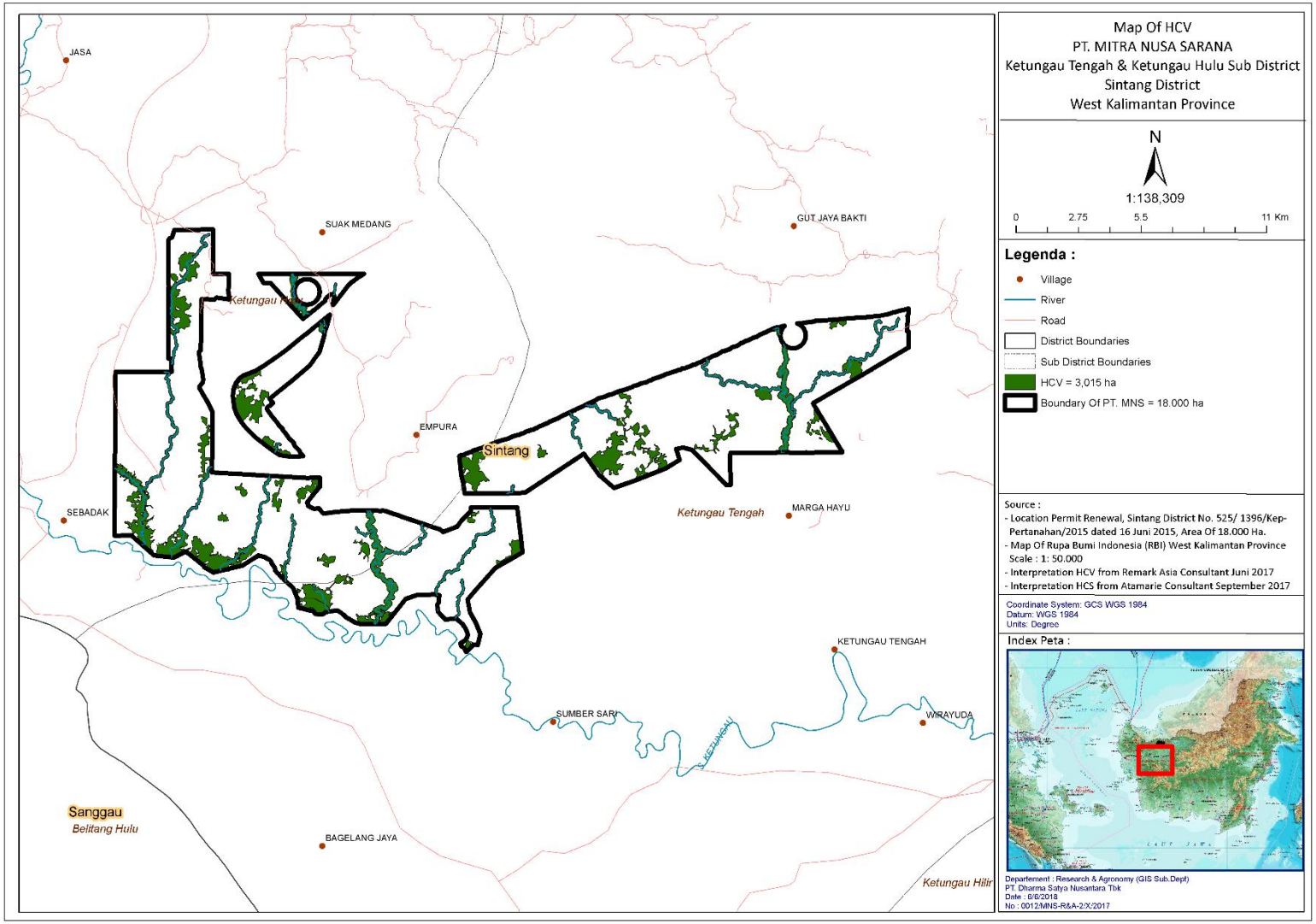


Figure 28. The distribution area map of HCV in the PT MNS concession area

3.3.2 Stakeholder Consultation

Stakeholder consultations are undertaken at all stages of HCV identification, starting from pre-assessment, during field identification, as well as in the process of report preparation. The consultations were conducted with two approaches, namely interviews and formal meetings (presentations and discussions). Stakeholders are grouped by relation and importance to the area of identification and the object under study. The group is divided into four, ie local / local communities, organizations and institutions representing local communities and local government.

For the identification aspects of HCV biodiversity HCV 1, HCV 2 and HCV 3, local communities are consulted on the historical use of local natural resources, current presence and location of RTE species and threats.

Aspects of HCV 4 identification consulted with local communities are important environmental services that are directly utilized by the community and the history of land resource use. To local management / authorities consulted on regulations concerning the protection and management of environmental services.

In the identification of HCV 5 and HCV 6, consultation with local communities is absolutely essential. Such consultations cover the history of land use, the fulfillment of basic needs and livelihoods; Origins, local cultural diversity, sacred / religious areas, traditional history related to natural resources and their utilization; Past and present status, and future management plans.

The process of Focus Group Discussion (FGD) activities, participatory mapping, deep interview, field observation and review documents are carried out as one of the process of consultation with the community and ensuring the socialization process has been carried out with stages involving the community in obtaining approval according to RSPO standard in Free, Prior and Informed Consent documents: Guide for RSPO members (2015). Several important summaries of community consultation activities that are summarized and presented below:

Date	Name / Contibute on Community	Issue/ Recomendation
Socialization (Scooping)		
23 Maret 2017	Bapak Gambang, Camat Ketungau Hulu	The concerns of stakeholder stakeholders as community representatives of previous companies that have cleared land but have been abandoned for years. Plasma gardens are partly embedded but not harvested and those that have not yet been embedded are unclear realizations. **Answer by Sigit Budhi Setyanto:** Thank you for the information, team representatives, especially the social team, will formally visit to Camat and Kepala Desa. Please note the field team from ReMark Asia consists of: (1) Sigit Budhi Setyanto, Coordinator of HCV Assessment for Socio-Cultural Affairs, (2) Fadhli, HCV Assessment for Socio-Cultural Affairs, (3) Dera Syafrudin, HCV Evaluator for Ecology / (5) R. Sukasmianto, HCV Appraiser for Environmental Services and (6) Dian Pratiwi, HCV Assessors of GIS
	Bapak Dakun, Camat Ketungau Tengah	Expectations to PT MNS to undertake the development of the plantation adn plasma farm in accordance with national or international regulations / agreements so as to benefit the surrounding villagers and to contribute to the development of the regional / national level. Expectations to consultants to conduct activities of HCV identification which is procedurally and independently and involves community elements in order to avoid problems behind the day. **Answer by Sigit Budhi Setyanto:** Thank you for your wishes, as a consultant and also for the company, with this HCV Identification activity one of which aims to protect and ensure the important places for the community as one of the company's commitment to 'sustainable' to the surrounding environment and social a location permit area that all need the support of various parties.
	Bapak Iskandar, Ka Polisi Sektor Ketungau Hulu	
	Bapak Rayendra, Koordinator LSM Lokal 'Sintang Fresh Club', Kabupaten Sintang	Consultants are expected to be able to find the right stakeholder so that the data obtained is correct. Companies will be accepted society depends on guidance in the openness of insight, do not be shy to reveal the right or wrong. **Answer by Sigit Budhi Setyanto:** From the tentative schedule discussion results expected the assistance from the village helped us during the visit to meet important stakeholders in the village.
Consultation to stakeholder in the villages		
26 Maret 2017	Fadhli, Penilai Sosial dan Budaya ReMark Asia	The basic questions in the consultation are: Village Name (other name), number of hamlet, population and household, village boundary, village history & land management history, livelihoods source, basic needs (rice / carbohydrate, protein, vitamins, water, clothing, house materials & supplies, energy, livestock, primary income, essential location of basic necessities, site location or still being sacrificed and others.
	Atut, Kiroyanto Kepala desa dan Kaur Pemerintahan Desa Sungai Bugau	Sungai Bugau Village divided into 4 hamlet of Rentong Utara, South Rentong, Nyelawai, Birong, with area around 9,500 Ha with 283 families from Dayak Iban / Dayak bugau ethnic / tribe besides migrants from Java, Padang and Batak, Religion embraced 60% Prostestan and 40% Catholic. Oil palm plantation

