

Executive Summary

High Conservation Value (HCV) assessment for Northern Gunung Rara Sustainable Forest Management project area was carried out through field assessment in March 2015 and also attaining secondary data from management team and previous HCV report by Wong et al 2010. The main objective of this assessment is to enhance relevant information on the HCV elements within the NGR project area. A multidisciplinary team carried out the assessment with experienced assessors from various fields. Generally, all HCV elements are found to be present were elaborated for NGR project area. Appropriate management and monitoring actions have been recommended and discussed with the management team for further actions to be undertaken. Based on the High Conservation Values in Northern Gn Rara Forest Management Unit (July 2016), the HCV's identified present in NGR Project area is as follows:

1. HCV 1: Biodiversity Values
 - a. HCV 1.1: Protected Area
 - b. HCV 1.2: Threatened and Endangered Species
 - c. HCV 1.3: Endemic Species
 - d. HCV 1.4: Critical Temporal Use
2. HCV 2: Landscape Level Forest
3. HCV 3: Ecosystems
4. HCV 4: Services to Nature
 - a. HCV 4.2: Forest Critical to Erosion Control
 - b. HCV 4.3: Forest Providing Barriers to Destructive Fire
5. HCV 6: Cultural Identity of Local Community

All HCV identified were monitored according to the recommendation of the High Conservation Values in Northern Gn Rara Forest Management Unit (July 2016) report done by Forest Research Center. Periodic monitoring activities were established for all identified HCV's i.e. patrolling and surveillance activities, wildlife monitoring (5 methods established), and establishments of PSP Plots for HCV 1. On a landscape level (HCV 2), NGR project area forms a critical link that connects the three larger undisturbed natural forest of protected areas, namely Danum, Imbak Canyon and Maliau Basin forest reserves to support greater landscape connectivity of lowland areas Retaining the whole FMU under conservation and natural forest management functional zones is the best effort in maintaining the forest ecosystem function as forest corridor for plant dispersal and also acts as a transient wildlife migratory path between the different forest reserves it borders. Most of southern border of NGR project area is bordering oil palm estate. Furthermore, secondary vegetation dominates most of the peripheral area of the reserves that mostly susceptible to fire in comparison to pristine forest. A 50 m band of moderate to high forest structure inside the project area that border local communities land and oil palm estate are categorised as HCV 4.3. Nine teriti or heirs from Kg Kuamut carry out the edible nest collection at VJR Batu Timbang and they have obtained the collection permits from Sabah Wildlife Department. The continuous survival of the swiftlet that produce edible nests is highly dependent of the quality of food that are found outside of the limestone caves. The protection and preservation of mixed dipterocarp forest and limestone vegetation that is indicated as HCV 6 is crucial in order to support the cultural value of some Kg Kuamut villager. Continuous consultation with the stakeholder were established and strengthened through frequent meetings.

Analysis of the effectiveness of monitoring program was done and elaboration of the analysis was explained through this report. Improvements were seen in the effectiveness of conducting more frequent patrolling and surveillance in HCV 1 monitoring program i.e increase in patrolling frequency, extensive wildlife monitoring in all methods, and also maintaining all established PSP Plots. Frequent monitoring program covering the entire Project site for ensuring the link between the three larger undisturbed natural forests of protected areas, namely Danum, Imbak Canyon and Maliau Basin were done (HCV2). Re-enumeration of all PSP Plots and establishing new PSP plot covers the activities done for HCV 3. Water sampling were done in 4 locations to monitor HCV 4.2 Erosion Control, while frequent patrolling along the Forest Barrier of the 50 m band of moderate to high forest structure inside the project area that border local communities land and oil palm estate covers HCV 4.3. The Project Team also strengthened the relationship with the Birds' Nest Collectors of Bt Timbang Cave through continuous consultation and conflict resolution, which covers HCV6.

ANALYSIS REPORT ON THE EFFECTIVENESS OF HCV MONITORING IN NORTHERN GN RARA SFM PROJECT.

