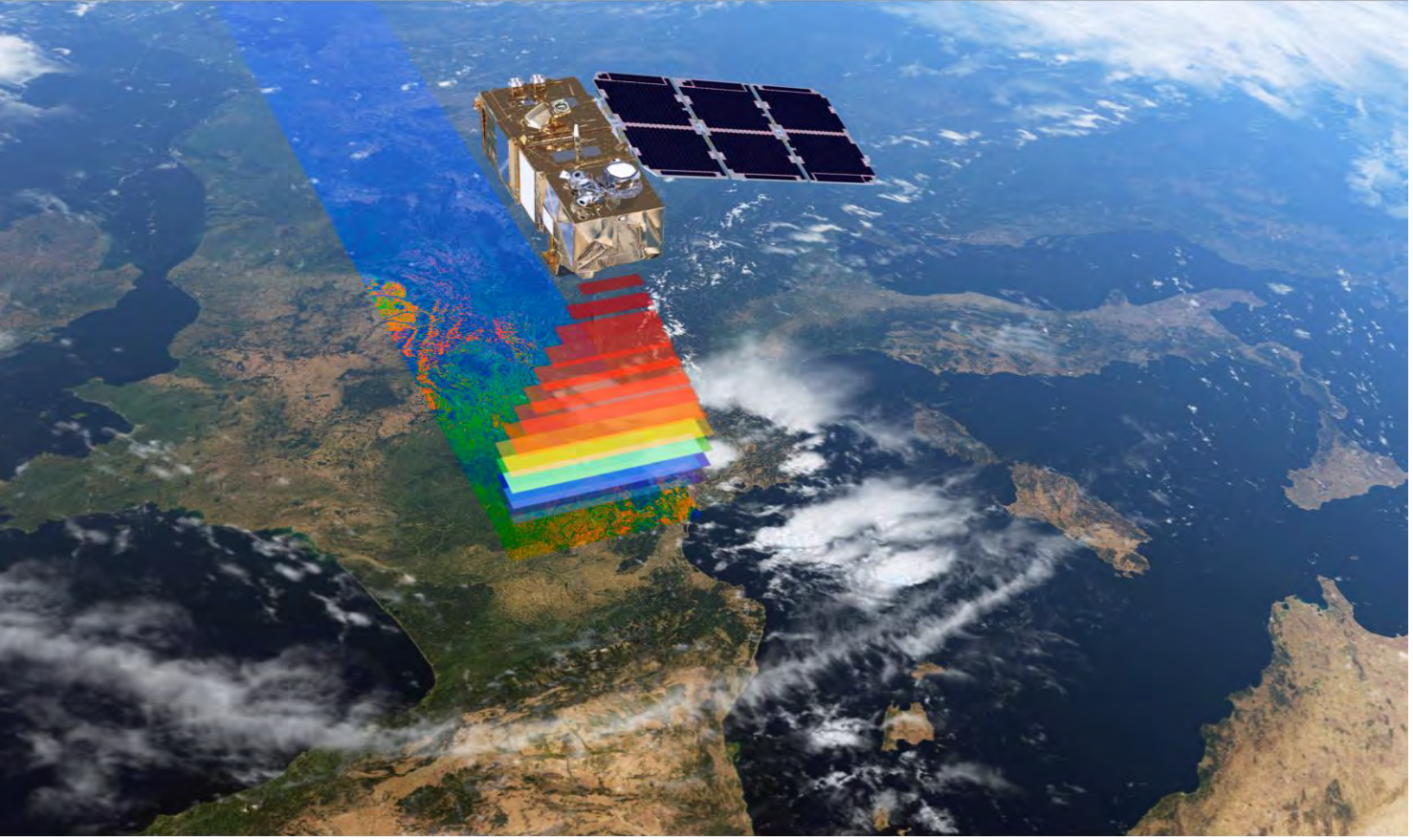

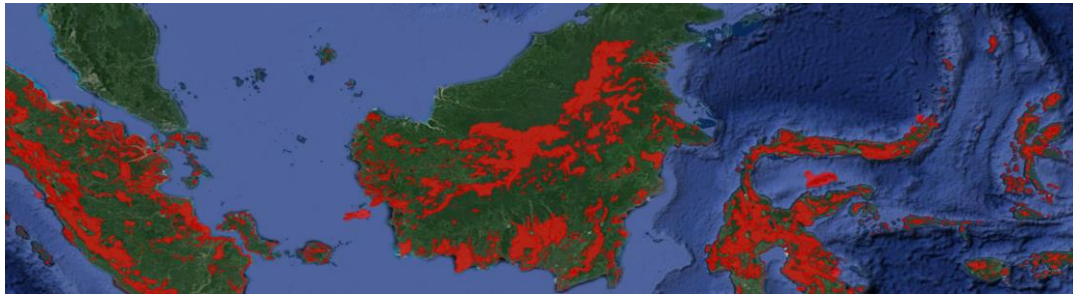

GRAS – Global Risk Assessment Services

Sustainability Risk Assessment: Estate_EastWest

Compliance with ISCC principle 1

Company Name: OM210, ISCC registration:

17 October 2022

GRAS Global Risk Assessment Services

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2	Assessment Results
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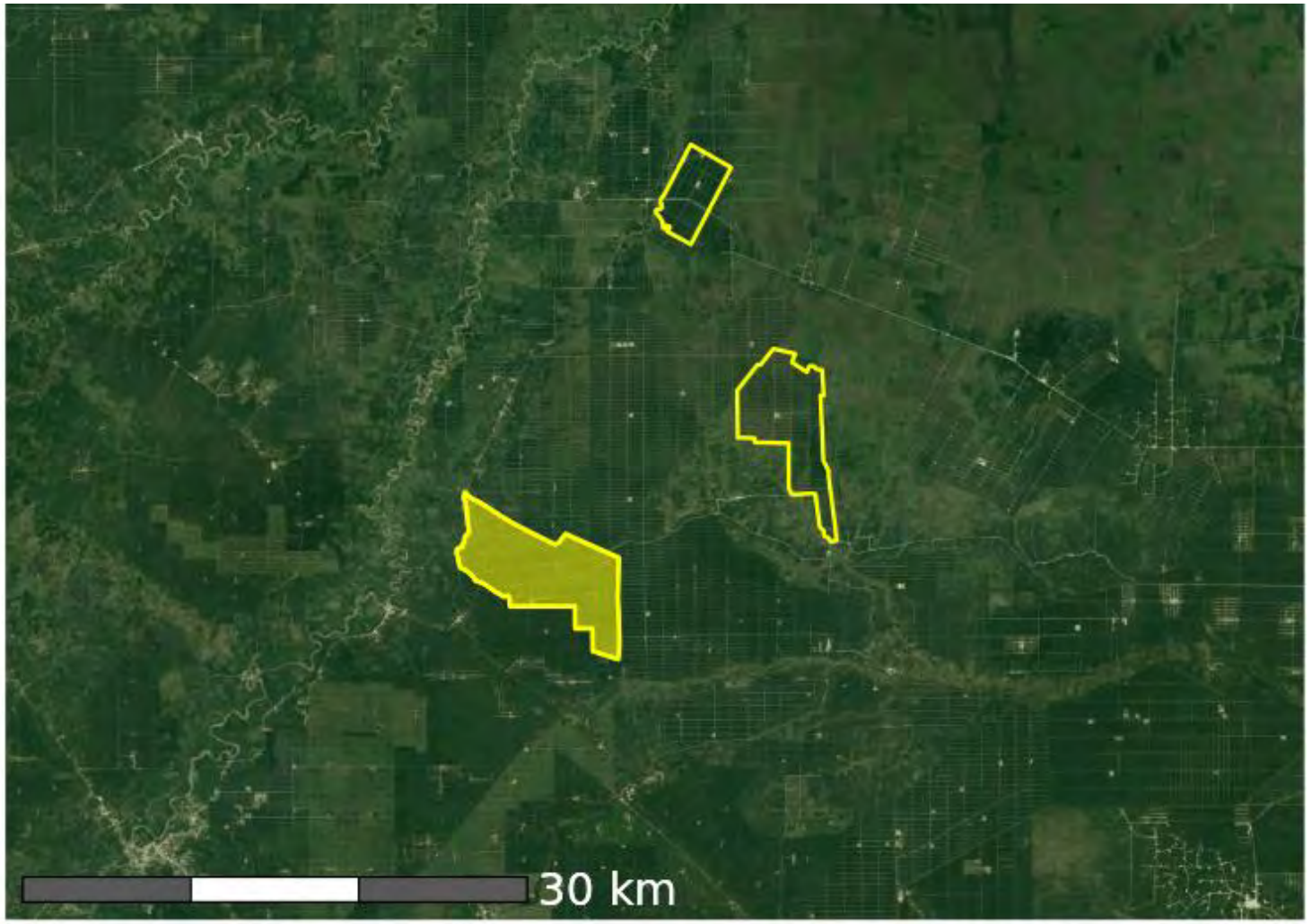
Summary: ISCC Principle 1 risk assessment for Estate_EastWest located in Riau, Indonesia

Assessment Area:	Estate_EastWest
Country	Indonesia
Province	Riau
Address	nice village
Total area	4339.86 ha
Longitude	100.741243
Latitude	0.857258

Overlap	Sustainability Indicator	Main findings
1) Deforestation	1.1 Potential deforestation	0 ha (0 %)
	1.2 Potential replanting	24.94 ha (0.6 %)
2) Potential High Biodiversity Value	2.1 Primary forest and other wooded land	0 ha (0 %)
	2.2 Forests and other wooded land	121.92 ha (2.8 %)
	2.3 Nature protection areas	0 ha (0 %)
	2.4 Areas for protection of RTE* species	0 ha (0 %)
	2.5 Grassland	0 ha (0 %)
3) Potential High Carbon Stock	3.1 Wetlands	4145.27 ha (95.5 %)
	3.2 Continuously forested areas	90.01 ha (2.1 %)
	3.3 Forested areas with 10-30% canopy cover	8.67 ha (0.2 %)
4) Peatland	4.1 Peatland areas	0 ha (0 %)

GRAS Global Risk Assessment Services

The plantation outline in this report is part of a larger set of polygons provided to GRAS and analysed on separated sustainability risk assessment reports



Assessment Area	Estate_EastWest
Total Area	8876.61 ha
Report Assessment Area	4339.86 ha

Legend

Total Area

Report Assessment Area

GRAS
Global Risk Assessment Services

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2 Assessment Results

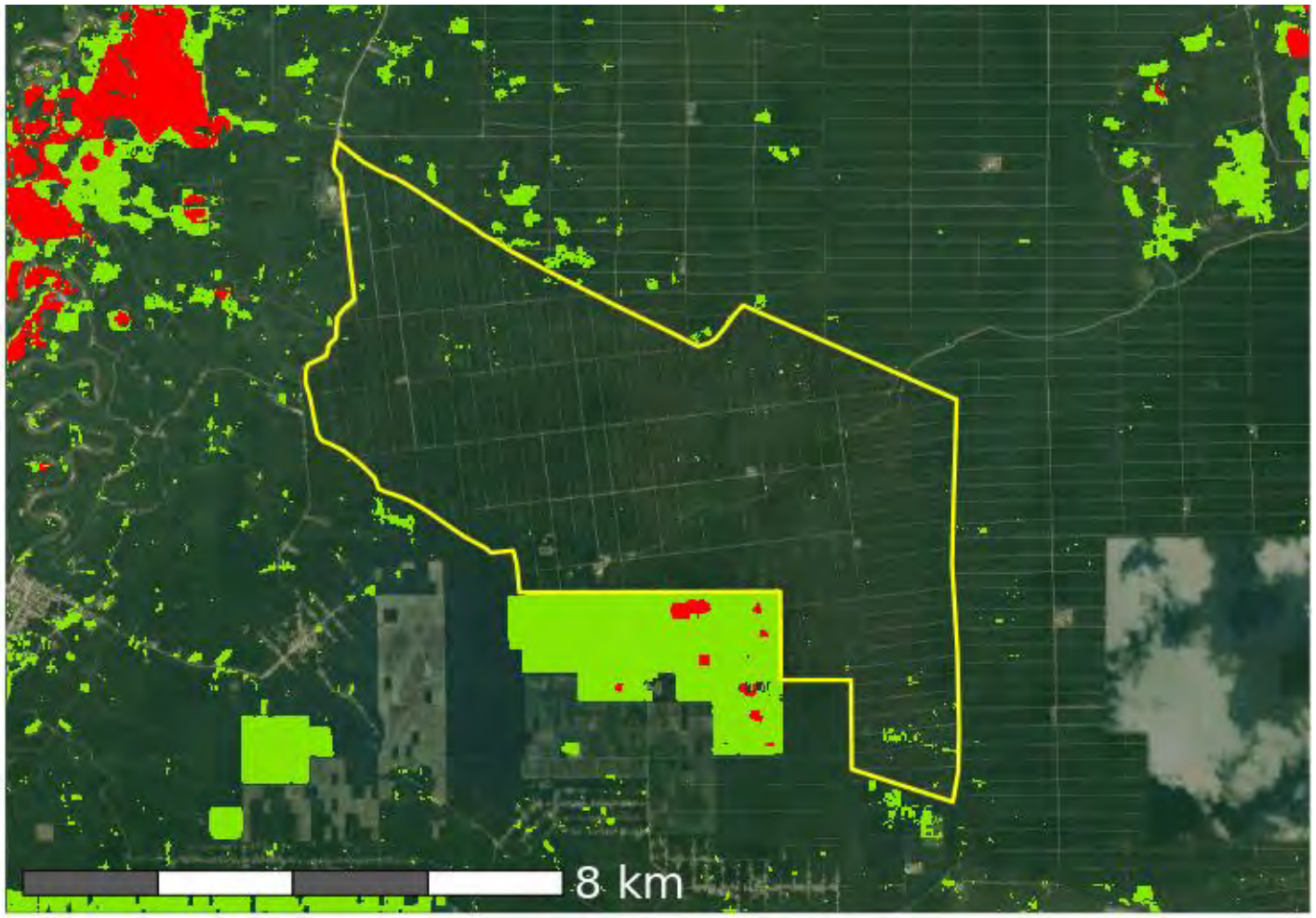
2.1 Results for ISCC Principle 1

2.2 Additional datasets supporting ISCC audits

3 Conclusions

4 Annex

1) Deforestation:
0 % of the assessment area overlaps with potential deforestation



1) Deforestation (after 1st January 2008)	
1.1 Potential deforestation	0 ha (0 %)
1.2 Potential replanting	24.94 ha (0.6 %)

Potential deforestation is defined in this report as tree cover loss on areas that GRAS mapped as probable forests in the year 2007. Tree cover loss is defined as the removal of tree cover due to a variety of factors. Tree cover is defined as all vegetation greater than 5 meters in height, and may take the form of natural forests or plantations across a range of canopy densities.