Date	Name / Contibute on Community	Issue/ Recomendation
		already operating by PT.Kiara Sawit Abadi. Carbohydrate requirements (rice) are obtained from planting rice with the traditional 'shifting cultivation' system accompanied by burning, which is done once a year. An additional requirement of rice is obtained by buying at a shop.. For the needs of vegetables and fruits obtained from farming around the garden. Vegetables type are cultivated ie sweet potatoes, cucumbers, tomatoes, chili and beans while for the types of fruits namely coconut, rambutan, duku and durian . For most protein needs are obtained by utilizing the river for fishing or by hunting seasonally into the forest outside the location permit. Types of fish caught are Tapah fish and Lais fish consumed by internal family and not sold. Poultry feeds such as cattle, goats, ducks, chickens and pigs are allowed to be released in the market, in addition to being sold to the market or to consumers. For the needs of building materials - wood for home improvement - people can still buy village wood from the source around the village, for large amounts of timber for the construction of new homes already expensive wood prices are expensive. Traditional household appliances are still found locally such as wood, bamboo and rattan, such as mats, cupak (a container commonly used for storing groceries), kindai (large baskets for carrying goods), tangkin (medium baskets to bring results rice harvest), tables and chairs, fishing grounds and equipment. Source of Clean Water comes from the springs with pipanisasi in addition to utilizing the flow of the river Sungaiung river. For sanitary comes from Sungai Bugau located outside PT.MNS location. For everyday clothes only fulfilled by buying the market. More community medicines to seek polindes and buy diwarung, there is no longer treatment to herbs or shamans. Polindes available with midwives and honorary nurses as well as posyandu officers who come regularly scheduled hamlets.
		In the neighboring villages the tendency of 'social change' occurs in social structures and functions such as geographical conditions, material culture, population composition, cultural traditions and ideologies that can change the economy and the political situation. Social change affects its social system; such as values, attitudes, and patterns of behavior among groups in society. Changes in geographical conditions also occur due to land clearing, resulting in shifting patterns of land use. The development of road infrastructure and the construction of village facilities also influences the change of the social community, due to the ease of public access to economic resources. Sarankan edit
30 Maret 2017	Sigit Budhi Setyanto, Penilai Sosial dan Budaya ReMark Asia	Have you ever met the PT MNS field staff, and what has been informed or done? So far, how does society relate to land and how to get it?

Date	Name / Contibute on Community	Issue/ Recomendation
		The decision-making process at the village level, as there are customary leaders and village heads, what is the mechanism?
	K. Lagar, Sunaro dan Ganda, Kepala Desa, Ketua Adat Desa dan BPD Desa Mungguk Entawak	PT MNS has conducted initial socialization to inform the local community about the oil palm development plan, right after the permit area is granted. And states: (a) The Company is committed to providing compensation as required, subject to the Company's SOPs on compensation requirements complying with legal and certification standards, transparent and involving local community participation. Currently the company's relationships and surrounding villages are sufficient, where the relation is built without overriding the objective evaluation. The Company has been allocating CSR contributions to local communities since the commencement of PT MNS operations.
		Local community relationships with land include: 1) Ownership of land Local people have own land or family owned (including tembawang), obtained from forest clearing, or have been inherited from previous generations / ancestors years ago. Each family has at least 2 ha with 3 plots of land or in some cases can be more than 20 ha and more than 10 fields of land. 2) The community once converted forest areas into agricultural land is a common practice and has been implemented since the first settlement. This is related to the livelihoods of local communities, the agrarian Dayak farming. 3) There are several water sources that are utilized by local people, but almost all families get a source of clean water from rivers, rainwater and nearby springs. 4) People are still doing shifting cultivation involving land rotation, land that has been passed (often has become a forest area) needs to be reopened when farmers return to previous land. 5) In some river estuaries there is illegal gold mining which is done by the public in cooperation with the investors along the banks of the Ketungau River, before this is prohibited by the government. Gold mining activities using crates with suction machines cause damage to rivers and water quality degradation. Mining is done by local residents and local people outside the village. 6) Most wildlife species hunted for consumption purposes, have been practiced for a long time as part of local traditions, cultures, and hobbies. Hunting wildlife is done by making traps and using firearms. Some of these traps can still be found in certain locations. 7) There is still utilization of community forest for indigenous needs such as timber that must obtain permission from traditional chairman and village head. Sedangka community land that has become secondary forest, former agricultural land, rubber gardens and garden pepper (sahang) that is not managed mixed with shrubs.
		Decision Making Process In village and government authorities

Date	Name / Contibute on Community	Issue/ Recomendation
		have full authority to make decisions, but the involvement of informal adat institutions at the village / sub-village level still occurs. The adat leader gives advice and advice to the village head. When referring to village representatives, this refers to groups of RT heads, village representatives (BPD), and formal leaders such as teachers, principals and civil servants.
Public Consultation		
3 April 2017	Bapak Empuli, Ketua BPD Desa Mungguk Gelombang	Subject boundary permit areas of PT.MNS village 'Mungguk Wave', has not done village boundary by the company. If you already know the boundary of permit area so good we determine the boundaries of the village area. **Answer by Mr. R.Sukasmianto:** Some villages enter into the location permit, to become HGU still need more stages and of course there will be border measurement. Later in the process of socialization that will continue to be of course inform the limit to the community in the process of compensation ..
	Bapak Kiro Yanto (Kaur Pemerintah desa Sungai Bugau	Sungai Bugau Village, not all of the areas mentioned in the findings of the HCV team, to be more specific and complete the data of the HCV team should be more spacious and straightforward so that more clear the names of tembawang, pendam, and others. **Answer Mr. Sigit Budhi Setyanto:** We can not take long to do this HCV assessment, we are accompanying other consultants to visit and socialize, then there will be other teams that will help collect or collect data which potential to be protected more complete again. HCV information obtained is the result of visits to GPS-based villages, social teams also have much discussion with the community, some of the village areas that enter the location permit and HCV have been included.
	Tanggapan Toni Analius, Kepala Desa Nanga Bugau.	The proposals for protected areas should involve the community in this HCV survey to make it clear which locations are protected areas for the community. Because people who know the location points that are protected areas, especially for community camat areas such as lalau, pendam and tembawang. **Explanation by Mr. Sigit Budhi Setyanto:** While the results of our discussion for the Tembawang Umum type will surely be protected and will not be submitted to the company and enter the HCV 5 and HCV 6 areas. For personal tembawang may be submitted to the company of origin of the company compensation from the company. For personal tembawang not enter into HCV 6 area.
	Saran Bapak Gambang Camat Ketungau Hulu	Community land compensation process many problems such as 2 mastery or ownership of tembawang. Based on the experience of the field has ever happened to another company that claimed 2 times the compensation of tembawang. It is necessary to take care of the company in the compensation of tembawang land, in this case the need for witnesses from the customary board that is customary head. Because customary heads who know the origin / ancestry and understand about custom and know ownership of tembawang, it is expected that the customary head can rebuke when there is a case like this.

Date	Name / Contibute on Community	Issue/ Recomendation
		Answer by Sigt Budhi Setyanto: Later the company has mechanisms and SOPs on land compensation, of course the company will conduct further socialization of plantation development plans including community land compensation process.
	Bapak Ratendra, Koordinator NGO SFC, Sintang	HCV 1 concerning the diversity of species has not been exposed in the identification of its fisheries, please Remark Asia also make where the potential is still very high. SFC once conducted a survey on the river Serawa (outside permit), that the catchment area must be maintained, there has been a flash flood some time ago. Hoping that the CSR associated with environmental services will recommend aji lake entry to the cultivation or restocking of fisheries, have entered the regulation and RT / RW Expect companies that enter the RSPO standard to continue to pay attention to the value of conservation as well as the sustainability of the plantation. The hope of this activity is not only done by companies and consultants only and the community is expected to participate. **Answer Mr. Sigit Budhi Setyanto:** Thank you for the information, we repeated that the total area of HCVs is 1,832.8 ha or 10.17% of the total area of PT.MNS location permit. For identification of fish has been entered into the list because the information there is 'siluk fish' is in Aji lake.

3.4 Soil and Topography Findings and Results

Based on landsystem Soil Taksonomi System USDA, 1982 and based on Clasification System Soil Research System in Bogor, 1981, type of soil found in PT MNS can be classified into four (4) soil type association namely: (1) Inceptisol (*Tropaquepts dan Dystropepts*), (2) Entisol (*Tropaquents*), (3) Ultisol (*Tropudults dan Paleudults*) and (4) Histosol (*Tropohemist dan Troposaprist*).

Based on Map of Macro Scale of Land System (RePPProt 1990), land systems associated with soil type on PT MNS permit area are: (1) Lawanguwang (LWW) land system with Paleudults; Tropudults, and Tropoquepts soil types for 17.406,51 Ha (96,56%), (2) Mendawai (MDW) with Tropohemists, Troposaprists, and Tropaquents soil types, contributed for 176,56 Ha (0,98%), (3) Pendreh (PDH) with Tropudults and Dystropepts soil type for 273,20 Ha (1.52%) and (4) Teweh (TWH) with Tropudults; Paleudults and Dystropepts soil types for 170,93 Ha (0.95%).

