Retrospective Review of Potential HCV Korindo Group

Merauke and Boven Digoel Regencies Papua, and North Maluku, Indonesia

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EXECUTIVE SUMMARY

INTRODUCTION

In August 2018, the FSC Board of Directors (BoD) determined that an additional detailed analysis of the potential destruction of High Conservation Values (HCVs) was needed, prior to a final decision to be taken by the FSC BoD regarding the Policy for Association (PfA) complaint filed by Mighty Earth (Mighty) against Korindo Group (Korindo).

The main objective of this additional analysis is to determine whether the conversion of forests due to the establishment of oil palm plantations (and other operations) in Indonesia by Korindo has caused the destruction HCVs[1], and to analyze the related potential environmental impacts.

The PfA complaint corresponds to Korindo's subsidiaries in Indonesia (oil palm plantations) which Mighty raised against Korindo:

- PT Tunas Sawa Erma, Boven Digoel Regency of West Papua (PT. TSE);
- PT Papau Agro Lestari, Merauke Regency of West Papua (PT. PAL);
- PT Dongin Prabawa, Merauke Regency of West Papua (PT. DP);
- PT Berkat Cipta Abadi, Boven Digoel Regency of West Papua (PT. BCA);
- PT Gelora Mandiri Membangun, North Maluku (PT GMM).

REDACTED

PT GMM in North Maluku, PT. PAL in Papua REDACTED were the focal areas for a detailed retrospective assessment of the destruction of one or more HCVs. These concessions were used as proxies for the other three Papua based oil palm concessions (PT.TSE, PT. BCA, PT. DP) even though there was evidence for the loss of HCV's in all the concessions.

[1] '*Destruction of HCVs'* is defined in the FSC Policy for Association (FSC-POL-01-004) as a "Significant damage of the attributes that constitute high conservation values in a way that they no longer exist or cannot be repaired."

- PT. PAPUA AGRO LESTARI (PT PAL)

The PT. PAL oil palm concession has been subject to the most recent and ongoing land use change and conversion from a forest landscape to an oil palm estate. The changes to the landscape have contributed to broad impacts to multiple HCVs within and adjacent to the concession.

FAILURE TO IDENTIFY AND CONSERVE HCVS PRIOR TO FOREST CLEARING FOR PALM OIL PLANTATIONS

According to company records, clearing began in 2015 and approximately 1,574.08 Ha were cleared during that year (even though company records indicate that PT. PAL received its initial permit to harvest timber in March of 2016) 2. In 2016, an additional 2,141.52 Ha of forest was cleared, followed by another 30.88 Ha in 2017. An HCV Assessment began for the PT PAL area in May of 2016 (approximately 8 months after clearing began). The HCV report was completed in August of 2017 and signed by the both the HCV Assessor at the Director of PT. PAL on August 28th, 2017. At the time the HCV report was completed, the company reported clearing at total of 3,746 Ha of land, most of which was primary forest in the northern portion of the concession.

PT PAL HCV/HCS REPORTS FAILED TO ACCURATELY IDENTIFY HCVS WITHIN KORINDO'S CONCESSION

Korindo has promoted and made both the PT PAL HCV and HCS reports available to the public. Weaknesses were highlighted by both the HCS and HCVRN panel reviewers. Although there were weaknesses and the review panel requested revisions, the data and observations from the field surveys presented in the HCV and HCS reports are very relevant and useful to a proxy approach toward retrospective assessment of previously existing HCS and HCV areas.

The records of flora and fauna observations from the HCV and HCS surveys were presented in the HCV and HCS reports, along with maps and photographs from the field. These records from field visits and surveys carried out in 2016 are among the best available record of "first-hand" direct observations which were made in the area during and after clearing. The assessment team recorded their direct observation of RTE species within the concession at multiple locations. Many of the observations of RTE species of flora and fauna were recorded in the remaining riparian set-asides or fragmented forest. These areas are considered proxies for the previous land cover and habitat. The RTE species

[2] FV15. PT. PAL management plan

observed in the fragmented habitats after clearing were almost certainly present in the primary forest before clearing.

IMPACTS TO RARE, ENDANGERED AND THREATENED SPECIES

The Common Guidance for the High Conservation Values indicates, "where it is difficult to determine the presence or population status of individual endemic or RTE species in practice, suitable habitat for RTE species can be used as a proxy".[3] The HCV Assessment team directly observed and identified approximately 17 endemic species of fauna and 44 species which are listed under CITES, the IUCN Redlist, and/or Indonesian Regulations (Peraturan Pemerintah Nomor 7 Tahun 1999).[4] This assemblage of RTE species, observed in an area designated as an Intact Forest Landscape in 2013 and Primary Forest in 2015 would support the decision to treat the area as HCV 1. The evidence from the field surveys supports broader classification of the entire concession landscape as HCV 1 and HCV 4.

IMPACT, FRAGMENTATION AND REDUCTION OF IFL

Prior to the land clearing and conversion which Korindo began in 2015, the entire PT PAL concession area was classified as part of an Intact Forest Landscape (IFL) in the 2013 version of the Intact Forest Landscape map[5]. It was also included as an IFL on the earlier 2000 Intact Forest Landscape map and a review of satellite imagery prior to conversion shows no sign of timber harvesting or human disturbance to the IFL within the concession boundaries.

In the PT PAL HCV Full Report (Bahasa Indonesia version), the entire PT PAL concession area was identified as being part of the IFL 2013. The HCV Assessors suggested that it should no longer be part of the IFL (as of the date of their field visit in 2016) due to land clearing, timber harvesting and land use change. Indeed, in the 2016 revision of the Global IFL map, the northern portion of the PT PAL oil palm concession was removed from the IFL map, along with a larger area of the IFL to the North. The land clearing and conversion which Korindo began in 2015 within the PT PAL concession (which was part of the IFL 2013 at the time) appears to have triggered the reduction of the IFL in the 2016 revision.

[3] Common Guidance for the High Conservation Values HCVRN

[4] PT PAL HCV Full Report Tabel V-3 and Tabel V-4

[5] Potapov, P., A. Yaroshenko, S. Turubanova, M. Dubinin, L. Laestadius, C. Thies, D. Aksenov, A. Egorov, Y. Yesipova, I. Glushkov, M. Karpachevskiy, A. Kostikova, A. Manisha, E. Tsybikova, and I. Zhuravleva. 2008. Mapping the world's intact forest landscapes by remote sensing. Ecology and Society 13(2): 51. [online] URL: http://www.ecologyandsociety.org/vol13/iss2/art51/

Although the clearing and land use conversion within the PT PAL concession caused the direct loss of more than 3,500 Ha forest within the concession (according to the PT PAL Management Plan), the location of the clearing which took place in PT PAL had a broader impact on IFL connectivity and triggered an approximately 40,000 Ha reduction to the IFL 2016. As a direct result of the Korindo clearing in PT PAL and the logging operations in Korindo's adjacent timber concession (PT Inocin Abadi) in the year prior to assessment, the IFL 2013 status would have likely resulted in the area being classified as HCV 2. The assessor chose not to identify the area as HCV 2 because a portion of the area was no longer part of the IFL 2013 when his team conducted a review in 2016/17.

In the HCV report, the assessor ended his review of potential HCV 2 with "In addition, the connectivity between the ecosystem components have been much disturbed. Thus, in the PT PAL area is no area that is being of HCV 2". He failed to mention that the entire concession area would have met the basic criteria of HCV 2 just a few years earlier, before Korindo began logging and land clearing inside the PT PAL concession.

Degradation to Watershed Outside of the Concession

Korindo's clearing in PT PAL in 2015 and 2016 appears to have significantly impacted and altered the hydrology. The impact of the clearing in PT PAL on the larger watershed are evident in the satellite imagery and drone images acquired in May of 2016. Numerous small streams within PT PAL contributed to the flow of water into the main catchment, eventually flowing into the Fly River. The central portion of the watershed is also in the center of the area which has been cleared in PT PAL. The impact to the watershed and the main river flowing North from the catchment can be clearly seen in recent satellite images.

Potential Breach of the land clearing moratorium

In December of 2016, Korindo announced a voluntary moratorium on land clearing and logging operations within the PT PAL concession. The scope and scale of land use change and conversion within PT PAL declined significantly in 2017 which appears consistent with the self-declared moratorium. However, beginning around July of 2018, a number of relatively small areas which were previously blocked for clearing and planting within the PT PAL concession were slowly being cleared of the remaining vegetation. Some of the vegetation appears to have been scrub and regenerating forest recovering from the initial clearing in 2016. However, there were also small stands of forest which were cleared. Logging operations in the adjacent timber concession, PT Inocin Abadi have continued through 2018 and into 2019.

GLOBAL 200 ECOREGIONS

The Global 200 ecoregions were developed in 2002 and focus on biological values as the critical first step in setting global conservation priorities[6].

All of the Korindo oil palm estates in Papua referenced in this report are part of two Global 200 ecosystems. The first is for the terrestrial Southern Papua Lowland Forest and the second is for the New Guinea Rivers and Streams. Both the terrestrial and freshwater ecosystems in this part of Papua and referenced in the Global 200 are widely recognized for their biodiversity and endemism.

The Southern Papua Lowland Forest is currently classified as "critical/endangered". Plant richness is high, and the mammalian fauna consists of a wide variety of tropical Australasian marsupials, including a tree kangaroo. The WWF data on this ecoregion indicates that it contains sixty-nine mammal species, thirteen of which are endemic or near endemic.

- ## PT GELORA MANDIRI MEMBANGUN (PT GMM)

The PT GMM oil palm concession lies on the southern end of the Island of Halmahera in the South Halmahera Regency. Halmahera Island is also central to Wallacea, a biogeographical designation for the group of mainly Indonesian islands (and deep-water straits) between the Asian and Australian continental shelves. The islands of Wallacea lie between Sundaland (the Malay Peninsula, Sumatra, Borneo, Java, and Bali) to the west, and Near Oceania including Australia and New Guinea to the south and east.

Wallacea's forests are mostly lowland tropical rainforest Overall, 45 percent of Wallacea has some remaining forest cover, although only 15 percent is in pristine condition. The lowland areas are under more threat of land use conversion due to accessibility and suitability for agriculture. There are more than 10,000 species of plants in Wallacea, approximately 1,500 of which are endemic. 1,142 terrestrial vertebrates are found here, 529 of which are endemic. The flora and fauna of Wallacea are so varied that each island needs protected areas to preserve the region's biodiversity. [7]

PT GMM HISTORICAL LAND USE AND CONVERSION TO OIL PALM CONCESSION

Korindo's PT GMM oil palm concession was previously zoned as Production Forest (HPK) and the process of converting it to agricultural land (APL) began around 2007. According to company records

[6] Olson, D.M., E. Dinerstein, E.D. Wikramanayake, N.D. Burgess, G.V.N. Powell, E.C. Underwood, J.A. D'Amico, H.E. Strand, J.C. Morrison, C.J. Loucks, T.F. Allnutt, J.F. Lamoreux, T.H. Ricketts, I. Itoua, W.W. Wettengel, Y. Kura, P. Hedao, and K. Kassem. 2001. Terrestrial ecoregions of the world: A new map of life on Earth. BioScience 51(11):933-938.

[7] https://web.archive.org/web/20040404233653/http://www.biodiversityhotspots.org/xp/Hotspots/wallacea/

reported in the HCV Assessment, the PT GMM area was previously logged when it was zoned HPK forest between the 1980's and 2002. We were unable to verify this. The best available Landsat 7 satellite image from just prior to PT GMM commencing clearing was acquired on 17 October 2010. In this scene, the high ground of the peninsula is dominated by forest. The resolution of the imagery is not sufficient to determine the extent of disturbance. However, there is evidence of shifting/subsistence cultivation (small patches of non-commercial clearing) and variation in the type of forest from the northwest to southeast which appears to be related to elevation and the soil conditions. Commercial clearing of the forest appears to have begun in 2012.

Loss of HCV Forest

The HCV assessment for PT GMM indicated that based on the assessor's analysis of the Landsat 8 scene from the 10th of December 2015. At that time, they indicated that approximately 50% of the PT GMM concession area had been planted with oil palm prior to the HCV assessment. It is also clear from the subsequent satellite images that a considerable amount of the area which was classified as secondary forest (1,547.66 Ha) had been cleared. The HCV and HCS assessments both indicated the presence of steep slopes which are "off limits" to planting due to concerns about erosion and damage to the watershed. These areas were at least partially cleared, and the satellite imagery shows sign of ongoing clearing or erosion of the steep slopes consistent with clearing.

Damage to Riparian Areas

The PT GMM HCV Assessment indicates that there are 20 rivers inside the PT GMM concession. The assessor noted that "all the rivers are small rivers and the length between upstream and downstream relatively short.". This is because the topography of the area creates a central ridge which runs down the peninsula and the location of the oil palm concession dominates the high ground. The rivers are "short" because the peninsula is not very wide in most places and they flow down from both sides of the central ridge. The peninsula averages 6.5 Km wide in this area and the average width of the PT GMM oil palm concession is 4.2 Km.

The HCV Assessment noted that most of the people here depend on the rivers and springs for freshwater for drinking, bathing, etc. The widespread conversion of the entire upper watershed to oil palm is a concern. The ecological services of the previously forested area are gone. Erosion, silt, and sedimentation are likely to be problematic in the near term. Longer term concerns about damage to the catchment area are fertilizer and pesticide outflow into the streams and downslope villages. Waste management (effluent and empty fruit bunch application can create very high levels of biochemical oxygen demand BOD) is a concern that is not addressed in the HCV management plan.

IMPACTS TO HCVS

Even though the HCV assessment began after most of the area had been cleared and planted with oil palm, the PT GMM HCV report identified multiple HCV's, including HCV 1, HCV3, HCV4, and HCV5. The survey points were mapped by the assessment team.

Loss of HCV 1

At the time off assessment, more than 50% of the area had been cleared and planted with oil palm. Despite the large-scale land use conversion which had already taken place, more than 20 RTE faunal species were observed, primarily in the small fragments of forest adjacent to riparian set asides. Without baseline surveys, it is difficult to assess the habitat requirements and impacts to the population of these species within the PT GMM area. Logic follows that if the assessment team observed RTE species in most of the forest fragments, they were there prior to land use conversion, too. Attempting to determine the habitat requirements of all these RTE species is beyond the scope of this review but RTE habitat was destroyed by Korindo's clearing activities.

Loss of HCV 2

The PT GMM HCV report limited the scope of HCV2 assessment to the presence or absence of an overlapping Intact Forest Landscape (IFL). Halmahera Island is not part of an IFL. However, they did not address this concession area in the context of the Global 200 ecoregions.

The PT GMM concession in North Maluku is part of the Moluccas Moist Forests ecoregion. This ecoregion is not known for particularly high biodiversity. However, it has higher than average levels of endemism and the ecoregion falls within the Wallacean biogeographic zone, therefore exhibiting a mixture of Asian and Australian fauna. Timber harvesting and forest land conversion for agriculture are leading causes of habitat loss in the ecoregion, particularly in the lowland areas. Clearing this area, as defined by Global 200 ecoregions, contributed to the destruction of HCV 2.

Destruction of HCV 4

In total, more than 1,400 Ha of steep slopes were identified in the HCV report which were considered part of the ecosystem services for water quality and erosion control, etc. These areas were mapped using coarse data (90m SRTM data). Based on the satellite imagery and topographic data, there are additional areas which would likely fall into the watershed protection category. The previous forest land cover itself may have been considered HCV 4 in this area because it may have been locally significant to preserving the micro-climate, rainfall patterns and filtration of the water. Korindo's clearing and planting of the upper watershed has profoundly changed the catchment area and watershed. Each of these 20 rivers and streams identified in the HCV report now originates from inside

the oil palm plantation and there is evidence that the riparian buffer zones were at least partially cleared and planted.

Conclusion

The evidence provided by the complaints panel investigative team, FSC, the data from the Korindo HCV/HCS reports and analysis of the multispectral and multitemporal satellite imagery all support the conclusion that **land use change and conversion by Korindo has caused the destruction of HCV's in both the PT PAL and PT GMM concession areas**.

All of the evidence supports the conclusion that Korindo's clearing in the PT PAL concession caused the loss of HCV 1 (destruction of RTE habitat and forest), HCV 2 (reduction of the IFL) and HCV 4 (destruction of the watershed). The destruction of HCV is defined as "significant damage of the attributes that constitute high conservation values in a way that they no longer exist or cannot be repaired". The **evidence is clear and convincing** that these HCV's were for all intents and purposes, destroyed. Rehabilitation efforts would stimulate recovery, but in an ecological context, the landscape has been irreparably altered by Korindo's commercial activities.

The evidence around the land use/land cover conversion in the PT GMM area supports the conclusion that Korindo's commercial clearing activities caused the loss and degradation of HCVs on the southern end of Halmahera Island, an area of significant importance to the biodiversity of Wallacea.

The nearly complete transformation of the southern peninsula of Halmahera Island from a mixture of Moluccan moist forest interspersed with shifting cultivation and small coconut groves to large-scale production of oil palm monocrop has had a profound impact on the landscape. The loss of HCV 1 should be considered destruction because it is not feasible to restore/rehabilitate the area.

The conversion of the PT GMM concession presents unique circumstances because it has changed the landscape of entire southern end of the island which is also the entire upper portion of the watershed. Even if the riparian zones are restored/rehabilitated, the destruction of HCV 4 has occurred due the clearing of steep slopes, damage to the riparian areas and complete conversion of the watershed to an oil palm plantation. The ecosystem services of the moist forest have been destroyed, potentially changing the microclimate and water resources of the area. This should be a focal point of remediation at PT GMM. The water resources were identified as a critical resource for the surrounding communities. Site surveys and hydrological studies should be done to mitigate the damage and begin restoration of the steep slopes and riparian areas, perhaps beyond the legal minimum due to their

significance. Since all the streams now originate from within the oil palm concession, it is especially important to mitigate erosion, run-off of fertilizer, pesticides, and effluent from the mill.

INTRODUCTION AND OBJECTIVE

In August 2018, the FSC Board of Directors (BoD) determined that an additional detailed analysis of the potential destruction of High Conservation Values (HCVs) was needed, prior to a final decision to be taken by the FSC BoD regarding the Policy for Association (PfA) complaint filed by Mighty Earth (Mighty) against Korindo Group (Korindo).

The main objective of this additional analysis is to determine whether the conversion of forests due to the establishment of oil palm plantations (and other operations) in Indonesia by Korindo has caused the destruction HCVs[8], and to analyze the related potential environmental impacts.

The methodology presented here corresponds to the methodology used in developing the above-mentioned additional analysis between the months of January and February 2019.
The results of the implementation of this methodology will be presented to the FSC BoD by the end of February 2019, as a basis for their upcoming decision on the complaint. The methodology presented below for the HCV retrospective assessment constitutes a combination of remote sensing analysis and complementary desk assessment (based on available data – such as vegetation and ecological surveys - on the HCVs found in the areas within the scope of the analysis).

METHODOLOGY

SCOPE

The main scope of this analysis corresponds to Korindo's subsidiaries in Indonesia (oil palm plantations) which Mighty raised allegations against in its PfA complaint:

- PT Tunas Sawa Erma, Boven Digoel Regency of West Papua (PT. TSE);
- PT Papau Agro Lestari, Merauke Regency of West Papua (PT. PAL);
- PT Dongin Prabawa, Merauke Regency of West Papua (PT. DP);
- PT Berkat Cipta Abadi, Boven Digoel Regency of West Papua (PT. BCA);
- PT Gelora Mandiri Membangun, North Maluku (PT GMM).

[8] '*Destruction of HCVs'* is defined in the FSC Policy for Association (FSC-POL-01-004) as a "Significant damage of the attributes that constitute high conservation values in a way that they no longer exist or cannot be repaired."

REDACTED

PT GMM in North Maluku, PT. PAL in Papua REDACTED shall be the focal areas for a detailed retrospective assessment of HCV. PT. PAL has undergone the most recent land use conversion and there are highly relevant and detailed secondary sources for HCV assessment. PT. PAL REDACTED concession shall be used as proxy for the other three Papua based oil palm concessions (PT.TSE, PT. BCA, PT. DP) unless there are significant differences in baseline land cover or ecological settings found during the review.

BACKGROUND AND PRINCIPLES OF THE METHODOLOGY

Retrospective High Conservations Value Forest (HCVF) assessments are typically carried out using a broad range of secondary data. Multispectral satellite imagery and analysis are key components of the assessment because they provide clear and concise data which can be used to determine baseline land cover for a specific time and then subsequent changes over time. Land cover and land use changes can then be compared with nearby or adjacent areas which are unchanged for comparison in a proxy approach to determining if the area of interest (AOI) contained one or more HCV's.

Research activities, flora and faunal surveys conducted within or adjacent to the AOI prior to any land use change often provide very detailed information about species composition and relative abundance. HCV and High Carbon Stock (HCS) assessments conducted within the AOI or in adjacent areas with a similar landscape are useful for assessment of HCV's which may have been present prior to land cover conversion.

PRECAUTIONARY APPROACH

The FSC recognizes the Precautionary Principle (PP) for decision-making processes about HCVs in the absence of adequate scientific knowledge on the consequences of human impact on forest areas. FSC Principle 9 states that "decisions regarding high value conservation forests shall always be considered in the context of a precautionary approach". The definition of the precautionary approach used by the FSC was ratified during the FSC General Assembly in June 1999. The term is defined as: Tool for the implementation of the precautionary principle. The term "principle" is defined as: An essential rule or element; in FSC's case, this is forest stewardship.

Though there are multiple definitions of the PP, the most commonly used is from the Rio Declaration, "In order to protect the environment the Precautionary Approach shall be widely applied by states according to their capabilities. Where there are threats of serious or irreversible damage, lack of evidence/ demonstration gathered following a science-based approach shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation".

The methods used to conduct a retrospective assessment of HCV are designed to provide a scientific demonstration/evidence. However, any gaps in the understanding of what was or was not present prior to land clearing and conversion which cannot be completely filled with the following methods should also be considered with the same precautionary approach. Decisions regarding the presence or absence of high conservation value forests prior to clearing should be considered with the same precautionary approach. In addition to identifying the loss of HCV's, the results of the retrospective assessment often highlight the ensuing consequences of human impact on the environment.

The HCVRN Toolkit states that "where doubt exists as to whether an attribute, or collection of attributes, are sufficient to signify HCVs, then the forest manager will treat these attributes as HCVs, until information proves otherwise". Given that despite the rather limited state of knowledge about biodiversity attributes in the intact forests of Papua, these are recognized as biodiversity hot spots[9,10] and therefore, a reasonable interpretation of the precautionary principle could conclude that all such forests hold HCV and hence all should be assigned HCVF status. Many ecologists and HCVRN practitioners consider the FSC HCVF definitions to infer that all-natural forest in Indonesia is HCVF. While the Toolkit does not explicitly state this, it is important to emphasize that the use of a precautionary approach does not begin with a foregone conclusion but works to fill knowledge gaps wherever possible.

The HCV identification process is designed to include measurable, observable and objective secondary data analysis through the satellite imagery analysis and image interpretation to close as much knowledge gap as possible. However, if there is not enough data to make a completely informed

[9] Mittermeier, Russell A., et al. "Biodiversity Hotspots and Major Tropical Wilderness Areas: Approaches to Setting Conservation Priorities." Conservation Biology, vol. 12, no. 3, 1998, pp. 516–520. JSTOR, JSTOR, www.jstor.org/stable/2387233.

[10] Ceballos, Gerardo and Paul R Ehrlich. "Global mammal distributions, biodiversity hotspots, and conservation" Proceedings of the National Academy of Sciences of the United States of America vol. 103,51 (2006): 19374-9.

decision in positively determining the presence, or extent of the cleared areas which are considered to have been HCVs, a precautionary approach is expected.

HIGH CONSERVATION VALUES

This study will focus on assessment of the presence of absence of HCV 1-4 and provide supplemental information for assessment of HCV 5-6. Retrospective HCV assessments are based on evaluation of the landscape prior to land cover conversion and the HCVs which were present. The land cover prior to conversion is used as baseline to assess ecotype and habitat. Secondary data sources are used to determine if HCVs were present in the landscape prior to conversion.

HCV 1: Species Diversity

HCV 1 covers significant concentrations of biodiversity, recognized as unique or outstanding. Any area that contains significant concentrations of HCV 1 species (RTE or endemic), or which contains habitat critical to the survival of these species will be an HCV area. This does not mean that any sighting or recorded presence of a RTE species would qualify as HCV, only where the concentration of species is globally, regionally or nationally significant. It is not necessarily important to have a certain amount of biological diversity to qualify as an HCV 1; A single species can be considered important enough to be an HCV 1 on its own; if the species is for example, endemic and was found in a population large enough to qualify as a concentration or significant in the country. The HCVRN advises against converting areas that are needed to maintain or enhance HCVs. Therefore, if the habitat of an IUCN or endemic species is cleared in an area where that species was known, it is considered to contribute to the loss of an HCV.

HCV 2: Landscape-level ecosystems and mosaics

HCV 2 includes ecosystems and ecosystem mosaics that are sufficiently large and relatively undisturbed enough to support viable populations of the great majority of the naturally occurring species and (implicitly) the great majority of other environmental values occurring in such ecosystems. Large areas that are relatively far from human settlement, roads or other access, particularly if they are among the largest such areas in a particular country or region. Smaller areas that provide key landscape functions such as connectivity and buffering (e.g. protected area buffer zone or a corridor linking protected areas or high-quality habitat together). These smaller areas are only considered HCV 2 if they have a role in maintaining larger areas in the broader landscape. Large areas that are more natural and intact than most other such areas and which provide habitats of top predators or species with large range requirements. An example of HCV 2 would include an Intact Forest Landscape (IFL). The HCV Resource Network guidance states that forests formally designated as IFLs, and other forests which reasonably match the above descriptions, should be considered as a potential HCV 2, unless there is clear and compelling evidence to the contrary. Determination of

whether an IFL is HCV 2 in any given country depends on the quality of the forest (e.g. forest structure and species composition prior to land use conversion) and the secondary data sources.