Potential replanting defines tree cover loss occurring after 1st January 2008 on areas that GRAS mapped as probable non-forested areas in the year 2007.

Legend

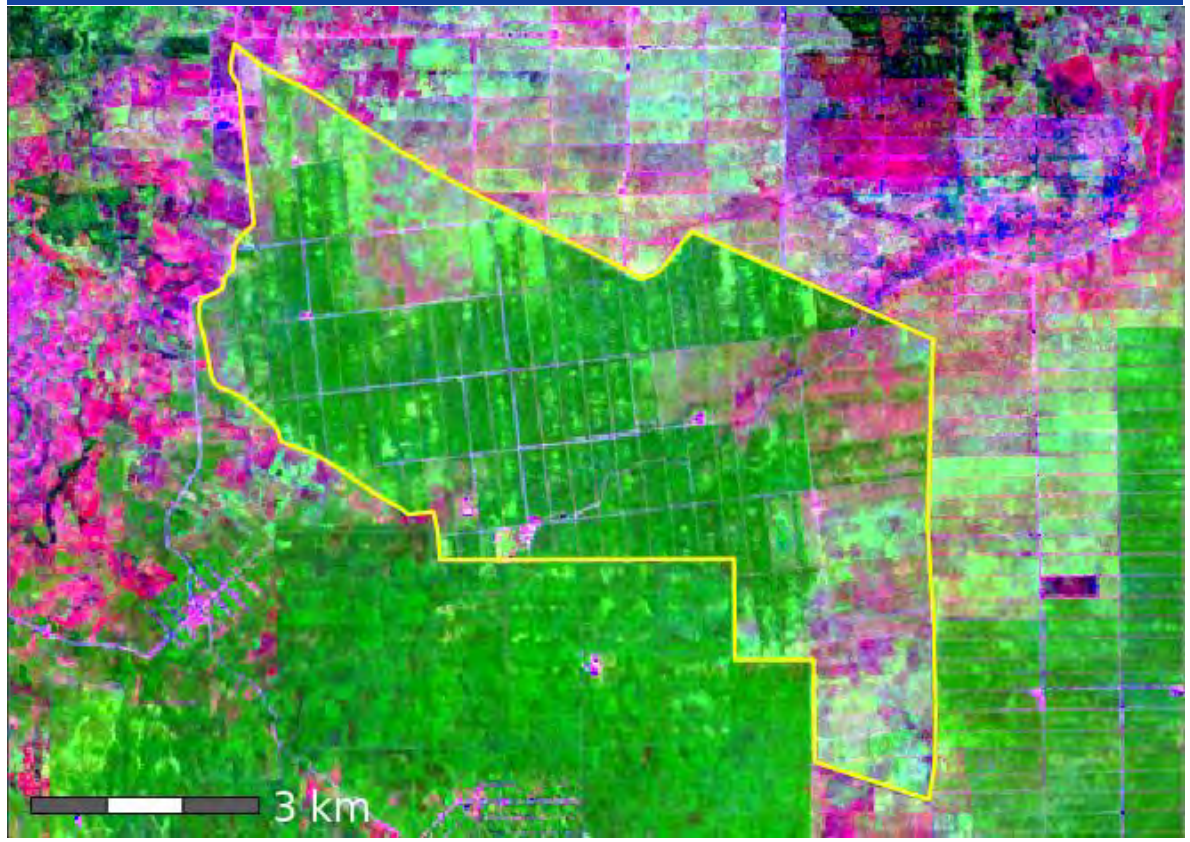
- Assessment Area
- Potential Replanting
- Potential Deforestation after 1st January 2008

Data Source: GFC, 2020

GRAS Global Risk Assessment Services

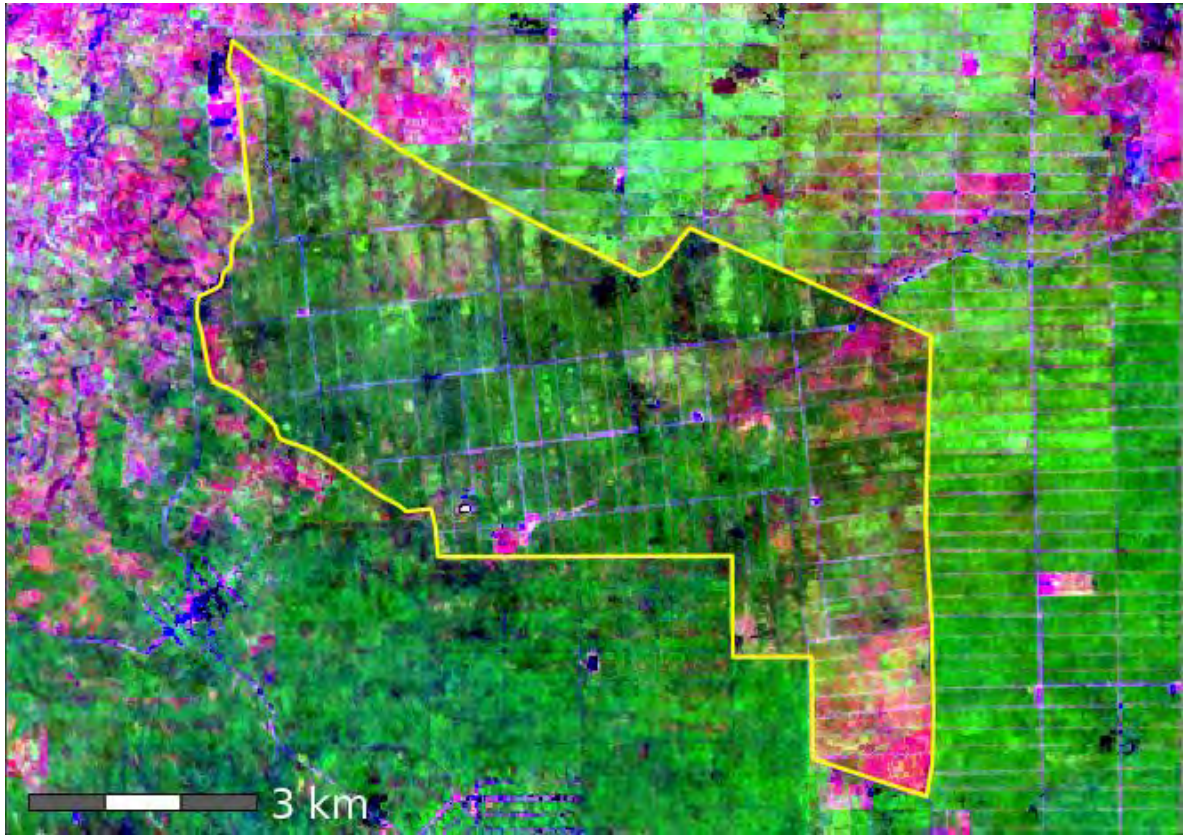
1) Deforestation:
Landsat satellite imageries - 1 of 2

Landsat Mosaic 2003 - 2007



Source: U.S. Geological Survey

Landsat Mosaic 2008 - 2012

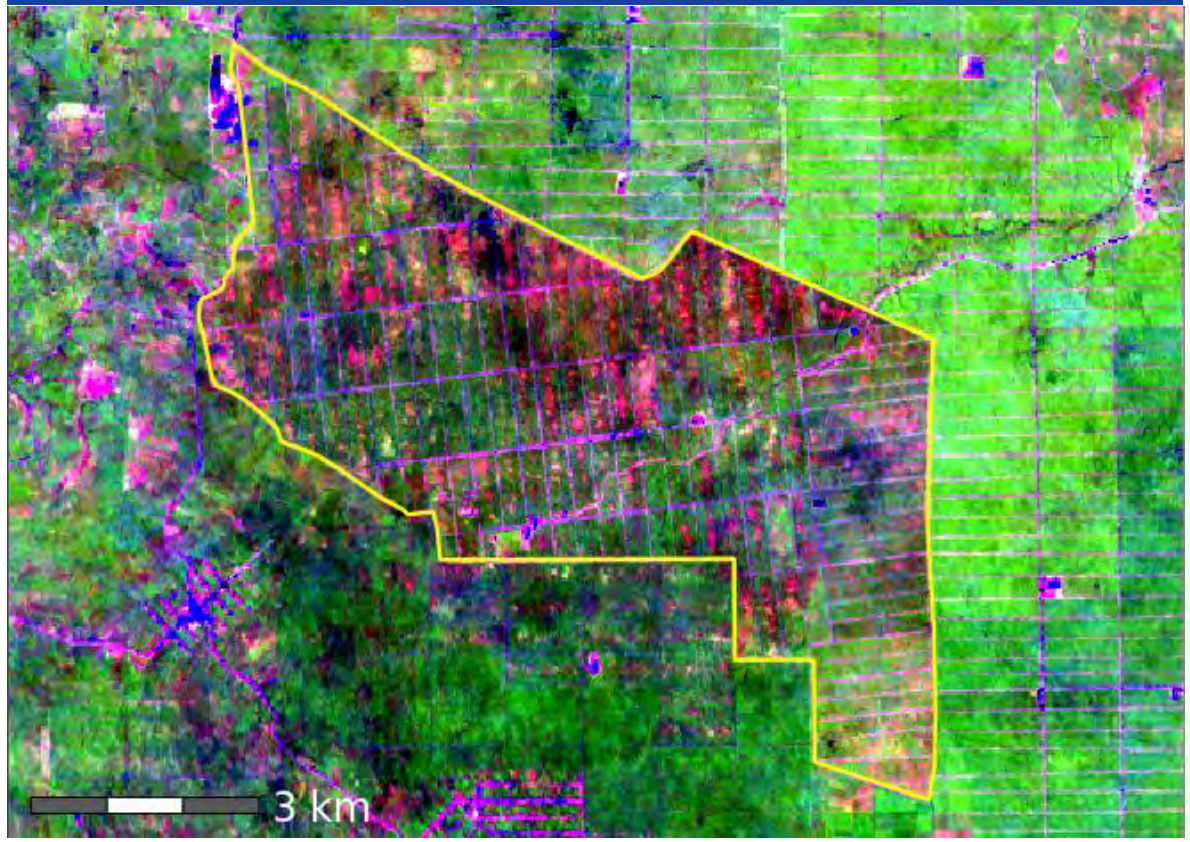


Source: U.S. Geological Survey

GRAS Global Risk Assessment Services

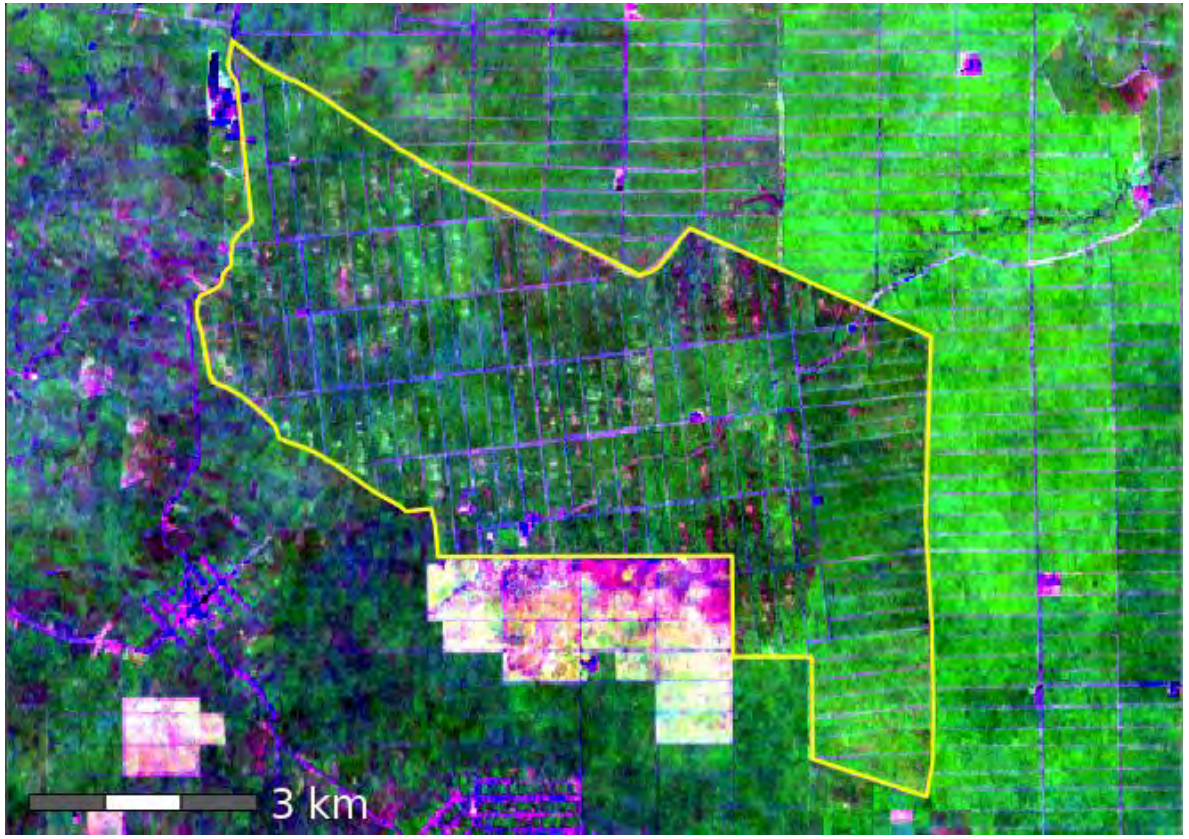
1) Deforestation:
Landsat satellite imageries - 2 of 2

