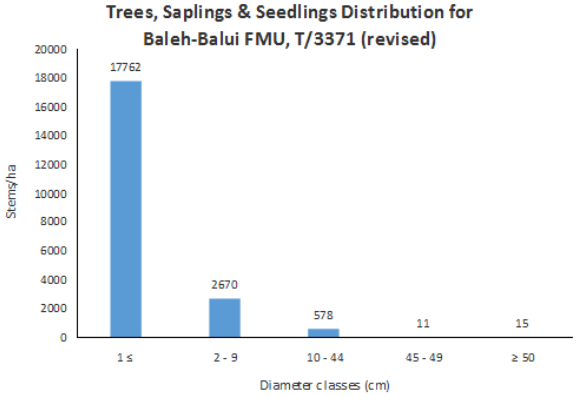
Public Summary

Baleh-Balui FMU (T/3371)

Summary of Monitoring Results on Timber Yield and Forest Conditions

Item	Particulars	Data Source(s)	Interim Results/Remarks
1	Yield of Forest Products	Royalty Volume	• The FMU shall commence timber harvest later in 2023. • Aside from timber, there will be no commercial production of other forest products.
2	Forest Regeneration	To-date, a total of 14 Permanent Sample Plots (PSP) has been established – as stratified by i) terrain classes; ii) timber stocking density; and iii) soil series. The number of PSP within the FMU is to be increased gradually. Two (2) PSP have been re-assessed in Year 2021.	• Regeneration of seedlings and saplings conforms to the *Reverse J-curve* (Whitmore and Burnham, 1984) (**Figure 1**). **Figure 1:** Average stand population distribution (*n*/ha) by diameter classes at Baleh-Balui FMU (T/3371) – derived from the established 14 PSP. 
3a	Condition of the Forest	The collected data from the 2 re-assessed PSP was insufficient.	• The finding is inconclusive, as more re-assessment is needed to be carried out.
3b	Condition of the Forest	10 Diagnostic Sampling Plots (DSP) have been established in the water catchment area in July 2019 (Tasan, 2019).	• The regeneration of undisturbed forest could be used as a benchmark; in comparison with both pre-harvest and post-harvest timber stocking of the production forest.
4	Growth Rate	Similar to Item #3a.	• The MAI was determined based on cross comparison with the stand condition of Bahau-Kahei FMU (T/3236), which is adjacent to FMU T/3371 and shared similar ecological environment. • It is reasonably presumed that there is no substantial difference in the environmental factors; therefore, FMU T/3371 shall adopt the MAI of 1.0 m^3/ha/year to project growth and yield, until more PSP are established progressively and re-assessment is carried out in the future.
	Composition and Observed Changes of Flora and Fauna	**Flora:** Sourced from 14 PSP; Chapters 2, 8 and 10 of *FMP for FMU T/3371*. **Fauna:** Sourced from BRNS (2019).	• Information on the composition of flora and fauna shall form the baseline at this stage paving way for future monitoring. **Flora:** • The total number of enumerated flora species (*i.e.* trees) was 306; which was further segregated into timber groups and growing conditions (**Table 1**). **Table 1:** Total number of enumerated flora species (*i.e.* trees) in FMU T/3371 and segregated into timber groups and growing conditions.

Total Number of Flora Species			
306			
Dipterocarp		Non-Dipterocarp	
42		264	
Light-demanding	Shade-tolerant	Light-demanding	Shade-tolerant
35	7	234	30

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• Across all DBH classes (≥ 10.0 cm), Non-Dipterocarp is dominant than Dipterocarp (Table 2).

Table 2: Average stand density, basal area and gross volume by DBH classes and timber groups based on enumerated 14 PSP.