HCVRN recommended data sources for assessing HCV 2:

- Geographic Information Systems (GIS) and land cover analysis (e.g. data sets on forest blocks and intact watersheds and catchments), remote sensing, satellite imagery
- Maps of areas that have high landscape importance either as corridors or buffer zones
- Field measurements (e.g. tree size, density, age classes, canopy pattern, vegetation cover in arid lands, signs of erosion, water quality, etc.) to understand ecological patterns.
- Measures of human presence: interviews with local communities, signs of trapping, hunting, clearance etc.

HCV 3: Ecosystems and habitats

HCV 3 includes ecosystems, habitats or refugia of special importance because of their rarity or the level of threat that they face or their rare or unique species composition and/or other characteristics. WWF Ecoregions and IUCN Red List of Ecosystems are land use classifications based on broad and overarching patterns of vegetation and biological diversity. However, rare ecosystems must be defined in the context of the presence of similar ecosystems in the same biogeographic region and/or country. For example, in Indonesia an ecosystem that has lost 50% or more of its original extent in a bio physiographical region is considered HCV 3.

HCV 4: Ecosystem services

Basic ecosystem services in critical situations include protection of water catchments, control of erosion of vulnerable soils and slopes, and there are often significant overlaps between these services and HCV 5-6 (social and cultural HCVs). For example, water flow regulation and purification (HCV 4) and drinking water provision (HCV 5). Cultural ecosystem services contribute to cultural identity (HCV 6)[11]. The following indicators are used to assess the presence of a likely HCV 4:

- Remote and/or poor rural areas where people rely directly on natural resources to supply most of their needs, including water.
- Areas which are upstream of extensive or important wetlands, fish nurseries and spawning grounds, or sensitive coastal ecosystems (e.g. mangrove forests, coral reefs etc.)
- Steep or mountainous areas, or areas of high rainfall, where the risk of catastrophic erosion is high
- Where there is naturally low soil fertility, especially on sandy, peaty or fragile soils, where land clearance, drainage, use of heavy machinery and intensive land use might affect soil structure and fertility.

[11] Millennium Ecosystem Assessment (2005) Ecosystems and Human Well Being: Synthesis. Island Press, Washington DC.

SECONDARY DATA COLLECTION

Secondary data will be collected and analyzed throughout this retrospective assessment. Multiple sources of information have been provided by FSC (this information was obtained through various sources as part of the complaints panel investigation). Additional secondary data was obtained by the assessment team, referenced, tracked with FSC protocols, and catalogued.

Topographical Data

High resolution, vector based topographical data was not available for this study, so the 30m ASTER GDEM dataset will be used to understand the relative difference in topography across the study areas. Topographic maps and data from the HCV reports

Ecosystem Mapping

For the identification of HCV 2 (Forest areas containing globally, regionally or nationally significant large landscape level forests) and HCV 3 (Rare or Endangered Ecosystems), Global 200 ecoregions, ecological importance of the watershed to the Trans-fly Ecoregion, and Intact Forest Landscape (IFL) data will be used as a proxy for ecosystems.

Species Data

For species data, a checklist of all the species potentially present will be prepared. Secondary data on species potentially present in the assessment area is based on known distribution and habitat use. This is extracted from publications, field guides and supporting data, including: the IUCN Red List 2018-2; CITES 2018; Mammals of Papua; Bird Life International, HCV Forest Toolkit for Indonesia and Papua New Guinea. Data from the Korindo HCV and HCS Assessment team's field surveys which recorded direct observations of species are used to support the presence of individual species.

Vegetation Surveys

Remaining forest (identified by satellite imagery and land cover analysis) is used as a rapid assessment method that sought to understand the potential presence or absence of species considered to be HCV 1 and to confirm the quality of vegetation that could be considered HCV 3. Additional secondary data will be obtained from timber cruise surveys in adjacent timber concessions, Korindo's AMDAL, HCV, and HCS reports, the Global 200 ecoregion data, and participatory mapping projects.

Mammals, Birds, Reptile and Amphibians

Analysis on mammals, birds, reptiles and amphibians will be primarily based on analysis of secondary data to determine the likelihood of presence prior to land cover change. The survey of mammals and other vertebrates of concern under HCV 1 will be conducted using rapid assessment techniques, combining assessment of habitat quality (remote sensing), known distribution of species, Korindo's HCV and HCS reports, hunting reports, and ecological surveys. BirdLife International data and research

aimed to identify features of the bird community relevant to HCV 1. and reports of interviews with local people.

Land Cover/Land Use Change

Korindo has multiple concessions for both oil palm plantations and forest management within the Merauke and Boven Digoel Regencies of Papua, as well as in North Maluku, Indonesia.

For the purposes of the retrospective assessment, satellite imagery was obtained (when possible due to cloud cover) for individual concessions and the surrounding landscape when suitable. This imagery will be used to assess continuity and connectivity across the landscape and enable visual interpretation of environmental changes to the landscape and a proxy approach for forested areas which were cleared.

Multispectral Image Processing and Analysis

The below sections provide some samples of the satellite imagery and band combinations that was used to assess the land use change over time (multispectral and multitemporal). Various combinations of the electromagnetic spectrum were used to best depict the area of interest.

Shortwave Infrared

This band combination is very useful for vegetation studies, where reflectance in the SWIR region is due primarily to moisture content in the leaf or soil. Vigorous and irrigated vegetation, and riparian areas are displayed in bright green while dryland and natural areas are dull green. Coniferous forest appears as a deep rich green and deciduous forest is bright green. Soils appear as tan, brown and mauve. This band combination is suited for studying vegetation health and stress, change detection, disturbed soils, and soil type. (SWIR1, Red8, Red)

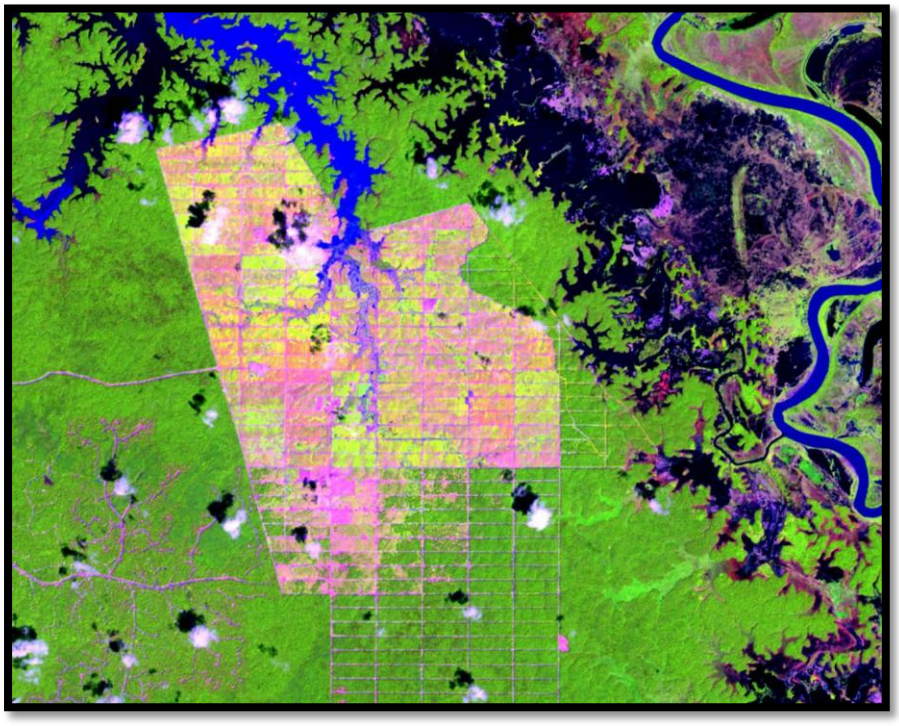


Figure 1. Shortwave Infrared band combination Sentinel 2 Imagery from PT PAL.

Agriculture

This band combination is useful for monitoring agricultural crops. In the image, bright green represents vigorous, healthy vegetation while non-crops, such as mature trees, appear in a dull green. Coniferous forests appear as a dark, rich green while deciduous forests appear as a bright green. Sparsely vegetated and bare areas appear brown and mauve. (SWIR1, Red8, Blue)

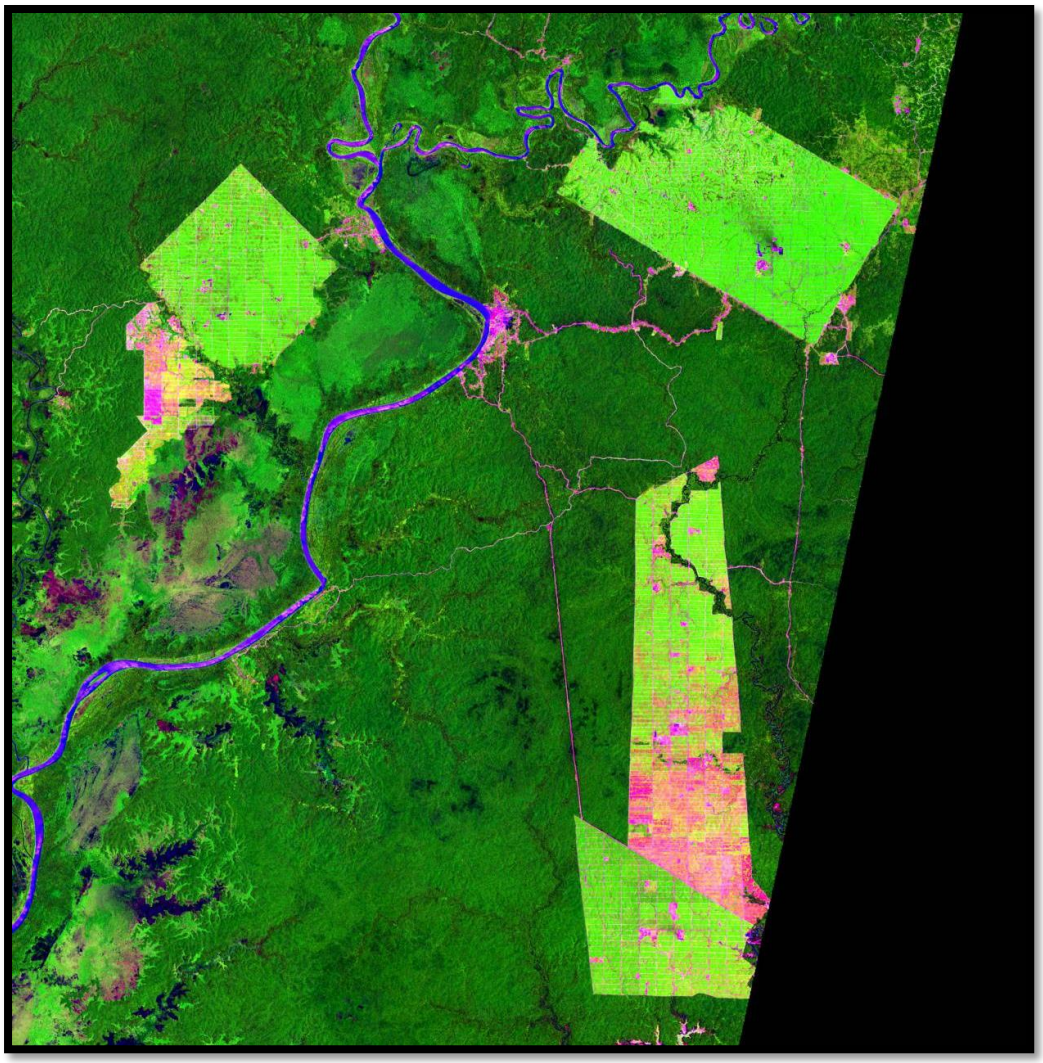


Figure 2. Agriculture band combination Sentinel 2 Image of multiple Korindo Concessions in Papua

Land/Water

This band combination used for differentiating land from water. In this false color image, land appears in shades of orange and green, ice stands out as a vibrant magenta color, and water appears

in shades of blue. This combination can also be used to differentiate water bodies with higher amounts of suspended sediment. (Band 8A, Band 11, Band 4)

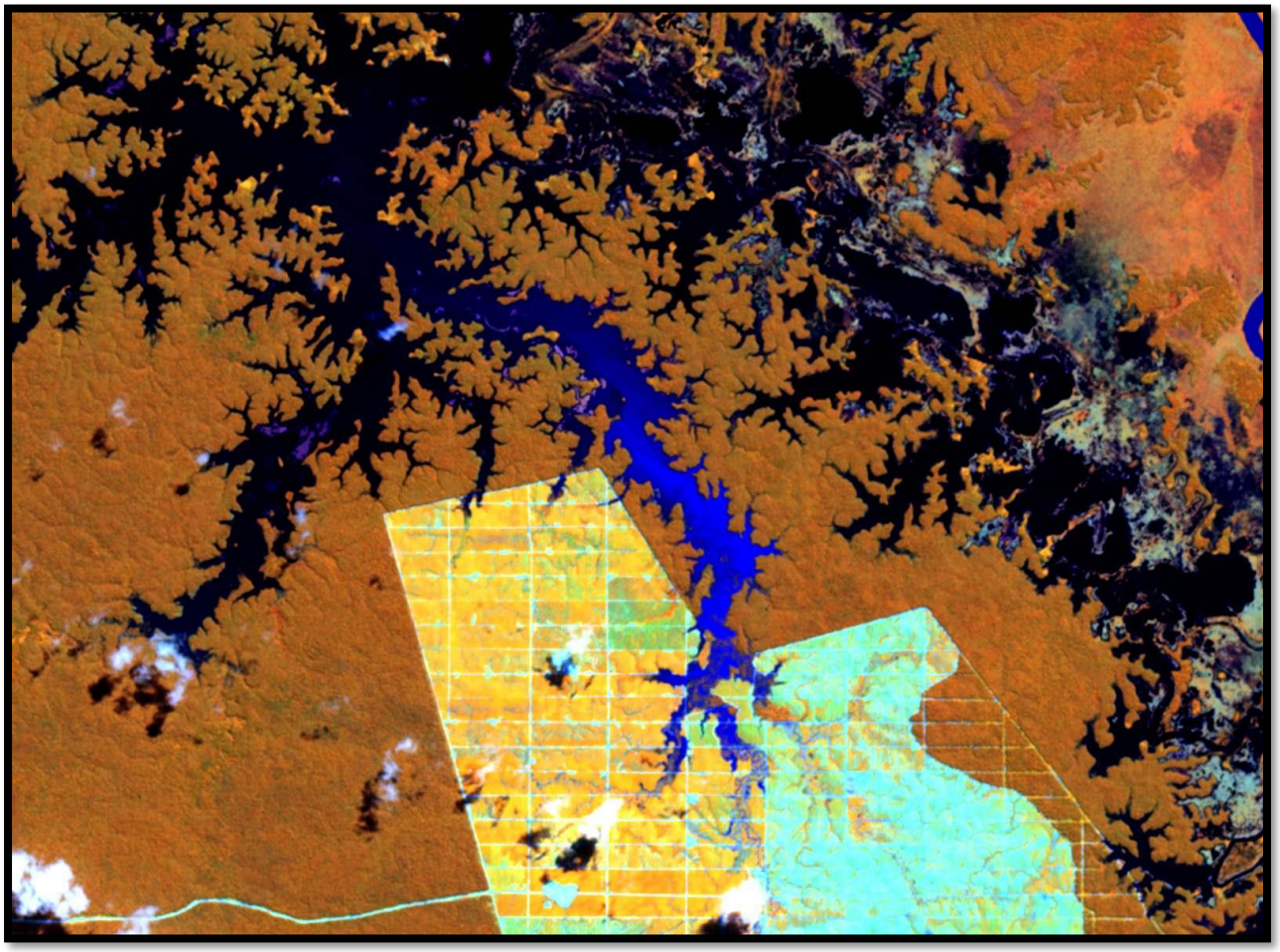


Figure 3. Land/Water band combination Sentinel 2 Scene from PT PAL Concession.

HIGH CONSERVATION VALUES

The extent and distribution of HCVs which have been cleared, damaged or adversely affected will be identified in the satellite imagery and with reference to secondary data including the data collected for the HCV and HCS reports prepared for the various concessions granted to subsidiaries of Korindo. The use of GIS is necessary to take data collected from multiple locations within the district and identify the on the maps. However, the specific location of a particular value (e.g., endangered and endemic species) does not immediately translate to a precise HCV boundary on a map. Rather, the team will interpret species and habitat information to best estimate the real-world occurrence and extent of the forest in which the HCV was present prior to clearing. For example, the presence of endemic species will be based on presence and extent of their identified or predicted preferred habitats and reports of their presence in the HCV and HCS reports which were prepared for Korindo's concessions after land cover conversion and clearing.

PT. PAPUA AGRO LESTARI (PT PAL)

Of all the Korindo oil palm concessions in southeastern Papua, the area within the PT. PAL oil palm concession has been subject to the most recent and ongoing land use change and conversion from a forest landscape to an oil palm estate.

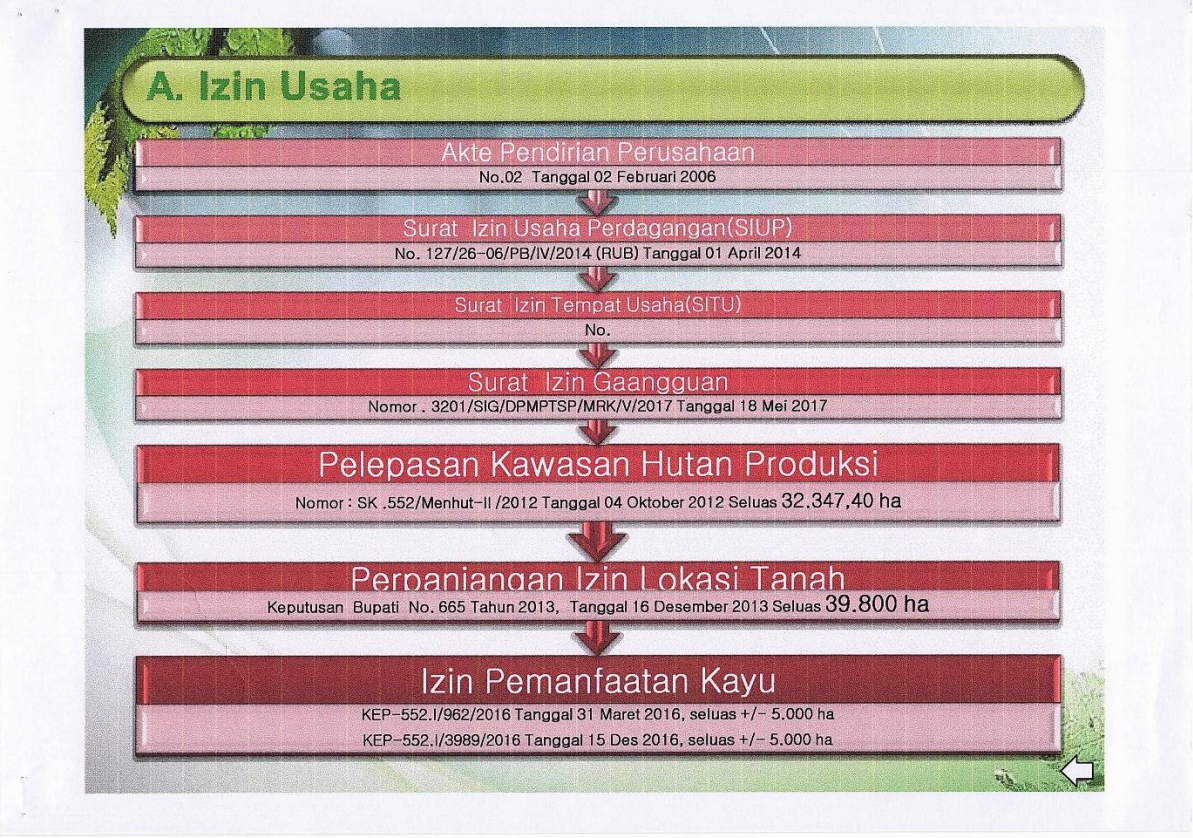
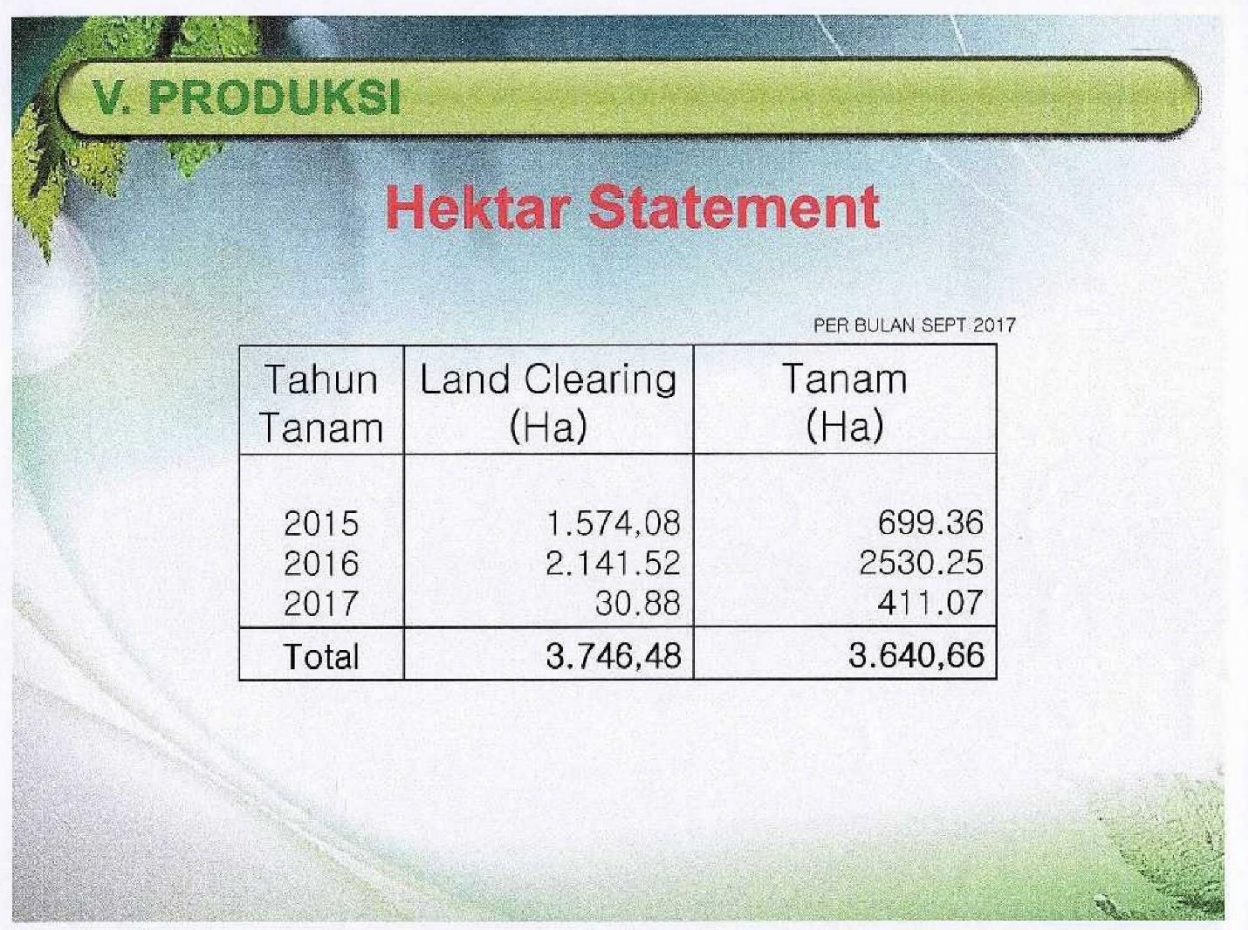


Figure 4: Commercial land clearing within the PT PAL oil palm concession began in 2015.

FAILURE TO IDENTIFY AND CONSERVE HCVS PRIOR TO FOREST CLEARING FOR PALM OIL PLANTATIONS

According to company records, clearing began in 2015 and approximately 1,574.08 Ha were cleared during that year. In 2016, an additional 2,141.52 Ha of forest was cleared, followed by another 30.88 Ha in 2017. An HCV Assessment began for the PT PAL area in May of 2016 (approximately 8 months after clearing began). The HCV report was completed in August of 2017 and signed by the both the HCV Assessor at the Director of PT. PAL on August 28th, 2017. At the time the HCV report was completed, the company reported clearing at total of 3,746 Ha of land, most of which was forest in the northern portion of the concession.



Tahun Tanam	Land Clearing (Ha)	Tanam (Ha)
2015	1.574,08	699.36
2016	2.141.52	2530.25
2017	30.88	411.07
Total	3.746,48	3.640,66

Figure 5 Report of land clearing from the PT PAL Management Report. Land clearing and the associated costs are typically monitored very carefully by oil palm growers.

II. LEGALITAS PERUSAHAAN

No	Jenis Izin	No / Tanggal & Luas	Pemberi Izin
1.	Pelepasan Kawasan Hutan	SK.552/Menhut-II/2012 Tanggal 04 Oktober 2012 **Luas : 32.347.40 Hektar**	Menteri Kehutanan RI
2.	Izin Lokasi	No.08 Tahun 2007 Tanggal 16 Januari 2007	Bupati Merauke
3.	Izin Usaha Perkebunan (IUP)	No.05/SK.IUP/KS/2014 Tanggal 15 Desember 2014 **Luas : 39.800 Hektar**	A.N Gubernur Papua Badan Perizinan Terpadu dan Penanaman Modal Prop.Papua.
4.	Izin Kelayakan Lingkungan (AMDAL)	SK No.836 Tahun 2014 Tanggal 05 Desember 2014	Bupati Merauke
5.	Hak Guna Usaha	No.63/HGU/KEM-ATR/BPN/2016 Tanggal : 30 September 2016	Menteri Agraria dan Tata Ruang / Kepala Badan Pertanahan Nasional Re publik Indonesia

Figure 6: From PT PAL (FV15. PT PAL management plan). Dates of Permits. AMDAL (Environmental Impact Assessment) completed 5 December 2014. IUP (Plantation Permit) Issued 14 December 2014. The HGU No. 63/HGU/KEM-ATR/BPN/2016 issued 30th of September 2016 does not indicate how many Ha are in the legal concession.