Landsat Mosaic 2013 - 2017



Source: U.S. Geological Survey

Landsat Mosaic 2018 - today



Source: U.S. Geological Survey

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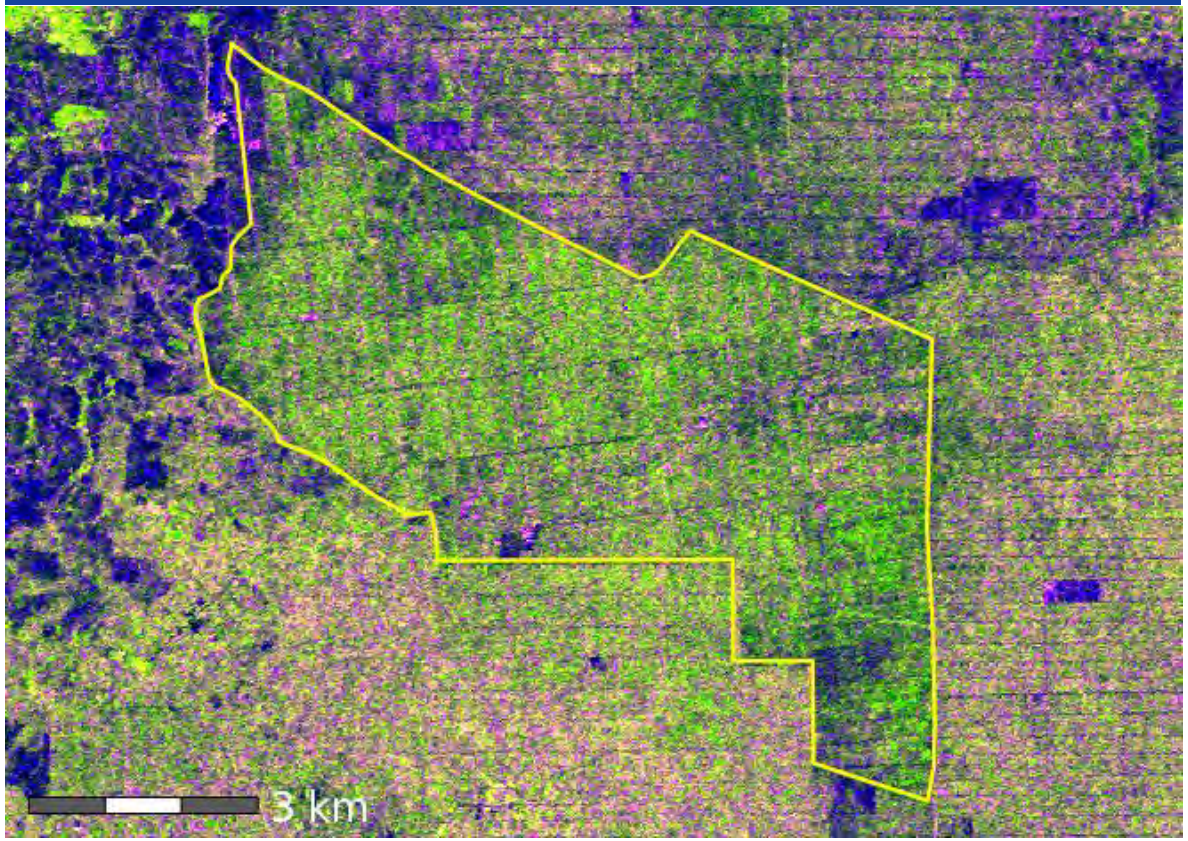
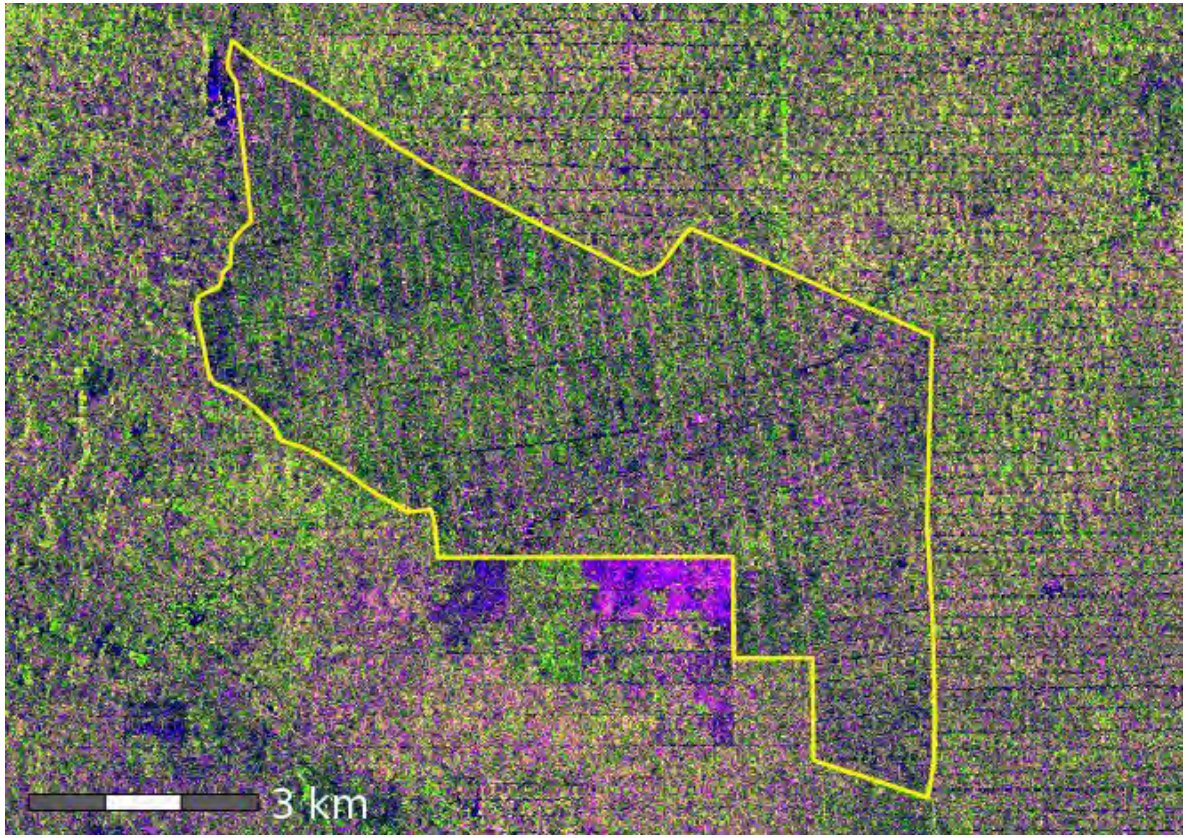
1) Deforestation:
Palsar satellite imageries

ALOS PALSAR 2007



Data Source: Jaxa

ALOS PALSAR 2018



Data Source: Jaxa

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Global Risk Assessment Services

2) Potential high biodiversity value - 2.1 Primary forest and other wooded land: 0 % of the assessment area overlap with areas in the available datasets

2) Potential high biodiversity value: **2.1 Primary forest and wooded land**	
Primary Forest	0 ha (0 %)
Intact Forest Landscapes	0 ha (0 %)
Total overlap with primary forest and wooded land	0 ha (0 %)

GRAS uses the following datasets to identify the potential presence of *primary forest and other wooded land* within the assessment area:

- Primary Forest
- Intact Forest Landscapes

Legend

- Assessment Area
- Primary Forest
- Intact Forest Landscapes

Data Source: Indonesian Ministry of Forestry, 2010; IFL, 2000

GRAS Global Risk Assessment Services

2) Potential high biodiversity value - 2.2 Forests and other wooded land: 2.8 % of the assessment area overlap with areas in the available datasets

Data Source: WHRC, 2007; GLCF, 2005

2) Potential high biodiversity value:
2.2 Forests and other wooded land

Forests and other wooded land	121.92 ha (2.8 %)

GRAS uses the following datasets to identify the potential presence of *forests and other wooded areas* within the assessment area:

- Tree Cover Density 2005 (GLCF)
- Forest Height 2007 (WHRC)

The combination of these datasets allows the detection of forests and other wooded land

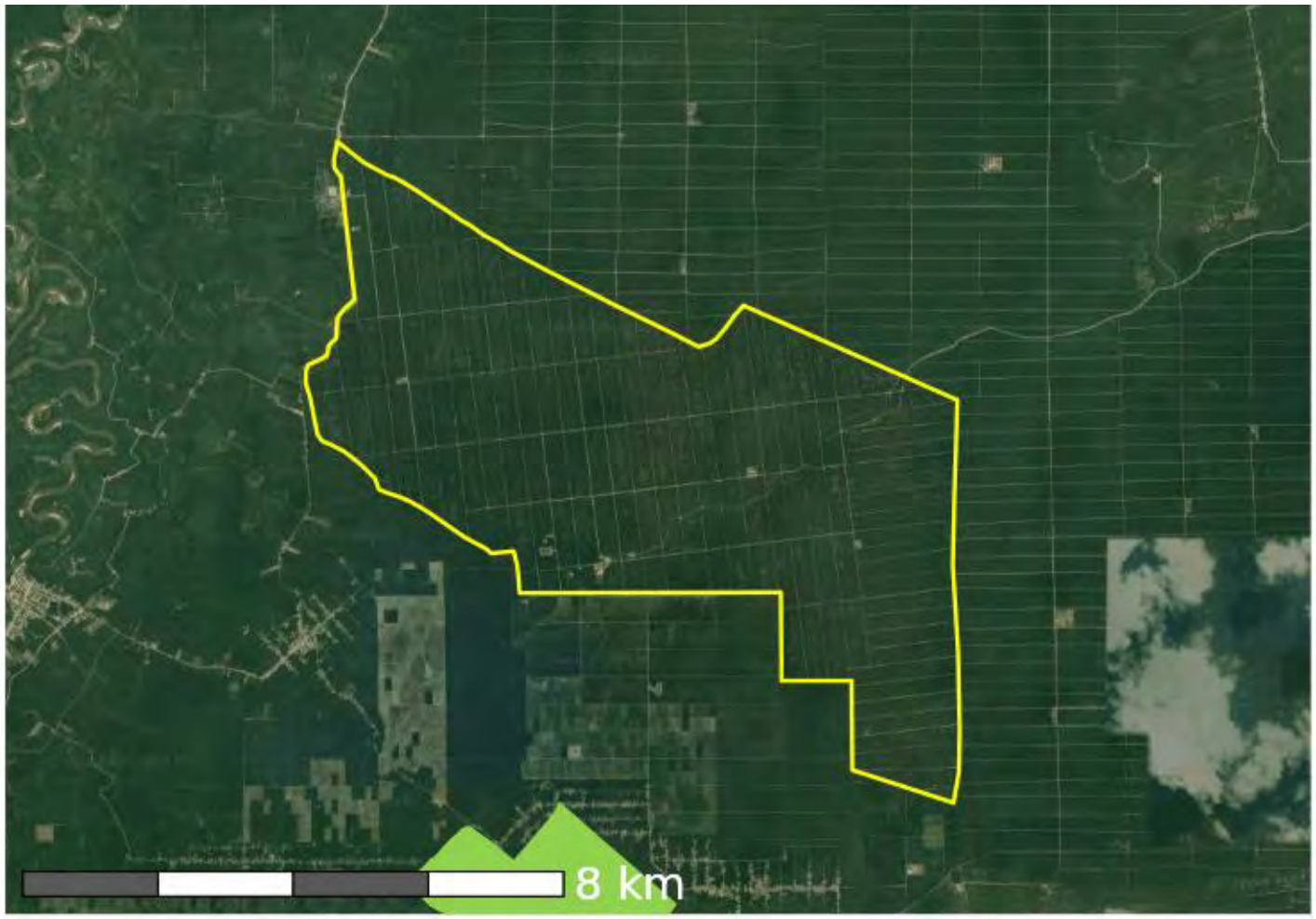
The datasets **do not provide** any indication on the biodiversity status of the areas