3.5 GHG Findings and Results

3.5.1 Carbon Stock Evaluation

Table 3.10 and Table 3.11 show the results of the forest inventory carried out in the study area. After removal of plots in the MAF strata, sample size is 89 inventory plots. The Forest strata has an average carbon stock of 109.2 tonnes per ha, YRF strata has an average carbon stock of 73.2 tonnes per ha, while the scrub stratum has an average carbon stock of open land 11.3 tonnes per ha.

Table 3.10. Stand and Stock Table

Land Cover Stratum	Number of Plots Measured	Stems per ha	Biomass per ha (kg/ha)	Carbon Stock per ha by DBH class					90% confidence limits	
				Total	5.0-14.9	15.0-29.9	30.0-49.9	50.0+	Lower	Upper
				tonnes/ha					tonnes/ha	
Forest	52	1,340	232,286	**109.2**	18.0	15.4	35.9	39.9	98.4	120.0
YRF	18	984	155,746	**73.2**	13.2	10.1	20.9	29.0	59.5	86.9
Scrub	15	1,575	24,065	**11.3**	10.3	1.0	0.0	0.0	8.0	14.6
Open Land	4	90	5,820	**2.7**	0.5	0.5	1.8	0.0	-2.3	7.7

Table 3.11. Summary of carbon stock results per vegetation class

No.	Strata	Carbon (ton/ha)	Description
1	FOR	109.2	Forest (Secondary Forest)
2	YRF	73.2	Young Recovering Forest
3	MAFH	53.1	Mixed Agro Forestry (predominantly old rubber and fruit trees)
4	MAFL	29.9	Mixed Agro Forestry Light Stocking (predominantly young rubber and fruit trees)
5	SCR	11.3	Scrub
6	OL	2.7	Open land

3.5.1.1 Land Cover Stratification

Table 3.12 shows the results of the land cover stratification. Two sets of area data are presented. The "Before Pre-RBA" data represents the results of the after the initial field survey. The "After Pre-RBA" data incorporates the results of the Pre-RBA activities. In the MNS case there is a 331 ha difference in the potential HCS forest area between the two data sets. This is the result of two factors; firstly, most of the polygons initially allocated for Pre-RBA checks were found to be

mixed rubber areas and so were re-allocated to agriculture, and secondly over the three-month period between the two site visits significant forest clearance took place for smallholder agriculture**.**

Table 3.12 Results of Land Cover Stratification "After Pre-RBA"

No.	Strata_LC	Description	Width (ha)
1	FOR	Forest (Secondary Forest)	1,252
2	YRF	Young Recovering Forest (Old Scrubs)	740
3	MAFH	Mixed Agro Forestry Heavy Stocking (predominantly old rubber and fruit trees)	3,935
4	MAFL	Mixed Agro Forestry Light Stocking (predominantly young rubber and fruit trees)	4,031
5	SCR	Scrub	2,332
6	OL	Open Land	4,667
7	AGR	Field	902
8	AGRI2	Oil Pal MJM	53
9	AGRI3	Oil Palm of Community	8
10	RIC	Paddy land (Sawah)	17
11	Road	Road	30
12	SET	Settlement	11
13	WB	Water Body	49
	Total		**18,027**

Based on the HCS assessment conducted by Atamarie and submitted to the HCS Approach, it is known that the net area of HCS is 331 ha.

3.5.2 Results of GHG Calculations

3.5.2.1 Scenario testing

Table 3.13. Description of new development scenarios in PT MNS

1	Scenario 1	Mixed vegetation types (non-forest areas) cleared for oil palm development, excluded reserve area**.** No methane capture facility planned for the mill. No clearing of HCV areas and community areas as identified in HCV-HCS Assesment and SEIA • Planned planted area = 7,392 ha (41.1 %) oil palm. • Planned conservation area = 5,677 ha (31.5 %) • Planted = 4,931 ha (27.4 %)
2	Scenario 2	Mixed vegetation types (non-forest areas) cleared for oil palm development. No methane capture facility planned for the mill. No clearing of HCV areas and community areas as identified in HCVA and SEIA. • Planned planted area = 8,731 ha (48.5 %) oil palm. • Planned conservation area = 4,377 ha (24.1 %) • Planted = 4,931 ha (27.4 %)

		S1	S2
Area avoided for developments	Secondary forest	1,258	1,258
	Young Regeneration Forest	650	650
	Scrub	645	479
	Mixed Agro Forestry Heavy	995	745
	Mixed Agro Forestry Light	887	491
	Agricultural	177	112
	Oil Palm	52	-
	Open Land	1,015	552
Potential areas for new development	Mixed Agro Forestry Heavy	1,893	2,142
	Mixed Agro Forestry Light	1,962	2,358
	Scrub (Semak)	1,045	1,215
	Open Land (Lahan Terbuka)	2,092	2,555
	Agricultural	400	463
POME Treatment	Open Pond	Y	Y
	Methane Capture	-	-

3.5.2.2.Projection of GHG Emission

Table 3.14 Projection of GHG Emissions of two development scenarios (tCO_{2e}/ tCPO)

	S1	S2
Land conversion	0,57	0,56
Crop sequestration	-1,56	-1,56
Peat oxidation	0,00	0,00
Conservation Sequestration	-0,48	-0,33
Fertiliser (mineral soil; manufacture & transport)	0,19	0,23
N20 Emissions	0,15	0,18
Fuel Consumption	0,01	0,01
Net estate emission	-1,11	-0,90
POME	0,82	0,82
Mill Diesel fuel	0,04	0,04
Purchased Electricity	-	-
Credit	-	-
Net Mill emission	0,86	0,86
Net GHG emission	(0,2)	(0,0)

3.5.2.3.Selection of PT MNS Optimal Scenario

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

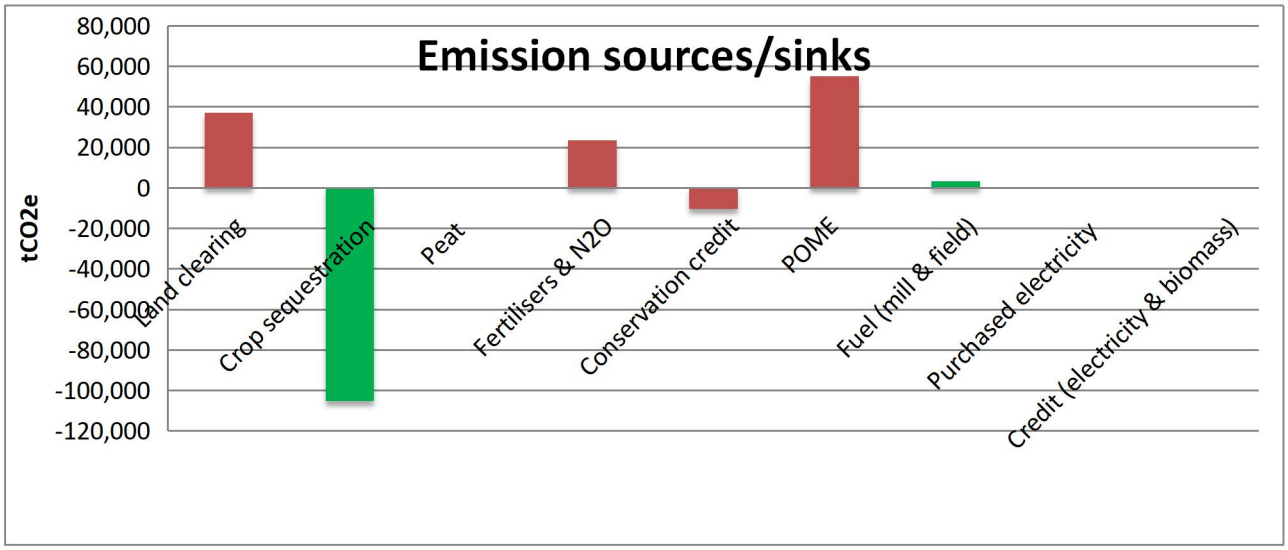


Figure 22 . Summary of GHG emissions for new development plan of PT MNS (tCO2e)

New planting plan of PT MNS from 2020 – 2023 are presented in the table 3.15 and Figure 29

Table 3.15. New planting plan of PT MNS

No	Plantation	Planted	New Planting Plan					Grand Total
			2020	2021	2022	2023	Total	
1	Nucleus	3,577	1,761	1,254	1,095	1,007	5,117	**8,694**
2	Smallholder	1,352	697	556	555	467	2,275	**3,627**
Total		**4,930**	**2,458**	**1,810**	**1,650**	**1,474**	**7,392**	**12,322**