At the time of the HCV assessment, the report indicates that the PT PAL concession included 28,630.46 Ha by Hak Guna Usaha (HGU) or "Right to Exploit", there was 8,777.63 Ha of HCV identified in the report, and a total of 1,843.64 Ha had already been planted with oil palm. According to the PT PAL Management Plan, the HGU was issued on the 30th of September of 2016 (fig. 2). While it is not unusual that there are inconsistencies between the Indonesian legal requirements and the timing of these permit processes, the actual concession map of the HGU (not made available) and dates of its validity should be compared with the dates of clearing and other activities. As Korindo has pointed out, the HGU can be revoked if the terms and conditions are not complied with. Of course, this is not an excuse to otherwise clear HCV areas. There are provisions for compliance set asides which are consistent with Indonesian laws and conservation area management within an oil palm concession should the company choose to pursue them.

PT PAL HCV/HCS REPORTS FAILED TO ACCURATELY IDENTIFY AREAS AS HCVS WITHIN KORINDO'S CONCESSION

The PT PAL HCV report was submitted to the HCVRN on October 30th, 2017 and was sent back with requests for revisions. Based on the information available from the HCVRN website, the report was not resubmitted with the necessary changes and was subsequently cancelled.[12]

Although not an RSPO certified grower, Korindo and its subsidiary PT PAL have voluntarily committed to following the RSPO Principles and Criteria[13]. A search of the RSPO registry on the 1st of February 2019 did not indicate that either PT PAL nor Korindo were members or licensees of the RSPO trademark.[14] However, Korindo states on its webpage that it is "Operating our palm oil division consistent with the guidelines of the Roundtable on Sustainable Palm Oil (RSPO)" and that they "do not develop in High Conservation Value (HCV) or High Carbon Stock (HCS) areas and commit to conduct HCV and HCS studies before any new development in accordance with standard of HCV Resource Network's ALS and HCS Approach". It certainly seems unpersuasive to claim adherence to and support for RSPO standards if neither entity is an actual member of the organization.

Since Korindo has promoted and made both the PT PAL HCV and HCS reports available to the public, they were further reviewed within the context of the weaknesses which were highlighted by both the HCS and HCVRN panel reviewers. Although there were weaknesses and the review panel requested revisions, the data and observations from the field surveys presented in the HCV and HCS reports are very relevant and useful to a proxy approach toward retrospective assessment of previously existing HCS and HCV areas.

The records of flora and fauna observations were presented in the HCV and HCS reports along with maps and photographs from the field. These were recorded during the field visit and surveys carried out in 2016 and are the best available record of "first-hand" direct observations which were made in the area after clearing. There are inherent weaknesses in the survey methods used in the Korindo HCV Assessment. They are not based on standard ecological census techniques and only based on visual observations during the day. Because of the methods used, this is not a rigorous approach to estimating the presence or absence of RTE species nor assessing populations. However, the assessment team recorded their direct observation of RTE species within the concession in multiple locations. Many of the observations of RTE species of flora and fauna were recorded in the remaining riparian set-asides or fragmented forest. These areas are considered proxies for the previous land

[12] https://hcvnetwork.org/reports/hcv-pt-papua-agro-lestari-merauke-district-papua-indonesia/
[13] https://www.korindo.co.id/sustainability/
[14] https://rspo.org/members/all

cover and habitat. The RTE species observed in the fragmented habitats after clearing were almost certainly present before clearing.

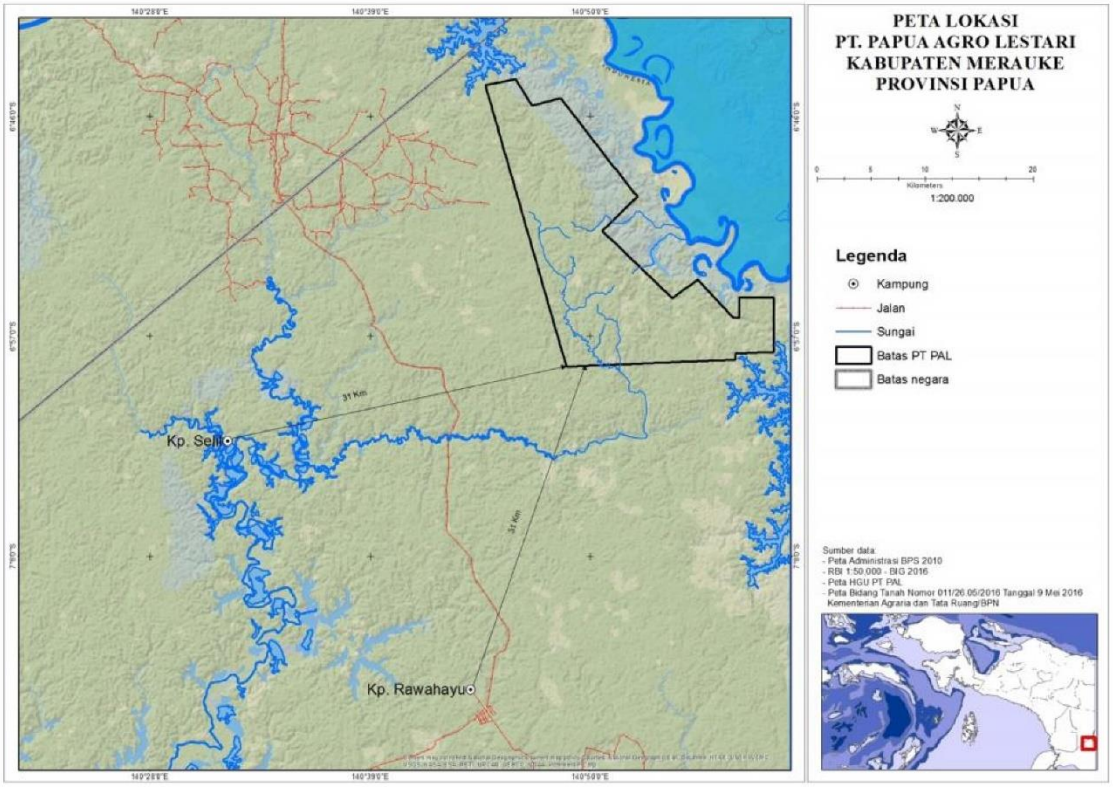


Figure 1. Map Location of PT Papua Agro Lestari

Table 1. Information Description of Company

Information of Company		Description
Name of Company assessment	:	PT. Papua Agro Lestari
Land Use	:	Palm Oil
Geograpically	:	140° 44' 45.80" - 140° 59' 9.01" East Longitude 6° 44' 26.60" - 6° 58' 31.69" South Latitude
Administrativelly	:	Kampong of Selil, District of Ulilin, Merauke Districts, Papua Province.
The Extent assessment	:	28.630,46 Hectare
Luas areal yang sudah tertanam	:	1.843,64 Hectare
Scale of Operational	:	Big (> 500 Ha) with the HGU extent is 28.630,46 hectare, and involving some customary owners in Selil village.
Management Intensity	:	Including intensive, duet o palm oil plantation is involving a lot of labor, canging of land cover, fertilizer, pesticides, using fuel in a particular place and time scale..
Licensing		PT. PAL obtained a permit busniness of palm oil plantation with an area 32.347 ha, is located at District of Ulilin, Merauke Districts, Papua Province based on Decree Letter of Merauke Regent 14th April 2007 Number 525/1111. Decree head of integrated investment and licensing agencies of Papua Province on 15th December 2014 Number 05/SK.IUP/KS/2014. On 9th May 2016 PT. PAL has obtained Map of Land from National Land Agencies with Number 011-26.05-2016 with extent 28.630,4602 Ha.

Figure 7. The HCV Assessment location map indicates the area which was assessed. At the time of assessment, a total of 1,843.64 Ha was reported as already being planted with oil palm. The extent of the HGU has not been verified with the official HGU issued by the Indonesia BPN.

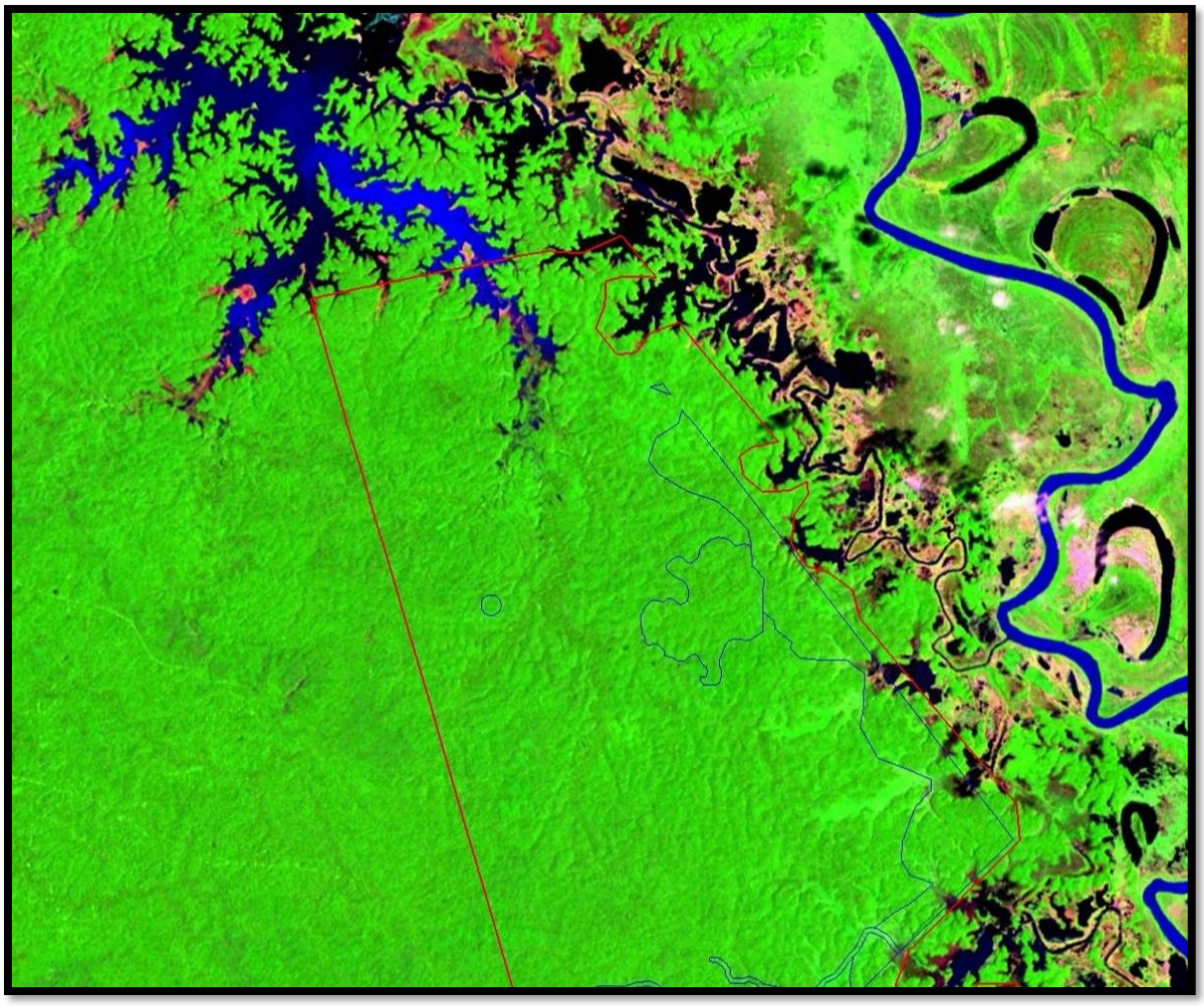


Figure 8: Depicting the PT PAL area prior to clearing, this satellite image of the northern part of the concession was acquired on 25 January 2015. The red lines depict the approximate boundaries of the concession. The blue lines within the concession depict the areas which were later classified as HCV and HCS. At this time, the Indonesian Forestry Department classified the forest within the concession as "primary forest" and it was part of IFL 2013 at this time. In the initial HCS Assessment review, a panel member indicated that there did not appear to be any significant forest disturbance or reason to classify the area as secondary forest. The image is from Landsat 8 and presented here with the band combinations of B7_B5_B4. The darker green areas are indicative of dense forest. Lighter shades of green are consistent with grass and shrub. Water appears in various shades of blue and may appear black where is there is very little suspended sediment. The primary watershed is visible in the central portion of the concession and flows North to the lake in the upper portion of the scene. Bare soil and areas with sparse vegetation appear shades of pink with lighter areas being the most sparsely vegetated.

IMPACT/ DEGRADATION TO WATERSHEDS AND RIPARIAN AREAS

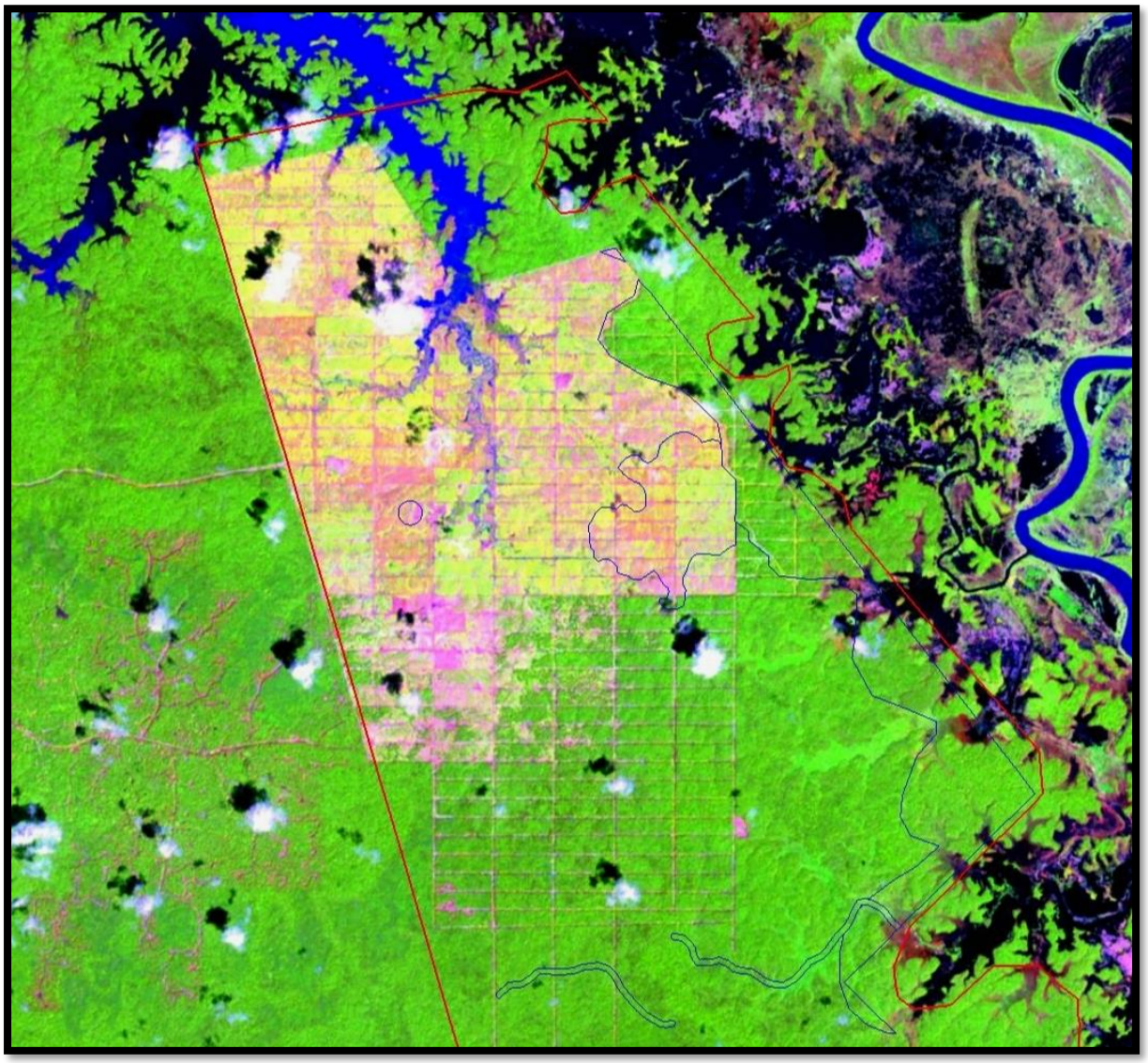


Figure 9. This satellite image was acquired on the 24th of December 2017. The approximate concession boundaries are outlined in red and the previously determined (2016) HCS and HCV areas are delineated with blue lines. The northern portion has now been completely cleared of forest and the rectangular shapes are the fields which have been created in the process known as "blocking" Bright pink areas are bare soil and the areas which appear yellow and pink brown have been cleared of forest but shows sign of low vegetation consistent with scrub and/or the cover crop commonly planted after planting oil palm.

The southern portion of the image is still forested but some preliminary blocking has been done in preparation for forest clearing and planting. There is a cleared area in the center right portion of the scene which was classified as HCS in the report but has been cleared. The HCV areas on the right side of the scene remain forested but have been blocked for clearing/planting. The area to the left of the cleared area of the concession is a timber concession controlled by Korindo, PT Inocin Abadi and the brown areas within the forest are indicative of selective logging operations.

Damage to the watershed is apparent in the center of the cleared area. The upper portion of the Fly River watershed has been completely cleared within the concession. The three blue areas within the cleared land clearly show water and the extent of clearing in these riparian areas. The light blue color in the lake to the North of the concession indicates that this portion of the lake likely has more sediment than the adjacent arm of the lake (left) which appears dark blue/black. Sentinel 2 Satellite/bands B11_B8A_B02.

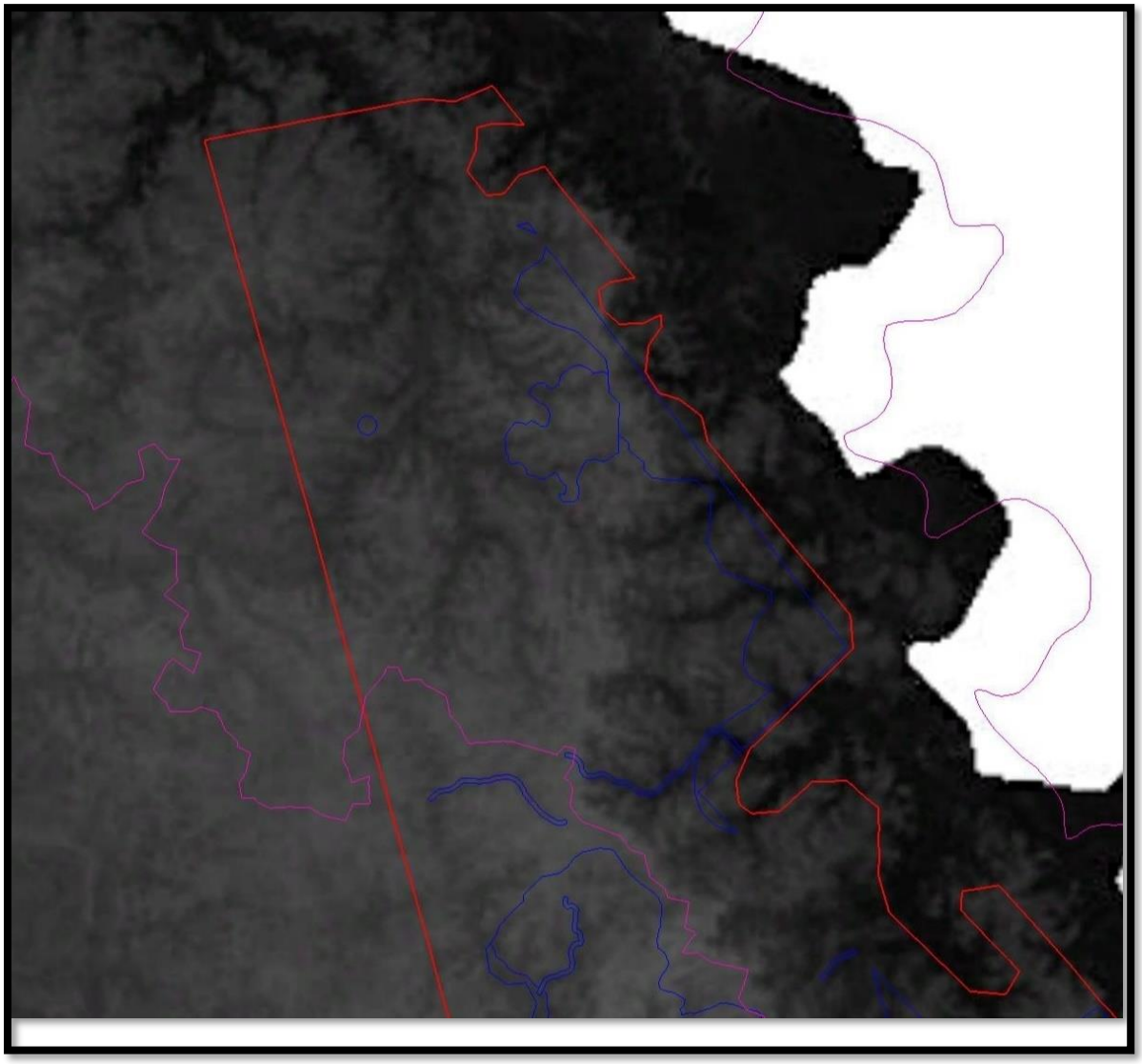


Figure 10. This image depicting the topography in the northern portion of the PT PAL concession clearly show the upper portion of the watershed which has been cleared of forest in Fig 6. The primary riparian areas which support the adjacent lake and Fly River were not included in the HVC report, even though there was water present at the time of assessment. The only "riparian" areas reported in the HCV report are depicted in double blue lines (lower portion of scene) but they don't appear to delineate the more prominent portions of the watershed which have already been cleared.

IMPACTS TO RARE, ENDANGERED AND THREATENED SPECIES

The primary data presented in the PT PAL HCV report indicates that there were numerous RTE species directly observed within the concession area which were subsequently identified by the assessor as being consistent with HCV 1[15].

> Based on observations, 102 wildlife species grouped into 46 family are found, with the details 10 species from 8 family of mammals, 80 species from 31 family of birds, 12 species from 7 family of reptile. Based on list of protected by Government Regulation No. 7 /1999, trading status based on CITES and rareness status by redlist IUCN, there are found 48 wildlife species is needed attention, are 4 species of mammals, 38 species of birds and 6 species of reptile. Groups of mammals are protected by the Government RI such as Rusa timor (Rusa timorensis), Kanguru hutan (Thylogale brunii), Kanguru hutan-kecil (Macropus agilis), and Kuskus abu-abu (Phalanger orientalis). Based on trading status of CITES, only one species is including into Appendix II is Kuskus (Phalanger orientalis). While there are two species are including into threatened species and Vulenerable, the species are Rusa timor (Rusa timorensis) and Kanguru hutan (Thylogale brunii). 32 species of birds are found and the species are protected by Government Regulation RI, 1 species including into Appendix I and 21 species listed into Appendix II CITES. Generally, the species including into groups of Kasuari, Mambruk, Maleo, Elang, Julang, Burung Paruh Bengkok, Cendrawasih, Raja udang and Burung Madu. 2 birds of species including into threatened with categorical of vulnerable species by Red list IUCN 2017 are Kasuari gelambir-ganda (Casuarius casuarius) and Mambruk selatan (Goura scheepmakeri). 6 species of reptile is including into protected category, with details 2 species include into Government Regulation RI are Buaya air tawar papua (Crocodylus novaeguineae) and Kura-kura leher-ular (Chelodina novaeguineae). 4 species listed into Appendix II such as Biawak (Varanus salvator), Ular sanca-papua (Apodora papuana) and Boa pohon (Candoia carinata).

Although these species were directly observed in numerous locations, the assessor concluded that not all the remaining habitat (as of May 2016) should be classified as HCV 1. The Common Guidance for the High Conservation Values indicates, “Where it is difficult to determine the presence or population status of individual endemic or RTE species in practice, suitable habitat for RTE species can be used as a proxy”.[16] The HCV Assessment team directly observed and identified approximately 17 endemic species of fauna and 44 species which are listed under CITES, the IUCN Redlist, and/or Indonesian Regulations (Peraturan Pemerintah Nomor 7 Tahun 1999).[17] This assemblage of RTE species, which were observed in an area designated as an Intact Forest Landscape in 2013 and Primary Forest in 2015

[15] PT. PAL HCV Report
[16] Common Guidance for the High Conservation Values HCVRN
[17] PT PAL HCV Full Report Tabel V-3 and Tabel V-4

would support the decision to treat the area as HCV 1. As can be seen in the satellite image prior to clearing (Primary Forest and IFL in Fig. 5) and the actual extent of the watershed shown in Fig 6 and

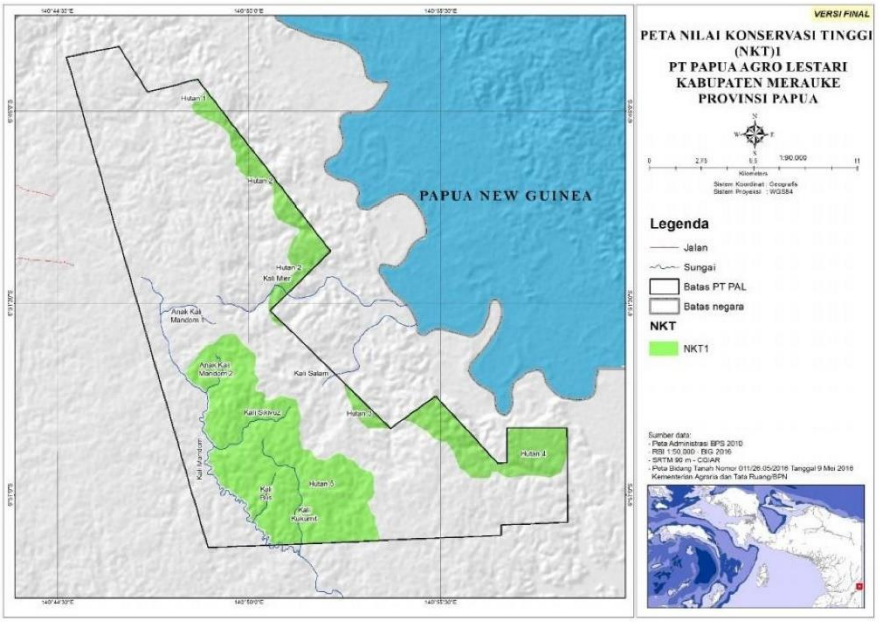


Figure 2. Map of HCV1

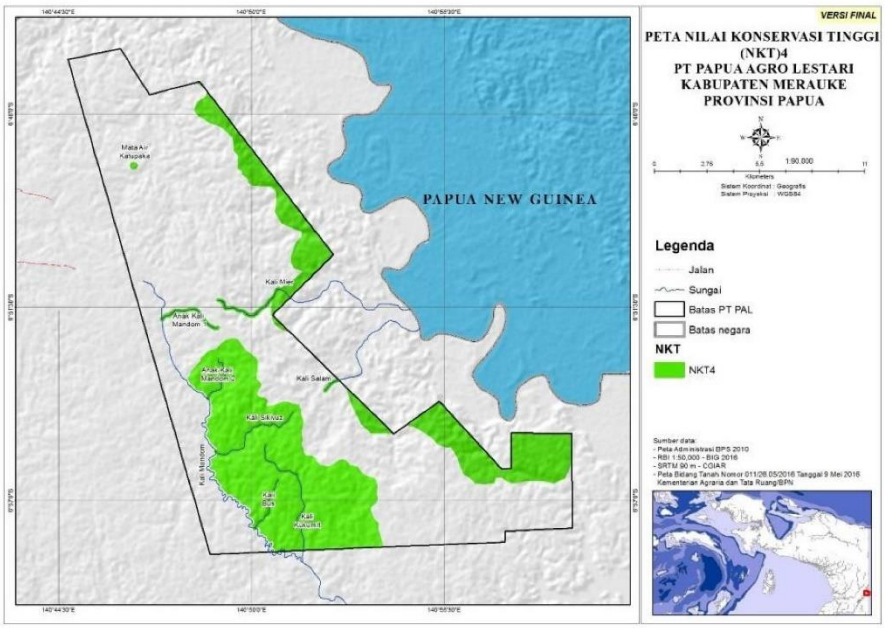


Figure 3.Map of HCV4

Figure 11. PT PAL HCV Report with extent HCV areas 1 and 4 determined to be present in mid 2016. The primary data gathered during the assessment and reported in the full report indicate and support much larger and more extensive HCV 1 and 4 areas than depicted here.