Legend

- Assessment Area
- Forests and other wooded land

GRAS Global Risk Assessment Services

2) Potential high biodiversity value - 2.3 Nature protection areas: 0 % of the assessment area overlap with areas in the available datasets



2) Potential high biodiversity value: **2.3 Nature protection area**	
Reserved forest	0 ha (0 %)
Protected forest	0 ha (0 %)
Marine protected areas	0 ha (0 %)
Nature conservation area	0 ha (0 %)
Total overlap with nature protection areas	0 ha (0 %)

GRAS uses the following datasets to identify the potential presence of *nature protection areas* within the assessment area:

- Reserved forest
- Protected forest
- Marine protected areas
- Nature conservation areas

Legend

- Assessment Area
- Reserved forest
- Protected forest
- Marine protected areas
- Nature Conservation Area

Data Source: Indonesian Ministry of Forestry, 2010

2) Potential high biodiversity value - 2.4 Areas for the protection of RTE species: 0 % of the assessment area overlap with areas in the available datasets

2) Potential high biodiversity value: **2.4 Areas for the protection of RTE species**	
Areas for the protection of RTE species	0 ha (0 %)

GRAS uses the following datasets to identify the potential presence of *areas for the protection of RTE species* within the assessment area:

- Orangutan habitats
- Tiger conservation landscapes
- Tx2 Tiger conservation landscapes

Legend

- Assessment area
- Tiger Conservation Landscape
- Tx2 Tiger Conservation Landscapes
- Orangutans habitats

Data Source: WWF; RESOLVE, 2015; Wich et al, 2006

GRAS Global Risk Assessment Services

2) Potential high biodiversity value - 2.5 Grassland:
0 % of the assessment area overlap with areas in the available datasets

2) Potential high biodiversity value: **2.5 Grassland**	
Grassland	0 ha (0 %)

GRAS uses the following datasets to identify the potential presence of *grassland* within the assessment area:

- Grassland/ Shrubland (the datasets do not indicate the biodiversity status)

Legend

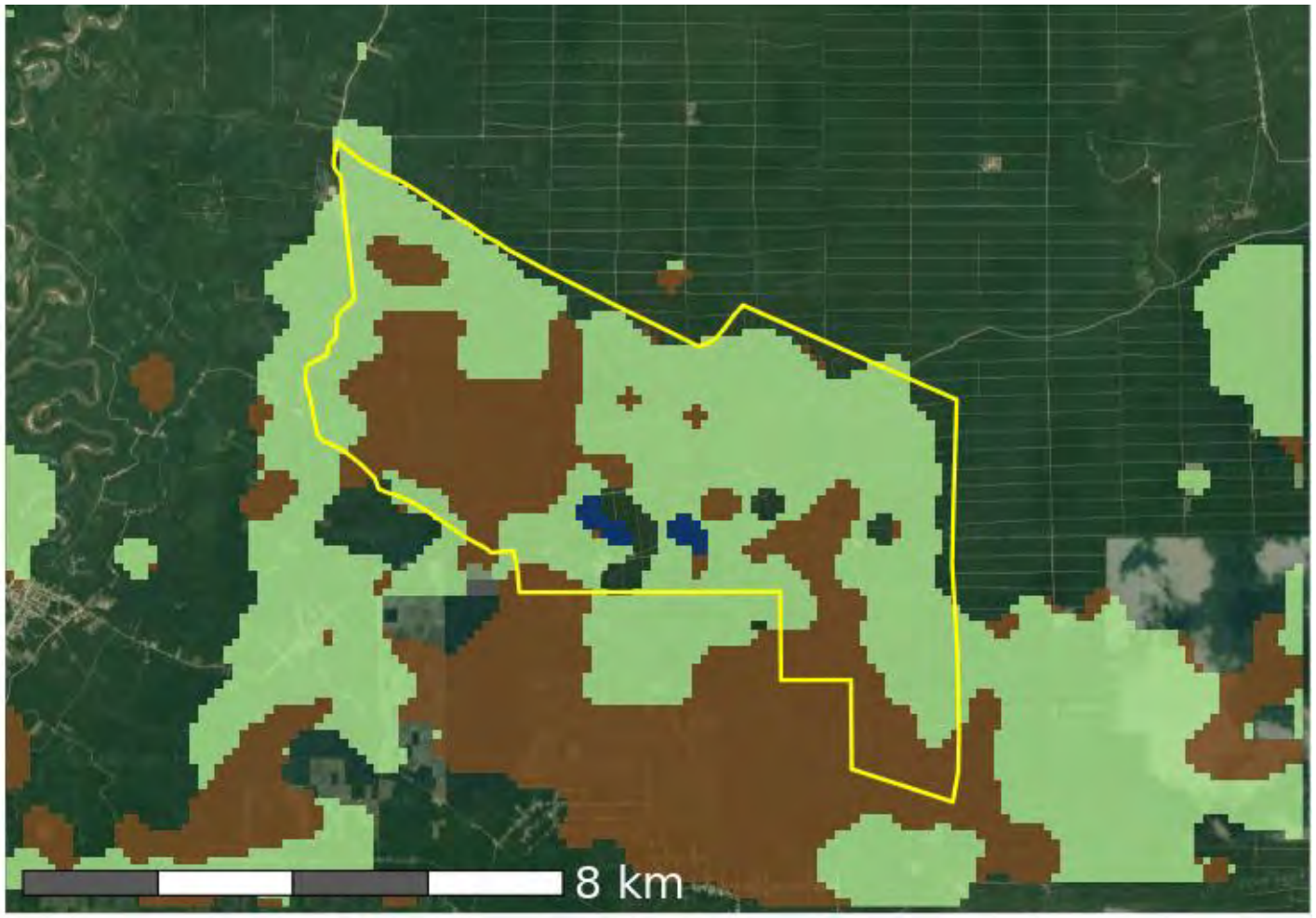
Assessment area

Potential grassland

Data Source: GlobCover; © ESA 2010 and UCLouvain [http://due.esrin.esa.int/page_globcover.php]

GRAS Global Risk Assessment Services

3) Potential high carbon stock - 3.1 Wetlands:
95.5 % of the assessment area overlap with areas in the available datasets



3) Potential high carbon stock: **3.1 Wetlands**	
Wetlands	4145.27 ha (95.5 %)

GRAS uses the following datasets to identify the potential presence of *wetlands* within the assessment area:

- Tropical and Subtropical Wetlands Distribution

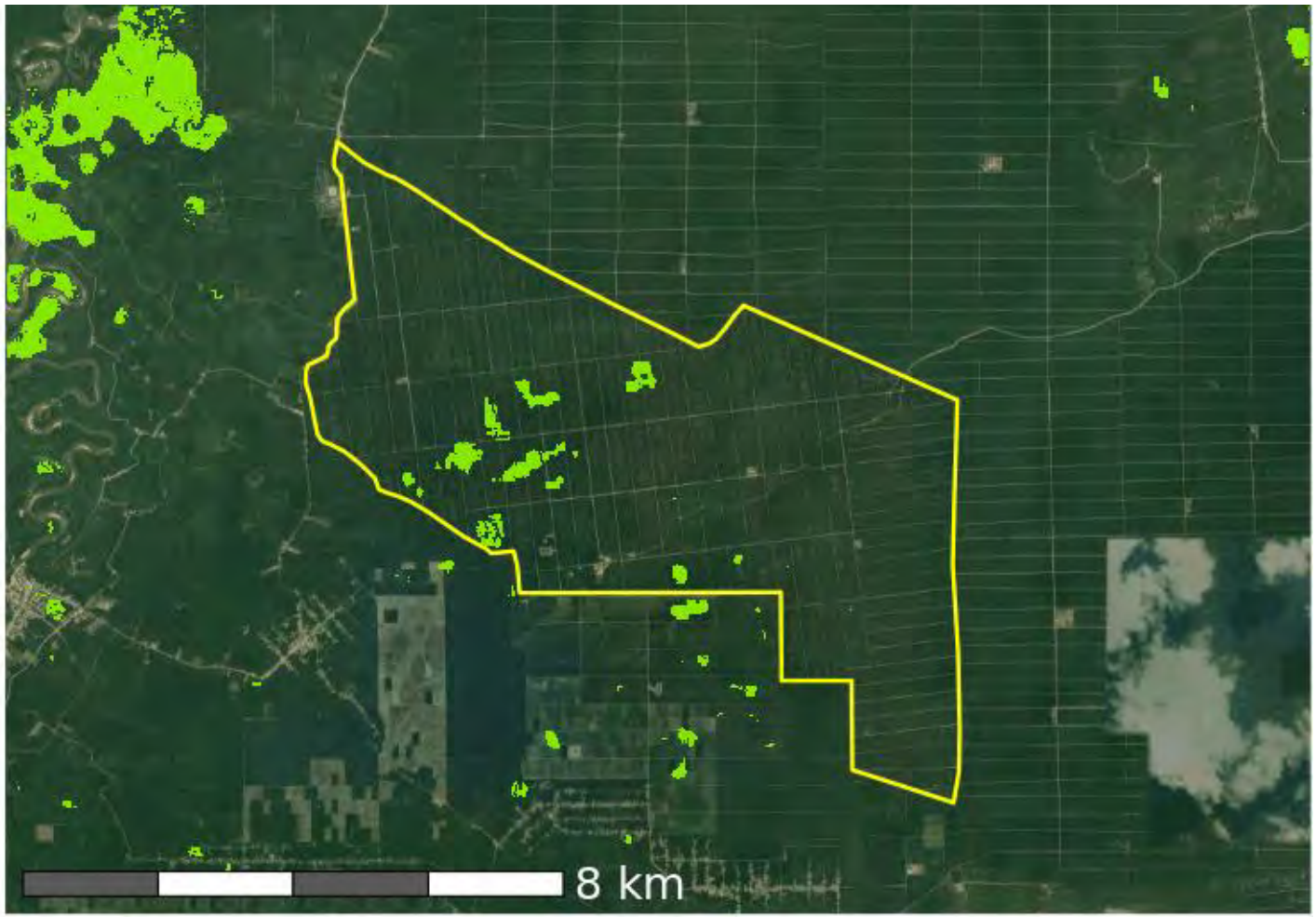
Legend

- Open water
- Mangrove
- Swamp/bog
- Fen
- Riverine
- Floodswamp
- Floodplain
- Marsh
- Wetland in dry areas
- Wet meadow
- Assessment area

Data Source: CIFOR, 2011

GRAS Global Risk Assessment Services

3) Potential high carbon stock - 3.2 Continuously forested areas: 2.1 % of the assessment area overlap with areas in the available datasets



Data Source: WHRC, 2007; GLCF, 2005

3) Potential high carbon stock: **3.2 Continuously forested areas**	
Continuously forested areas	90.01 ha (2.1 %)

GRAS uses the following datasets to identify the potential presence of continuously forested areas within the assessment area:

- Tree Cover Canopy Density 2005 (GLCF)
- Forest Height 2007 (WHRC)

The combination of these datasets allows the detection of forested areas with trees higher than 5m and canopy cover larger that 30%.

Legend

- Assessment area
- Continuously forested areas (canopy cover > 30% and tree height > 5m)

GRAS Global Risk Assessment Services

3) Potential high carbon stock - 3.3 Forested areas with 10-30% canopy cover: 0.2 % of the assessment area overlap with areas in the available datasets

3) Potential high carbon stock: **3.3 Forested areas with 10-30% canopy cover**	
Forested areas with 10-30% canopy cover	8.67 ha (0.2 %)

GRAS uses the following datasets to identify the potential presence of *Forested areas with 10-30% canopy cover* within the assessment area:

- Tree Cover Canopy Density 2005 (GLCF)
- Forest Height 2007 (WHRC)

The combination of these datasets allows the detection of forested areas with trees higher than 5m and canopy cover between 10% and 30%.