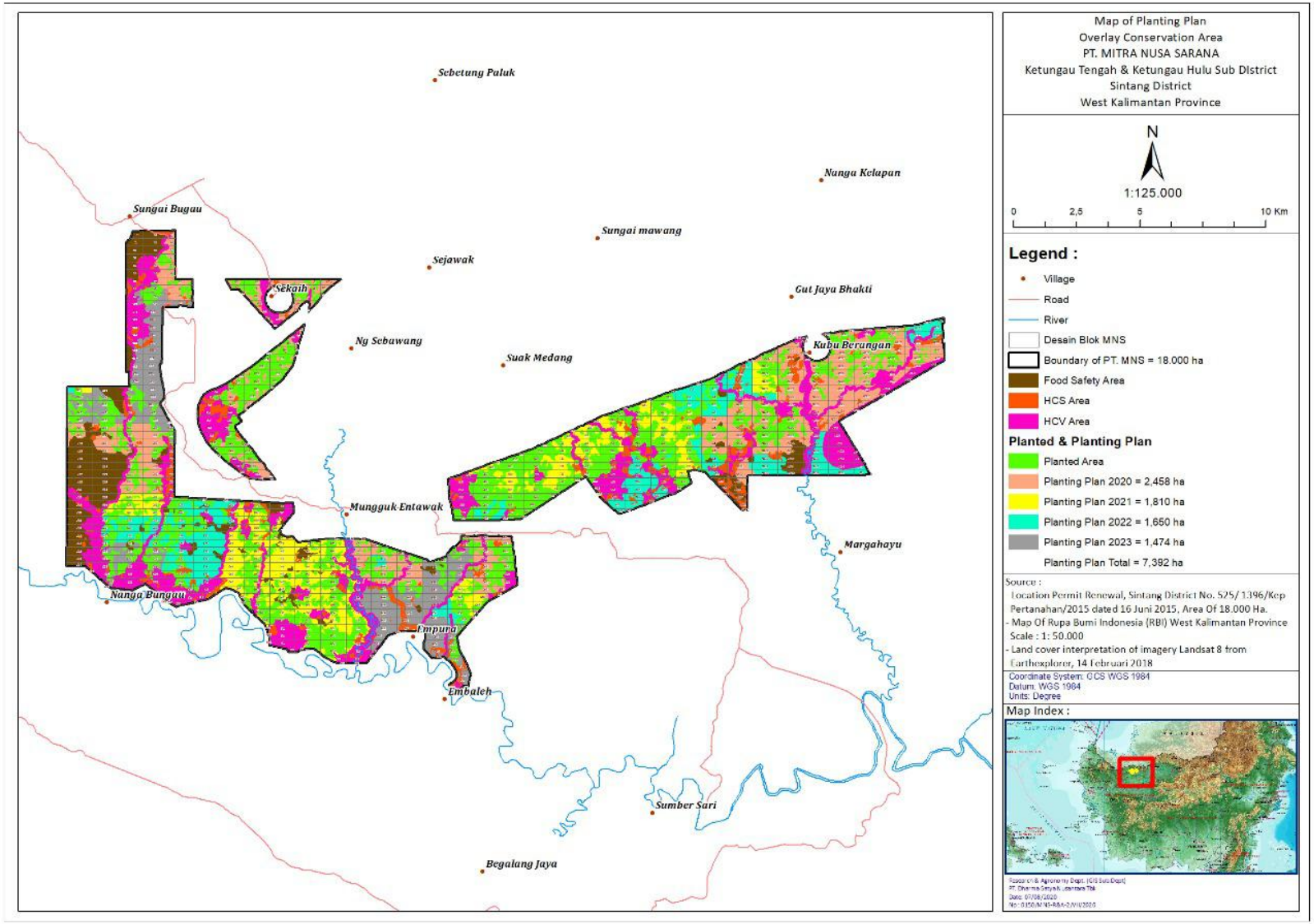


Figure 29. The new planting plan map of PT MNS

3.6 FPIC Process

3.6.1 Community Engagement – Objectives and Approach

The key objectives of DSN Team and Ata Marie's community engagement activities were as follows:

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

Ata Marie, Remark Asia team and MNS staff conducted the meeting in Sintang on March 23rd 2017. There was 26 people attended the meeting, including Camat Ketungau Hulu, Camat Ketungau Tengah, Kapolsek Ketungau Hulu, most of the Kepala Desa of villages inside the area, a number of other village representatives, representative from Dinas Pertanian & Perkebunan, Dinas Lingkungan Hidup, and local NGOs.

Several stages for community engagement consists of opening meeting, participatory meeting, and participatory review of draft ICLP. The following is an explanation of opening meeting and for participatory mapping and participatory review in sub chapters 3.6.4.

- Opening Meeting

The primary objectives of the Opening Meeting were:

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

Attendees were positive about PT MNS's planned plantation development.

Several speakers gave valuable input:

- Community members described their bad experience with the previous license holder PT MJM. Land was released to PT MJM but plantation development and related community progams were not implemented. They obviously do not want a repeat of this experience and asked PT MNS to be active, transparent and communicative regarding project development.
- Government officials described (from their own experience) the potential for increased social conflict within communities if the land acquisition process is not well managed. The Camat said that he wants PT MNS to implement a transparent land acquisition process involving local Government. He said that written agreements should be held by both parties (farmers and PT MNS) as protection.
- One of the key reasons for inviting palm oil companies into the area is to increase employment opportunities. Attendees requested that community members be used and be given priority as plantation workers at PT MNS because they gave their land, even though they may require training beforehand regarding skills upgrading.
- Local Government officials stated that the site is in a remote location with poor road infrastructure. PT MNS was told to expect requests for contributions and collaboration in order to maintain local infrastructure.
- Local Government officials requested that as part of their CSR program, PT MNS should address improvements on clean water supply for community consumption. This condition needs to be stated in the MOU.
- Communities requested that as part of the plasma program, MNS allocate specific land in the name of the village administration itself, to provide funds for village activities (tanah kas desa).

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

3.6.2 Initial Consultation and FGD at Village Level

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

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

Table 3.16 The schedule of initial socialization activities carried out by Ata Marie in PT MNS

Date	Village	Dusun	No of Antendee	Attendee
24-Mar-17	Suak Medang	Engkarem	9	KaDes, KaDus, Dusun Staff and Local Community
		Batih		
24-Mar-17	Mungguk Entawak	Batih Raba	7	KaDes, KaDus, Dusun Staff and Local Community
		Sejelu		
26-Mar-17	Sungai Bugau	Rentong Selatan	3	KaDes, KaDus, Dusun Staff and Local Community
		Rentong Utara		
		Nyelawai		
		Birong		
27-Mar-17	Embaleh	Temaloi	6	KaDes, KaDus, Dusun Staff and Local Community
		Embaleh		
28-Mar-17	Empura	Rantau Kesumpit	21	KaDes, KaDus, Dusun Staff and Local Community
		Sungai Inung		
28-Mar-17	Nanga Bungau	Pejangan Raya	8	KaDes, KaDus, Dusun Staff and Local Community
		Kedang Ran		
		Binjai		
		Tapang Nibung		
29-Mar-17	Sekaih	Sepadit	14	KaDes, KaDus, Dusun Staff and Local Community
		Mungguk Lempung		
30-Mar-17	Kubu Berangan	Nanga Sepula	6	KaDes, KaDus, Dusun Staff and Local Community
		Kubu Berangan		
		Mungguk Kubu		
30-Mar-17	Mungguk Gelombang	Mungguk Payan	1	KaDes
		Mungguk Gelombang		
		Sungai Antu		
		Sepulau		

3.6.3 Summary of Others Findings

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

Other items commonly brought up during FGDs included:

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

Employment issues are discussed indept in the SIA report

3.6.4 Participatory Mapping

3.6.4.1 Participatory Review of Draft ICLP

Objectives and Activities

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

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

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

The participatory mapping exercise included the following activities:

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

Tabel 3.17. shows the schedule of the Participatory Mapping team during the initial Field assessment

Date	No of Field Crews	Desa/ Dusun
26 March 2017	2	Sejelu
27 March 2017	2	Sejelu, Suak Medang
28 March 2017	2	Sejelu
29 March 2017	2	Sejelu
30 March 2017	2	Sejelu
01 April 2017	4	Empura, Binjai
02 April 2017	2	Binjai
03 April 2017	4	Empura, Danau Aji
04 April 2017	5	Empura, Mungguk Kunyuk
05 April 2017	5	Empura
06 April 2017	5	Mungguk Kubu
07 April 2017	5	Mungguk Kubu
08 April 2017	2	Mungguk Kubu
10 April 2017	5	Kubu Berangan

Date	No of Field Crews	Desa/ Dusun
11 April 2017	4	Kubu Berangan
12 April 2017	4	Kubu Berangan, Sekaih
13 April 2017	5	Sekalih/Sepadit, Kedang Langkau (Nanga Bugau)
15 April 2017	3	Sekaih
17 April 2017	3	Sekaih
18 April 2017	1	Sekaih
19 April 2017	3	Nyelawai, Sekaih
20 April 2017	4	Nanga Bugau

3.6.4.2 Participatory Review of Draft ICLP

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

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

Table 3.18 The activities schedule for final consultation of the draft conservation plan.