Fig. 7, the data and evidence do not support the rather sparse map of HCV 1 and 4 values identified in the HCV Report (Fig 8). In fact, the evidence from the field surveys supports broader classification of the concession landscape as HCV1 and HCV 4.

IMPACT, FRAGMENTATION AND REDUCTION OF IFL

In addition to the HCV Assessment, an HCS study was also carried out in 2016. The primary data and subsequent plot analysis map (Fig 9) in the PT PAL HCS report (derived from the HCS decision tree) supported classification of almost the entire concession area as "High Carbon Stock", with the only exception being the areas which were previously cleared by the company between 2015-2017 and some seasonally flooded riparian areas where the natural vegetation is not HCS.[18] The HCS Assessor stated that although the HCS decision tree supported classifying nearly the entire remaining forest as High Carbon Stock (approximately 24,783 Ha), because "it has indication to be conserved but has to combine with other decision variable such as spatial plan map (RTRW), socio-economic, forest in landscape level, etc.". The HCS assessor apparently chose to prioritize external factors in his final determination of what should be classified as HCS. In fact, according to the raw data analysis, the remaining forest in the PT PAL concession appears to meet the requirements to qualify as HCS. The Assessor's comments indicate that perhaps he chose to alter the final classification based on external information, such as land use zoning maps or socio-economic interests.

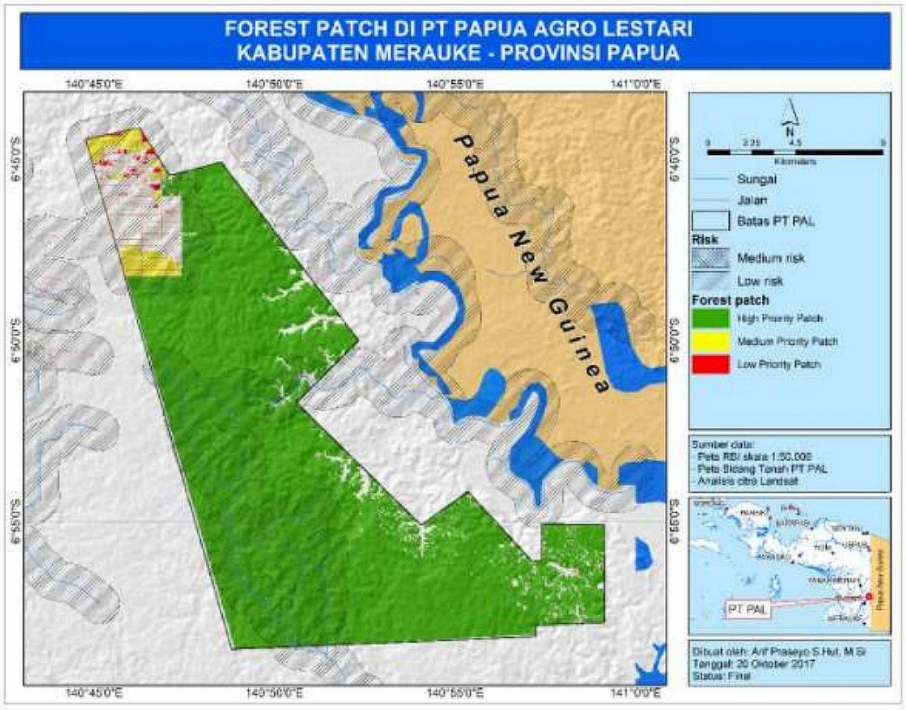


Figure 19. Plot Analysis map

Figure 12 Plot analysis map from HCS report classified most of the uncleared portion of the PT PAL concession as a High Priority Patch of High Carbon Stock forest.

[18] PT PAL HCS Report Figure 19 "Plot Analysis Map"

Table 12. Consideration of HCS decision tree

Patch number	Total area (ha)	Of which core (ha)	Priority (Low-LP, Medium-MP, High-HP)	Description of Decision Tree results
29 - 326	136.07	0.94	Low priority	It has indication to be develop because high risk, no core area, small plot, and with carbon stock density less than 75 tonC.ha^{-1}
2- 28	510.59	34.09	Medium priority	It has indication to be develop because high risk, and with carbon stock density less than 75 tonC.ha^{-1}
1	24,743.83	19,253.64	High priority	It has indication to be conserved, but has to combine with other decision variable such as spatial plan map (RTRW), socio-economic, forest in landscape level, etc.

Figure 13. Table 12 from the HCS Report identified approximately 24,743.83 Ha of forest which was considered High Priority. The Assessor recognized the extent of the High Priority HCS by following the Decision Tree but then excluded much of it from the final HCS map. The justification for doing this based on external considerations are not consistent with the HCS Decision Tree. The results of the plot analysis map in Fig. 9 and Table 12 from the HCS report and other primary data gathered in the field during the HCS Assessment appear to be consistent with the High Priority classification of 24,743.83 Ha of HCS in PT PAL at the time of completion in 2017 (after the initial clearing which began in 2015).

Prior to the land clearing and conversion which Korindo began in 2015, the entire concession area was classified on the official Indonesian Forestry Department maps as “primary forest”. Prior to the land clearing and conversion which Korindo began in 2015, the entire concession area was classified as part of an Intact Forest Landscape (IFL) in the 2013 version of the Intact Forest Landscape map19. It was also included as an IFL on the earlier 2000 Intact Forest Landscape map and a review of satellite imagery prior to conversion shows no sign of timber harvesting or human disturbance to the IFL within the concession boundaries[20].

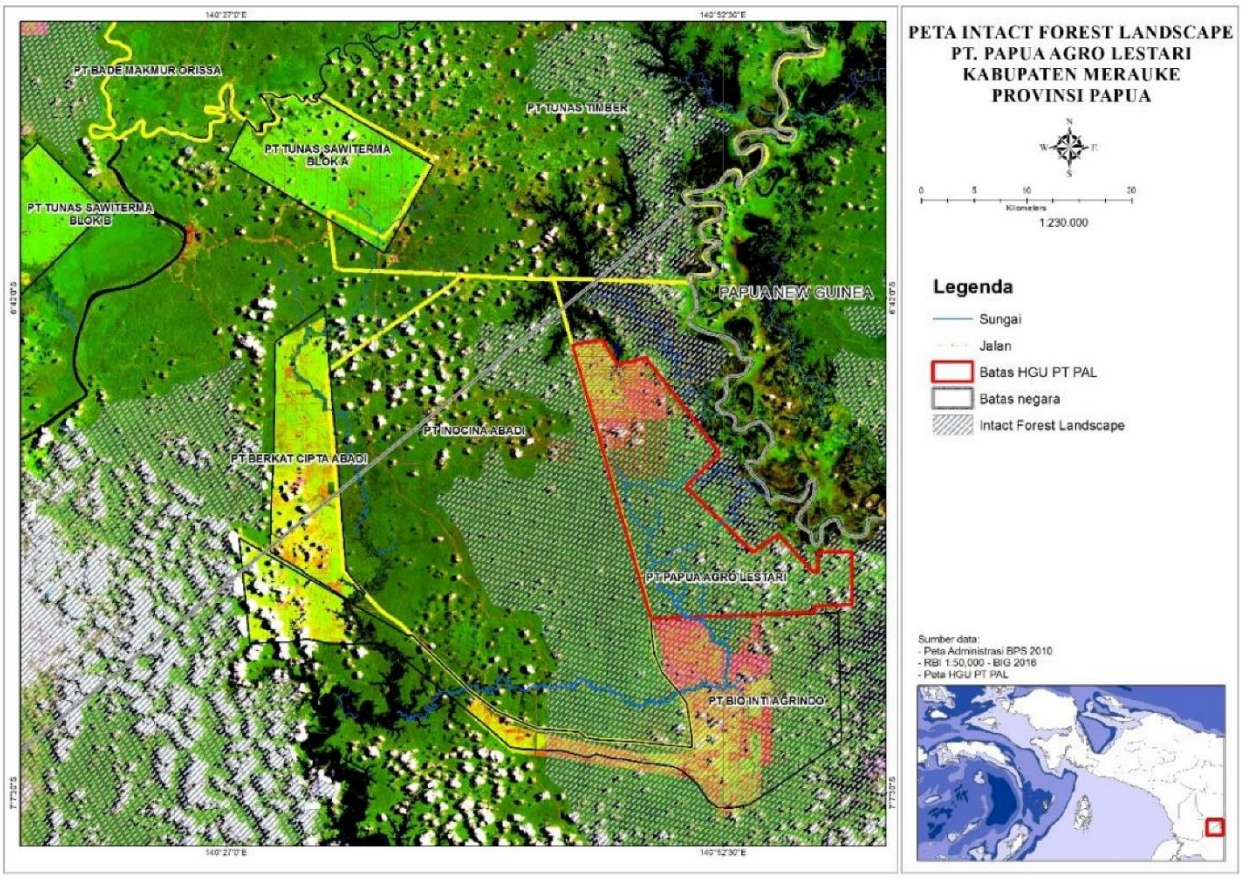
In the PT PAL HCV Full Report (Bahasa Indonesia version), the entire PT PAL concession area was identified as being part of the IFL 2013. The HCV Assessors suggested that it should no longer be part of the IFL (as of the date of their field visit in 2016) due to land clearing, timber harvesting and land use change. Indeed, in the 2016 revision of the Global IFL map, the northern portion of the PT PAL oil palm concession was removed from the IFL map, along with a larger area of the IFL to the North. The land clearing and conversion which Korindo began in 2015 within the PT PAL concession (which was part of the IFL 2013 at the time) appears to have triggered the reduction of the IFL in the 2016 revision.

[19] Potapov, P., A. Yaroshenko, S. Turubanova, M. Dubinin, L. Laestadius, C. Thies, D. Aksenov, A. Egorov, Y. Yesipova, I. Glushkov, M. Karpachevskiy, A. Kostikova, A. Manisha, E. Tsybikova, and I. Zhuravleva. 2008. Mapping the world’s intact forest landscapes by remote sensing. Ecology and Society 13(2): 51. [online] URL: http://www.ecologyandsociety.org/vol13/iss2/art51/

[20] The legal concession boundaries as mapped by the Indonesian BPN (Land and Survey Dept.) have not been provided by Korindo. Sources of the approximate boundaries are from the PT. Pal HCV and HCS reports, as well as third party reports/data.

The PT PAL concession area was considered for the potential of HCV 2 in the HCV report. The Assessor referenced the IFL 2103 and indicated the following:

> "Based on data by Global Forest Watch about Intact Forest Landscape (2013) PT PAL Is including into part of intact forest with a little of fragmentation. But, based on Imagery landsat interpretation and field survey, PT PAL is not primary forest, and also not intact natural forest that are not disconnected or not disturbed by human activity."



Gambar V-3. Peta Keberadaan *Intact Forest Landscape* (IFL) dalam areal PT. Papua Agro Lestari

Figure 14. In the full version of PT PAL HCV Report (Bahasa Indonesia), the Assessor mapped the extent of the surrounding Intact Forest Landscape (IFL 2013). However, it was determined that the IFL was no longer intact due to the logging operations in Korindo subsidiary PT Inocin Adabi's timber concession, the clearing and logging in the northern portion of the PT PAL oil palm concession and clearing by PT Bio Inti Agrindo to the South of PT PAL's concession.

Although the clearing and land use conversion within the PT PAL concession caused the direct loss of more than 3,500 Ha forest within the concession (according to the PT PAL Management Plan), the location of the clearing which took place in PT PAL had a broader impact on IFL connectivity and triggered an approximately 40,000 Ha reduction to the IFL 2016 (Fig 12). As a direct result of the Korindo clearing in PT PAL and the logging operations in Korindo's adjacent timber concession (PT

Inocin Abadi) in the year prior to assessment (the logging activities were referenced by the HCV Assessor), the IFL 2013 status would have likely resulted in the area being classified as HCV2. The assessor chose not to identify the area as HCV 2 because a portion of the area was no longer part of the IFL 2013 when his team conducted a review in 2016/17.

However, the southern portion of the PT PAL concession remains intact and is still connected with an Intact Forest Landscape in the IFL 2016 map. Additional clearing or logging in adjacent concessions will likely impact the remaining IFL, causing additional fragmentation. This area appears to be under severe threat of further fragmentation and loss of IFL due to the multiple timber and palm oil concessions in the area. Korindo's subsidiary PT Inocin Abadi has carried out what appears to be selective logging adjacent to PT PAL into 2018. To the South, PT Bio Inti Agrindo has cleared forest from areas previously part of the IFL 2013 for an oil palm plantation.

In the HCV report, the assessor ended his review of potential HCV 2 with "In addition, the connectivity between the ecosystem components have been much disturbed. Thus, in the PT PAL area is no area that is being of HCV 2". He failed to mention that it would have met the basic criteria of HCV 2 just a few years earlier, before logging and land clearing began inside the PT PAL concession.

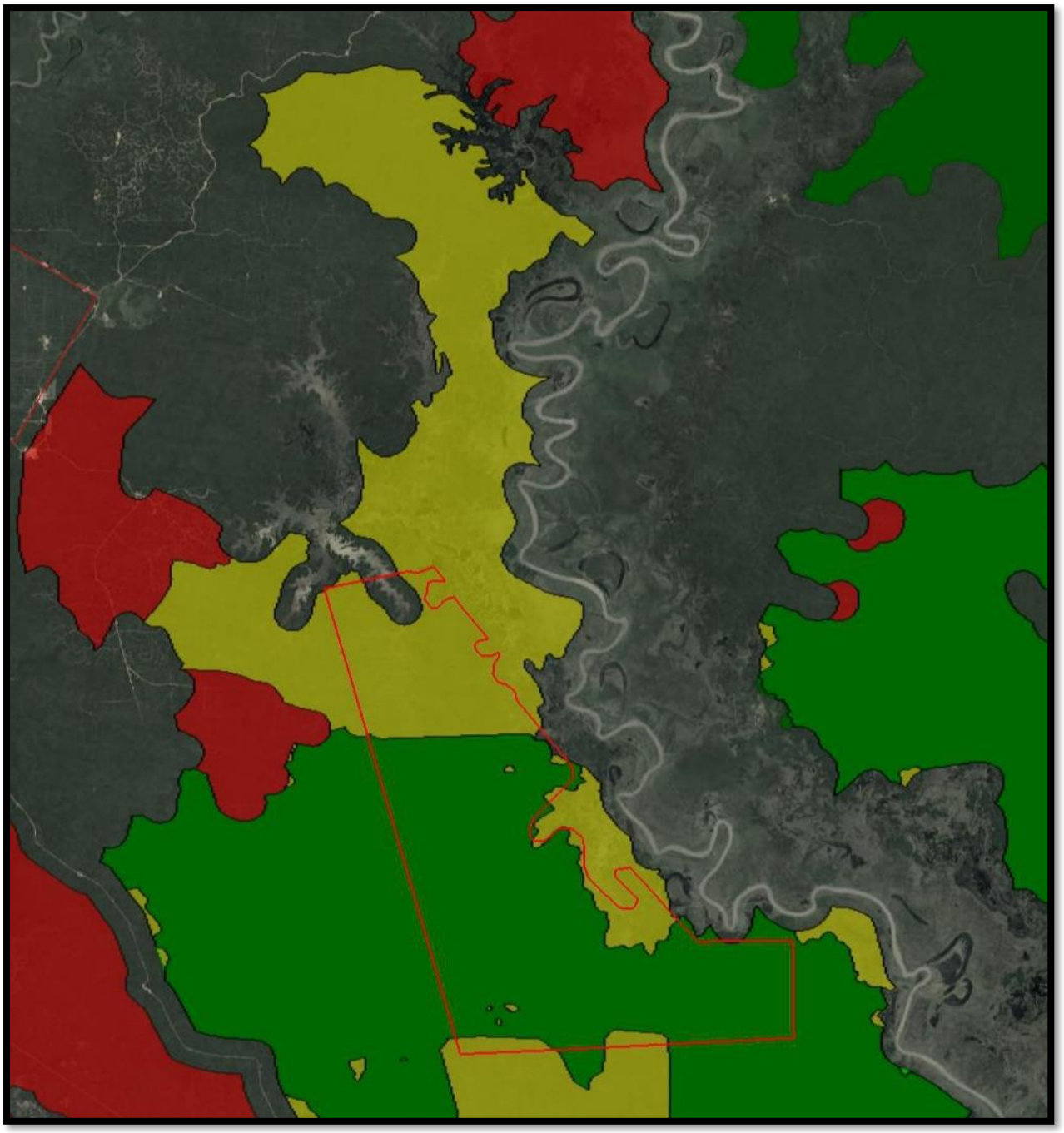


Figure 15. The Intact Forest Landscape IFL 2000-2013-2016 changes are depicted in this image with an overlay of the approximate boundaries of the PT PAL Concession (red line). The red areas depict forests which were part of the IFL 2000 up until the classification of IFL 2013. The yellow polygons depict the forested areas which were still present in the IFL 2013. The green areas are forested areas that remain in the IFL 2016. Although the Korindo's clearing/logging of land in the northern portion of the PT PAL concession was reported by the company to be a bit more than 3,500 Ha in early 2016, the location in which it occurred (at one of the more narrow sections of the IFL, resulted in fragmentation of the IFL and a net reduction of more than 40,000 Ha of the IFL to the North (yellow polygon).

DEGRADATION TO WATERSHED OUTSIDE OF THE CONCESSION

As mentioned earlier, Korindo's clearing in PT PAL in 2015 and 2016 appears to have significantly impacted and altered the hydrology. Although the HCV report identified a number of small streams and springs within the PT PAL concession as HVC 4, they did not map the primary drainage of the watershed which flows into a network of lakes which are connected with the main stem of the Fly River. The impact of the clearing in PT PAL on the larger watershed are evident in the satellite imagery and drone images acquired in May of 2016. Numerous small streams within PT PAL contributed to the flow of water into the main catchment, eventually flowing into the Fly River. The central portion of the catchment is also in the center of the area which has been cleared in PT PAL. The apparent impact to the watershed and the main river flowing North from the catchment can be clearly seen in recent satellite images.

Figure 16. Satellite imagery acquired in December 2017 provides a glimpse of the impacts on the Fly River watershed as a result of the land clearing practices in the PT PAL concession.

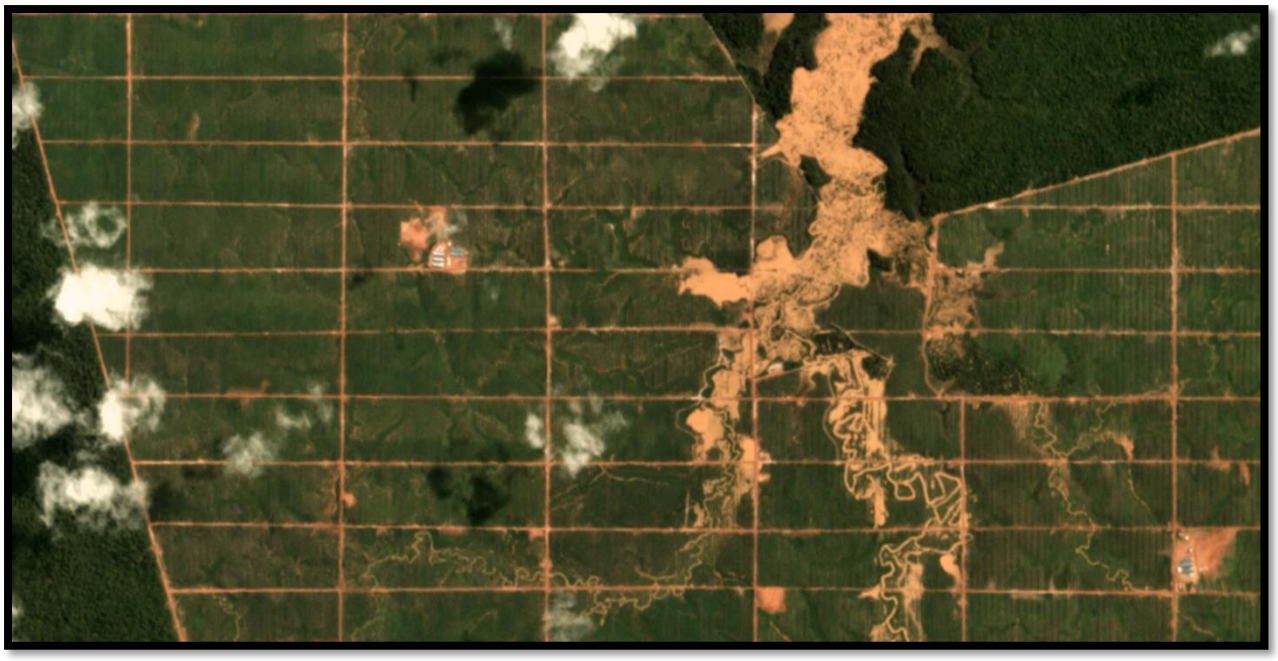


Figure 17. Satellite imagery from April 2018 depicts the upper portion of the Fly River watershed where it exists the PT PAl concession. There are no riparian buffers visible here and the color of the water flowing from the concession is consistent with suspended sediments.

Figure 18. Satellite image from December 2018 depicts the ongoing runoff from PT PAL into the wetlands to the North of the concession. Mapping and restoration of the riparian areas inside the concession and mitigation of the impact and damage to the watershed should be a high priority.

There are no remnants of forest as a riparian buffer zone around the larger streams and rivers. This portion of the concession has been cleared and the erosion and run off from the estate appears to have impacted the lake to the North of the concession (beyond the concession boundary) for up to 7 Km away. Determining the extent and impact of the sedimentation and run-off would require a field visit, but it is clearly visible in multiple satellite images and drone imagery which was acquired by Mighty at the time of clearing in 2016. The risk of erosion and siltation was identified in the AMDAL (dated as complete in 2014 - prior to Korindo beginning logging and clearing) but the recommendations for mitigation don't appear to be in place. Due the apparent severity of the watershed degradation and downstream impacts of the outflow from PT PAL (sediment and potential fertilizer and pesticide washout), remediation of the watershed should be a high priority. PT PAL does not appear to be compliant with either Indonesian legal requirements, ISPO, nor the RSPO standards for riparian buffer zones in PT PAL.