Legend

Assessment area

Forested areas with 10-30% canopy cover (tree height > 5m)

Data Source: WHRC, 2007; GLCF, 2005

GRAS Global Risk Assessment Services

4) Peatland - 4.1 Peatland areas:
0 % of the assessment area overlap with areas in the available datasets

4) Peatland **4.1 Peatland areas**	
Peatland areas	0 ha (0 %)

GRAS uses the following datasets to identify the potential presence of *peatland areas* within the assessment area:

- CIFOR 2016
- Indonesian Ministry of Agriculture 2012

Legend

- Assessment area
- Peatland areas

Data Source: CIFOR, 2016; Indonesian Ministry of Agriculture, 2012

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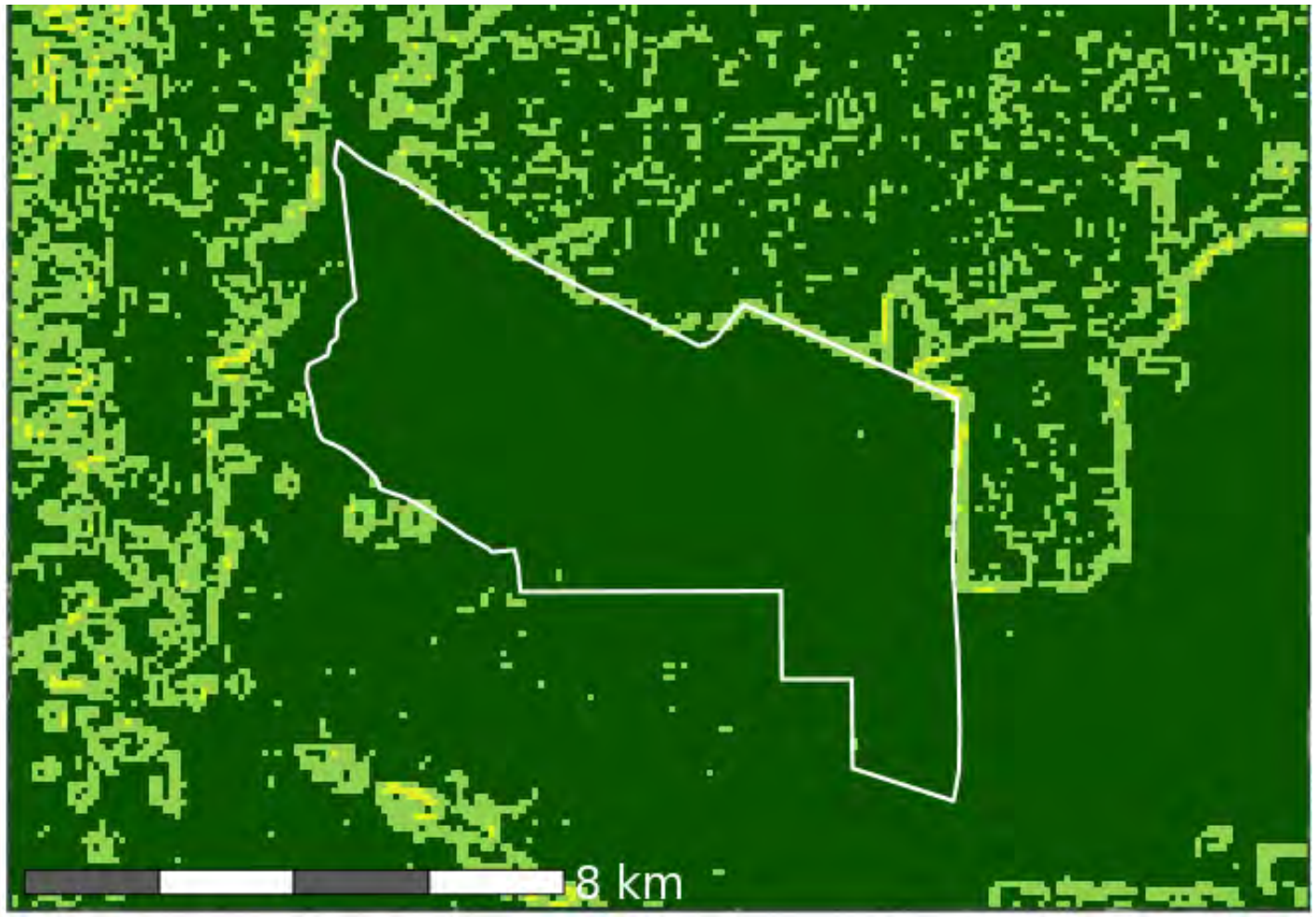
Additional datasets supporting the ISCC audit - Steep Slope:
0 % of the assessment area overlap with steep slope in the available datasets



Steep slopes	
Overlap with Steep slope area	0 ha (0 %)

GRAS uses the Digital Elevation Model to identify the potential presence of steep slopes within the assessment area. In order to correctly interpret the dataset, the following is relevant:

- The local topography is represented by the slope percent rise classified into 6 classes
- Moderately steep slope and steep to very steep slope classes are all designated as Steep slopes

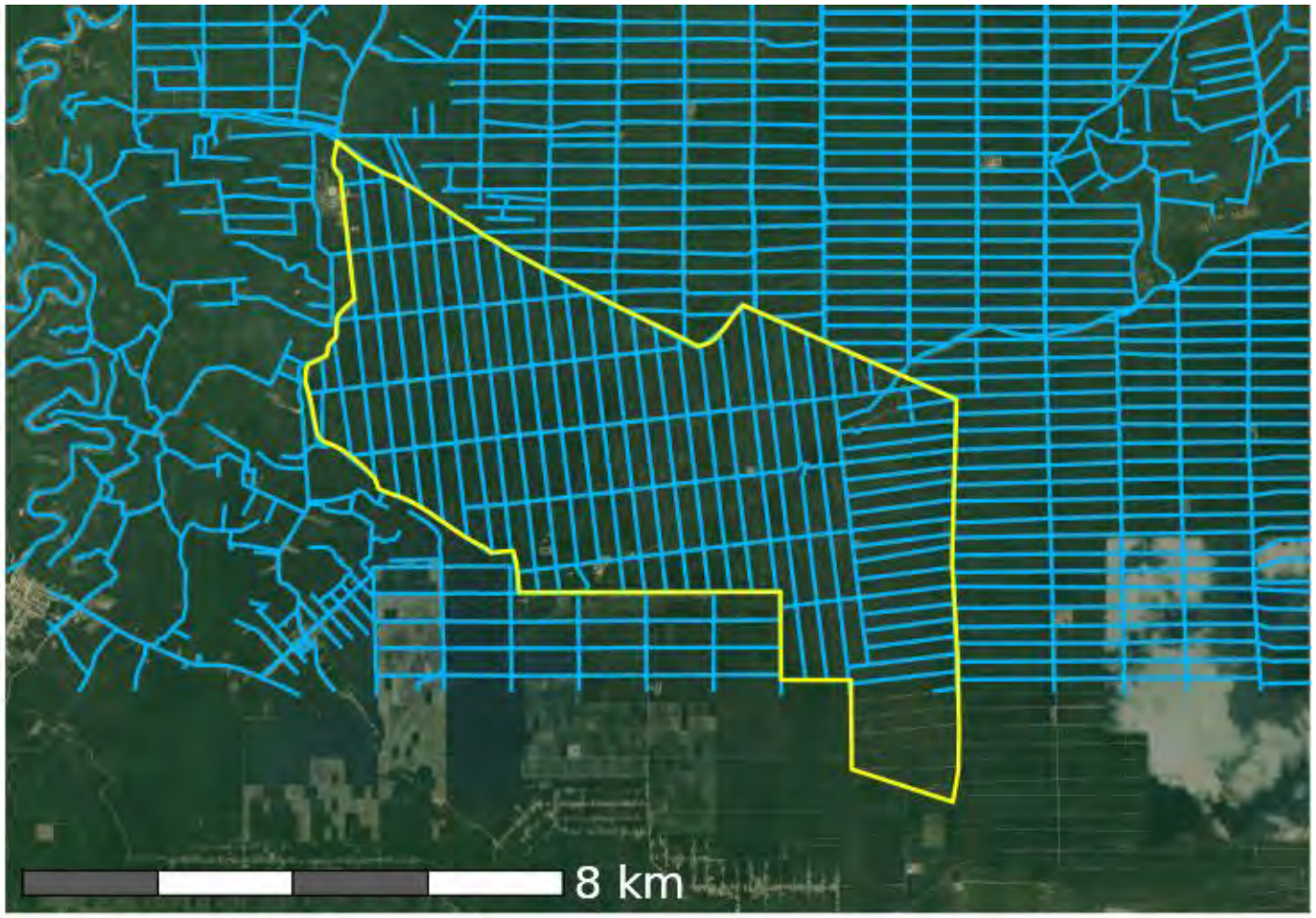
Legend

- Assessment Area
- 0% - 3% Flat slope
- 3% - 8% Undulating slope
- 8% - 15% Moderately sloping
- 15% - 30% Hilly slope
- 30% - 45% Moderately steep slope
- >= 45% Steep to very steep slope

Data Source: Digital Elevation Model (OpenTopographie)

GRAS Global Risk Assessment Services

Additional datasets supporting the ISCC audit - Waterbodies:
0 % of the assessment area overlap with areas in the available datasets



Waterbodies	
Overlap with waterbodies	0 ha (0 %)

GRAS uses different datasets to identify the potential presence of waterbodies within the assessment area. The waterbodies dataset includes:

- rivers
- streams
- canals
- lakes, ponds
- fishponds
- reservoirs
- shallows

Legend

Assessment Area

Waterbodies

Data Source: Humanitarian Open Streetmap Team, 2019 (HOT)

GRAS Global Risk Assessment Services

Additional datasets supporting the ISCC audit - Fires:
0 fires have been recognized within the plantation outline

Fires	
Number of recognized fires within the plantation outline	0

GRAS uses the following datasets to identify the potential presence of *fires* within the assessment area:

- MODIS Active Fire Product based on NASA - Fire Information for Resource Management System (FIRMS) Database (confidence level of at least 80%)

Legend

Assessment Area

Fires

2008 — 2022

Data Source: MODIS Active Fire Product based on NASA - Fire Information for Resource Management System (FIRMS) Database

GRAS Global Risk Assessment Services

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Main findings

Overlap	Sustainability Indicator	Main findings
1) Deforestation	1.1 Potential deforestation	0 ha (0 %)
	1.2 Potential replanting	24.94 ha (0.6 %)
2) Potential High Biodiversity Value	2.1 Primary forest and other wooded land	0 ha (0 %)
	2.2 Forests and other wooded land	121.92 ha (2.8 %)
	2.3 Nature protection areas	0 ha (0 %)
	2.4 Areas for protection of RTE* species	0 ha (0 %)
	2.5 Grassland	0 ha (0 %)
3) Potential High Carbon Stock	3.1 Wetlands	4145.27 ha (95.5 %)
	3.2 Continuously forested areas	90.01 ha (2.1 %)
	3.3 Forested areas with 10-30% canopy cover	8.67 ha (0.2 %)
4) Peatland	4.1 Peatland areas	0 ha (0 %)

GRAS Global Risk Assessment Services

Conclusions

- GRAS classifies the assessment area as a **medium risk** area.
- The classification is based only on the **presence of potential replanting** and on the **absence of potential deforestation** within the assessment area. Hence, the overlap with areas with high biodiversity value, wetlands, continuously/sparsely forested areas, peatlands, steep slopes or waterbodies is not taken into consideration for this classification
- However, GRAS recommends to verify that in the areas, where potential replanting was detected, no actual deforestation took place, e.g. through the satellite images available in this report or through external sources
- In case of further unclarity, GRAS recommends to verify these areas through a detailed assessment
- GRAS always recommends the thorough analysis of the point in time when agricultural activities have been established within the assessment areas
- In case of overlap between the assessment area and areas with high biodiversity value, wetlands, continuously/sparsely forested areas, peatlands, steep slopes or waterbodies, GRAS recommends for a detailed assessment conducted by the auditor
- The results of this report can be used to support sustainability certification audits, e.g. under ISCC/ ISCC PLUS or others

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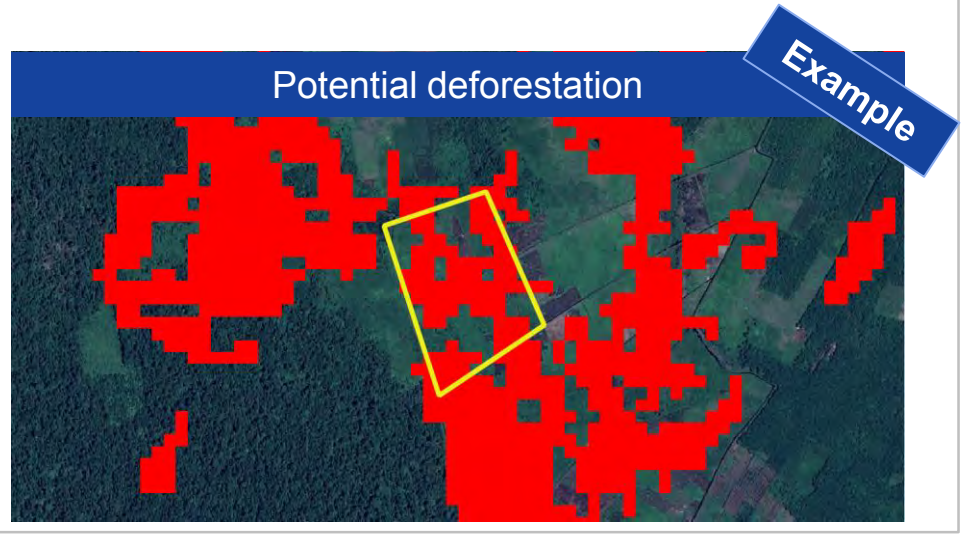
4.1 Additional information supporting ISCC audit