<table>
<tr><th rowspan="2">Timber Group</th><th colspan="3">Parameters</th></tr>
<tr><th>Stems (n/ha)</th><th>Basal Area (m^2/ha)</th><th>Volume (m^3/ha)</th></tr>
<tr><td>Dipterocarp</td><td>142</td><td>7.34</td><td>74.13</td></tr>
<tr><td>Non-Dipterocarp</td><td>518</td><td>20.96</td><td>203.31</td></tr>
<tr><td>Total</td><td>660</td><td>28.30</td><td>277.44</td></tr>
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Fauna:
• Mammals, avifauna and herpetofauna were enumerated using four indices at the highest level (Table 3).

Table 3: Population dynamics of mammals, avifauna and herpetofauna in FMU T/3371.

<table>
<tr><th>Method</th><th>Shannon-Weiner Diversity Index (H')</th><th>Shannon's equitability index (Evenness, E_H)</th><th>Simpson's Diversity Index (D_S)</th><th>Margalef Species Richness Index</th></tr>
<tr><td>Mammals (Line transect)</td><td>2.68</td><td>0.54</td><td>0.15</td><td>3.85</td></tr>
<tr><td>Mammals (Camera trapping)</td><td>1.80</td><td>0.30</td><td>0.25</td><td>2.53</td></tr>
<tr><td>Avifauna</td><td>3.97</td><td>0.92</td><td>0.02</td><td>11.40</td></tr>
<tr><td>Herpetofauna</td><td>2.61</td><td>0.47</td><td>0.08</td><td>3.78</td></tr>
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• Based on the findings by rapid assessment, the current forest condition is still providing a reasonable habitat for the well diverse and rich fauna species present in the FMU (Table 4).

Table 4: The recorded number of families and species of fauna in FMU T/3371.

<table>
<tr><th>Fauna Type</th><th>Number of Families</th><th>Number of Species</th></tr>
<tr><td>Mammals</td><td>12</td><td>26</td></tr>
<tr><td>Avifauna</td><td>27</td><td>73</td></tr>
<tr><td>Herpetofauna</td><td>8</td><td>22</td></tr>
</table>

• The abundance of fauna in FMU T/3371 could be due to the availability of food sources in the still intact forest landscape and less pressure from hunting.
• However, the level of hunting by outsiders is expected to increase due to the ease of road accessibility to Baleh HEP.
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<td>6</td>
<td>Environmental Impacts of Forest Operations</td>
<td>At FMU level → HCVF Assessment Report.

At operational level → Environmental Compliance Audit (ECA) Report, made under the NRE (Audit) Rules, 2008 covering on:
a. Biodiversity conservation;
b. Forest harvesting operations;
c. Control of soil erosion and sedimentation;
d. Protection of water quality;
e. Waste disposal management; and
f. Abandonment plan.</td>
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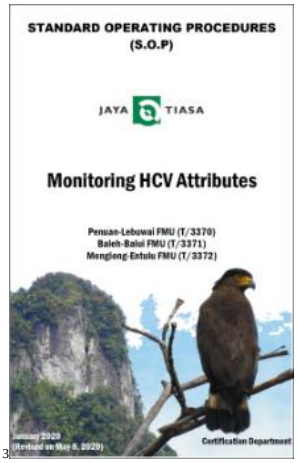
• HCV attributes 1 – 4 identify the environmental aspects complete with appropriate mitigation measures (Figure 2) and their levels of implementation are been described in the HCV monitoring report. It also follows Guideline 5 of The Green Book (FDS, 2019a).

Figure 2: The 'SOP on Monitoring HCV Attributes' at FMU level.



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- Internal Audit for FMU T/3371 – against *MC&I SFM* – has been conducted twice on 24th – 25th April 2019 and 18th – 20th September 2020; followed by Verification Audit on 8th – 9th December 2020 (**Figure 3**). The summary of audit findings is as shown in **Table 5**; and follow-up actions shall be taken to address the non-compliances.

Figure 3: A combo picture showing cover pages on Internal Audit and Verification Audit findings for FMU T/3371.