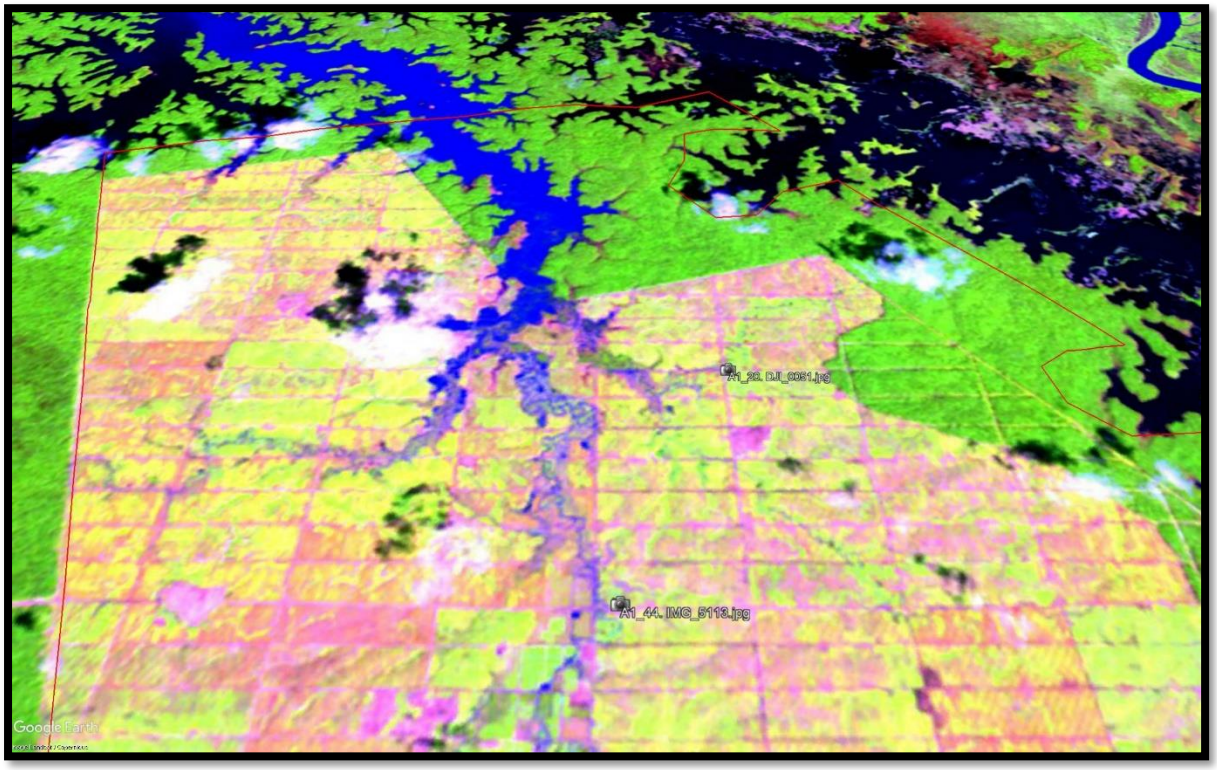


Figure 19. Just two of the many geotagged drone images provided by Mighty are displayed here at the location where they were taken. Image locations for A144_IMG_5113 and A1_20_DJI_0051 are overlaid on the satellite image of PT PAL after the forest had been cleared. These images, taken on 4 June 2016, provide a glimpse of the condition of these riparian areas. All of the drone images provided by Mighty have been geotagged for reference to the date, time and location they were taken. They provide a reference for the site conditions at that time.

Figure 20. Aerial image from Mighty documents the disregard for legally required riparian buffer zone in PT PAL (A1_20_DJI_0051.jpg) An interactive map of the photo locations will be provided as a .kmz file for a temporal and geographic reference to (when and where) they were taken.

Figure 21. This image is of the upper end of the Fly River watershed inside the PT PAL concession on 4 June 2016. Trees have been stacked as base for a road across the riverine area. The water is being used for the oil palm nursery, but the location elevates the risk of pesticide and fertilizer washout into the river.

POTENTIAL BREACH OF THE LAND CLEARING MORATORIUM

In December of 2016, Korindo announced a voluntary moratorium on land clearing and logging operations within the PT PAL concession. The details regarding the self-imposed moratorium appear somewhat ambiguous and the exact dates of when Korindo and FSC agreed that it was in effect are not totally clear, but it seems that it should be in effect between June 2017 and December of 2018. The scope and scale of land use change and conversion within PT PAL declined significantly in 2017 which appears consistent with the self-declared moratorium. However, beginning around July of 2018, a number of relatively small areas which were previously blocked for clearing and planting within the PT PAL concession were slowly being cleared of the remaining vegetation. Some of the vegetation was appears to have been scrub and regenerating forest recovering from the initial clearing in 2016. However, there were also small stands of forest which were cleared.

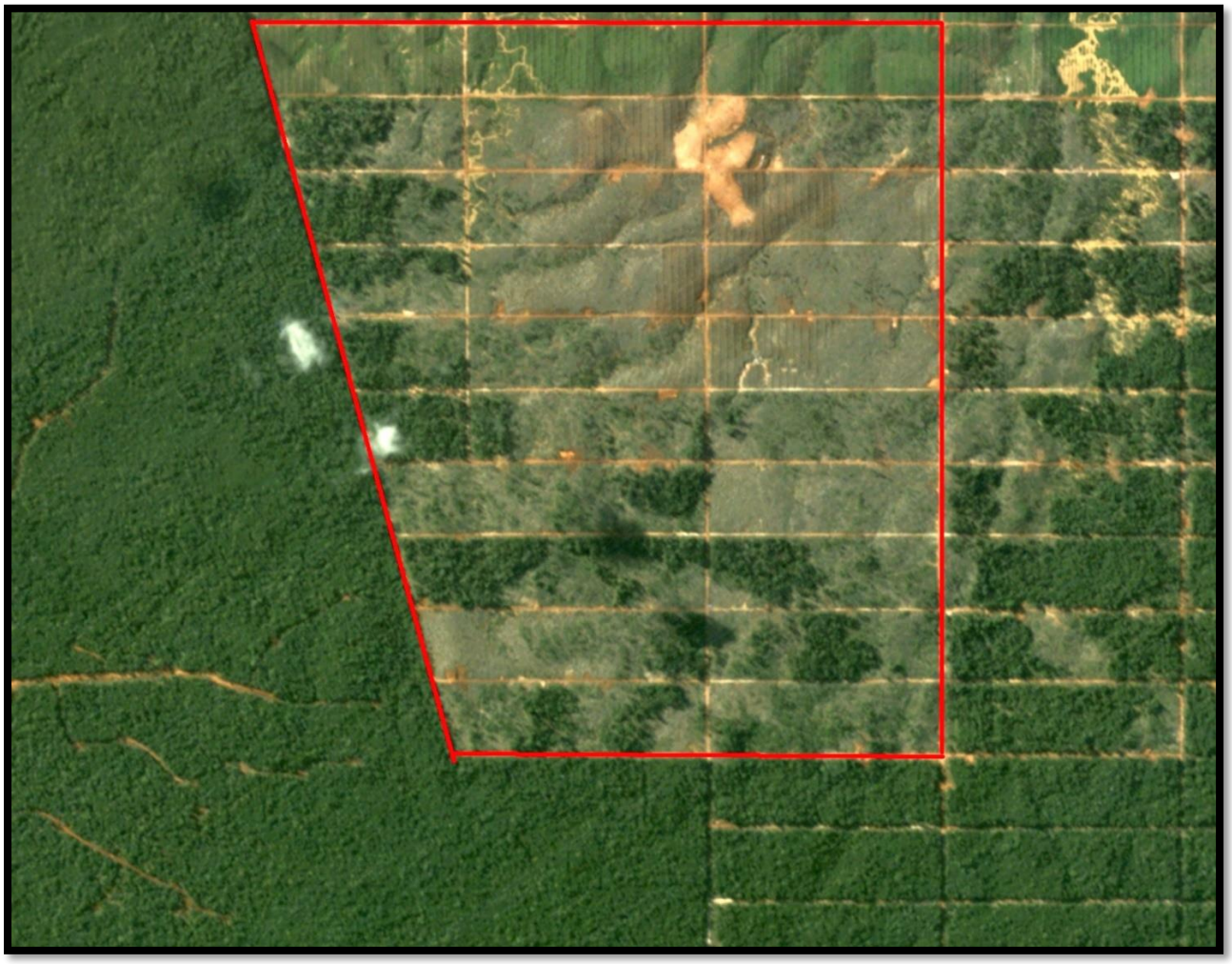


Figure 22. Satellite Imagery from June of 2017 depicts some of the blocked areas within the PT PAL concession which have not been completely cleared. The blocks within the red boundary are the primary area of interest with regards to clearing after the moratorium.

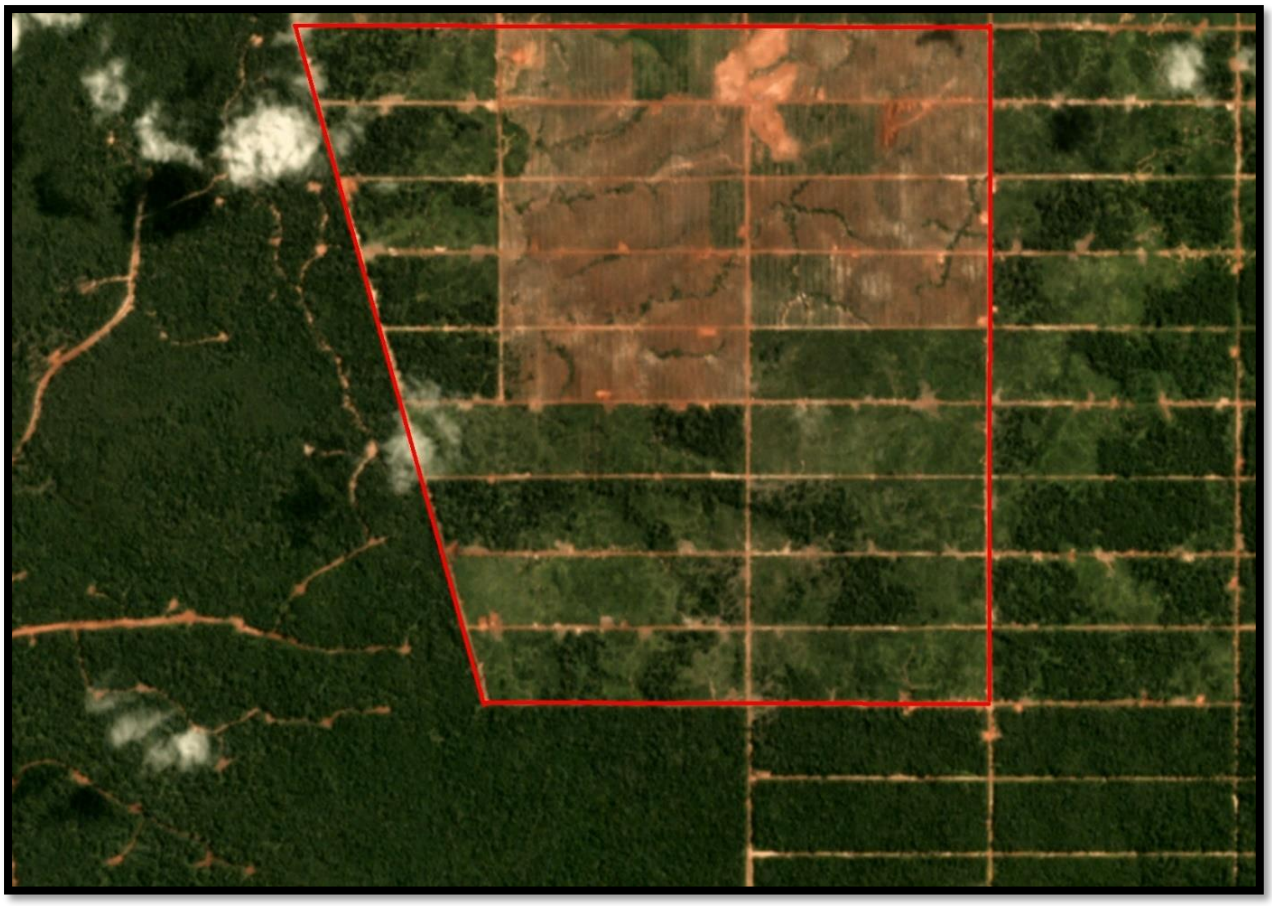


Figure 23. In April of 2018, 9 blocks in upper portion of the area of interest had been recently cleared, likely in preparation for planting oil palm seedlings.

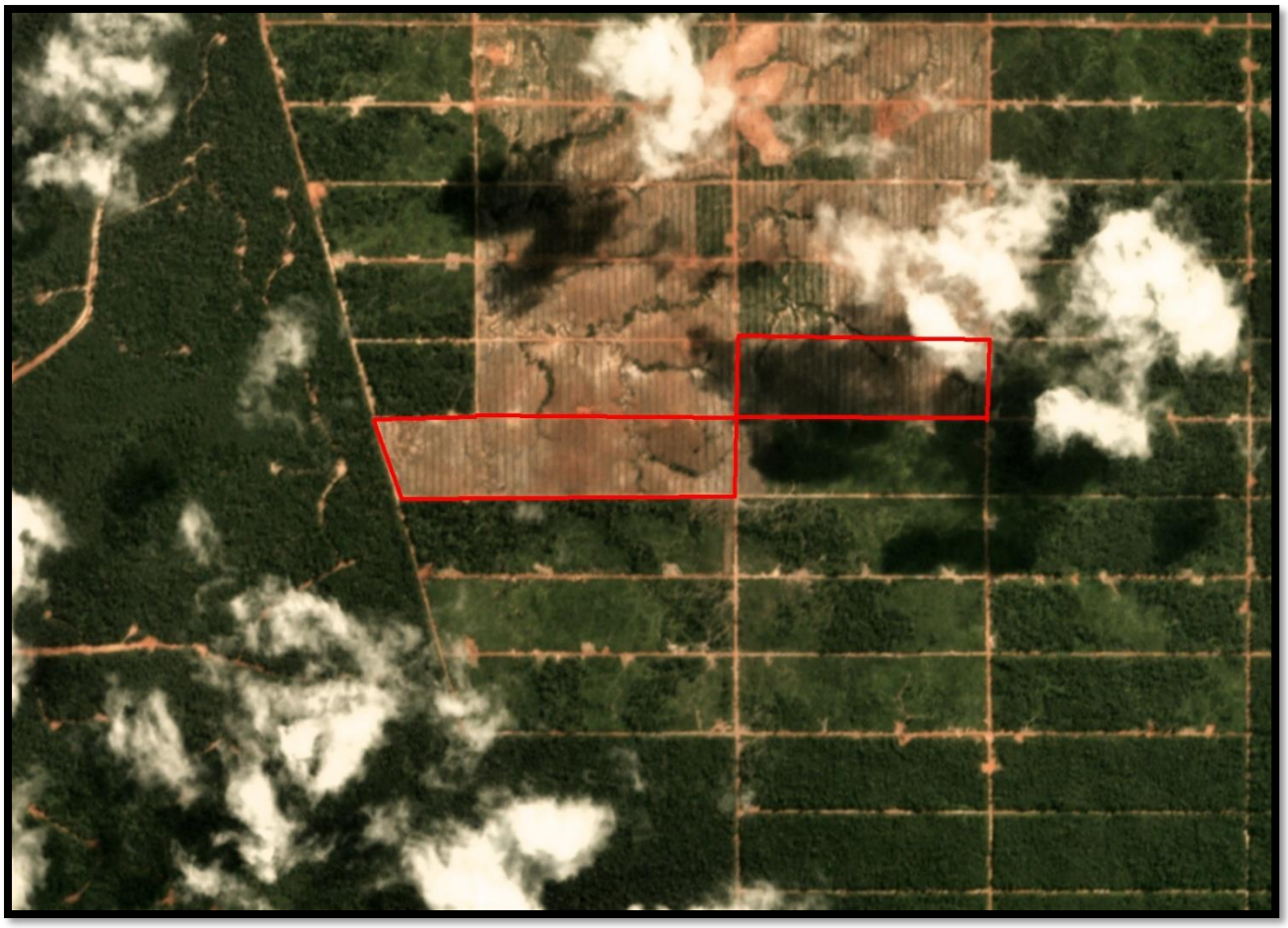


Figure 24 By May of 2018, two additional blocks have been cleared, replacing some small patches of forest.

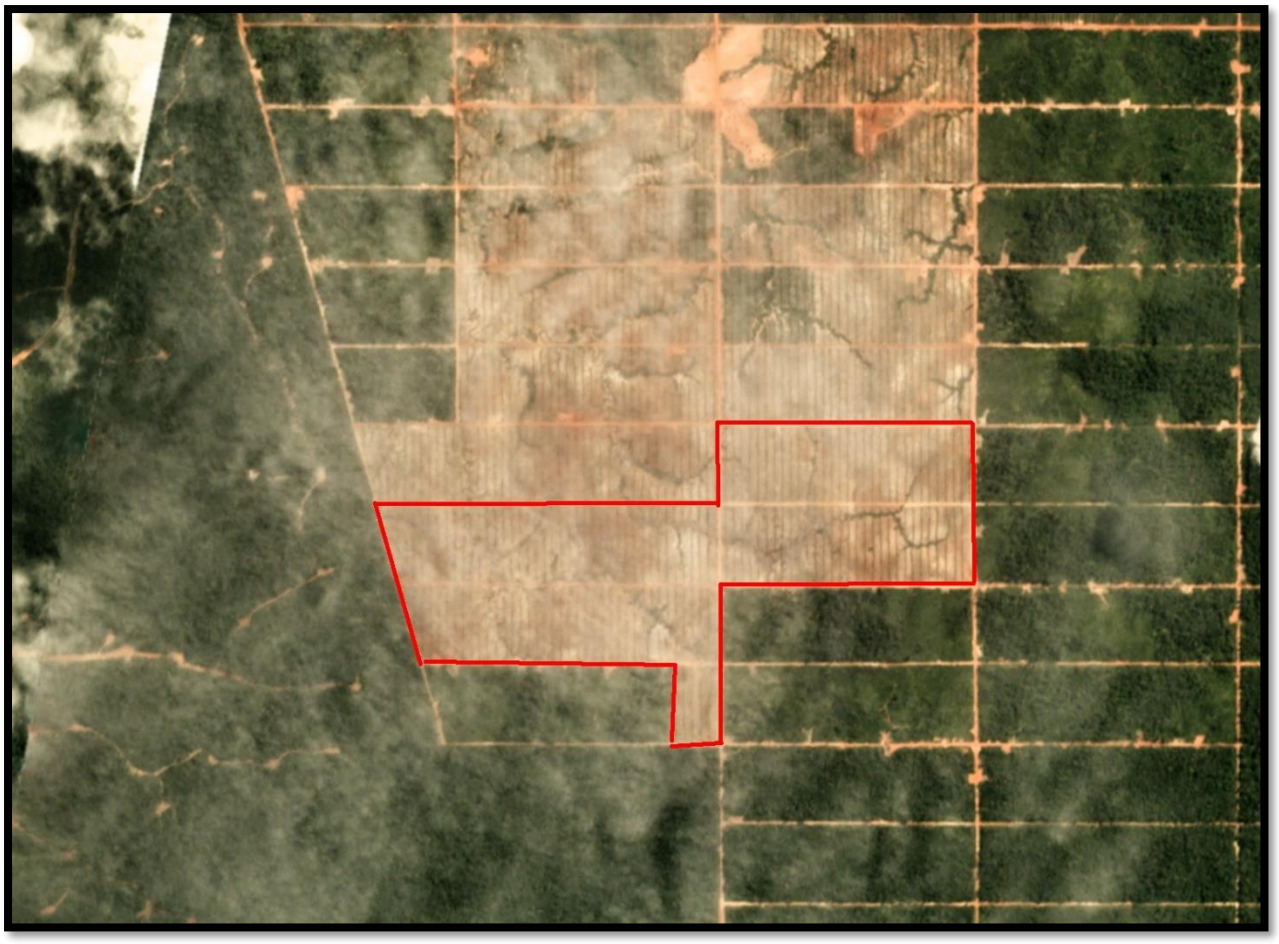


Figure 25. Satellite Imagery from August of 2018 shows that additional areas have been cleared since May of 2018.

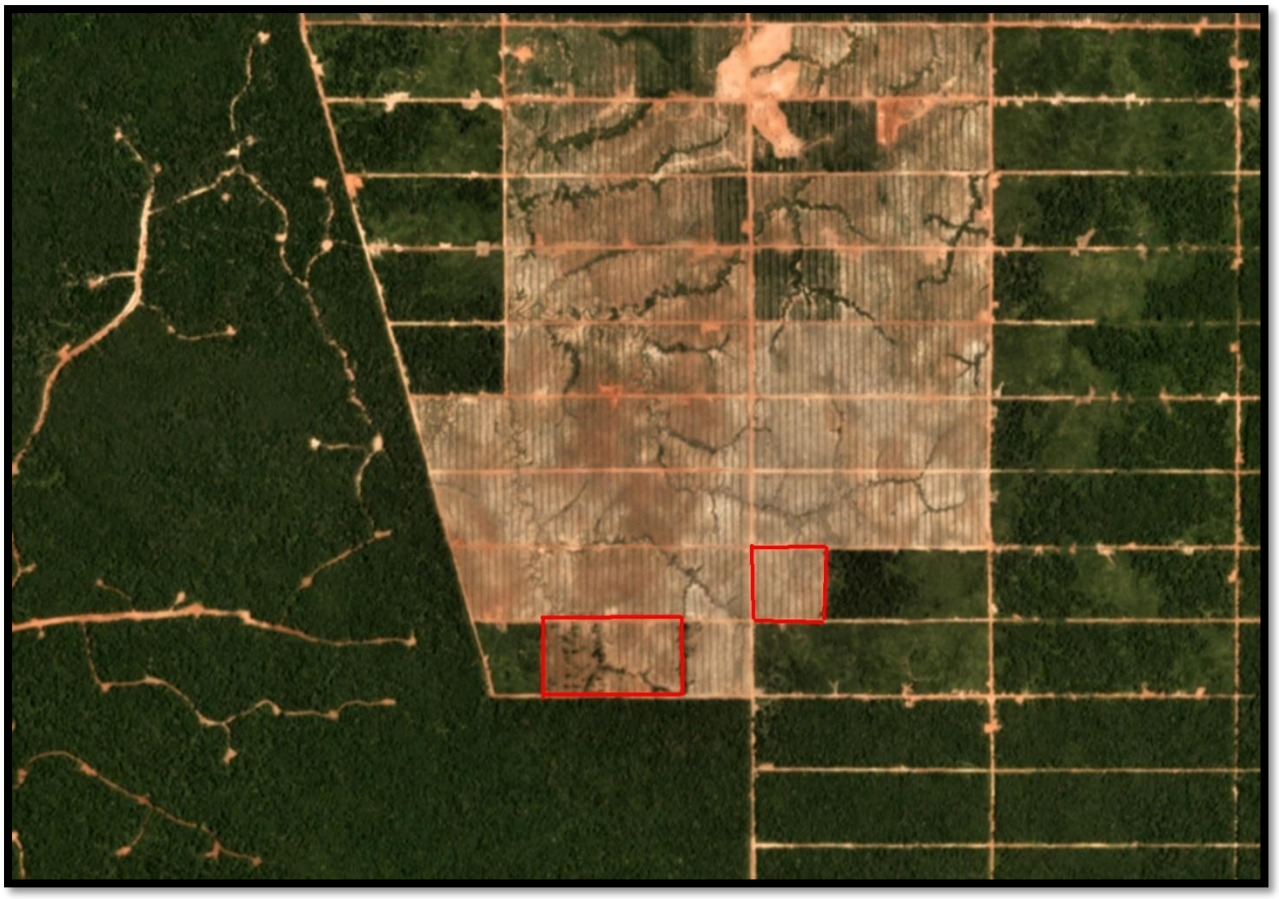


Figure 26. Between August and October 2018 these additional areas were cleared.

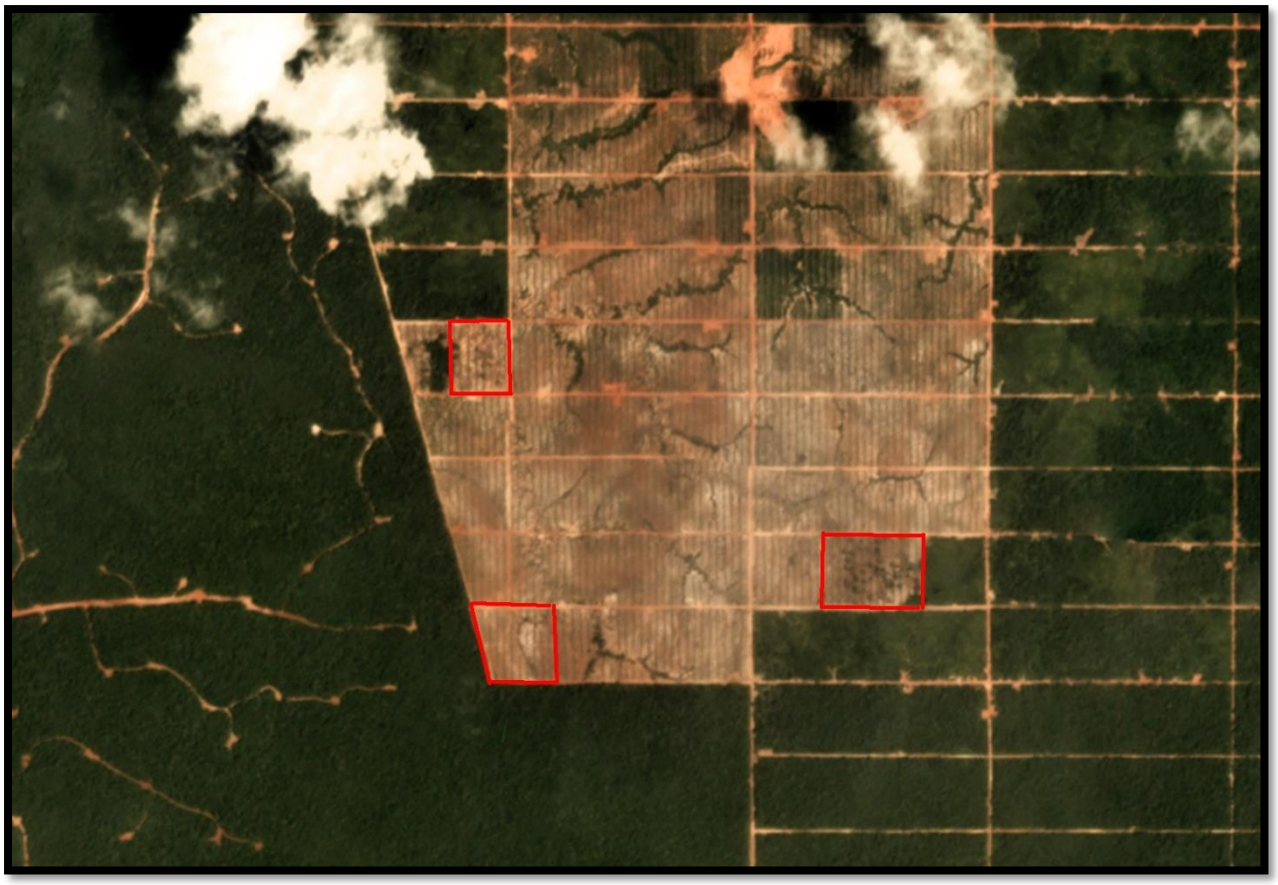


Figure 27. This scene from November of 2018 depicts clearing in three more areas.