4.2 Approach and methodologies

Potential deforestation and **potential replanting**: Definitions used by GRAS

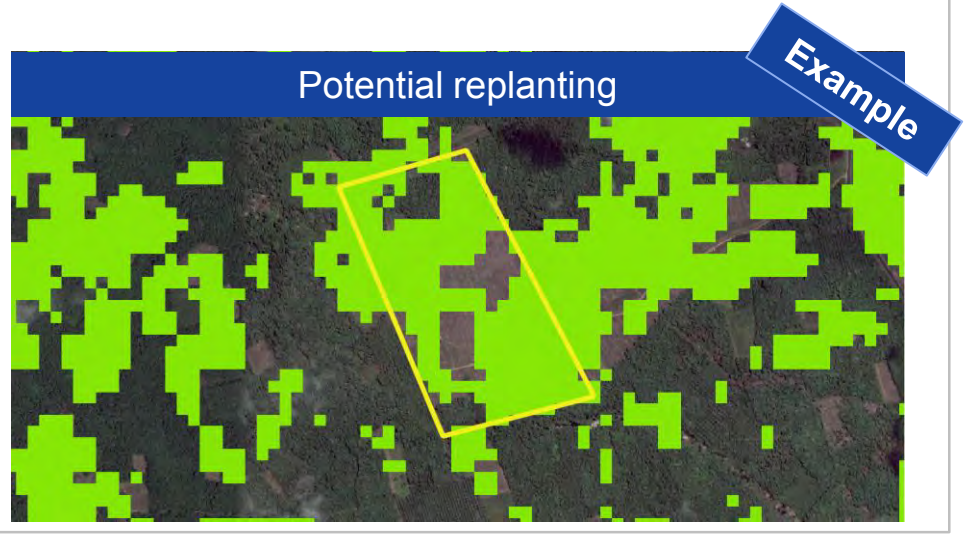
Potential deforestation

- Tree cover loss on areas that GRAS has mapped to be potential forests in the year 2007. Tree cover loss is defined as the removal of tree cover due to a variety of factors. Tree cover is defined as all vegetation greater than 5 meters in height, and may take the form of natural forests or plantations across a range of canopy densities
- Potential deforestation is detected between 2008 and November 2020



Potential replanting

- Potential replanting defines tree cover loss occurring after 1st January 2008 on areas that GRAS mapped as probable non-forested areas in the year 2007.
- Potential replanting is detected between 2008 and November 2020

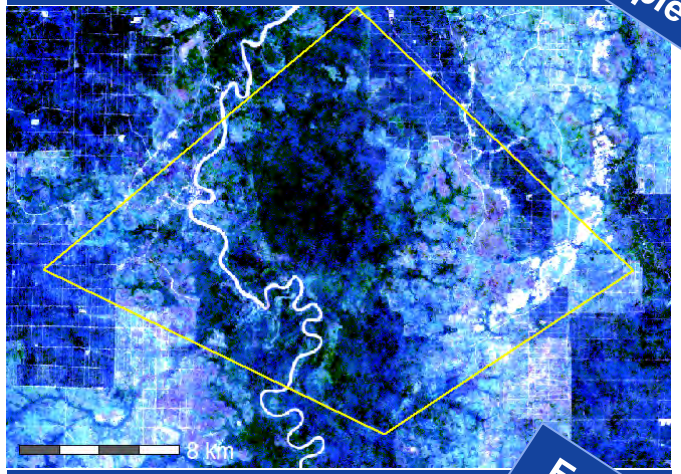


GRAS Global Risk Assessment Services

GRAS has added various datasets to the report to support the verification of potential deforestation and replanting

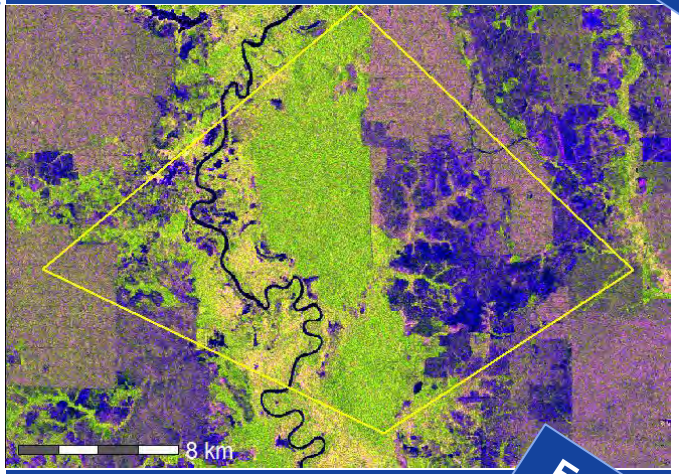
Landsat satellite images

Example



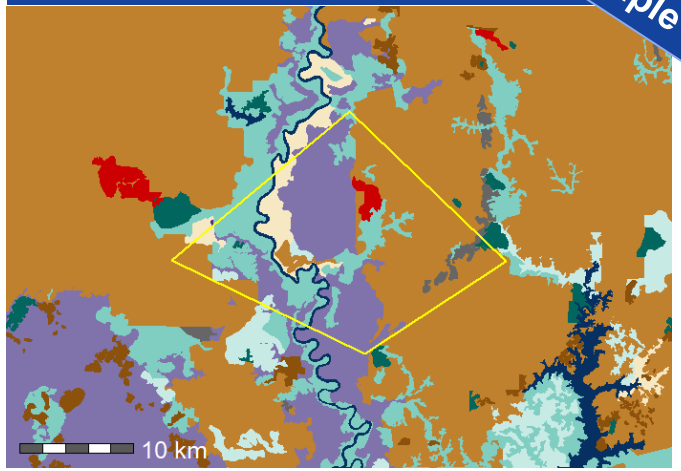
ALOS PALSAR satellite images

Example



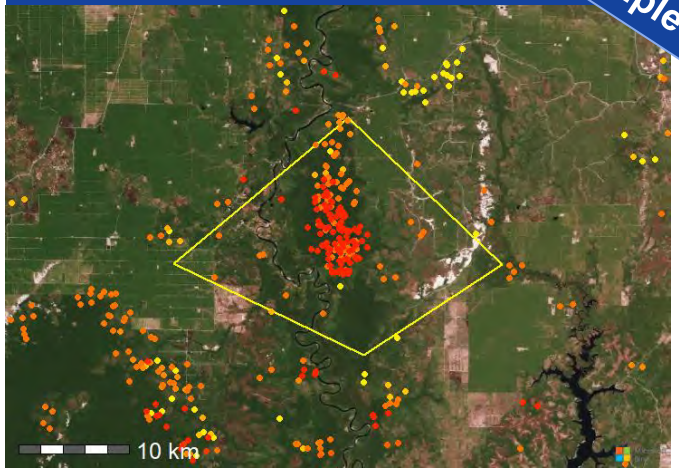
Landcover maps

Example



Fire events

Example

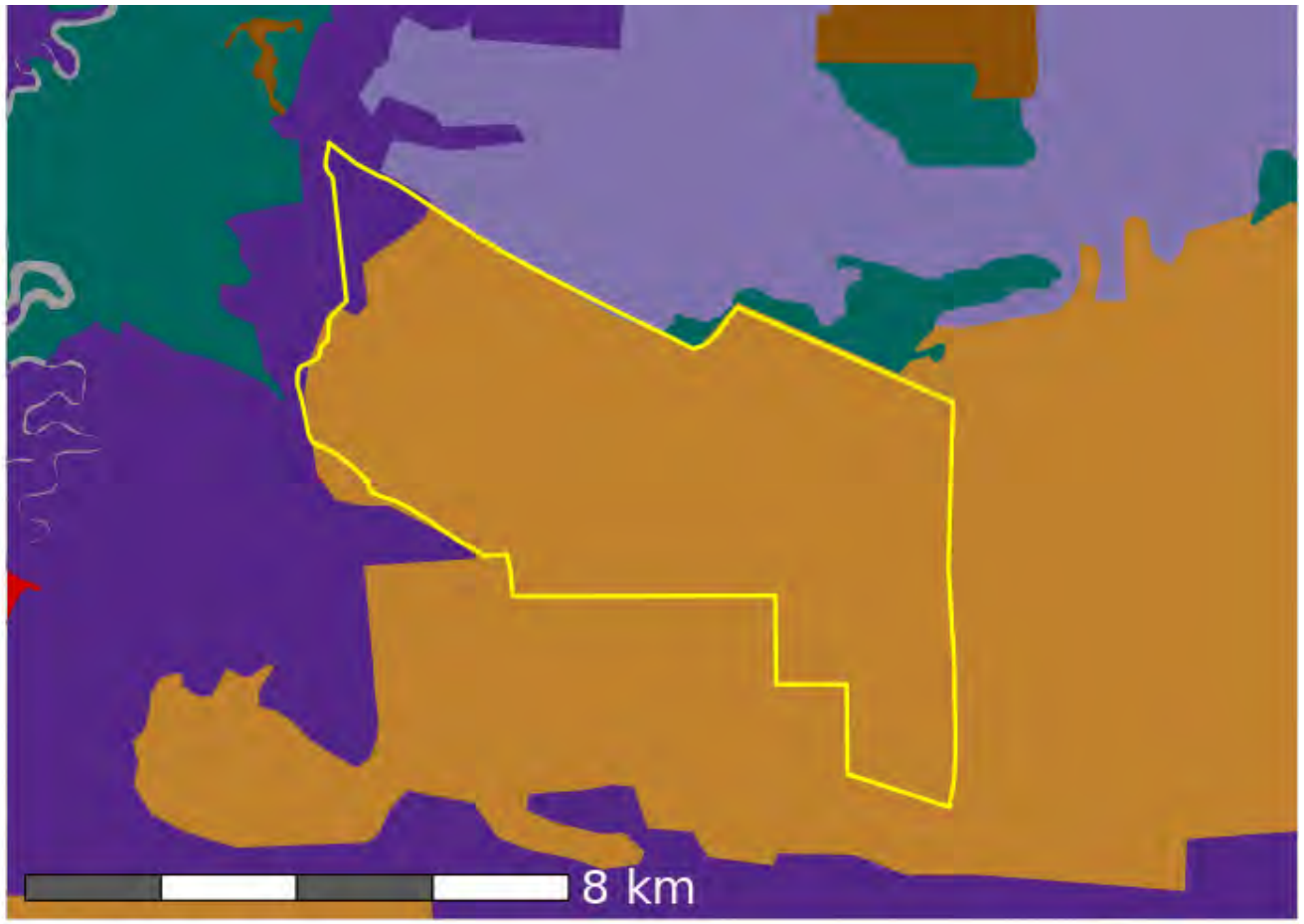


Datasets to support the verification of potential deforestation and replanting

- Cloud-free Landsat satellite composites for the time periods 2003-2007, 2008-2012, 2013-2017, and 2018-today (here and here)
- ALOS PALSAR satellite images for the years 2007 and 2018 (here)
- Landcover maps for the year 2009 (here)
- Fires from 2008 until 2022 (here)
- In order to support the users with the interpretation of these datasets, GRAS offers a separate online training complementary to this report
  - Methodology behind the GRAS approach to support the verification of ISCC Principle 1
  - Interpretation of all datasets provided
  - Assessment of satellite images

GRAS Global Risk Assessment Services

The Land Cover Map for 2009 can support the assessment of potential deforestation and land use within the assessment area



Land Cover 2009

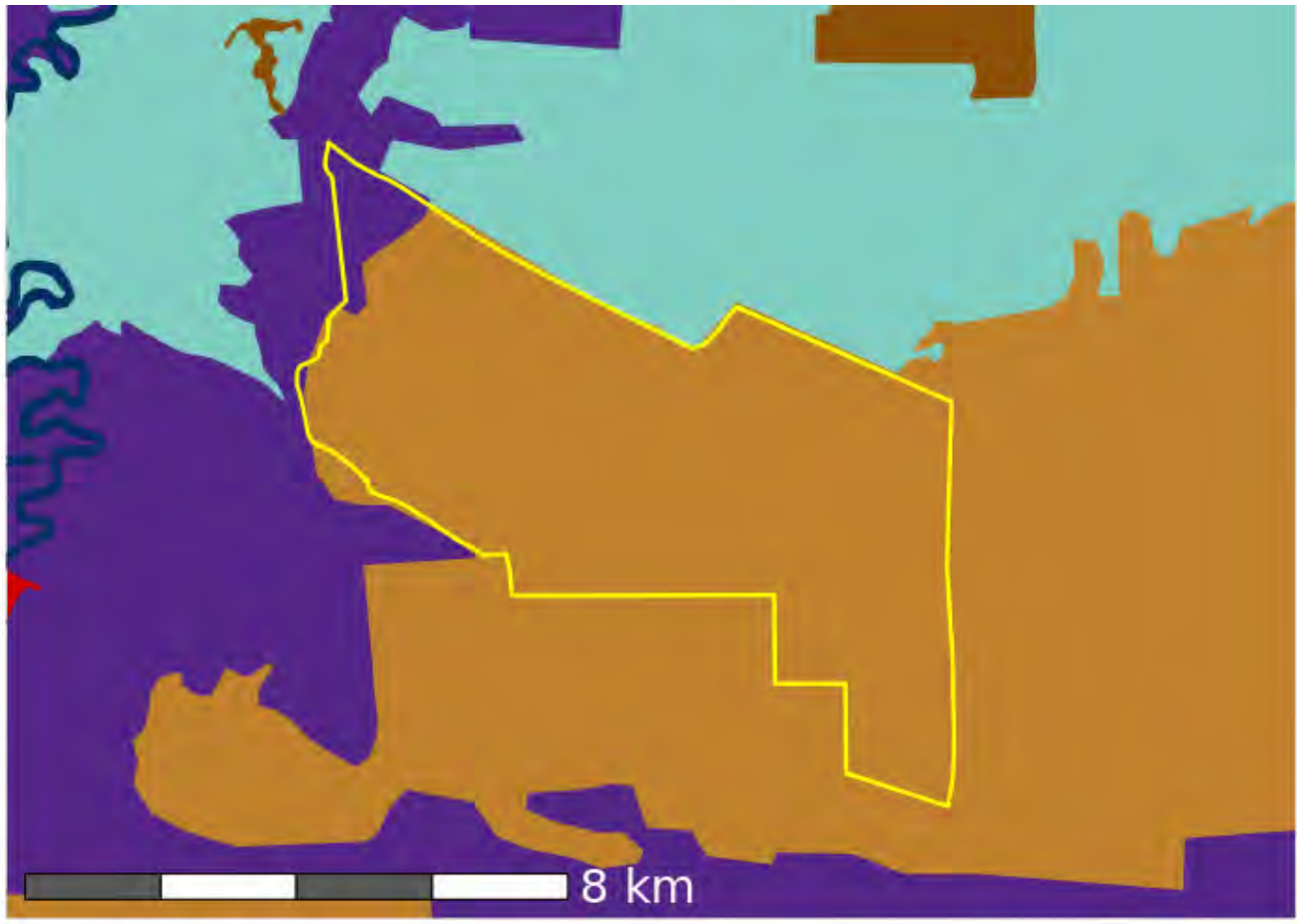
Legend

- Assessment area
- Shurb-Mixed Dryland Farm
- Barren Land
- Secondary Swamp Forest
- Not Available
- Estate Cropplantation
- Bush/Shrub
- Settelment Area