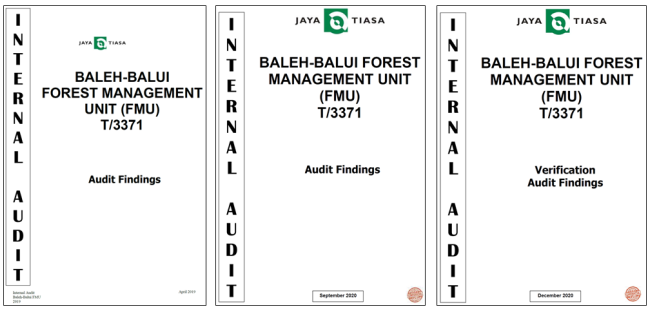
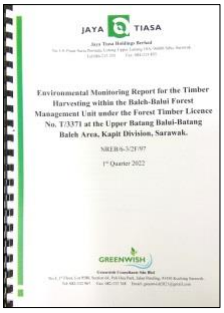


Table 5: The summary of audit findings for FMU T/3371.

Type of Audit	Compliance	Non-Compliance
First Internal Audit (April 2019)	66%	34%
Second Internal Audit (September 2020)	61%	39%
Verification Audit (December 2020)	80%	21%

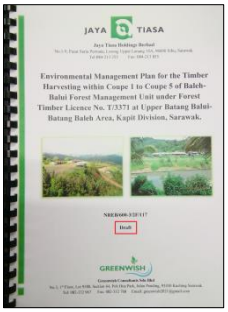
- The first '*Environmental Monitoring Report (EMR) for FMU T/3371*' was conducted in March 2022 (**Figure 4**). No major pollution has been detected and the water quality was found to be good.

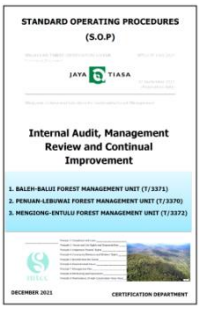
Figure 4: The EMR for FMU T/3371 (Q1; 2022).



- In the active coupe, road density at 8.7 m/ha and skid trail density at 51.6 m/ha are within the permissible limits, *i.e.* below the 10 m/ha – 13 m/ha (road density) and 80 m/ha – 90 m/ha (skid trail density), respectively. In addition, the 20-m width of Stream Buffer Reserve (SBR) has also been demarcated on both banks of permanent waterways (*Guideline 10A* of *The Green Book* (FDS, 2019b)).
- Moreover, the '*Environmental Monitoring Plan (EMP)*' covering Coupes 01A – 05A have been drafted and pending approval (**Figure 5**).

Figure 5: The draft copy of EMP for FMU T/3371 (Coupes 01A – 05A).



7	Social Impacts of Forest Operations	At the FMU level: • HCVF Assessment Report; and • Social Impact Assessment (SIA) Report At the operational level: • Environmental Compliance Audit (ECA) report under NRE (Audit) Rules, 2008; covering locals and forest workers on: o Occupational Safety and Health (OSH); o Road and River Traffic Safety; and o Socio-Economic Consideration. • Internal audit.	• HCV attributes 5 – 6 identifying the basic needs and cultural values of the local communities in Long Unai, Long Busang, Long Singut and Rantau Penora. • In the SIA report, four key impacts comprising water supply and qualities, livelihood, air and noise pollution and social cultural life were studied: o Out of the 4 key impacts, water supply and qualities and livelihood (forest resources) were identified as major impacts; o Despite the negative impact on river quality from previous harvesting, the locals are less dependent on water supply from river for daily usages. Instead, they rely on gravity feed water supply; o Some degree of siltation has also occurred from previous harvesting activities, but it has not caused disruption to the river transportation by locals for conducting farming mostly along the river; o A higher degree of difficulty in obtaining some of the forest resources nearby the village, such as rattan, fish, wild fruits and construction material; and o The FMU shall monitor the major impacts once in every five years, *i.e.* based on the *SOP on SIA* (**Figure 5**). **Figure 5:** The '*SOP on SIA plus Monitoring from Harvesting and Management Operations*' at FMU level.  • In addition, the annual internal audit shall be conducted, *i.e.* based on the *SOP on Internal Audit, Management Review and Continual Improvement* (**Figure 6).** **Figure 6:** The '*SOP on Internal Audit, Management Review and Continual Improvement*' at FMU level.  • To safeguard the basic needs of the local communities, the FMU has already put the RIL practices in place. • The CRC has been established and endorsed by FDS; with the 1 – 3 meetings to-date; acting as one of the channels for FPIC process. Until now, no major issue has been encountered. • The FMU has strived to prioritize the employment for the local communities from Long Busang, Long Unai, Rantau Penora and Long Singut. To-date, the FMU is currently employs 19 local people as dump truck operator; assistant chief mechanic and mechanics; log scalers; chief storekeeper; forest surveyors and also as a security guard; with 74% of the work force came from Long Busang and 26% are from Long Unai.