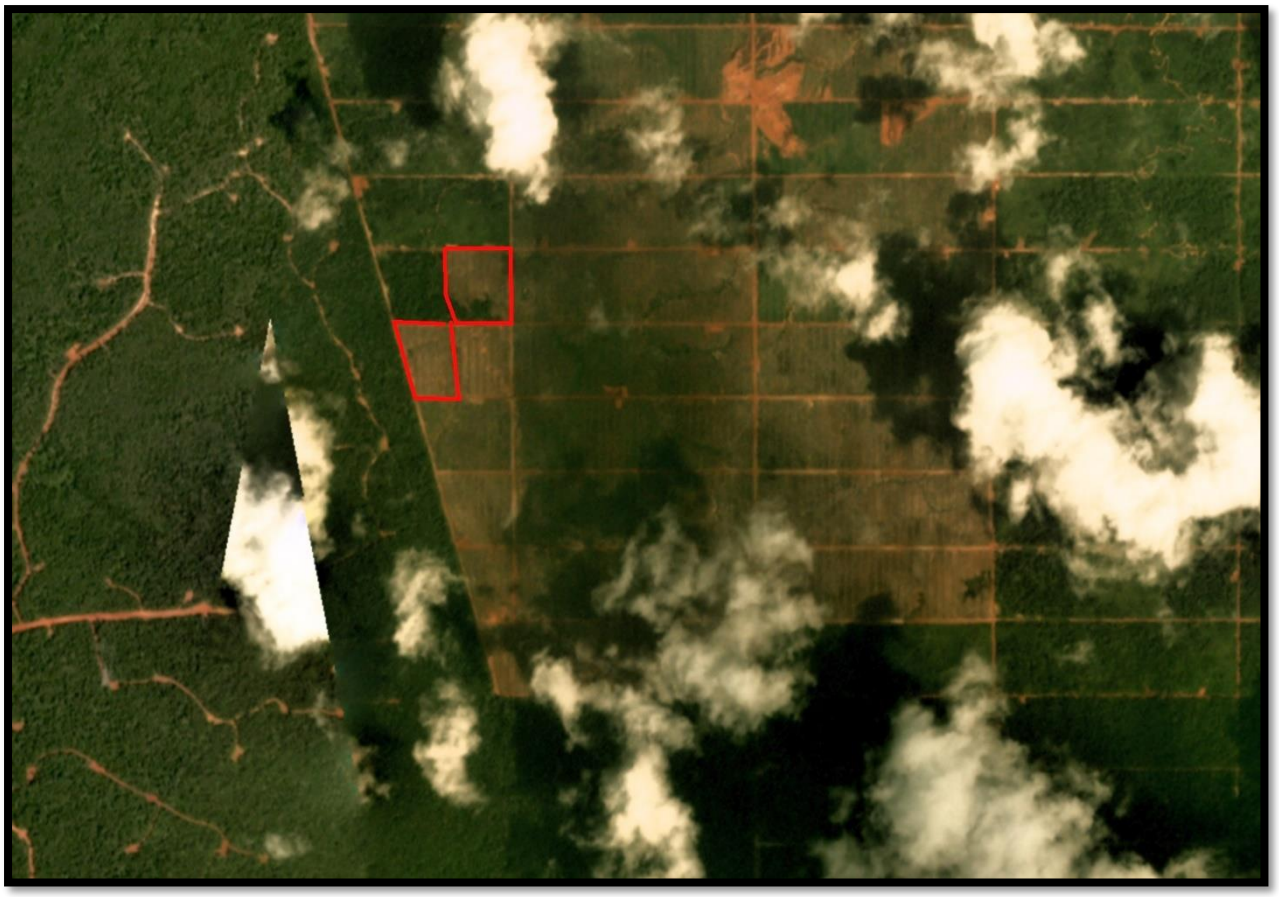


Figure 28 The most recent available satellite image from December of 2018, shows that the process of gradually clearing small blocks of scrub and patches of forest has continued from May 2018 through December of 2018 in this portion of the PT PAL concession.

REDACTED

GLOBAL 200 ECOREGIONS

The Global 200 ecoregions were developed in 2002 and focus on biological values as the critical first step in setting global conservation priorities[21]. In general, widely recognized global and regional centers of richness and endemism were selected for Global 200 status. Together, the Global 200 identifies a set of the Earth's terrestrial, freshwater, and marine ecoregions that harbor exceptional biodiversity and are representative of its ecosystems.

All of the Korindo oil palm estates in Papua referenced in this report are part of two Global 200 ecosystems. The first is for the terrestrial Southern Papua Lowland Forest and the second is for the New Guinea Rivers and Streams. Both the terrestrial and freshwater ecosystems in this part of Papua and referenced in the Global 200 are widely recognized for their biodiversity and endemism.

The Southern Papua Lowland Forest is currently classified as "critical/endangered". Plant richness is high, and the mammalian fauna consists of a wide variety of tropical Australasian marsupials, including a tree kangaroo. The WWF data on this ecoregion indicates that it contains sixty-nine mammal species, thirteen of which are endemic or near endemic. The species of bats in the region are particularly noteworthy. Bulmer's fruit bat (Aproteles bulmerae) and the large pogonomelomys (Pogonomelomys bruijni) are critically endangered, whereas the lesser tube-nosed bat (Nyctimene draconilla), New Guinea sheathtail-bat (Emballonura furax), Fly River horseshoe-bat (Hipposideros muscinus), and Papuan mastiff bat (Otomops papuensis) are considered vulnerable (IUCN 2000). The PT PAL HCV report made no mention of bat species, probably because they were not surveyed. Bats and other nocturnal species are often overlooked in rapid HCV assessments which do not include standard ecological census techniques. In an area known for its bat species and endemism, this should have been considered more thoroughly.

The Rivers and Streams of New Guinea were included in the Global 200 because "they support a large number of unusual and endemic species and higher taxa." Fish are particularly vulnerable to land use change due to their habitat requirements. Since no aquatic or fish surveys were conducted in the PT PAL HCV report, the Global 200 ecoregion should be considered in the context of the precautionary approach and the broader IFL landscape.

[21] Olson, D.M., E. Dinerstein, E.D. Wikramanayake, N.D. Burgess, G.V.N. Powell, E.C. Underwood, J.A. D'Amico, H.E. Strand, J.C. Morrison, C.J. Loucks, T.F. Allnutt, J.F. Lamoreux, T.H. Ricketts, I. Itoua, W.W. Wettengel, Y. Kura, P. Hedao, and K. Kassem. 2001. Terrestrial ecoregions of the world: A new map of life on Earth. BioScience 51(11):933-938.

Figure 29. The Global 200 ecoregion boundaries overlaid with the 7 available Korindo oil palm concessions. All of the Korindo oil palm concessions are part of the Southern Papua Lowland Forest ecoregion which is classified as critical/endangered in the most recent review. Logging and the rapid of expansion of oil palm concessions in Papua is a primary threat to the ecoregion.

North Maluku /Wallacea biogeographical importance

The PT GMM oil palm concession lies on the southern end of the Island of Halmahera in the South Halmahera Regency. Halmahera Island is also central to Wallacea, a biogeographical designation for the group of mainly Indonesian islands (and deep-water straits) between the Asian and Australian continental shelves. The natural history and importance of the area is well known and has led to formative ecological biogeographic discoveries and theories by Alfred Russel Wallace, Thomas Huxley and Max Carl Wilhelm Weber. The islands of Wallacea lie between Sundaland (the Malay Peninsula, Sumatra, Borneo, Java, and Bali) to the west, and Near Oceania including Australia and New Guinea to the south and east.

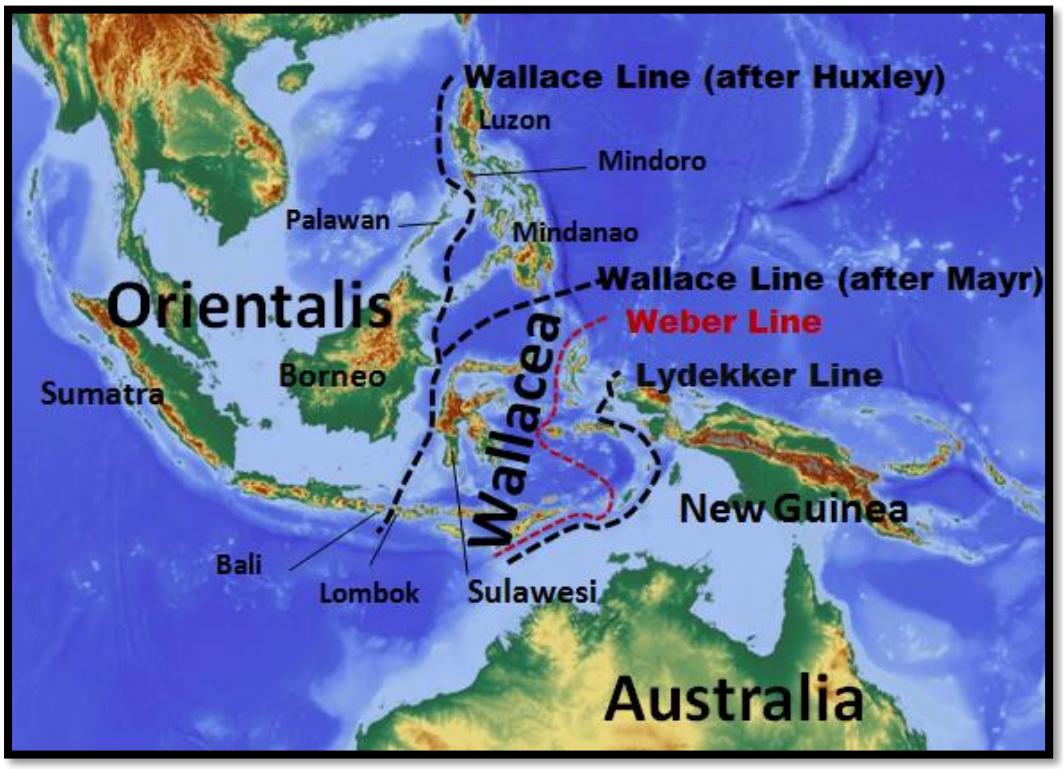


Figure 30. Halmahera Island is central to Wallacea, a "hotspot" for biodiversity known for its importance to natural history since the 1850's.

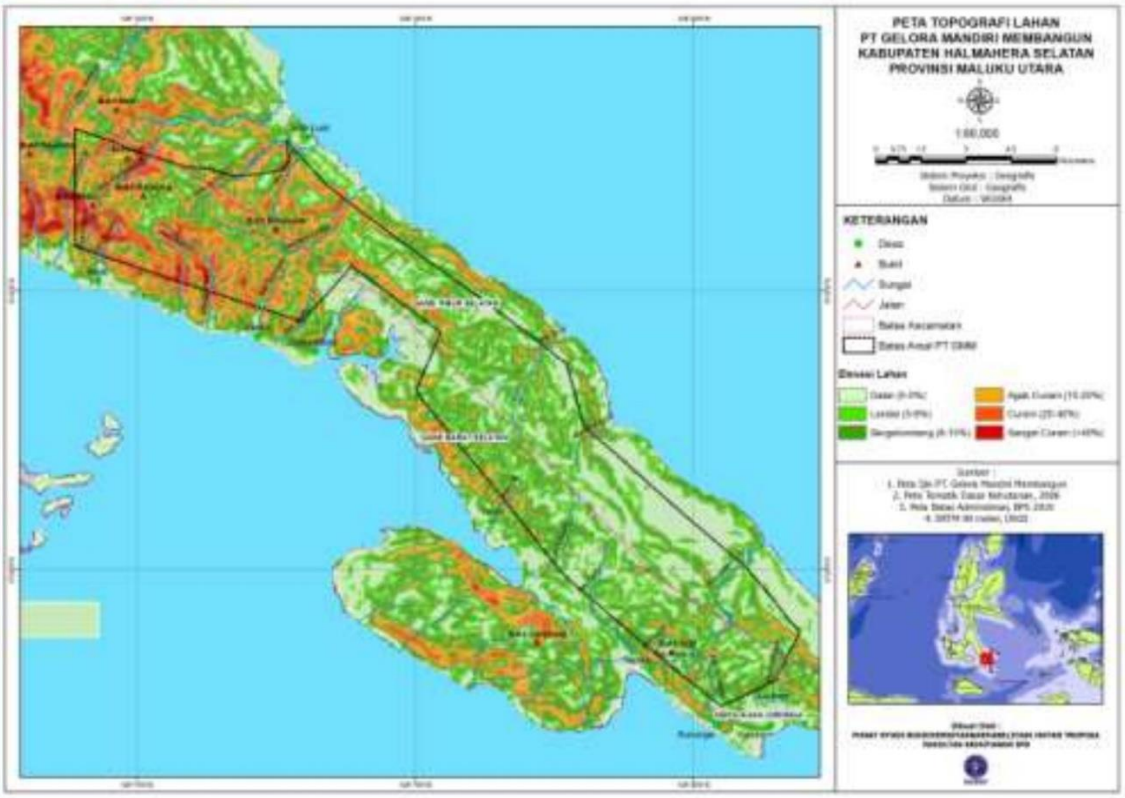
Wallacea's forests are mostly lowland tropical rainforest Overall, 45 percent of Wallacea has some remaining forest cover, although only 15 percent is in pristine condition. The lowland areas are under more threat of land use conversion due to accessibility and suitability for agriculture. There are more than 10,000 species of plants in Wallacea, approximately 1,500 of which are endemic. 1,142 terrestrial vertebrates are found here, 529 of which are endemic. The flora and fauna of Wallacea are so varied that each island needs protected areas to preserve the region's biodiversity. [22]

[22]https://web.archive.org/web/20040404233653/http://www.biodiversityhotspots.org/xp/Hotspots/wallacea/

PT GMM HISTORICAL LAND USE AND CONVERSION TO OIL PALM CONCESSION

Korindo's PT GMM oil palm concession was previously zoned as Production Forest (HPK) and the process of converting it to agricultural land (APL) began around 2007. According to the PT GMM HCV report, the Governor supported the land use planning changes, and, after a process, the Ministry of Forestry issued a Decree, (SK Menhut RI) Nr.SK.22/Menhut-II/2009) for the partial exchange of Production Forest (HPK) with a total area of 11,003.09 Ha. The Regent for South Halmahera subsequently issued a plantation permit to PT GMM in 2011 for a total of 10,100 Ha. At present, PT GMM reportedly holds a Land Cultivation Rights Title (HGU/Hak Guna Usaha) of about 8,444.61 Ha. The details were not available and therefore these figures and the exact location of the PT GMM boundaries are not known. There is a difference of more than 1,500 Ha between the area granted a plantation permit and the HGU. The location of this 1,500+ Ha has not been described. Occasionally, areas are excluded from the HGU due to land ownership issues or because they are deemed not suitable from cultivation by the company (steep slopes, swamp forest etc.,). Boundary information shared from a third party have been used for the purpose of this report and verified, to the extent possible, with information from the HCV report and other maps. Based on maps in the HCV report, we believe that the additional 1,500+ Ha was excluded from the final HGU because it included a public right away and an area of forest. Without the official boundaries, we have not been able to confirm this but can see a difference in the boundaries between two maps in the HCV and HCS Report (Figs. 34 and 35).

According to company records reported in the HCV Assessment, the PT GMM area was previously logged when it was zoned HPK forest between the 1980's and 2002. We were unable to verify this. The best available Landsat 7 satellite image from just prior to PT GMM commencing clearing was acquired on 17 October 2010. In this scene, the high ground of the peninsula is dominated by forest. The resolution of the imagery is not sufficient to determine the extent of disturbance. However, there is evidence of shifting cultivation (small patches of non-commercial clearing) and variation in the type of forest from the northwest to southeast which appears to be related to elevation and the soil conditions.



Gambar IV-2. Peta Topografi Lahan pada Areal PT Gelora Mandiri Membangun

Figure 31. Topographic map from the PT GMM HCS Report. The red areas in the northwestern portion of the estate are steep slopes which are not supposed to be cleared.

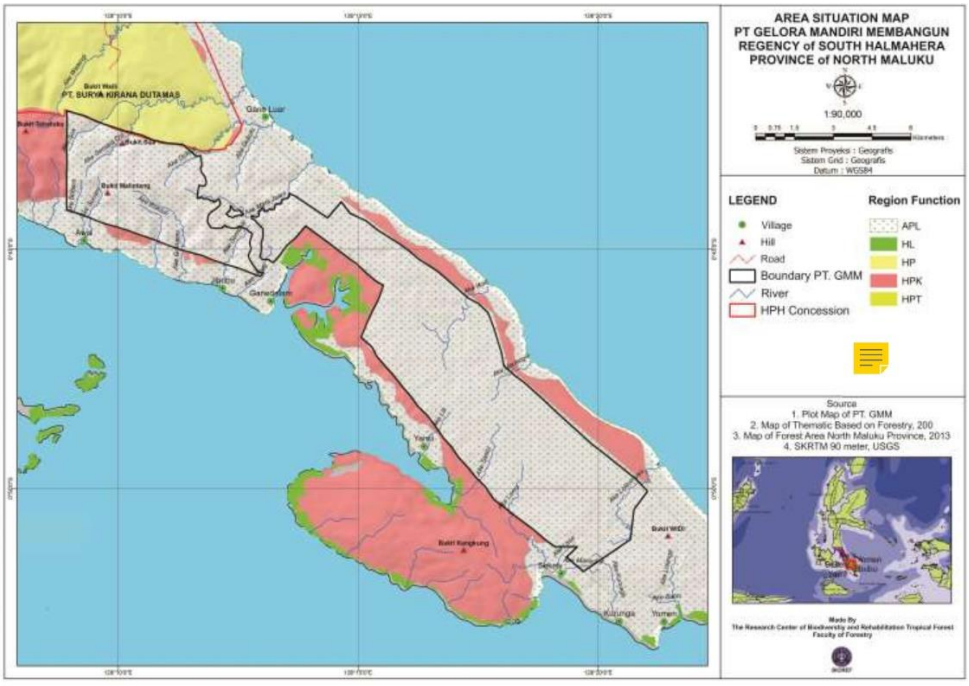


Figure-4. Area Situation Map PT. Gelora Mandiri Membangun

Figure 32. The boundaries shown in this map of the PT GMM area (from the HCV report) are different from the map above (fig. 31) and may explain the reduction of the HGU as compared to the IUP.

LAND CLEARING AND LAND PREPARATION PRIOR TO HCV ASSESSMENT.

Company records of clearing and planting were not available to develop/verify the chronology of PT GMM site development. Good quality satellite imagery of the area is difficult to obtain because the area is frequently obscured by clouds. This was particularly challenging for the period from 2010 to 2014 because there were not as many sources of satellite imagery. However, several Landsat 7 scenes provide adequate reference for the visual comparison of the pre-clearing land cover. Additional images at various stages of clearing depict the progression of clearing which took place in PT PAL.

Figure 33. This image depicts the land cover within the PT GMM concession prior to clearing. Landsat 7 image acquired on 17 Oct 2010.

Figure 34. This Landsat 7 image acquired on 09 December 2012 depicts early stages of clearing within the PT GMM concession.

Figure 35. This Landsat 8 image is from 01 February 2014. The band combinations are B7_B5_B3. Bare soil appears pink. Grass and scrub vegetation appear bright green. Forest appears dark green.

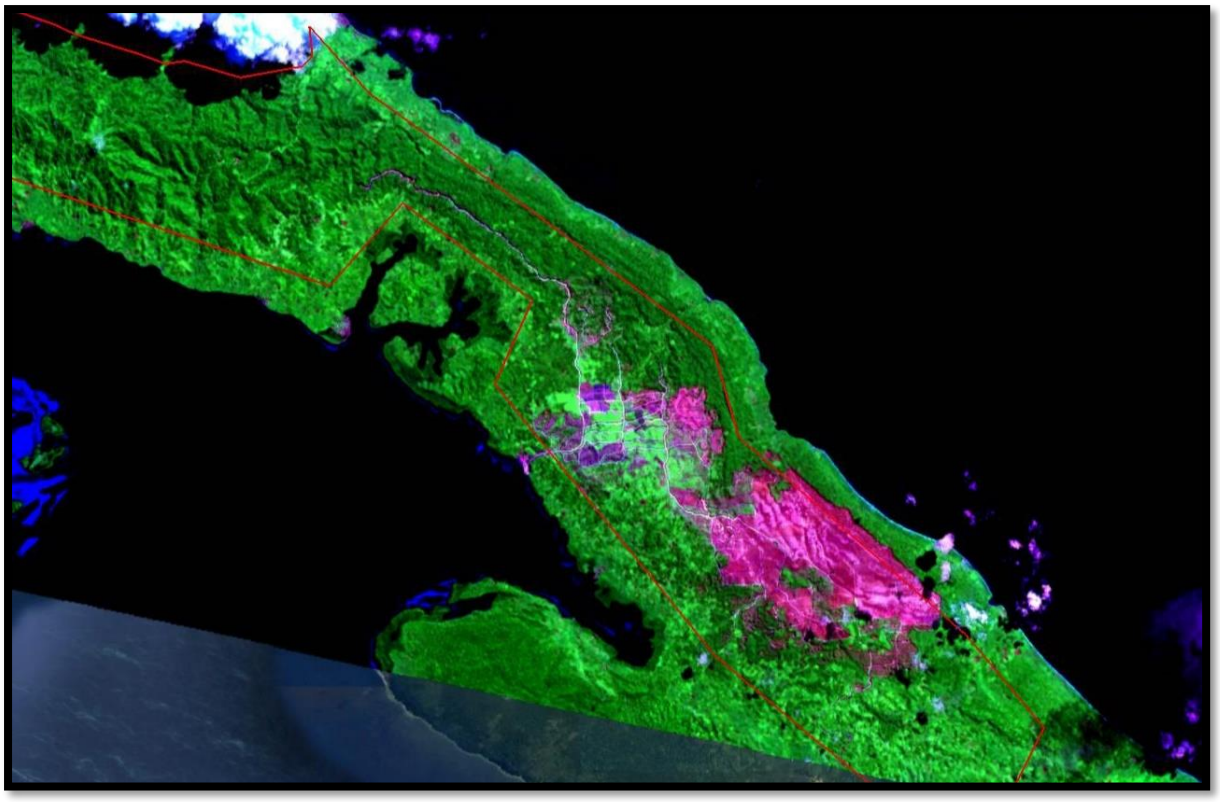


Figure 36. This Landsat 8 scene from the 29th of May 2014 shows a large area of bare soil in the southeastern portion of the concession and an extension of the road to the northeast. Band combinations are B7_B5_B3. Bare soil appears pink. Forest is dark green.

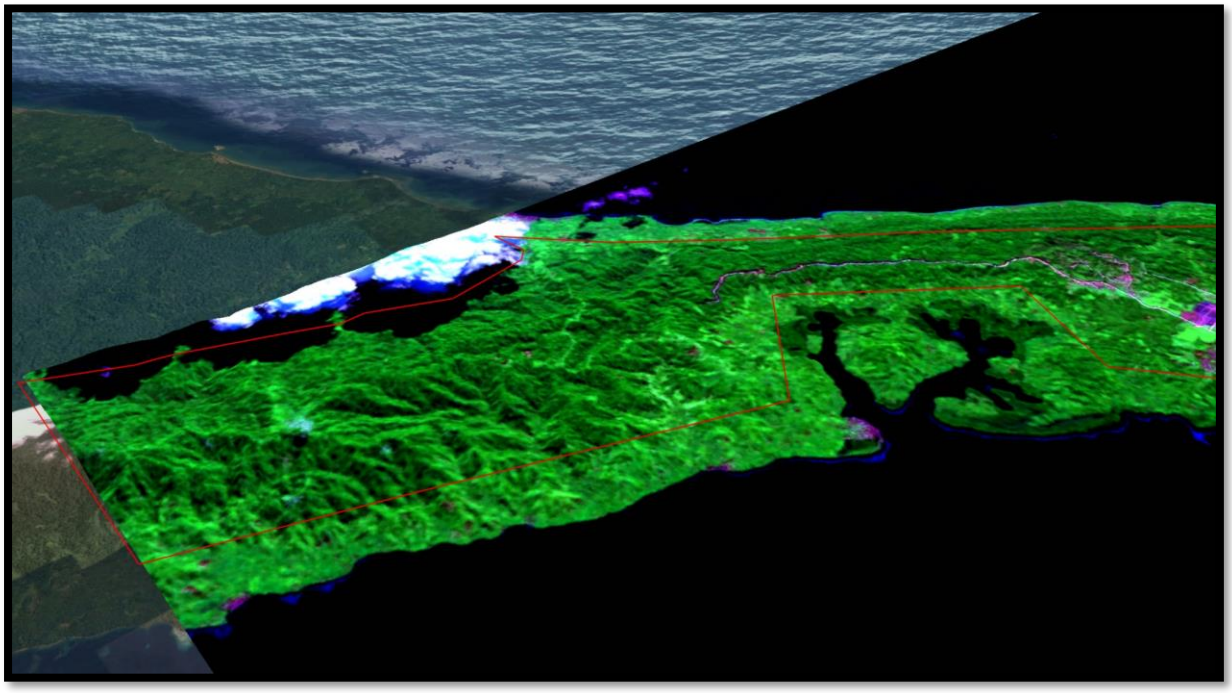


Figure 37. This 3D rendering of the above Landsat 8 scene from the 29th of May 2014 overlaid on the terrain provides visual relief context for the PT GMM site.