Data Source: Indonesian Ministry of Forestry, 2009

GRAS Global Risk Assessment Services

The Land Cover Map for 2011 can support the assessment of potential deforestation and land use within the assessment area



Land Cover 2011

Legend

- Assessment area
- Shurb-Mixed Dryland Forest
- Estate Crop Plantation
- Water Body
- Bush/Shurb Swamp
- Barren Land
- Settelment Area

Data Source: Indonesian Ministry of Forestry, 2011

GRAS Global Risk Assessment Services

Primary forest and other wooded land: Definitions and Recommendations

ISCC Criterion	Land status according to ISCC	Definition according to ISCC	Dataset used by GRAS	Definitions of the datasets used by GRAS
7.1.2	*Primary forests and other wooded land*	Primary forests and other wooded land are areas covered with native tree species where there is no clearly visible indication of human activity and the ecological processes are not significantly disturbed	**Primary Forest** Source: Indonesian Ministry of Forestry (2010)	Forests that consist of native tree species that grow naturally, with the absence of clear signs of human activities and without any real disturbance to ecological processes. Old forest which is dominated by native species and undisturbed by human activities in the long term.
			Intact Forest Landscapes Source: * (2000)	An Intact Forest Landscape (IFL) is a seamless mosaic of forest and naturally treeless ecosystems within the zone of current forest extent, which exhibit no remotely detected signs of human activity or habitat fragmentation and is large enough to maintain all native biological diversity, including viable populations of wide-ranging species.

Recommendation for ISCC audit:

- ISCC does not allow the production of raw materials on areas that had the status of *primary forests and other wooded land* in or after 1st January 2008
- In case of an overlap with the plantation outlines, this should be assessed in details by the auditor

** Potapov P., Yaroshenko A., Turubanova S., Dubinin M., Laestadius L., Thies C., Aksenov D., Egorov A., Yesipova Y., Glushkov I., Karpachevskiy M., Kostikova A., Manisha A., Tsybikova E., Zhuravleva I. 2008. Mapping the World's Intact Forest Landscapes by Remote Sensing. Ecology and Society, 13 (2)*

GRAS Global Risk Assessment Services

Forests and other wooded land: Definitions and Recommendations

ISCC Criterion	Land status according to ISCC	Definition according to ISCC	Dataset used by GRAS	Definitions of the datasets used by GRAS
7.1.3	*Highly biodiverse forests and other wooded land*	Highly biodiverse forest and other wooded land are areas which are species-rich and not degraded, or has been identified as being highly biodiverse by the relevant competent authority	**Forest Height Map (2007)**	A grid for which the vertical vegetation structure was analysed for each pixel with the use of a spaceborne light detection and ranging (lidar). Presented here is a global map of canopy height using 2005 data from the Geoscience Laser Altimeter System (GLAS) aboard ICESat (Ice, Cloud, and land Elevation Satellite). Only pixels overlapping with areas that GRAS mapped to be potential forest in 2007 are considered here.
			Tree Cover Density Map (2005)	Tree cover is defined as the proportional, vertically projected area of vegetation (including leaves, stems, branches, etc.) of woody plants above a given height. The datasets displays the percentage area of tree cover layers of the horizontal ground in each 30 m pixel covered by woody vegetation higher than 5 metres. Only pixels overlapping with areas that GRAS mapped to be potential forest in 2007 are considered here.

Recommendation for ISCC audit:

- ISCC allows the production of raw materials on areas that had the status of *highly biodiverse forests and other wooded land* in or after 1st January 2008 if evidence is provided that the production of that raw material does/did not interfere with those nature protection purposes
- The datasets used by GRAS **does not provide** any indication on the biodiversity status of the land
- In case of an overlap with the plantation outlines, the actual status of the land as well as the biodiversity status should be assessed in details by the auditor

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Nature protection areas: Definitions and Recommendations

ISCC Criterion	Land status according to ISCC	Definition according to ISCC	Dataset used by GRAS	Definitions of the datasets used by GRAS
7.1.4	*Designated Nature Protection Areas*	Areas designated by law or by the relevant competent authority for nature protection purposes. It is allowed to grow biomass, if evidence is provided that the production of that raw material does/did not interfere with those nature protection purposes	**Reserved forest, Protected forest, Marine protected areas, Nature conservation areas** Source: Indonesian Ministry of Forestry (2010)	**Reserved forest:** Areas with specific characteristics, either terrestrial or aquatic, the function of which is to protect ecosystems, conserve floral and faunal diversity, as well as to sustainably use natural resources and their ecosystems; **Protected forest**: A protected forest area has as its principal function the protection of ecosystems services to manage the water, preventing floods, controlling erosion, preventing sea water intrusion, and maintain soil fertility; **Marine protected areas**: Nature Reserves designated to protect biodiversity and ecosystem services in marine and coastal area; **Nature conservation areas**: Areas with the principal function of conserving plant and animal diversity as well as ecosystems and ecosystem services.

Recommendation for ISCC audit:

- ISCC allows the production of raw materials on areas that had the status of *Designated Nature Protection Areas* in or after 1st January 2008 if evidence is provided that the production of that raw material does/did not interfere with those nature protection purposes
- In case of an overlap with the plantation outlines, this should be assessed in details by the auditor

Areas for the protection of RTE species: Definitions and Recommendations

ISCC Criterion	Land status according to ISCC	Definition according to ISCC	Dataset used by GRAS	Definitions of the datasets used by GRAS
7.1.5	*Areas for the protection of rare, threatened or endangered species*	Areas that are recognised by international agreements or included in lists drawn up by inter-governmental organisations or the International Union for the Conservation of Nature (IUCN).	**Tiger Conservation Landscapes, Tx2 Tiger Conservation Landscapes** Source: WWF, RESOLVE (2015)	Tiger Conservation Landscapes (TLCs) are defined as large blocks of connected tiger habitat that can support at least five tigers and where tiger presence had been confirmed in the past 10 years. The dataset was produced by combining data on land cover, tiger occurrence and a human influence index. Tx2 Tiger Conservation Landscapes displays TLCs that could double the wild tiger population through proper conservation and management by 2020.
			Orangutan habitats Source: Wich et al. (2006)	The map shows a modelled orangutan spatial distribution for Borneo and Sumatra. The map was prepared based on species occurrence samples as well as contextual layers. The contextual layers included climatic, topographic, soil, above ground carbon stock, land cover and road density maps.

Recommendation for ISCC audit:

- ISCC allows the production of raw materials on areas that had the status of *Areas for the protection of rare, threatened or endangered species* in or after 1st January 2008 if evidence is provided that the production of that raw material does/did not interfere with those nature protection purposes
- In case of an overlap with the plantation outlines, this should be assessed in details by the auditor

Grassland: Definitions and Recommendations

ISCC Criterion	Land status according to ISCC	Definition according to ISCC	Dataset used by GRAS	Definitions of the datasets used by GRAS
7.1.6	*Grassland*	"Grassland" means terrestrial ecosystems dominated by herbaceous or shrub vegetation for at least five years continuously. It includes meadows or pasture that is cropped for hay but excludes land cultivated for other crop production and cropland lying temporarily fallow. ISCC further distinguish between: Natural highly biodiverse grassland and non natural highly biodiverse grassland	**GlobCover 2009 (Global Land Cover Map)** Source: ESA 2010 and UCLouvain	The aim of the GlobCover 2009 is to deliver global composites and land cover maps using as input observations from the 300m MERIS sensor on board the ENVISAT satellite mission. GRAS uses the land cover map of the time period January - December 2009. GRAS has extracted the land class "Closed to open (>15%) herbaceous vegetation (grassland, savannas or lichens/mosses)" to map grassland. The GlobCover 2009 used by GRAS does not provide any indications on the natural or highly biodiverse status of the land.

Recommendation for ISCC audit:

- ISCC does not allow the production of raw materials on areas that had the status of *natural highly biodiverse grassland* and *non natural highly biodiverse grassland* in or after 1st January 2008
- In case of an overlap with the plantation outlines, this should be assessed in details by the auditor

* European Space Agency (ESA) & Université catholique de Louvain (UCL),

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Wetlands: Definitions of the dataset used by GRAS

Dataset: Tropical and Subtropical Wetlands Distribution * (2011)			
Category	Geomorphology	Moisture conditions	Vegetation and soil conditions
Open water	Lakes and permanent rivers	Open water surface	-
Mangrove	In close proximity to coast or estuaries	Permanently wet, but with tidal variations in water levels	Dominated by different mangrove species; peat formation, but with limited depth
Swamp/bogs	Usually bound to valleys and plains; planar surfaces	Wet all year around, but not necessarily inundated	Usually tree covered. Peat domes with peat depths up to 45 m; otherwise with more limited peat depths
Fens	In valleys or lower slope positions	Mainly fed by ground water, and thus a stable water supply	Often nutrient-rich and with dense vegetation; peat forming
Riverine	Aligned with the adjacent water body	Permanently wet	Varying vegetation, not seldom with zonation reflecting proximity to water source; peat forming
Floodouts	On alluvial deposits	Fed by permanent rivers, large variations in water levels but never drying out	Forested or non-forested; grasses, rushes and sedges; peat forming
Floodplains	On alluvial deposits or in valleys	Annual flooding and drying regime with distinct dry season	Forested or non-forested. No peat formation
Marshes	In valleys and plains, coastal marshes, salt marshes, savannah and prairie marshes, etc.	No distinct intra-annual wetness cycle, permanently moist but not necessarily water-saturated soils	Usually not forested; grasses, rushes and sedges, but also herbs and bushes; no peat formation, but organic matter accumulation can occur, mixed with minerogenic sediments
Wetland in arid climate	Formed in channel valleys and over alluvial deposits	With a pronounced seasonality in soil moisture regime usually determined by lateral flow components	Can be regarded as an intermediate category between floodplains/floodouts and marshes, restricted to arid climate. Organic matter accumulation can occur, mixed with minerogenic sediments
Wet meadows	Transition zones between wetlands and surrounding drylands, sometimes on open slopes	Varying water source dependent on hydrological position and landscape geomorphology	Usually dominated by grasslands, woody vegetation if the soil moisture regime allows. No or little organic matter accumulation

* Source: Center for International Forestry Research (CIFOR)

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Wetlands: Definitions from ISCC and recommendations

ISCC Criterion	Land status by ISCC	Definition according to ISCC
7.1.7	*Wetlands*	Land that is covered with or saturated by water permanently or for a significant part of the year. Covered with water means that water is visible on the surface as water surface. Saturated by water is a soil that shows also water at the surface, but not as a closed water surface. Areas that are covered by or saturated with water during a considerable part of the year are saturated long enough, so that organisms dominate, which are adapted to wet or anaerobic conditions. These conditions can be found in areas of shallow water, shores, low-moor bog, marsh, fen and moor. They apply to natural or artificial wetland areas with water that is static or flowing, fresh, brackish or salt, including areas of marine water, at which the depth of low tide does not exceed six meters.

Recommendation for ISCC audit:

- ISCC allows the production of raw materials on areas that had the status of *Wetlands* in or after 1st January 2008 as long as the status is not changed or compromised and all applicable constraints are followed
- In case of an overlap with the plantation outlines, this should be assessed in details by the auditor

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Continuously forested areas: Definitions and Recommendations

ISCC Criterion	Land status according to ISCC	Definition according to ISCC	Dataset used by GRAS	Definitions of the datasets used by GRAS
7.1.8	*Continuously Forested Areas*	Land spanning span over more than one hectare with trees higher than five metres and a canopy cover of more than 30%, or trees able to reach those threshold In situ.	**Forest Height Map (2007)**	A grid for which the vertical vegetation structure was analysed for each pixel with the use of a spaceborne light detection and ranging (lidar). Presented here is a global map of canopy height using 2005 data from the Geoscience Laser Altimeter System (GLAS) aboard ICESat (Ice, Cloud, and land Elevation Satellite). For the purpose of detecting continuously forested areas, only pixels with vegetation higher that 5 m was considered. Only pixels overlapping with areas that GRAS mapped to be potential forest in 2007 are considered here.
			Tree Cover Density Map (2005)	Tree cover is defined as the proportional, vertically projected area of vegetation (including leaves, stems, branches, etc.) of woody plants above a given height. The datasets displays the percentage area of tree cover layers of the horizontal ground in each 30 m pixel covered by woody vegetation higher than 5 metres. For the purpose of detecting continuously forested areas, only pixels with tree cover higher that 30% was considered. Only pixels overlapping with areas that GRAS mapped to be potential forest in 2007 are considered here.