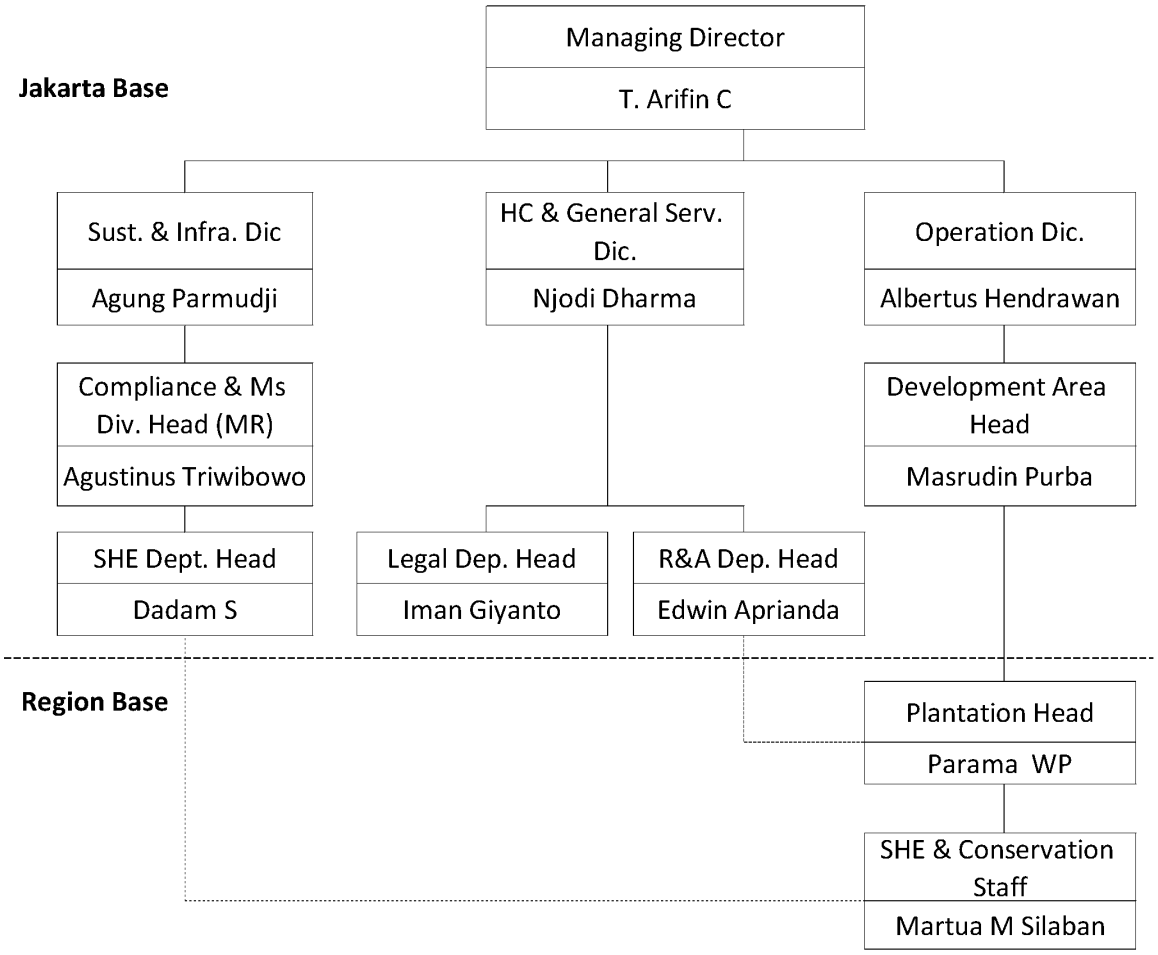
Date	Village
14 July 2017	Sekaih and Sungai Bugau
15 July 2017	Suak Medang
17 July 2017	Empura and Embaleh
18 July 2017	Nanga Bugau and Mungguk Entawak
19 July 2017	Mungguk Kubu (Desa Kubu Berangan)
20 July 2017	Kubu Berangan (Desa Kubu Berangan)
21 July 2017	Sepayan (Desa Mungguk Gelombang)

Chapter 4

4. Summary of Management Plans

4.1 Team responsible for developing management plans

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



4.2 Soil Type and Topography

Based on Map of Macro Scale of Land System (RePPProt 1990), land systems associated with soil type on PT MNS permit area are: (1) Lawanguwang (LWW) land system with Paleudults;

Tropudults, and Tropoquepts soil types for 17.406,51 Ha (96,56%), (2) Mendawai (MDW) with Tropohemists, Troposaprists, and Tropaquents soil types, contributed for 176,56 Ha (0,98%), (3) Pendreh (PDH) with Tropudults and Dystropepts soil type for 273,20 Ha (1.52%) and (4) Teweh (TWH) with Tropudults; Paleudults and Dystropepts soil types for 170,93 Ha (0.95%).

The new planting of PT MNS will avoid any steep terrain and/or marginal and fragile soils including peat or sandy soils. Based on the soil survey, there was not found the fragile soils over large area.

The soil asosiation of Entisols (Aquic Tropaquents), Tropohemists and Troposaprists which often require special handling especially in water management, such as the manufacture of drainage ditches, sewers and the a kind of water gates to maintain groundwater levels.

4.3 GHG Emissions Management and Mitigation Plans

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

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

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

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

4.4 Summary of Management and Mitigation SEIA

Potential impact, risk and social issue based on SEIA report has been classified based on the resources from group process development activities oil palm plantation and has done PT. MNS. The assessment of SEIA in the executive summary of AMDAL and SIA Report for identification of negative and positive impact on the environment and surrounding community of PT MNS as **Table 4.1.**

4.5 Summary of Management and Mitigation Plans HCV

Management Plan HCV was develop with the intention of providing guidance for the company in designing and implementation HCV and SEIA program. Monitoring HCV area during every six months. So that their resources can be focused a more integrated and effective in achieving the vision of the management plan PT MNS as **Table 4.2**

Table 4.1 PT MNS Social Management and Monitoring Program

No	Social Impact/ Social Issues	Target	Strategy Target Achievement	Location	PIC	Timeframe for completion	Monitoring
1	Natural resources						
	a. Unclear boundaries between villages	To facilitate resolution adminititrative between villages	a. To facilitator meeting with community between villages b. To facilitator for counselling boundary of village	Village around PT MNS	CSR Dept	2020-2023	Every three year (May 2022)
	b. Limitations of Fulfillment of Clean Water Resources	Facilitation of Water Facility & Infrastructure Development.	a. Implementation quality water in around village b. Assistance to the development of clean water supply	Quality water according EIA PT MNS Villages around PT MNS	SHE & Conservation Staff CSR Staff	2020-2023 2020-2023	every 6 months (June &December) Every two year (June 2021 & 2023
	c. Cultivation with burning system	The Formation of the Fire Concerned Society	Socialization awareness control of land burning	Villages around PT MNS	SHE & Conservation Staff and CSR Staff	2020-2023	Every year (July)
	d. Ignorance of boundary concession location PT MNS	a. Socialization of oil palm plantation development plan and CSR program plan. b. There needs to be a community land verification team (mapped) c. Establishment of land acquisition team	a. Socialization empowerment program from PT MNS b. Socialization of cadastral boundaries to the community around the company c. Rescheduling of PT MNS cadastral boundary determination (maping) with the community participation and BPN Officer. In addition, there will be re-sosialization of the HCV area management	Villages around PT MNS Villages around PT MNS Concession and Villages around PT MNS	CSR Staff CSR Staff Legal Staff, CSR Staff & Survey Staff	2020-2023 2020 2020	Every year (July) 27 September 2020 Desember 2020