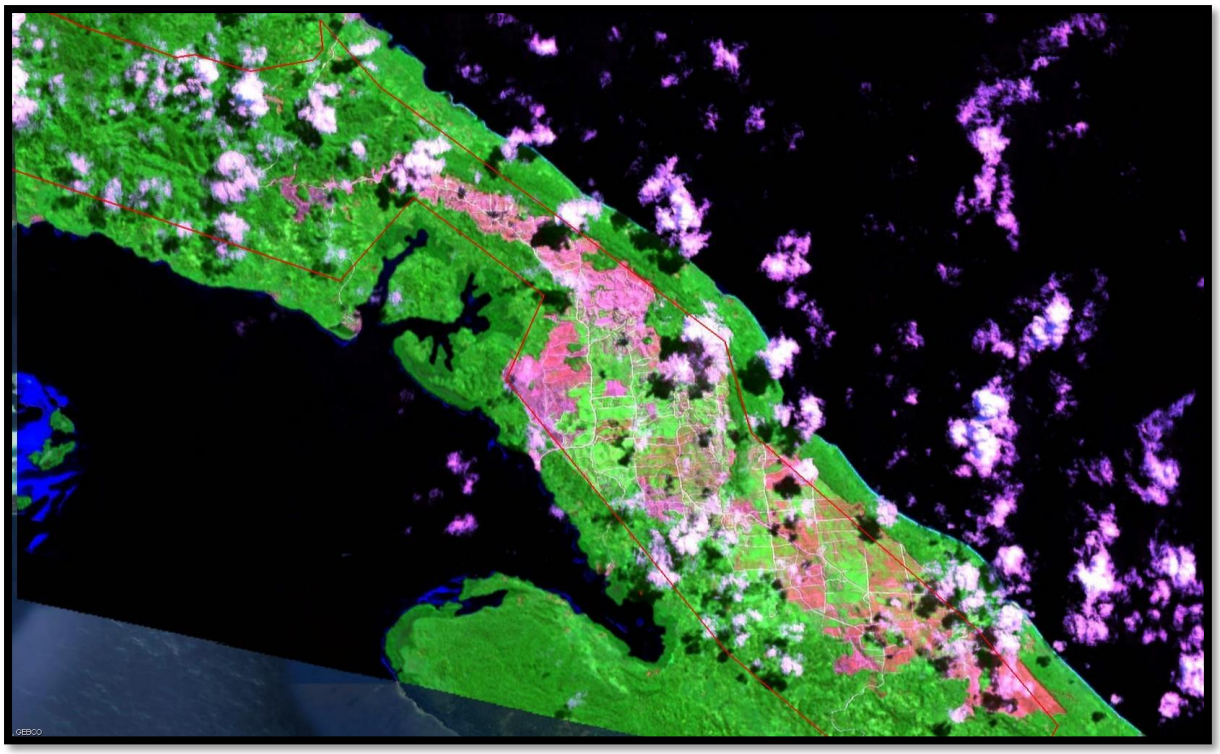


Figure 38. Land clearing progressed to the central portion of the concession by 18 April 2015. The width of the concession in narrow area is about 1.5 Km. Landsat 8 Bands B7_B5_B3.

Figure 39. The Landsat 8 scene from 10 Dec 2015 shows that the hilly terrain in the northwestern portion of the concession has not been cleared but it appears that some logging activity has begun. Korindo reportedly obtained a permit to harvest timber from the PT GMM in area in 2015.

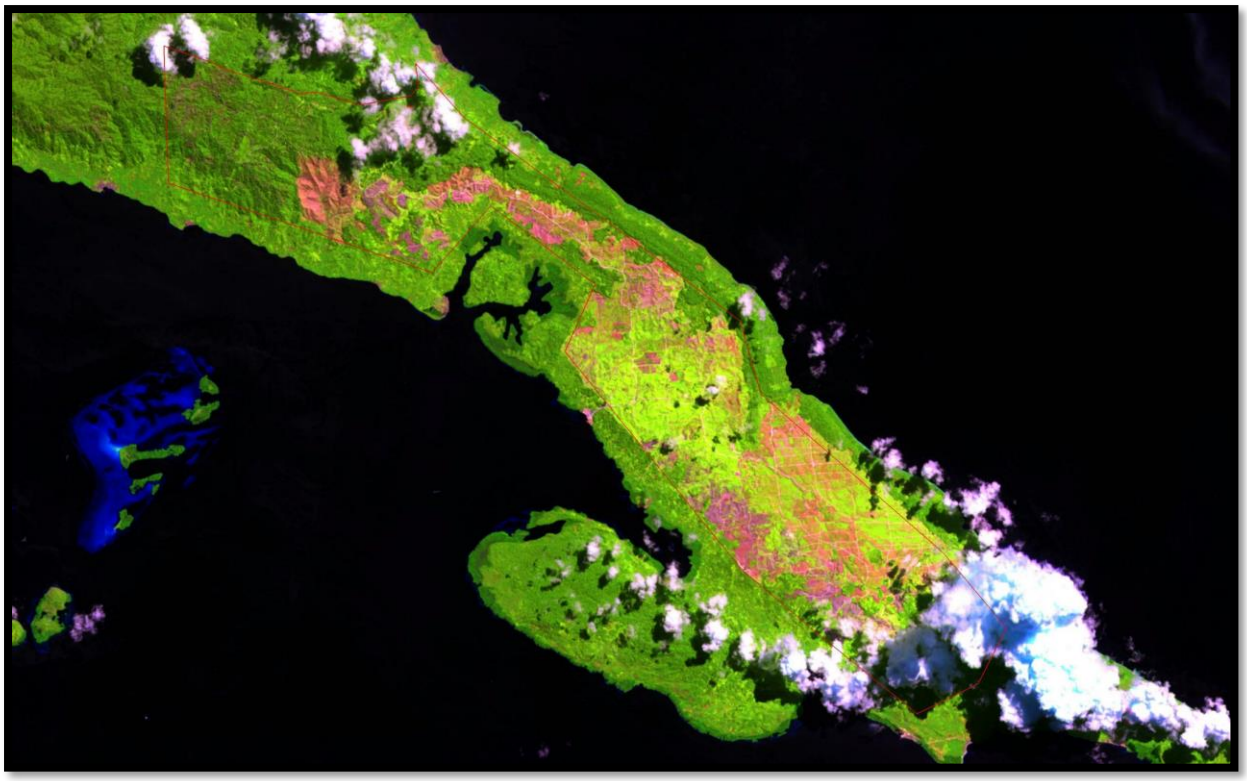


Figure 40. This image is significant because it was taken about the same time as the HCV and HCS field visits were being carried out at PT GMM. It provides context to land cover/land use to the observations and data presented in both reports. Sentinel 2. 05 June 2016 Bands B11_B8A_B04

Figure 41. This image provides a more detailed view of the northwestern portion of the PT GMM concession shown in Fig. 43. HCV and HCS surveys were conducted between 11 – 20 May 2016. This scene from 05 June 2016 shows that clearing is underway.

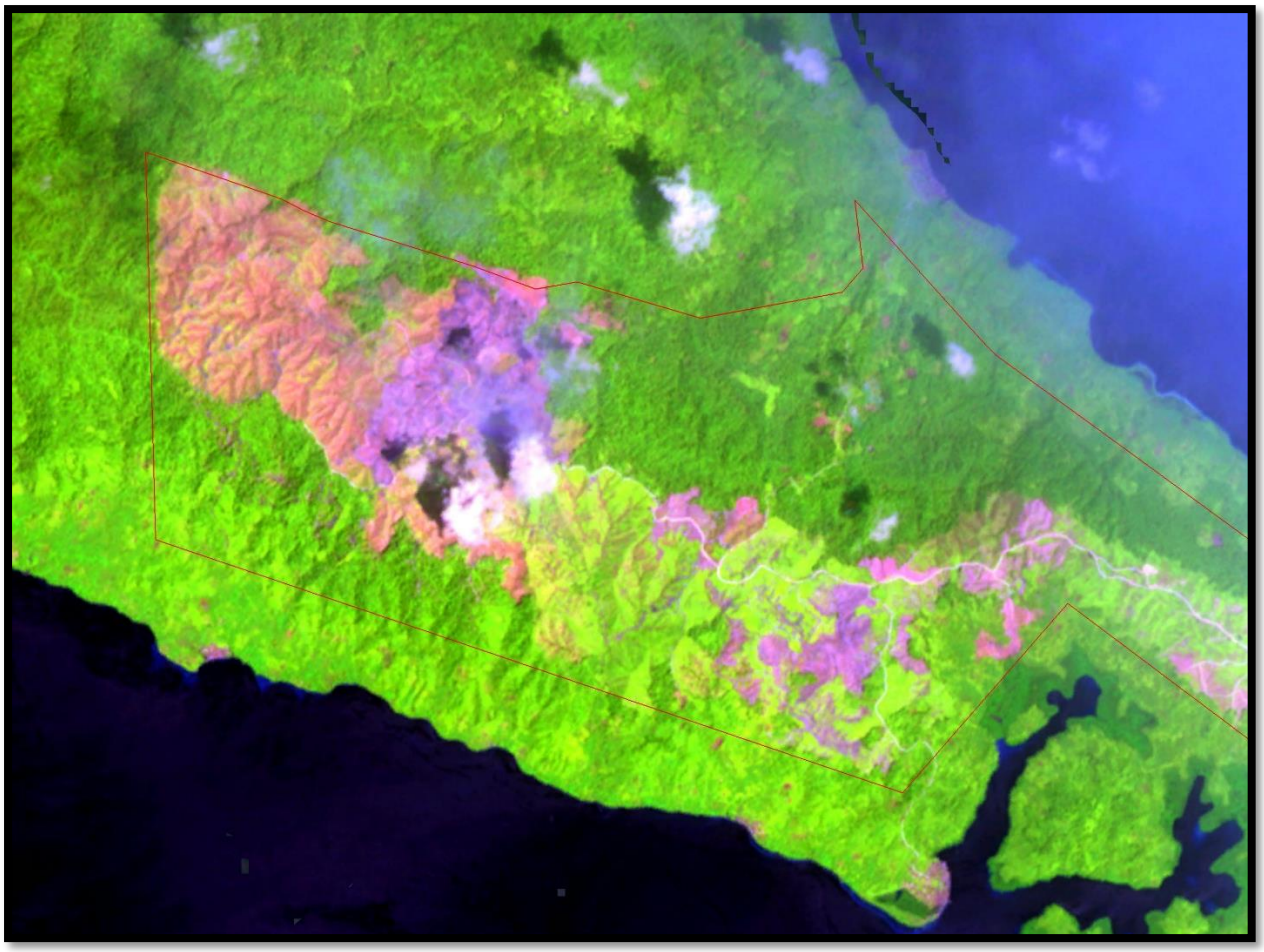


Figure 42. In this scene, acquired on 02 November 2016, much of the previously forested area has been cleared. Bare ground appears brownish pink. Grass and shrubs appear bright green. The area near the center of the scene which was cleared in 05 June scene (Fig.44) has some vegetation coming back, except there are brown areas which appear to remain bare due to the steep terrain. The steep area in the lower left portion of the scene appears to have been logged but not completely cleared for planting oil palm. Sentinel 2A scene Bands B11_B8A_B04.

This image is significant for several reasons:

1) *Although the HCV and HCS surveys had been carried out about 6 months before this scene, they had not been completed yet. Therefore, land use change which occurred between June and November 2016 occurred after the HCV/HCS Assessments were underway but before they were completed and signed for by the Director of PT GMM and the Lead Assessor on the 17th of April 2017.*

2) *Clearing and logging is taking place in areas which were later identified being as steep slopes and HCS.*

3) *The entire upper portion of the watershed has been cleared. The upper watershed in these areas is critical to supporting the lower areas where people rely on the streams and springs for freshwater. The HCV Assessment indicated that there are 20 rivers within the concession area, all of which flow down to the coast on either side of the concession. In other words, the upper catchment of the watershed for these 20 rivers originates from inside the oil palm concession.*

PT GMM HCV ASSESSMENT DATA

Although the HCV Assessment for PT GMM was not approved by the HCVRN Review Panel, it contains a significant amount of primary data which is relevant to this review. The primary data from the HCV field survey may not support the conclusions that were put forth in the HCV Report, but they do provide detailed first-hand professional observations of the situation on the ground as of May/ June 2016. Therefore, we are going to include them in the context of what is observed in the satellite imagery and literature review.

Loss of HCV Forest

The HCV assessment for PT GMM indicated that based on the assessor's analysis of the Landsat 8 scene from the 10th of December 2015. (see Fig. 42 for visible bands of the same scene) the "landscape of this area could be classified into five classes of land cover those are young shurbs (189.74 Ha), old shurbs (1,525.37 Ha), secondary forest (1,547.66 ha), mixed garden (858.74 ha), and palm oil plants (4,232.10 ha)."[23] Since this scene was acquired some six months prior to the site survey and there was active clearing taking place, it is not clear if these figures were accurate at the time of the HCV Assessment field survey. Nevertheless, they do indicate that approximately 50% of the PT GMM concession area had been planted with oil palm prior to the HCV assessment. It is also clear from the subsequent satellite images that a considerable amount of the area which was classified as secondary forest (1,547.66 Ha) had been cleared (see Figs. 44-45).

Gambar IV-2. Peta Topografi Lahan pada Areal PT Gelora Mandiri Membangun

Figure 43. Topographic map of PT GMM from HCV assessment. Based on the satellite imagery, some of the areas labeled "steep" and "very steep" were cleared in 2016, during and after HCV field survey.

[23] R47. HCV_GMM_Public Summary.pdf

The HCV assessment also conducted a spatial analysis data Digital Elevation Model (DEM)-Shuttle Radar Topography Mission (SRTM) 90M and indicated that the PT. GMM areas range from 7-419 meters above sea level. The topography of the PT. GMM areas were classified from “flat to very steep”, with the categories for slope identified as “flat is 0-5%, ramps 5-8%, wavy 8-15%, rather steep 15-25%, steep 25-40%, and very steep more than 40%.” These areas are presented in Fig 46.

Damage to Riparian Areas

The PT GMM HCV Assessment indicates that there are 20 rivers inside the PT GMM concession. The assessor noted that “all the rivers are small rivers and the length between upstream and downstream relatively short.”. This is because the topography of the area creates a central ridge which runs down the peninsula and the location of the oil palm concession dominates the high ground. The rivers are “short” because the peninsula is not very wide in most places and they flow down from both sides of the central ridge. The peninsula averages 6.5 Km wide in this area and the average width of the PT GMM oil palm concession is 4.2 Km.

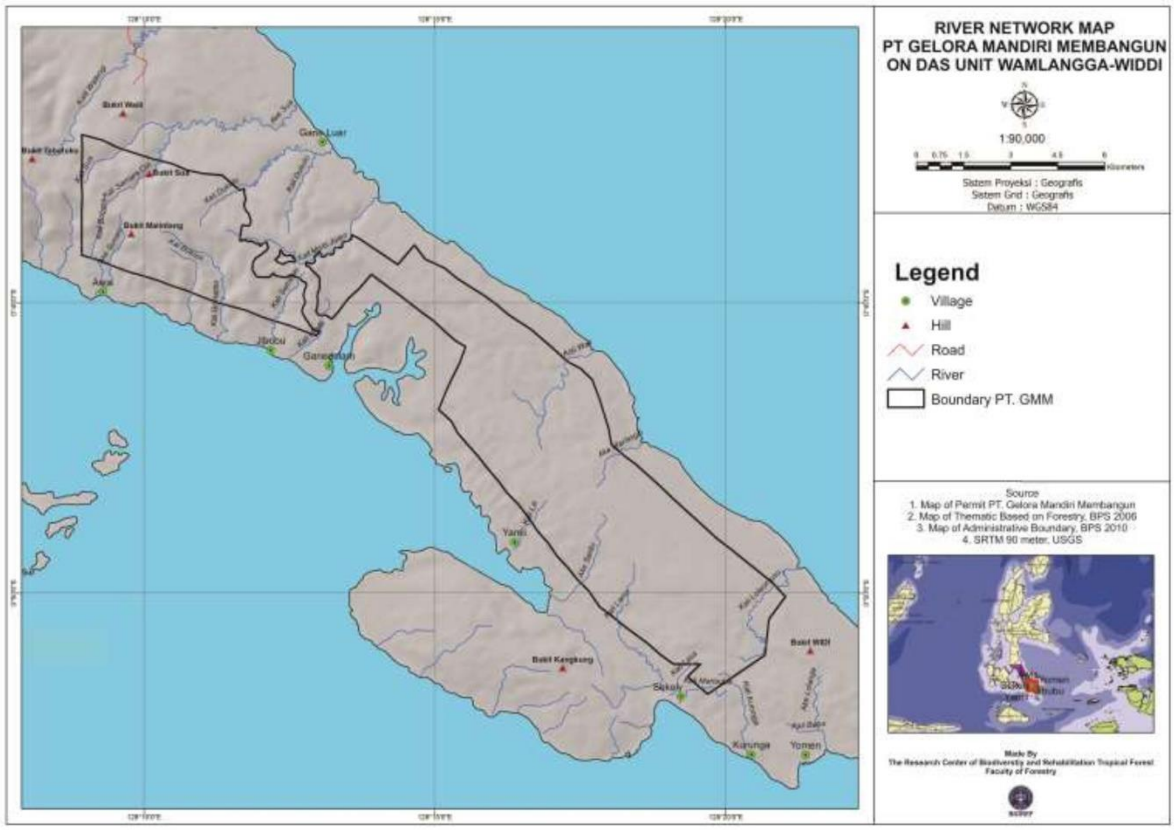


Figure-7. River Network Map on Area PT. Gelora Mandiri Membangun

Figure 44. Map of rivers from the PT GMM HCV Assessment. All 20 rivers in the area originate from inside the oil palm concession and flow out of the concession to lower terrain and villages near the coast.

The HCV Assessment noted that most of the people here depend on the rivers and springs for freshwater for drinking, bathing, etc. The widespread conversion of the entire upper watershed to oil palm is a concern. The ecological services of the previously forested area are gone. Erosion, silt, and sedimentation are likely to be problematic in the near term. Longer term concerns about damage to the catchment area are fertilizer and pesticide outflow into the streams and downslope villages. Waste management (effluent and empty fruit bunch application can create very high levels of biochemical oxygen demand BOD) is a concern that is not addressed in the HCV management plan.

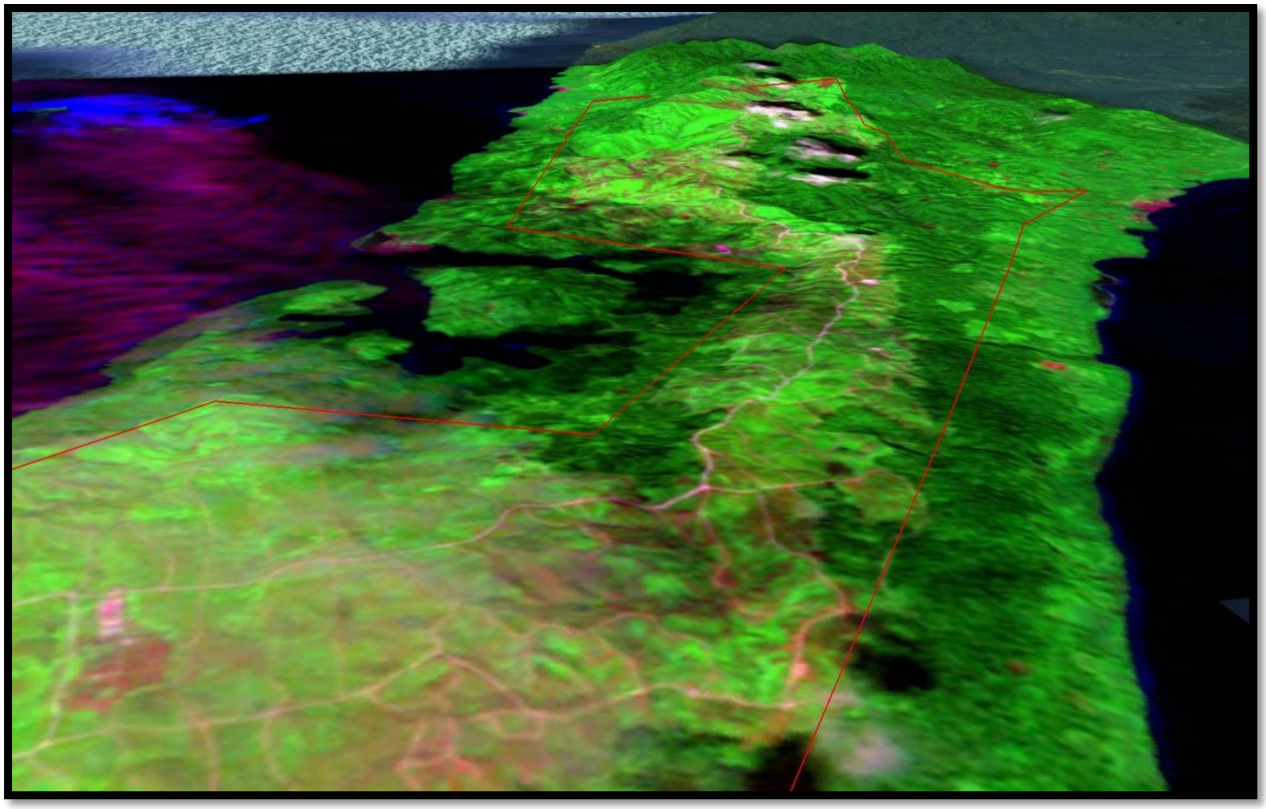


Figure 45. A 3D rendering of the topography in the northern half of PT GMM overlaid with a satellite image from 26 January 2019. The PT GMM oil palm concession dominates the high ground and all of the rivers flow down from this catchment to the coastline and the 8 communities on both sides. The width of the estate, on average, occupies and area of approximately 70% of the width of the peninsula.

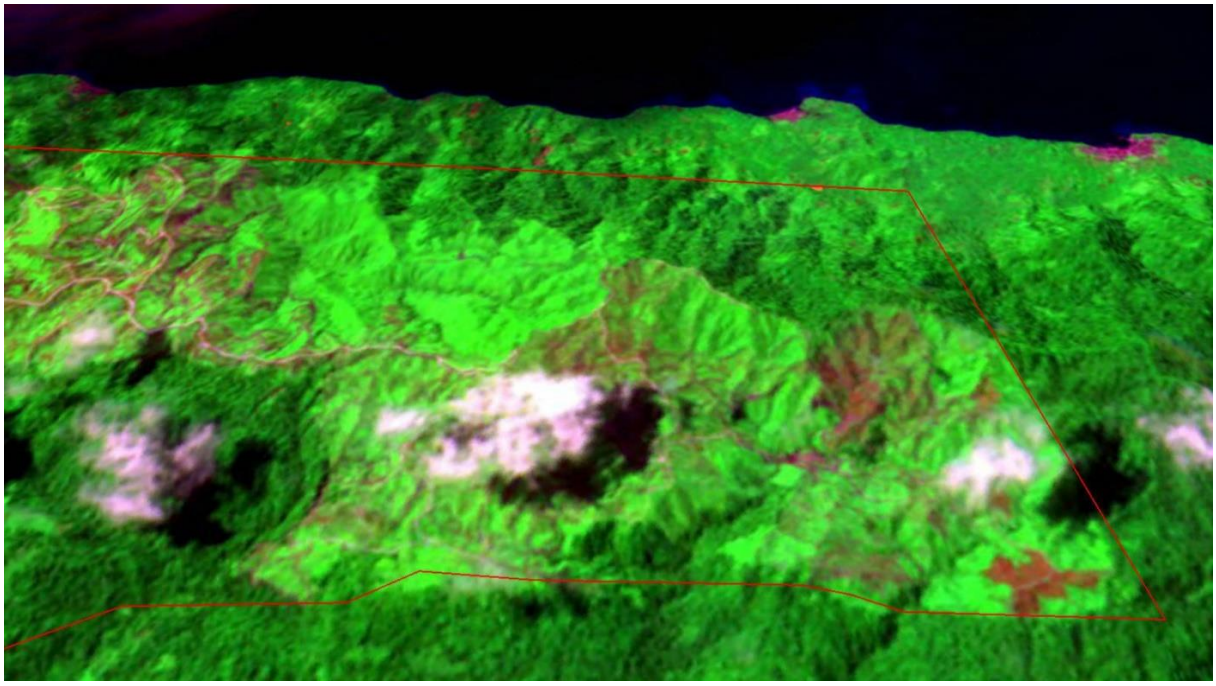


Figure 46. In this 3D rendering of the northwest end of the concession, this 26 January 2019 Sentinel 2 image overlaid on the terrain raise concerns about the clearing on steep slopes and damage to the watershed. The 90M SRTM data used for the slope analysis in the HCV report is not adequate for evaluating steep slopes at this scale. Brown/red indicates bare soil and appears to be related to landslides. Verification at this level of detail would require ground-truthing.

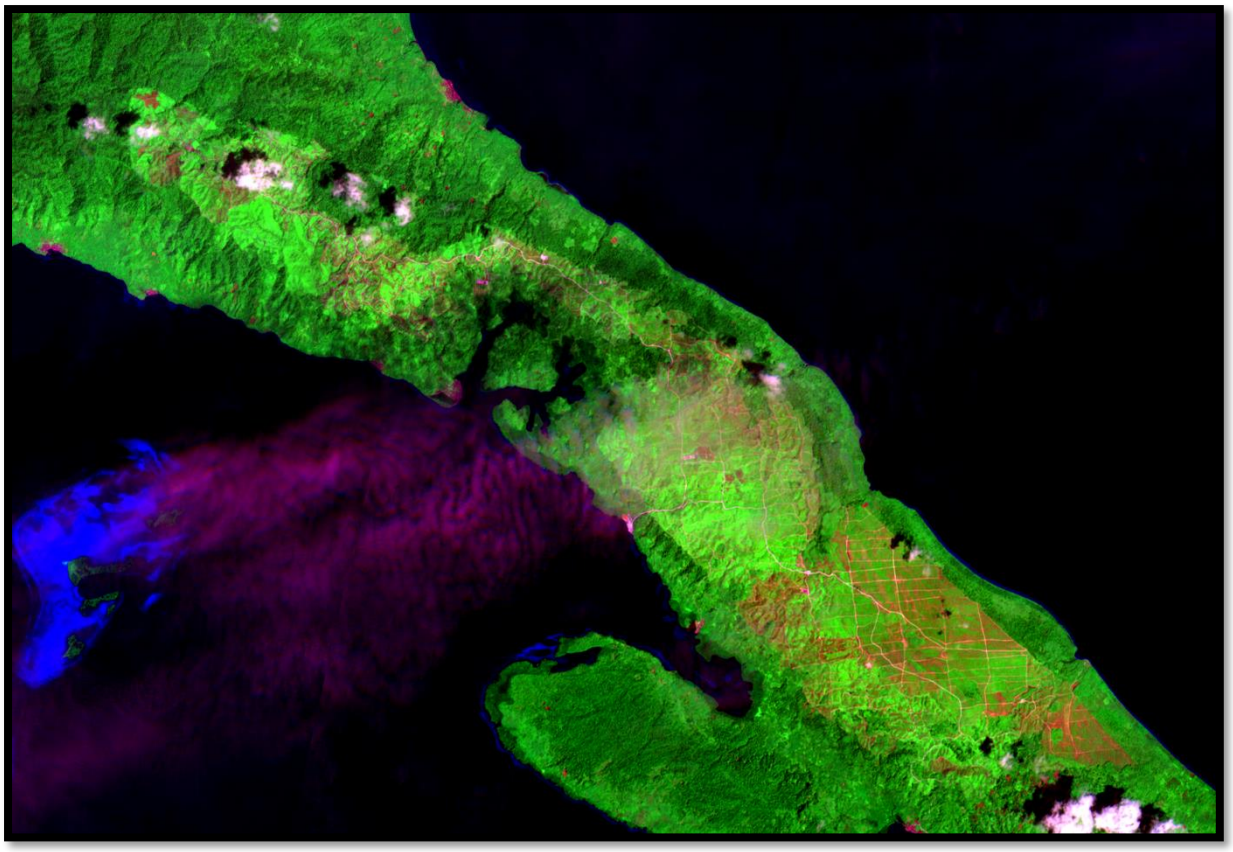


Figure 47. This scene shows the overall concession landscape of PT GMM. In addition to the concerns about the ecological services of the riparian areas, the large-scale conversion (approximately 8,500 Ha) of a relatively narrow area like this peninsula, affects the overall connectivity and can impact the faunal movement. The buffer zone between the estate and the coastline is approximately 500 meters wide in most areas. The estate is almost 30 km long. Faunal movement from one side of the peninsula to the other likely involves crossing through the oil palm concession.