			• On CSR to the affected communities, the FMU has made contributions in various forms. It includes the regularly maintained road leading to Long Busang and also other contributions to benefit the community. • The FMU has met all of the OSH as stipulated under OSHA, 1994: o Health, Safety and Environment (HSE) Policy has been communicated to all employees through training and displayed the policy at notice board at several designated locations; o risk assessment has been conducted for all main and support operations in the FMU and documented in the HIRARC register; o Safety Operation Procedures (SOP) and training programs for all type of works have been disseminated to forest workers; o Safety and Health Committee (SHC) has been set up to discuss on HSE-related matters regularly; o Emergency Response Team (ERT) has been established to assist and prepare for any unforeseen circumstances; and o hazardous areas with proper signages at the work sites have been identified and demarcated.
8	Forest Protection		• The FMU Production Area has been encroached for farming purposes – especially by some members of the Long Busang community, due to easy access via logging road. • The case has been reported to FDS and remedial actions have been drawn up and shall be implemented in stages.
9	Productivity and Efficiency of Forest Management		• The FMU is yet to commence timber harvest; however, the productivity of Pre-harvest team is between 6 – 7 mandays/ha. • The FMU shall extend similar study into other areas such as PSP and DSP establishment and assessment; including boundary demarcation and/or monitoring, *etc*.; and to produce useful figures for more accurate cost control.
10	Cost of Forest Management		• Operational cost is at its lower point at this juncture. The projected production cost for Financial Year 2022 is about RM489.00/m^3 – when timber harvesting commences later in 2022. • In addition to the harvesting and transport cost, the total production cost has also factored in the cost of R&D, RIL, training, protection, monitoring and other key activities. • Bottom line is slim with tighter budget on more prudent spending. • Measures to improve log production are pertinent, coupled with better productivity and efficiency.

References

FDS. 2019a. Guideline 5: Guidelines for monitoring of High Conservation values. Pp. 127 – 133. In *The Green Book: Manuals, Procedures and Guidelines for Forest Management Certification in Sarawak (Natural Forest)*. Management and Planning Division, Forest Department Sarawak. 284 p.

FDS. 2019b. Guideline 10A: RIL for ground-based harvesting system (Part 1). Pp. 215 – 244. In *The Green Book: Manuals, Procedures and Guidelines for Forest Management Certification in Sarawak (Natural Forest)*. Management and Planning Division, Forest Department Sarawak. 284 p.

BRNS. 2019. *Baseline Information of Status and Population Dynamics of Mammal, Avifauna and Herpetofauna Species in Baleh-Balui FMU, Timber License No. T/3371, Batang Balleh, Kapit Division, Sarawak*. April 2019. Biodiversity Resource Network, Sarawak. 60 p.

Tasan, J. 2019. *An Inventory Report on Forest Stocking in an Undisturbed Forest, Coupe 01, Baleh-Balui FMU (T/3371)*. October 2019. Forest Certification Department, Jaya Tiasa Holdings Berhad. 52 p.

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This document has been updated on 27th January 2023 (Friday).