No	Social Impact/ Social Issues	Target	Strategy Target Achievement	Location	PIC	Timeframe for completion	Monitoring
			plan and CSR programs.				
	e. Illegal mining	Recruiting community who work illegal mining to work in the company.	Recruitment of local workforce around PT MNS	Villages around PT MNS	HCD Dept	2020-2023	Every year (January)
2	Human resources						
	a. Low level of education of citizens	a. Socialization and Information related to labor recruitment system and mechanism in each village b. Main priority of local labor from the surrounding villages c. Facilitate teaching and learning tools of education school d. Facilitation Scholarship achievements and scholarships of underprivileged community	a&b. Recruitment of local workforce around PT MNS c. Assitance to around village in PT MNS for education community d. Schollarship for community	Villages around PT MNS Villages around PT MNS Villages around PT MNS	HCD Dept CSR Dept CSR Dept	2020-2023 2020-2023 2020-2023	Every year (January) Every year (July) Every year (July)
	b. High unemployment rate	Main priority of local labor from the surrounding villages	Recruitment of local workforce around PT MNS with salary according wages of region	Villages around PT MNS	HCD Dept	2020-2023	Every year (January)
	c. Vulnerable groups (access / assets)	Special CSR programs for underprivileged community (basic food and free health services) every month or before the celebration of the religious holidays	a. Socialization empowerment program from PT MNS b. Assitance for celebration of the religious holidays to community	Villages around PT MNS Villages around PT MNS	CSR Dept CSR Dept	2020-2023 2020-2023	Every year (July) Every year (December)

No	Social Impact/ Social Issues	Target	Strategy Target Achievement	Location	PIC	Timeframe for completion	Monitoring
3	Economy resources						
	a. Crop failure	b. Preparation for planned plasma estate realization such as socialization and community assistance in forming plasma cooperatives c. Facilitation of agricultural extension to increase productivity of rice fields, and rubber	a. Socialization empowerment program of plasma from PT MNS b. Assitance to productivity agriculture around PT MNS	Villages around PT MNS Villages around PT MNS	CSR Dept CSR Dept	2020-2023 2020-2023	Every year (July) Every year (August)
	b. Limited marketing access	a. Counseling and farmer assistance b. Cooperation between farmers and companies in the sale of agricultural products	Counseling working with local government for enhancement agricultural product villages around PT MNS	Villages around PT MNS	CSR Dept	2020-2023	Every two year (August 2021 & 2023)
4	Social Cultural						
	a. Conflict social	a. Together with communities making MOU agreement related to the plan of community programs (CSR Program). b. Establish good communication with traditional	a. Make MOU with community about conflict social and their regulation b. Make SOP for community and company based on mutual agreement c. Social visit to each village	Villages around PT MNS	CSR Dept	2020-2023	Every year (October)

No	Social Impact/ Social Issues	Target	Strategy Target Achievement	Location	PIC	Timeframe for completion	Monitoring
		leaders, community leaders and other multi parties c. Strengthening the company's public relations / community relations team					
	b. Minimum role of organization / institutional village	Assistance in each village	Social visit to each village	Villages around PT MNS	CSR Dept	2020-2023	Every semester or six months (May & October)
5	Infrastructure and accessbilitas						
	a. Accessibility of Health Facility & Infrastructure	Mobile health services counseling at each posyandu	Implementation of health assistance in each village	Villages around PT MNS	CSR Dept	2020-2023	Every semester or six months (May & October)
	b. Poor access to village	Facilitate the improvement, maintenance of rural access road	Assistance improvement access road to village	Villages around PT MNS	CSR Dept	2020-2023	Every two year (Feb 2021 & 2023)
	c. Limitations of Access to Information Facilities	Facilitation of facilities and infrastructure of street lighting	Assistance improvement infrastructure to village (street lighting)	Villages around PT MNS	CSR Dept	2020-2023	Every two year (Feb 2021 & 2023)

Tabel 4.2 Matrix Management and Mitigation Plan HCV

HCV	Type/ form of HCV Areas	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
HCV1 HCV3 HCV4 HCV5 HCV6	a. Riparian river of Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak	a. Loss of important tree species like *Keruing* (*Dipterocarpus cornutus*), *Kayu amang* (*Hopea mengarawan* Miq), *Meranti putih* (*Shorea accuminatissima*), *Kayu tekam* (*Shorea foxwarthyi*), *Mersawa* (*Dipterocarpus crinitus*)	a. Prohibited land clearing on forest spots where important plant species (especially HCV areas)	a. Regularly monitor particular species, important for HCV elements, and record their occurrence	HCV areas in PT MNS	SHE & Conservation Staff	2020-2023	Every month (Jan-Des)
	b. Lake of Sejirak, Aji, Meringat	b. Loss of important wildlife (pangolin and sun bear) due to illegal hunting.	b. Reduce wildlife hunting opportunities and prepare alternative needs fulfillment for the community / worker	b. Record every hunting activities, and destruction on wildlife habitat	HCV areas in PT MNS	SHE & Conservation Staff	2020-2023	Every month (Jan-Des)
	c. Forest of Tinting Medang, Kampung Kembang, observation area 9	c. Fragmented wildlife habitat and corridor	c. Maintaining the animal corridor so that the habitat is not fragmented	c. Monitor condition of wildlife corridors and disturbance if any	HCV areas in PT MNS	SHE & Conservation Staff	2020-2023	Every month (Jan-Des)
	d. Swamp forest area		d. Maintaining the integrity of the habitat, including					

HCV	Type/ form of HCV Areas	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
		d. Decline quality of wildlife habitat	the establishment of HCV areas and security patrols e. Enrichment of fragmented corridors					
HCV1 HCV3 HCV4 HCV5 HCV6	a. Riparian river of Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak, Aji, Meringat c. Forest of Tinting Medang, Kampung Kembang, observation area 9 d. Swamp forest area	a. Land clearing/logging on the remaining forest areas, especially those located along the riverbanks. b. Gold mining in vicinity to riverbanks, especially those close to swamp forest areas	a. Prevent land opening on swamp forests close to riverbanks b. Prohibit gold mining, especially those located on riverbanks and swamp forests.	a. Regular monitoring patrols related to HCV area safeguards b. Monitoring of disturbance intensity (encroachment, illegal logging, tree felling, fire, illegal mining) c. Record any important events related to the intensity of the disturbance d. Water quality measurement	HCV area and riparian river in PT MNS Concessions PT MNS	SHE & Conservation Staff SHE & Conservation Staff and Operational Staff	2020-2023 2020-2023	Every month (Jan-Des) Every month (Jan-Des)

HCV	Type/ form of HCV Areas	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
HCV1 HCV3 HCV4 HCV5 HCV6	a. Riparian river of Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak, Aji, Meringat c. Forest of Tinting Medang, Kampung Kembang, observation area 9 d. Swamp forest area	Road construction on HCV areas	a. HCV area protection with routine patrolling b. Close specific access/road towards HCV areas c. Prevent increasing access to protected conservation areas to avoid disturbance on forest cover	a. Routine patrolling and monitoring on HCV protection. b&c. Monitoring the possibility of road access establishment by other parties.	HCV area PT MNS Concessions PT MNS	SHE & Conservation Staff SHE & Conservation Staff and security (Operational Support) PT MNS	2020-2023 2020-2023	Every month (Jan-Des) Every month (Jan-Des)
HCV1 HCV3 HCV4 HCV5 HCV6	a. Riparian river of Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong,	Soil and water pollution	a. Implementation eco-friendly agricultural practices. b. Monitor river water	a. Monitoring water quality and oil palm waste disposal management b. Monitor water	Concession and around PT MNS Concession and	SHE & Conservation Staff SHE &	2020-2023	every 6 month (June &December) every 6 month (June

HCV	Type/ form of HCV Areas	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
	Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak, Aji, Meringat c. Forest of Tinting Medang, Kampung Kembang, observation area 9 **d.** Swamp forest area		and groundwater quality, control waste of oil palm plantation and mill waste disposal	debit and water quality periodically.	around PT MNS	Conservation Staff	2020-2023	&December)
HCV1 HCV3 HCV4 HCV5 HCV6	a. Riparian river of Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak,	Land conversion	a. The company should commit on the regulation that there will not be any land clearing on HCV areas. b. Establish SOP for forest cover protection and enrichment planting.	a. Monitor the quality and total area of forest cover b. Investigate cases on illegal land opening	HCV area PT MNS Concession PT MNS	SHE & Conservation Staff SHE & Conservation Staff and Operational Staff	2020-2023 2020-2023	Every month (Jan-Des) Every month (Jan-Des) Depend on the current activies

HCV	Type/ form of HCV Areas	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
	Aji, Meringat c. Forest of Tinting Medang, Kampung Kembang, observation area 9 d. Swamp forest area							
HCV1 HCV3 HCV4 HCV5 HCV6	a. Riparian river of Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak, Aji, Meringat c. Forest of Tinting Medang, Kampung Kembang, observation area 9	illegal logging and Encroachment	a. Establish sign board on riverbank borders, lake perimeter, secondary forest, and swamp forest borders. b. Undertake routine patrolling on HCV areas. c. Develop SOP for HCV border delineation, demarcation, and protection.	a. Monitor the intensity of land clearing, illegal logging and encroachment b. Monitor the condition and quality of sign boards c. Routine patrolling on HCV areas and borders.	Concession PT MNS Concession PT MNS Concession PT MNS	SHE & Conservation Staff and Operational Staff SHE & Conservation Staff and Operational Staff SHE & Conservation Staff	2020-2023 2020-2023 2020-2023	Every month (Jan-Des) Depend on the current activies Every month (Jan-Des) Every month (Jan-Des)