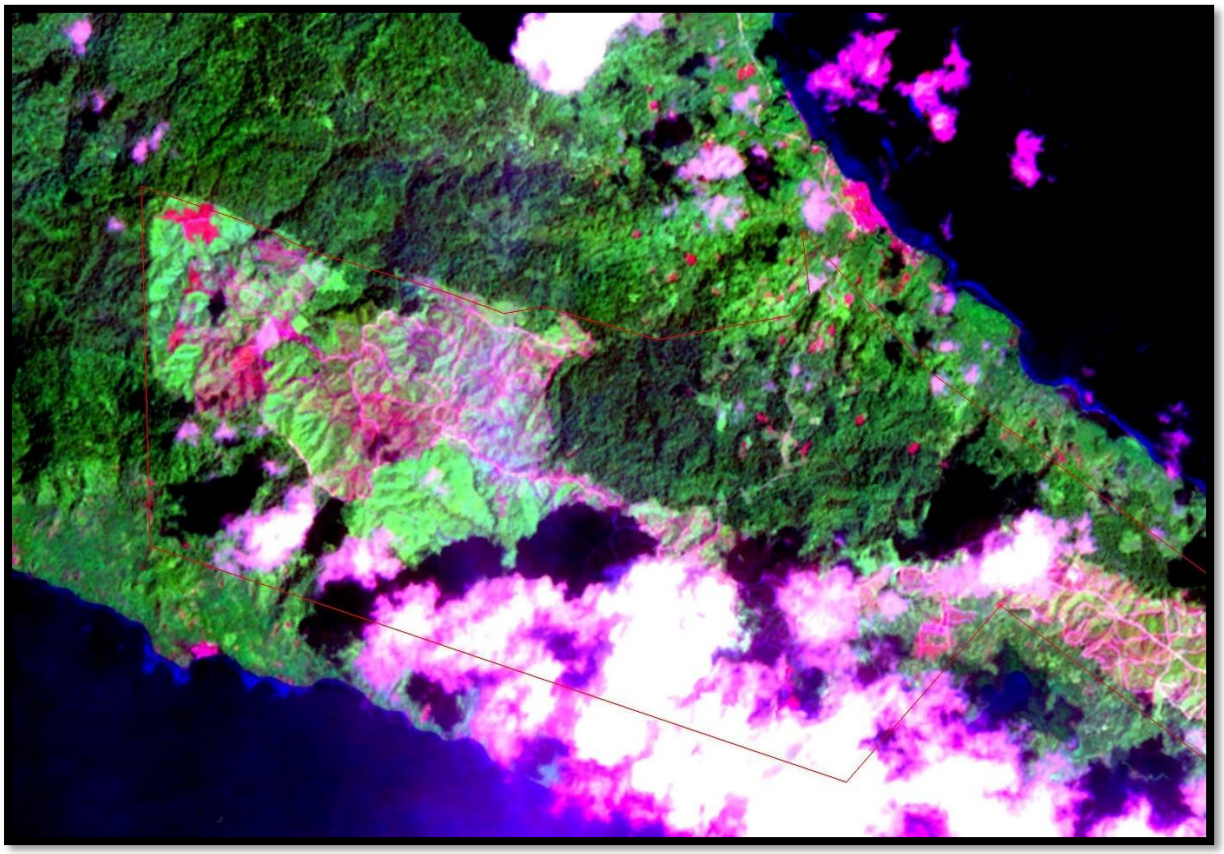


Figure 48. As indicated by the bare soils in this Sentinel 2 Scene acquired on 31 January 2019, there appears to be ongoing land clearing or land preparation activities in the northern portion of the PT GMM oil palm concession. This area was initially cleared of forest in 2015-16. The presence of bare soil some 2 1/2 years later indicates that either it has not been planted with oil palm and a cover crop (to prevent erosion) or there may be ongoing issues regarding land suitability/slope.

IMPACTS TO HCVS

Identification of HCV 1

Even though the HCV assessment began after most of the area had been cleared and planted with oil palm, the PT GMM HCV report identified multiple HCV's, including HCV 1, HCV3, HCV4, and HCV5. The survey points were mapped by the assessment team. These geospatial data were not available for this review, so the original map is included here.

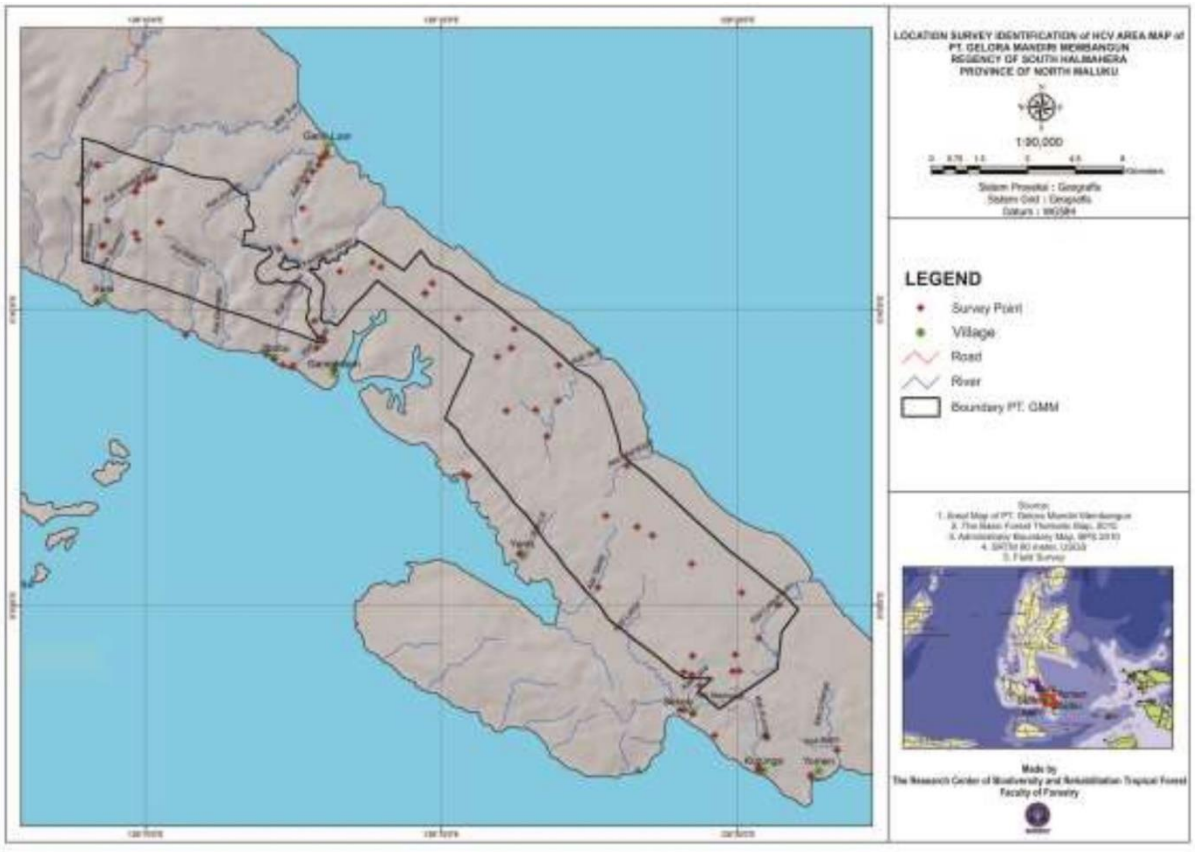


Figure-1. Location Survey Identification of HCV area map of PT. Gelora Mandiri Membangun

Figure 49. Location of survey point from Pt GMM HCV Assessment. Most of these points appear to be in planted areas and small fragments of forest which are also related to riparian areas.

At the time off assessment, more than 50% of the area had been cleared and planted with oil palm. Despite the large-scale land use conversion which had already taken place, more than 20 RTE faunal species were observed, primarily in the small fragments of forest adjacent to riparian set asides. Without baseline surveys, it is difficult to assess the habitat requirements and impacts to the population of these species within the PT GMM area. Logic follows that if the assessment team observed RTE species in most of the forest fragments, they were there prior to land use conversion, too. Attempting to determine the habitat requirements of all these RTE species is beyond the scope

of this review. We include a copy of the species list observed by the assessment team and note that nine of the species observed are local and provincial endemics. Four of these are local endemics. IUCN classifies that species considered as endemic if they are restricted to less than 20.000 km^2 or known only occupy an area of less than 2,000 km^2 area. Three species of birds observed in the forest fragments are endemic to Halmahera Island. It should be noted that these sightings were all based on casual observations rather than using standard ecological census techniques which would provide better understanding of the populations and provide baseline data for ongoing monitoring and adaptive management

Table -7. Endemici scale and level of wildlife species in PT. Gelora Mandiri Membangun area

Indonesian Name	Scientific Name	Endemic level of protected wildlife species		
		Local endemic	Provincial endemic	Regional endemic
A. Mamalia				
Kuskus kuning	*Phalanger ornatus*	High		
B. Burung				

Indonesian Name	Scientific Name	Endemic level of protected wildlife species		
		Local endemic	Provincial endemic	Regional endemic
Pergam boke	*Ducula basilica*		Middle	
Walik kepala-kelabu	*Ptilinopus hyogastra*		Middle	
Kakatua putih	*Cacatua alba*	High		
Nuri kalung-ungu	*Eos squamata*			Low
Kasturi ternate	*Lorius garrulous*		Middle	
Cekakak biru-putih	*Todiramphus diops*		Middle	
Kepudang-sungu Halmahera	*Coracina parvula*	High		
Bidadari halmahera	*Semioptera wallacii*	High		
Cikukua halmahera	*Melitograis gilolensis*		Middle	

Figure 50. Table of endemic species (from PT GMM HCV Assessment) found in the remaining forest fragments after more than 50% of the PT GMM oil palm concession had been cleared and planted.

Identification of HCV 2

The PT GMM HCV report limited the scope of HCV2 assessment to the presence or absence of an overlapping Intact Forest Landscape (IFL). Halmahera Island is not part of an IFL. However, they did not address this concession area in the context of the Global 200 ecoregions.

The PT GMM concession in North Maluku is part of the Moluccas Moist Forests ecoregion. This ecoregion is not known for particularly high biodiversity. However, it has higher than average levels of endemism and the ecoregion falls within the Wallacean biogeographic zone, therefore exhibiting a

mixture of Asian and Australian fauna. Timber harvesting and forest land conversion for agriculture are leading causes of habitat loss in the ecoregion, particularly in the lowland areas.

It is difficult to address the potential loss of HCV2 for this area without better information about the flora and faunal species composition. Some practitioners would consider the areas situation on the end of the peninsula as a potentially important transition area but there is little supporting evidence.

Identification of HCV 4

In total, more than 1,400 Ha of steep slopes were identified in the HCV report which were considered part of the ecosystem services for water quality and erosion control, etc. These areas were mapped using very coarse data (90m SRTM data) Based on the satellite imagery and topographic data, there are additional areas which would likely fall into the watershed protection category. The previous forest land cover itself may have been considered HCV 4 in this area because it may have been locally significant to preserving the micro-climate, rainfall patterns and filtration of the water. This aspect of the HCV 4 ecosystem services would need further review and ground truthing to identify the full extent. However, there are some additional insights in the HCV and HCS reports which provide insight toward the question of whether HCV's were damaged or destroyed by Korindo's clearing in the PT GMM oil palm concession. In the PT GMM HCV Public Summary, the assessor addressed the presence of HCV 4 and the degradation to the upstream rivers and streams.

> No main river or major river was found in the PT. GMM area. However, those rivers are found Inside the plantation area of PT. GMM. The characteristic of river flows in the garden area of PT. GMM are parallel pattern and the water flows are very short. This is because the range between upstream to the sea (estuary) very close. ***Most of upstream rivers and their tributaries have been lightly degraded into heavy due to oil palm planting and land opening, consequently the quality and quantity decreases. At the same time, there is still a riparian zone in the form of secondary forest and young regeneration forest precisely in the west and north part of the Management Unit***.[24] (emphasis added)

The area which the assessor is referring to in this paragraph is the area which was subsequently cleared between June 2016 and November 2016 (see Figs. 44-45). The report continues by describing the area of steep slopes where there was secondary forest at the time of the HCV field survey (Fig 44).

> Areas or hills that have a slope of > 40% have very important value for the existence of the

[24] R47 PT GMM HCV Public Summary (pg. 32)

surrounding area. ***The aims of protection of this area are to prevent erosion, flood disaster, sedimentation, and maintaining its hydrological functions, both to ensure soil nutrients, groundwater and surface water.*** Overall the existence of the area with a slope of > 40% in the area of PT. GMM spreads in the west part of the plantation area. Based on field observation, the vegetation condition is in the form of secondary forest with low to medium density. This location is part of Melintang and Sua hills***. It is also part of the upstream areas that necessary to maintain because its function is very important to maintain water quality. In term of regulation that apply in Indonesia, Presidential Decree Nr. 32 of 1990, states that area with a slope of > 40% and water catchment areas have to be maintained as a protection area for down part of its areas. The aims of protection of this area are to prevent erosion, flood disaster, sedimentation, and maintaining its hydrological functions, both to ensure soil nutrients, groundwater and water*** [*sic*] ***service.***[25](emphasis added).

It appears that the area referred to in this paragraph was cleared in the months that followed the HCV Assessment field visit and continues to exhibit signs of heavy erosion and degradation. (see Figs.44, 45, 49, 51).

The PT GMM HCV Report included a variety of photographs of the riparian areas and HCV forest fragments which provide a "snapshot in time" of the conditions in May of 2016. They are included here (with captions) for additional context.

[25] R47 PT GMM HCV Public Summary (pg. 33)

Gambar 12. Kondisi (Hamparan) Bukit Karst di Areal PT GMM

Figure 51. This picture appears to be of the forest on the northeast side of the peninsula (looking north). The forested area was classified as HCV 3 because it is karst (limestone) and important for supporting the springs used for drinking water It also shows that the plantation area (left) is right atop of the watershed.

Gambar 5. Kondisi Sempadan Sungai Leleongmusu di Areal PT GMM

Figure 52. Image from PT GMM HCV Report captioned "Condition of riparian buffer zone at Sungai Leleongmusu". The picture on the right show the damage to the riparian area, debris pushed into the stream, and landslides in the background.

Gambar 4. Kondisi Sempadan Sungai Marisogili di Areal PT GMM

Figure 53. Image from PT GMM HCV report captioned "Condition of riparian buffer zone at Marisogili River. The image on the right appears to show debris from timber harvesting and land clearing. The buffer zone is degraded, as mentioned in the HCV report.

Gambar 10. Kondisi Bukit Melintang di Areal PT GMM

Figure 54. Image from PT GMM HCV Report captioned "Condition of Melintang Hill" This area appears to have been logged/cleared within 6 months following this photograph (see Fig 49,51). There are no GPS coordinates provided but most of the area referenced was subsequently cleared.

Gambar 13. Kondisi (Hamparan) Bukit Sua di Areal PT GMM

Figure 55. Image from PT GMM HCV Report captioned "Condition of Sua Hill area". The satellite imagery of this area suggests that the road cut through the forest here was used to support logging or clearing operations in late 2016.

Gambar 7. Kondisi Sempadan Sungai Dokulo di Areal PT GMM

Figure 56. Image from HCV report captioned "Condition of Dukulo River buffer". The image on the right depicts the degradation of the riparian area mentioned in the HCV report. There is an oil palm planted on the left side of river bank and at the back of the scene, supporting the conclusion of the HCV Assessor that the riparian areas were degraded at the time of assessment.

CONCLUSION

The evidence provided by the complaints panel investigative team, FSC, the data from the Korindo HCV/HCS reports and analysis of the multispectral and multitemporal satellite imagery all support the conclusion that land use change and conversion by Korindo has caused the destruction of HCV's in both the PT PAL and PT GMM concession areas.

DESTRUCTION OF HCVS AT PT PAL

We consider the following as evidence that destruction of HCV took place in PT PAL:

1) The satellite imagery of the PT PAL concession area prior to clearing showed no indication of significant land use change that would suggest that it had been logged or degraded by human activities (this is supported by comments from the HCS review panel).
2) The PT PAL area was included in the 2013 IFL classification. After the clearing by Korindo began in 2015, the area was removed from the 2016 IFL classification due to land use changes in the Korindo concessions.
3) Indonesian Forestry Department maps classified the PT PAL area as "primary forest" prior to clearing.
4) The PT PAL area is in a WWF Global 200 ecoregion and was partially cleared of the endangered natural forest.
5) The HCV Assessment team directly observed and identified approximately 17 endemic species of fauna and 44 species which are listed under CITES, the IUCN Redlist, and/or Indonesian Regulations in the forest adjacent to the cleared area. The remaining forests are proxies for the forest which was cleared. Therefore, it is beyond reasonable to conclude that the forest which was cleared was the habitat of many of these species.
6) The area was classified as high-priority HCS (following the decision tree) in the Korindo HCS report. The primary data in that report, supports the conclusion that the remaining forest is HCS and the historical imagery indicates that it would be a suitable proxy for the forest which was cleared by Korindo.
7) Drone imagery of the area acquired during the clearing of the Korindo concession at PT PAL depicts destruction of riparian areas, logging, and clearing of the forest which corroborates the information from other sources and validates the use of the remaining
8) The SRTM terrain data depicts much of the area which was cleared as central to the watershed which then feeds water and nutrients into the lakes outside the concession.
9) The AMDAL which (unlike the HCV Assessment) was prepared prior to clearing, indicated that the watershed was important and should be protected.
10) The WWF Global 200 Ecoregions reference the unique diversity and importance of Papua's rivers and streams.
11) There is no evidence that Korindo attempted to clear the area with reference or regard to the riparian areas. The entire estate is blocked out in rectangular fields common to oil palm estates but not indicative of any regard for avoiding riparian zones.
12) The satellite imagery of the area after clearing depicts a landscape which was cleared without regard to the riparian areas. There are no riparian buffers visible
13) The erosion and runoff from the area Korindo cleared is visibly increased inside and outside the PT PAL concession after clearing. The runoff, sediment, and debris from the

rivers flowing north into the lake from the concession are clearly visible in multiple satellite images.

14) As of January 2019, there are no visible signs of riparian buffer zone restoration of mitigation of the erosion and sedimentation within the concession. The rivers are visibly damaged and degraded.
15) The extent of the destruction and degradation to the upper portion of the watershed is significant because it affects the rest of the hydrology and aquatic ecosystems.
16) The clearing of the riparian areas (streams, rivers, springs, and adjacent to lakes) is not consistent with Indonesian law.

The above are a sampling of the clear, concise (often visible) evidence from multiple sources, including detailed information and images of the area before, during and after clearing, all of which support the conclusion that Korindo's clearing in the PT PAL concession caused the loss of HCV 1 (destruction of RTE habitat and forest), HCV 2 (reduction of the IFL) and HCV 4 (destruction of the watershed).The destruction of HCV is defined as "significant damage of the attributes that constitute high conservation values in a way that they no longer exist or cannot be repaired". The evidence is clear and convincing that these HCV's were for all intents and purposes, destroyed. Rehabilitation efforts would stimulate recovery, but the landscape has been irreparably altered by Korindo's commercial activities.

There is no evidence that Korindo's standard operating procedures (SOP) for land clearing/preparation was different in PT GMM than they were in PT PAL (or any of the other concessions).

DEGRADATION AND DESTRUCTION OF HCVS AT PT GMM

The evidence around the land use/land cover conversion in the PT GMM area supports the conclusion that Korindo's commercial clearing activities caused the loss and degradation of HCVs on the southern end of Halmahera Island, an area of significant importance to the biodiversity of Wallacea.

1) The satellite imagery of the PT GMM concession area prior to clearing indicated a mixed-use landscape was present prior to conversion by Korindo. The area appeared to be dominated by secondary lowland most forest with small areas of shifting cultivation and subsistence agriculture.
2) The geography of the PT GMM concession area creates some unique considerations. It is on the southern peninsula of Halmahera Island and is situated atop the higher terrain in the area. It spans most of the width of the peninsula and is nearly 30 Km long. The conversion of this area has implications for movement of fauna, changes to the micro-climate and significant alteration and damage to the watershed, the lower portions of which are important for drinking water.
3) Korindo began clearing the PT GMM area in 2012 and by 2015 more than half of the concession was cleared and planted with oil palm. The commercial logging and clearing were mostly complete prior to the HCV assessment being carried out.
4) The HCV Assessment team directly observed and identified approximately 9 local or provincial endemic species of fauna and more than 20 species which are listed under CITES, the IUCN Redlist, and/or Indonesian Regulations in the forest adjacent to the cleared and planted areas. The remaining forest fragments were proxies for the forest which was cleared. Therefore, it is beyond reasonable to conclude that the forest which was cleared was the habitat of many of these endemic species.

5) A portion of the remaining forested area was classified as high-priority HCS (following the decision tree) in the Korindo HCS report. The primary data in that report, supports the conclusion that the remaining forest is HCS and the historical imagery indicates that it would be a suitable proxy for the forest which was cleared by Korindo.
6) Photographs of the area from the HCV report were taken during the clearing of the Korindo concession at PT GMM and depict destruction of riparian areas, logging, and clearing of the forest and steep slopes. These photos corroborate the information from other sources and validates the use of the remaining forest as a proxy for what was present prior to conversion.
7) The SRTM terrain data presented in the HCV and HCS reports identifies steep slopes which are "off limits" for clearing due the high risk of erosion, damage to springs and destruction of the watershed and water resources. The area which was cleared dominates the high ground and is central to the watershed. There is evidence that the land use conversion at PT GMM has destroyed the upper watershed which supports 20 short rivers and streams which are critical to the surrounding communities.
8) The WWF Global 200 Ecoregions reference the unique biodiversity and particular importance North Maluku's avifauna.
9) There is anecdotal evidence that the land use conversion to oil palm has altered the hexapod invertebrate population, particularly the increase of Coleoptera (beetles) which are pests to both oil palm and coconut trees. Coconuts are traditionally important to the local communities and economy.
10) There is evidence of dispersed yet widespread land use by local communities for subsistence agriculture which was replaced with oil palm. Very little arable land remains available for diverse small-scale agriculture because the peninsula is dominated by oil palm monocrop.
11) While there is evidence that Korindo attempted to avoid some of the riparian areas, this appears to have only been in areas too steep or too wet to clear. In several pictures of the "riparian areas" in the HCV report, woody debris from clearing, landslides and oil palm are all visible in the photos.
12) The erosion and runoff from the area Korindo cleared is visibly increased inside and outside the PT PAL concession after clearing. The runoff, sediment, and debris from the rivers flowing north into the lake from the concession are clearly visible in multiple satellite images.
13) As of January 2019, there are visible signs of repeated land clearing and earthwork (terracing) in areas with steep slopes. The riparian areas are visibly damaged and degraded.
14) The extent of the destruction and degradation to the upper portion of the watershed is significant because it affects the rest of the hydrology. The short-term impacts of the land clearing may have significant impacts on the small streams, rivers and micro-climate

The nearly complete transformation of the southern peninsula of Halmahera Island from a mixture of Moluccan moist forest interspersed with shifting cultivation and small coconut groves to large-scale production of oil palm monocrop has had a profound impact on the landscape. The evidence and chronology of the immutable changes to the landscape is very clear and concise. While we cannot recreate the actual species diversity and population of RTE species in the area, they were known to be present and many were still observed in the small patches of remaining forest fragments. The loss of HCV 1 should be considered destruction because it is not feasible to restore/rehabilitate the area.

The conversion of the PT GMM concession presents unique circumstances because it has changed the landscape of entire southern end of the island which also dominates the entire upper portion of the

watershed. The HCV assessment identified 20 rivers which originate from what is not the oil palm plantation. Even if the riparian zones are restored/rehabilitated, the destruction of HCV 4 has occurred due the clearing of steep slopes, damage to the riparian areas and complete conversion of the watershed to an oil palm plantation. The ecosystem services of the moist forest have been destroyed, potentially changing the microclimate and water resources of the area. This should be a focal point of remediation at PT GMM. The water resources were identified as a critical resource for the surrounding communities. Site surveys and hydrological studies should be done to mitigate the damage and begin restoration of the steep slopes and riparian areas. Since all the streams now originate from within the oil palm concession, it is especially important to mitigate run-off of fertilizer, pesticides and effluent from the mill.