Recommendation for ISCC audit:

- ISCC does not allow the production of raw materials on areas that had the status of *Continuously Forested Areas* in or after 1st January 2008
- In case of an overlap with the plantation outlines, this should be assessed in details by the auditor

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Forested areas with 10-30% canopy cover: Definitions and Recommendations

ISCC Criterion	Land status according to ISCC	Definition according to ISCC	Dataset used by GRAS	Definitions of the datasets used by GRAS
7.1.9	*Forested areas with 10-30% canopy cover*	Forested areas with 10-30% canopy cover refers to land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10% and 30%, or trees able to reach these thresholds in situ.	**Forest Height Map (2007)**	A grid for which the vertical vegetation structure was analysed for each pixel with the use of a spaceborne light detection and ranging (lidar). Presented here is a global map of canopy height using 2005 data from the Geoscience Laser Altimeter System (GLAS) aboard ICESat (Ice, Cloud, and land Elevation Satellite). For the purpose of detecting continuously forested areas, only pixels with vegetation higher that 5 m was considered. Only pixels overlapping with areas that GRAS mapped to be potential forest in 2007 are considered here.
			Tree Cover Density Map (2005)	Tree cover is defined as the proportional, vertically projected area of vegetation (including leaves, stems, branches, etc.) of woody plants above a given height. The datasets displays the percentage area of tree cover layers of the horizontal ground in each 30 m pixel covered by woody vegetation higher than 5 metres. For the purpose of detecting continuously forested areas, only pixels with tree cover between 10% and 30% was considered. Only pixels overlapping with areas that GRAS mapped to be potential forest in 2007 are considered here.

Recommendation for ISCC audit:

- ISCC allows the production of raw materials on areas that had the status of *forested areas with 10-30% canopy cover* as long as reliable evidence is provided that the carbon stock of the area before and after conversion is such that the requirements regarding the greenhouse gas saving, required by ISCC, would be fulfilled
- In case of an overlap with the plantation outlines, this should be assessed in details by the auditor

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Peatland areas: Definitions and Recommendations

ISCC Criterion	Land status according to ISCC	Definition according to ISCC	Dataset used by GRAS	Definitions of the datasets used by GRAS
7.1.10	*Peatlands*	Peatland soils are soils with horizons of organic material (peat substrate) of a cumulative thickness of at least 30 cm at a depth of down to 60 cm. The organic matter contains at least 20 mass percent of organic carbon in the fine soil. The obtaining of raw material is only possible if evidence is provided that: • The soil was completely drained in January 2008, or • There has been no deeper draining of the soil since January 2008	**Peatland Map** Source: CIFOR (2016), Indonesian Ministry of Agriculture (2012)	The map shows the distribution of peatland that covers the tropics and sub tropics, excluding small islands. It was mapped in 231 meters spatial resolution. Peat is here defined as any soil having at least 30cm of decomposed or semi-decomposed organic material with at least 50% of organic matter. This corresponds to 29% of carbon content using 1.72 as the transformation factor.

7

Recommendation for ISCC audit:

- ISCC allows the production of raw materials on areas that had the status of *Peatlands* in or after 1st January 2008, if evidence is provided that the cultivation and harvesting of that raw material does/did not involve drainage of previously undrained soil
- In case of an overlap with the plantation outlines, this should be assessed in details by the auditor

Steep slopes: relevant ISCC criteria and recommendations

ISCC Criteria	Relevant verification guidance under ISCC
7.1.15	Check evidence of good agricultural practices. Check soil management plan aimed at sustainable soil management, erosion prevention and erosion control. The plan should refer to: - Prevention and control of erosion; - Maintaining and improving balances of soil nutrient balance; - Maintaining and improving soil organic matter; - Maintaining and improving soil pH; - Maintaining and improving soil structure; - Maintaining and improving soil biodiversity; - Prevention of salinization. - Topographical, climate and pedological characteristics of soils and the suitability of crops have been considered.
7.1.16	Evidence of measures to reduce soil erosion is available. Maps of fragile soils and topographic characteristics must be available. A management strategy including measures should exist for plantings on slopes above a certain limit (specified to soil, climate and topographical characteristics).

Recommendation for ISCC audit:

- In case of the presence of steep slopes within the plantation outlines, the auditor should assess in details the above-mentioned criteria
- The dataset could underestimate the presence of steep slopes. Hence, the auditor shall also confirm this onsite

Waterbodies: relevant ISCC criteria and recommendations

ISCC Criteria	Relevant verification guidance under ISCC
7.1.11	(…) Around all protected areas (covered in Principle 1), set aside land or wildlife corridors, appropriate buffer zones shall be protected, restored or set up. Buffers include: riparian buffers, filter strips, grassed waterways (…)
7.1.12	(…) Check, whether appropriate riparian buffer zones to protect watercourse and wetlands were set up (…)
7.1.18	Verify if the producer can demonstrate that he observes at least a distance of 3 m to riverbanks etc. and takes care that there is no run-off of applied fertilizer into surface water bodies and the ground water.
7.1.34	If plant protection products are applied near populated areas or water bodies, appropriate distances must be kept (buffer zones). (…) Pesticides classified as WHO1a, 1b or 2 are not applied aerially within a 500 m distance to any populated areas or water bodies.
7.1.39	(…) Surface water contamination has been avoided.
7.1.43	(…) The risk of contamination of the environment, watercourses and flora and fauna is minimized.
7.1.44	(…) and consideration has been given to the proximity to water courses and flood risks.
7.1.51	(…) Appropriate measures could include inter alia: • Setting up buffer zones around water bodies
7.1.86	Applicable laws are being complied with. They apply to: • Water conservation and management (relating to e.g. abstraction, use and discharge of irrigation water, protection of water bodies)

Recommendation for ISCC audit:

- In case of an overlap between the waterbodies dataset and the plantation outlines, the auditor should assess in details the above-mentioned criteria
- The dataset could underestimate the presence of waterbodies. Hence, the auditor shall also confirm this onsite

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Content

1 Executive Summary

2 Assessment Results

3 Conclusions

4 Annex

4.1 Additional information supporting ISCC audit

4.2 Approach and methodologies

The GRAS sustainability risk assessments follow a three step approach to analyse plantation outlines against ISCC Principle 1 criteria

1. Potential Deforestation

Assessment of:

- Potential Deforestation
- Potential Replanting

2. Biodiversity, carbon stock and peatlands

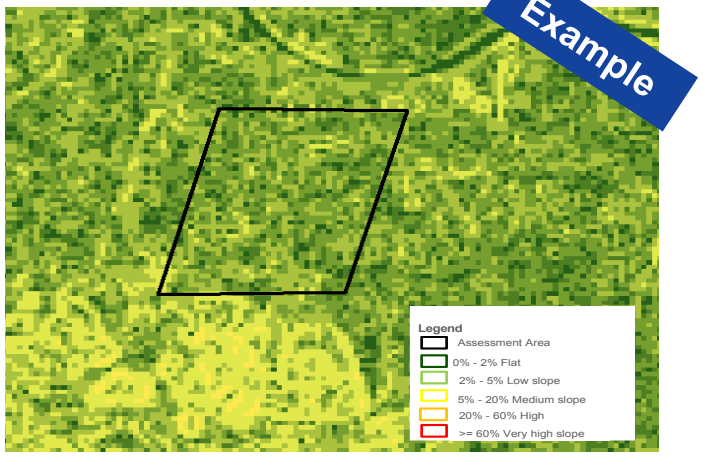
Assessment of:

- Areas with high biodiversity values
- Areas of high carbon stock
- Peatland Areas

3. Additional datasets supporting ISCC Audits

Assessment of:

- Steep Slopes
- Waterbodies
- Fires



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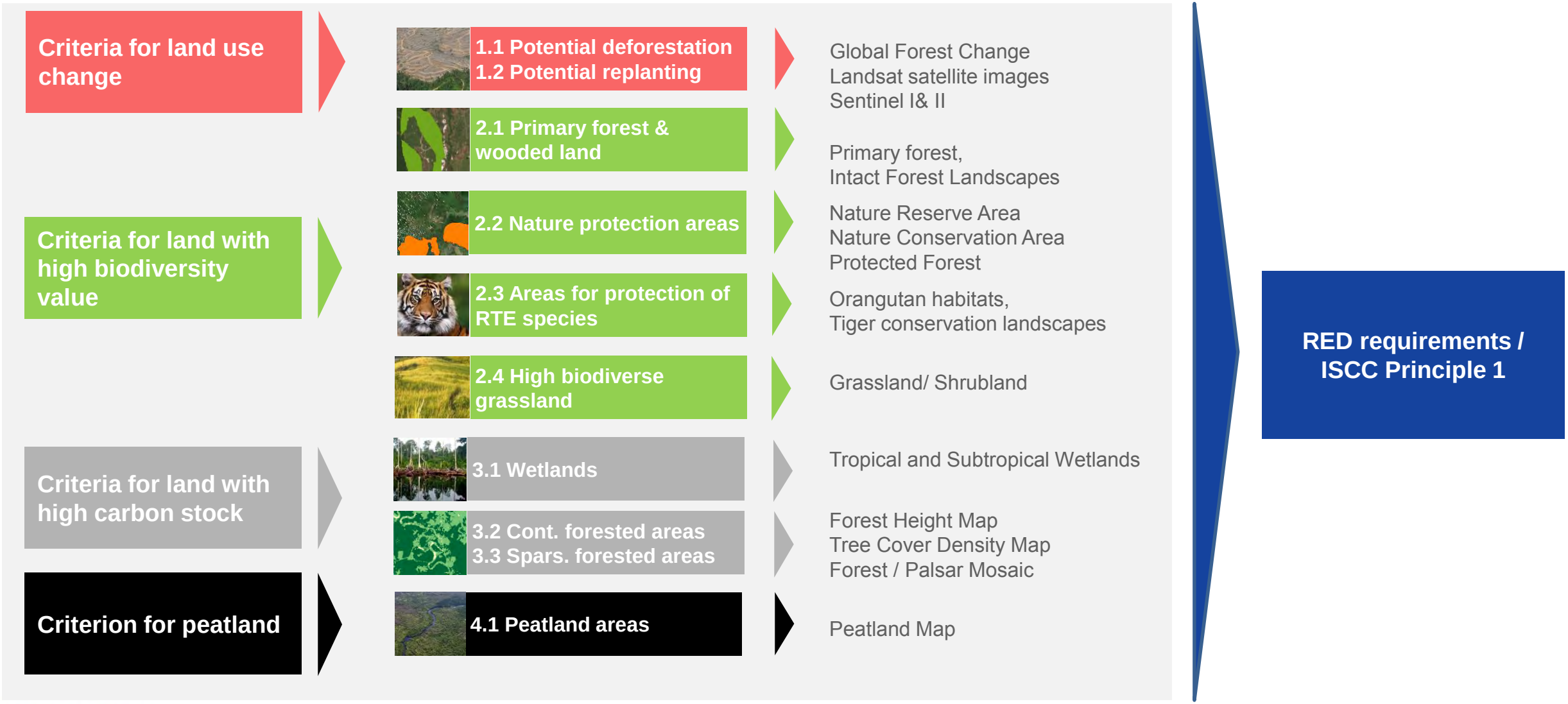
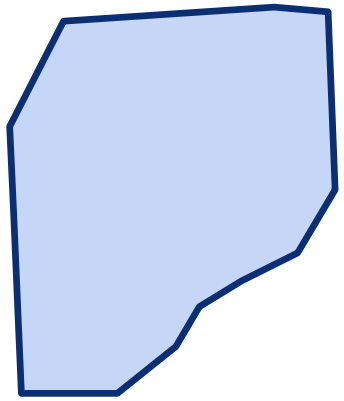
GRAS has evaluated several datasets to identify the most suitable ones to cover the ISCC Principle 1 criteria



GRAS has evaluated several datasets to identify the most suitable ones to cover further ISCC criteria

Additional relevant criteria

Based on the selected datasets and specific algorithms, ARIA users can create high quality, yet automated sustainability risk assessment reports of their plantations



Plantation outline

Geospatial datasets

- Satellite imagery (Landsat, ALOS PALSAR, etc)
- Geospatial datasets (tree height, tree cover)
- Protected areas, peatlands & wetlands
- Fire
- Slopes
- etc..

Algorithms

- Image processing
- SAR processing
- EVI processing
- Cloud computing
- Stacking & composing
- Random forest
- Deep learning
- Object-based classification
- etc..

ARIA

Sustainability risk assessment report

Risk levels are assigned to each assessment area based only on their overlapping with the potential replanting and deforestation amps

Risk level	Overlap with the potential replanting	Overlap with potential deforestation	Description
Low Risk			The plantation does not overlap neither with the potential replanting map nor with the potential deforestation map
Medium Risk	X		The plantation overlaps with the potential replanting map
High Risk	(X)	X	The plantation overlaps with the potential deforestation map

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