HCV	Type/ form of HCV Areas	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
	d. Swamp forest area							
HCV1 HCV3 HCV4 HCV5 HCV6	a. Riparian river of Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak, Aji, Meringat c. Forest of Tinting Medang, Kampung Kembang, observation area 9 d. Swamp forest area	Poor management activities	Implement soil and water conservation technique to improve catchment ability and reduce surface runoff	Map and monitor water catchment areas at least once a year.	Concession PT MNS	SHE & Conservation Staff	2020-2023	Every year (November)
HCV1 HCV3 HCV4	a. Riparian river of Keturau, Bugau, Gernis, Semaloi,	Extreme weather and storm	Improve and protect vegetation cover on riverbank areas, lake	a. Monitor climate and rainfall intensity	Concession PT MNS	R&A Staff and Operational Staff	2020-2023	Every month (Jan-Des)

HCV	Type/ form of HCV Areas	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
HCV5 HCV6	Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak, Aji, Meringat c. Forest of Tinting Medang, Kampung Kembang, observation area 9 d. Swamp forest area		perimeter, secondary forests, swamp forests, to reduce the possibility of flood and severe impact from storm occurrence	b. Monitor the frequency of flood and storm.	Concession PT MNS	R&A Staff and Operational Staff	2020-2023	Every month (Jan-Des)
HCV1 HCV3 HCV4 HCV5 HCV6	a. Riparian river of Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul,	Flood plain areas	a. Develop water management to manage waterways, ditch and canal. b. Monitor water management practices (water level, inlet, surface water flow)	a. Monitor erosion event and surface runoff. b. Monitor water table depth and water level on canals	Concession PT MNS Concession PT MNS	R&A Staff and Operational Staff R&A Staff and Operational Staff	2020-2023 2020-2023	Every month (Jan-Des) Every month (Jan-Des)

HCV	Type/ form of HCV Areas	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
	Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak, Aji, Meringat c. Forest of Tinting Medang, Kampung Kembang, observation area 9 d. Swamp forest area							
HCV1 HCV3 HCV4 HCV5 HCV6	a. Riparian river of Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak, Aji, Meringat c. Forest of Tinting	Forest degradation/deforestation on HCV areas	a. Revegetate riverbank areas, lake perimeter, secondary and swamp forests with native-local species. b. Survey key vegetation structure for erosion prevention (land cover, forest stand structure) c. Prevent clearing on forest areas, recover vegetation and forest cover to reach minimum coverage required for unit management area	a. Monitor the quality of land cover and water. b&c. Monitor the performance of HCV rehabilitation and revegetation	Concession PT MNS Concession PT MNS	SHE & Conservation Staff SHE & Conservation Staff	2020-2023 2020-2023	Every month (Jan-Des) Every month (Jan-Des)

HCV	Type/ form of HCV Areas	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
	Medang, Kampung Kembang, observation area 9 d. Swamp forest area		within single entity of watershed. Forest cover should be mapped periodically and clear sign boards should be installed.					
HCV1 HCV3 HCV4 HCV5 HCV6	a. Riparian river of Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak, Aji, Meringat c. Forest of Tinting Medang, Kampung Kembang, observation	Flammable peatland	a. Provide training and socialization for internal staff, contractors and communities about the importance of protection zones and danger of land fires. b. Measure peat subsidence periodically. c. Management and protection on river zone, lake and its perimeter, and swamp forest to prevent land and forest fire..	a. Monitor peat land subsidiaries b. Monitorwater level in peatland canals c. Monitoring subsidience of wetlands (riparian, lakes, swamp forest)	Concession PT MNS Concession PT MNS Concession PT MNS	SHE & Conservation Staff and R&A Staff SHE & Conservation Staff and R&A Staff SHE & Conservation Staff	2020-2023 2020-2023 2020-2023	Every month (Jan-Des) Every month (Jan-Des) Every 6 month (June & December)

HCV	Type/ form of HCV Areas	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
	area 9 **d.** Swamp forest area							
HCV1 HCV3 HCV4 HCV5 HCV6	a. Riparian river of Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak, Aji, Meringat c. Forest of Tinting Medang, Kampung Kembang, observation area 9 d. Swamp forest area	Forest and land fires	a. Develop fire prevention and suppression management. b. Routine patrolling on hotspots c. Company's commitment to protect river zone, lake perimeter and forested areas should be implemented. d. Conduct training on fire prevention, early warning and operation, in collaboration with related institutions, and undertake training on fire suppression simulation. e. Implement zero burning on land preparation. f. Install warning signs to prevent the use of fire for land opening. g. Undertake periodic socialization for internal staff and local communities to prevent land fire.	a. Monitor and maintain the condition of fire breaks within or surrounding permit areas. b. Establish fire extinguisher team, equipped with well-established system and suppression equipment in line with SOP of fire prevention and suppression c. Undertake routine patrolling throughout unit management areas and HCV that are prone to fire, especially during dry season.	Concession PT MNS Concession PT MNS Concession PT MNS	TKTD or emergency response PT MNS TKTD or emergency response PT MNS TKTD or emergency response PT MNS	2020-2023 2020-2023 2020-2023	Every month (Jan-Des) Every month (Jan-Des) Depend on the current activies Every month (Jan-Des) Depend on the current activies

HCV	Type/ form of HCV Areas	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
			h. Establish fire breaks and plant fire-resistant species on areas prone to fire					
HCV1 HCV3 HCV4 HCV5 HCV6	a. Riparian river of Keturau, Bugau, Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak, Aji, Meringat c. Forest of Tinting Medang, Kampung Kembang, observation area 9 d. Swamp forest area	Reduction on water quality	a. Install sign boards to prevent the use of chemical compounds on riparian zones. b. Implement soil and water conservation techniques, such as: establishing terrace on steep slope or water infiltration/*rorak* c. Develop sediment trap/gully plug on water streams, especially those flow to HCV areas.	Monitor water quality periodically (at least every 6 months) on observation points (river inlet-outlet), visually or quantitatively (on laboratory)	Quality river in concession PT MNS	SHE & Conservation Staff	2020-2023	Every semester (June &December)
HCV1 HCV3	a. Riparian river of Keturau, Bugau,	a. Reduction on water quality	a. Undertake periodic socialization about the protection of riverbanks	a. Monitor quality and quantity of	Quality river in concession PT	SHE & Conservation	2020-2023	Every 6 month (June

HCV	Type/ form of HCV Areas	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
HCV4 HCV5 HCV6	Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak, Aji, Meringat c. Forest of Tinting Medang, Kampung Kembang, observation area 9 d. Swamp forest area	and quantity b. Land conversion on riverbanks area c. Excessive river resources utilization	and its surrounding to related stakeholders. b. Conduct training and socialization on utilization of household disposal to become organic fertilizer and rehabilitation of riverbank areas. c. Install sign boards to prevent the use of chemical compounds on riparian areas. d. Conduct socialization on household river water utilization. e. Support village/customary initiation to develop regulation on river management, rehabilitation and protectio	water debit periodically. b. Support village stakeholders to develop village regulations related to river management c. Encouraging villages to conducted village regulations d. Check the quality and quantity of water regularly d&e. Socialization to around community and employee about custody river	MNS Around village in concession PT MNS concession PT MNS Around village in concession PT MNS	Staff SHE & Conservation Staff SHE & Conservation Staff SHE & Conservation Staff & CSR Staff	2020-2023 2020-2023 2020-2023	&December) Every two year (August 2021 & 2023) Every two year (August 2021 & 2023) Every 6 month (June &December)
HCV1 HCV3	a. Riparian river of Keturau, Bugau,	a. Possibility of compensation	a. Conduct socialization for local communities about the company's plan on oil	Record socialization activities and	Around village and internal	SHE & Conservation	2020-2023	Every year (October)

HCV	Type/ form of HCV Areas	Threat of HCV	Management & Mitigation Plan	Monitoring Plan	Location	PIC	Timeframe for completion	Monitoring
HCV4 HCV5 HCV6	Gernis, Semaloi, Pendam, Nyeliyay, Sekalau, Empura, Lokoi, Delong, Bugao Kuntul, Berangan, Merakit, Meringat, Ran, Sejirak b. Lake of Sejirak, Aji, Meringat c. Forest of Tinting Medang, Kampung Kembang, observation area 9 d. Swamp forest area	request on "tembawang" area b. Loss of sacred tombs that will possible trigger conflict in the near future	palm establisment b. Communicate the company's procedures on compensation mechanism through village level socialization or workshop. c. Provide training for internal staff to improve their understanding about compensation mechanism.	feedbacks from local communities and internal staff Monitor compensation activities, ensure that compensation mechanisms are implemented in line with the SOP.	concession PT MNS Around village and internal concession PT MNS	Staff & CSR Staff SHE & Conservation Staff & CSR Staff	2020-2023	Every month (Jan-Des)

5. References

- Remark Asia. 2017. *Laporan Kajian HCV (High Conservation Value) PT. Mitra Nusa Sarana. Central Ketungau and Ketungau Hulu Sub District, Sintang District, West Kalimantan.* Final Report
- Remark Asia. 2017. *Laporan Kajian SIA (Social Impact Assessment) PT. Agro Andalan. . PT. Mitra Nusa Sarana. Central Ketungau and Ketungau Hulu Sub District, Sintang District, West Kalimantan.* Final Report
- CITES. 2014. Protected Species. <www.cites.org>. didownload pada 26 Juli 2014
- IUCN. 2014. IUCN Red List Categories. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland.
- Roundtable on Sustainable Palm Oil Remediation and Compensation Procedures Related to Land Clearance without Prior HCV Assessment. Endorsed by RSPO Board of Governers for staged implementation on December 1, 2015.
- Gunarso, P., Hartoyo, M., Agus, F., and T. Killeen. 2013. Oil Palm and Land Use Change in Indonesia, Malaysia and Papua New Guinea. Reports from the Technical Panels of the 2nd Greenhouse Gas Working Group of the Roundtable on Sustainable Palm Oil (RSPO). Published November 2013 at www.rspo.org

6. Internal Responsibility

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

Signed for and on behalf of PT Mitra Nusa Sarana

PT. MITRA NUSA SARANA

Agung Pramudji
Operation Director
Date : July 2020

Signed for and on behalf of PT Remark Asia

remark asia
marking sustainability future today

Sigit Budhi Setyanto
Team Leader of HCV & SIA Assessment
Date : July 2020

6.1 Organizational information and contact persons.

Contact details of the company are as follow :

Company Name	:	PT Mitra Nusa Sarana (PT MNS)
Address	:	Gedung Sapta Mulia, Jl. Rawa Gelam V, Kav. OR 3B, Kelurahan Pulogadung, Jakarta
Location for proposed NPP	:	Central Ketungau and Ketungau Hulu Sub District, West Kalimantan
Telp/ Fax	:	021 – 4618135/ 021 – 4606942
Contact Person	:	Agustinus Triwibowo
Position	:	Management Representative
Email	:	agustinus.triwibowo@dsngroup.co.id
Status Business Land	:	Land permit certificate, issued by Bupati Sintang No 525/1396/KEP-PERTANAHAN/ Tahun 2015 dated on June 16, 2015
Total Area of Location Permit	:	18,000 Ha

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

Table 6.1 . List of Legal Document for process New Planting Procedure (NPP)

Tahun	Tanggal dan Nomer Dokumen	Perihal
2010	02 Februari 2010	Kementerian Keuangan Republik Indonesia Direktorat Jenderal Pajak tentang **NPWP 03.088.920.8-004.000 PT Mitra Nusa Sarana**
2010	03 Desember 2010, Nomor AHU-56643.AH.01.01 Tahun 2010	SK Menteri Hukum dan Hak Asasi Manuasia Republik Indonesia tentang **Pengesahan Badan Hukum Perseroan**
2012	21 Desember 2012 Nomor 86	Akta Notaris Kumala Tjahjani Widodo SH.MH.MKn tentang **Perubahan Anggaran Dasar**
2013	07 Maret 2013 Nomor 08638-05/PK/1.824.271	Pemerintah Provinsi Daerah Khusus Ibukota Jakarta Dinas Koperasi, Usaha Mikro, Kecil dan Menengah, dan Perdagangan tentang **Surat Izin Usaha Perdagangan (SIUP) Kecil**
2013	01 April 2013 Nomor AHU-16338.AH.01.02. Tahun 2013	SK Menteri Kehakiman, tentang **Pengesahan Akta Perubahan Anggaran Dasar Perseroan**.
2013	22 Mei 2013, Nomor TDP 09.04.1.46.36158	Dinas Koperasi, Usaha Mikro, Kecil dan Menengah, dan Perdagangan tentang **Tanda Daftar Perusahaan berlaku s/d tanggal 18 Januari 2016**
2015	08 Mei 215 Nomor 503/1285/II-BAPPEDA	Surat Bupati Sintang tentang **informasi lahan**
2015	01 Juni 2015 Nomor 85/2015	Badan Pertanahan Nasional tentang **Risalah**

Tahun	Tanggal dan Nomer Dokumen	Perihal
		Pertimbangan Teknis Pertanahan Dalam Penerbitan Izin Lokasi
2015	16 Juni 2015 Nomor 525/1396/KEP-PERTANAHAN/2015	SK Bupati Sintang tentang Tentang **Pemberian Izin Lokasi** untuk Keperluan Perkebunan Kelapa Sawit atas Nama PT Mitra Nusa Sarana Terletak di Desa Kubu Berangan Kecamatan Ketungau Tengah dan Di Desa Embalih, Desa Empura, Desa Nanga Bugau, Desa Sungai Bugau, Desa Sekaih Kecamatan Ketungau Hulu Kabupaten Sintang Provinsi Kalimantan Barat
2015	22 Juni 2015 Nomor S.467/BPKH.III-2/2015	Kementerian Kehutanan Direktorat Jenderal Planologi Kehutanan Balai Pemantapan Kawasan Hutan Wilayah III tentang **Hasil Telaahan Teknis Fungsi Kawasan Hutan terhadap Izin Lokasi untuk Keperluan Perkebunan Kelapa Sawit a.n PT Mitra Nusa Sarana** di Kabupaten Sintang, Prov. Kalimantan Barat
2015	25 Juni 2015 Nomor 864/Dishut-II/Ppk/2015	Pemerintah Provinsi Kalimantan Barat Dinas Kehutanan tentang **Status Kawasan Hutan Areal Izin Lokasi** Perkebunan Kelapa Sawit PT Mitra Nusa Sarana di Kabupaten Sintang
2015	23 Juli 2015, Nomor 660.1/51/KEP-BLH/2015	Keputusan Kepala Badan Lingkungan Hidup Kabupaten Sintang tentang **Kesepakatan Kerangka Acuan Analisis Dampak Lingkungan Hidup** pada Kegiatan Perkebunan dan Pabrik Pengolahan Kelapa Sawit oleh PT Mitra Nusa Sarana di Kecamatan Ketungau Tengah dan Kecamatan Ketungau Hulu Kabupaten Sintang
2015	24 Agustus 20015 Nomor 660.1/1583/KEP-BLH/2015	SK Bupati Sintang tentang **Izin Lingkungan Atas Kegiatan Perkebunan dan Pabrik Pengolahan Kelapa Sawit** Dengan Luas ± 18.000 (Delapan Belas Ribu) Hektar dan Kapasitas 60 (Enam Puluh) Ton TBS/Jam oleh PT Mitra Nusa Sarana di Kecamatan Ketungau Tengah dan Ketungau Hulu Kabupaten Sintang
2015	14 September 2015 Nomor 29	Akta Notaris Nanny Wiana Setiawan, SH tentang **Pernyataan Keputusan Rapat PT Mitra Nusa Sarana**
2015	Tanggal 16 September 2015 Nomor AHU-AH.01.03-0964945	Kementerian Hukum dan Hak Asasi Manusia Republik Indonesia Direktorat Jenderal Administrasi Hukum Umum tentang **Penerimaan Pemberitahuan Perubahan Data Perseroan PT Mitra Nusa Sarana**
2015	Tanggal 7 Oktober 2015, Nomor 525/25/Ekbang-A	Gubernur Kalimantan Barat tentang **Rekomendasi Kesesuaian Dengan Rencana Makro Pembangunan Perkebunan** Provinsi Kalimantan Barat
2015	Tanggal 22 Oktober 2015 Nomor 503/599/B/BPMPTSP/2015	Badan Penanaman Modal dan Pelayanan Terpadu Satu Pintu tentang **Izin Gangguan**
2015	Tanggal 22 Oktober 2015 Nomor TDP 140610101320	Badan Penanaman Modal dan Pelayanan Terpadu Satu Pintu Kabupaten Sintang tentang **Tanda Daftar Perusahaan Perseroan Terbatas (PT)**
2015	Tanggal 22 Oktober 2015 Nomor REG.503.3/445/BPMPTSP/2015	Badan Penanaman Modal dan Pelayanan Terpadu Satu Pintu tentang **Surat Izin Tempat Usaha (SITU) berlaku s/d Tanggal 22 Oktober 2018**