1.0 Objectives:

1. To evaluate the effectiveness by which HCV management and protection measures to maintain and/ or enhance the pertinent conservation attributes
2. As a guidance for Forest Manager to modify/ adjust/ enhance HCV management prescription to cater for any weaknesses
3. To comply with FSC indicator 9.4.3 and to close Minor CAR in the last surveillance audit

References:

- Annual Report 2013
- Annual Report 2014
- Annual Report 2015
- Annual Report 2016
- Wildlife monitoring report 2014
- Wildlife monitoring report 2015
- Wildlife monitoring report 2016
- Wildlife monitoring report 2017
- Quarterly wildlife monitoring 2014-2017
- List of Enforcement Activities/ Arrests/ Prosecution Cases 2013 – 2017
- High Conservation Values in Northern Gunung Rara Forest Management Unit: Assessment Report and Management Recommendations (July 2016)
- Annual Environmental Monitoring Program Report 2017
- Quarterly Report 2017

2.0 HCV Attributes/ Elements found in Northern Gn Rara SFM Project area, the management prescription and monitoring activities:

HCV	Findings	Management Prescription	Monitoring
1.1	Northern Gunung Rara Sustainable Forest Management Project Area is about 69,777.36 ha and consist of six Totally Protected Area, i.e. Mt Magdalena FR (Class I), Gunung Rara Wildlife Corridor (Class 1), part of Maliau Buffer Zone (ext) Class 1, Borthern Gunung Rara FR (Class 1), Batu Timbang FR (Class VI) and Imbok FR (Class VI).	<ul style="list-style-type: none"> • All designated HCV areas are manage under natural forest Management and no conversion of forest is permitted. • Conduct periodic patrolling and surveillance in accessible HCV areas to curb illegal activities such as encroachment and poaching. Any signs of encroachment should be reported and dealt with immediate actions. • Demarcation of HCV boundaries on the ground for all designated HCVs within the TPAs is not required Since 100 % overlaps occurred among other HCV elements. 	<ul style="list-style-type: none"> • Periodic monitoring and control should be carried out to prevent encroachment in the FMU. • Twice yearly progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing • Reporting of monitoring results of known HCV attributes
1.2	The presence of considerably high number of high conservation significant fauna and flora from both past research findings and the recent HCV assessment may conclude that NGR project area is an important natural plant habitat or for wildlife nesting and foraging habitats	<ul style="list-style-type: none"> • Conduct periodic patrolling and surveillance in designated HCV areas to curb illegal activities, such as encroachment and poaching. • Establish a long-term biodiversity monitoring system for critical forest ecosystem, flora and fauna. • If the management team discover high conservation value plant species (IUCN) red list, prohibited species under Sabah Forestry Department CITES and Sabah Wildlife Enactment) as listed in Appendix II, in permanent sample plots and nature trails in NGR project area, they should be clearly marked on the ground and on the maps. • Migratory pathway of wildlife on logging roads, along streams or wildlife trails in the forest should be marked on the map and kept to ensure wildlife are able to use it for movement within and between forest reserves. • Field staff is required to attend training 	<ul style="list-style-type: none"> • Periodic monitoring and control should be carried out to prevent encroachment in the HCV areas. Any signs of encroachment should be reported and dealt with immediate actions. • Quarterly progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing reporting of monitoring results of known HCV attributes. • Periodic monitoring by conducting re-enumeration of all the trees in the permanent sample plots and to be conducted once every three years to get indication of changes in tree structure and species assemblages. • Periodic monitoring of

		<p>courses on plants and wildlife to further enhance their botanical and wildlife knowledge on species that are currently listed in the threatened, endemic and forestry prohibited lists to ensure they do not harvest or damage and also for monitoring purposes.</p> <ul style="list-style-type: none"> • Update current biodiversity conservation status to management team of the upgrade or downgrading of threat status locally and globally. 	<p>endangered, endemic and migratory wildlife species will be practiced using Wildlife Management System adopted by the management team. Any changes in terms of population count or migratory pathways observed by either researchers or ground staffs, the management team must be alerted.</p>
1.3	<p>The presence of considerably high number of endemic fauna and flora from both past research findings and the recent HCV assessment may conclude that NGR project area is an important natural plan habitat or for wildlife nesting and foraging habitats.</p>	<ul style="list-style-type: none"> • Conduct periodic patrolling and surveillance in designated HCV areas to curb illegal activities, such as encroachment and poaching. Any signs of encroachment should be reported and dealt with immediate actions. • Establish a long-term biodiversity monitoring system for critical forest ecosystem, flora and fauna. • If the management team discover high conservation value plant species (IUCN red list, prohibited species under Sabah Forestry Department, CITES and Sabah Wildlife Enactment) as listed in Appendix II, in permanent sample plots and nature trails in NGR project area, they should be clearly marked on the ground and on the maps. Migratory pathway of wildlife on logging roads, along streams or wildlife trails in the forest should be marked on the map and kept to ensure wildlife are able to use it for movement within and between forest reserves. • Field staff is required to attend training courses on plants and wildlife to further enhance their botanical and wildlife knowledge on species that are currently listed in the threatened, endemic and forestry prohibited lists to ensure they do not harvest or damage and also for monitoring purposes 	<ul style="list-style-type: none"> • Periodic monitoring and control should be carried out to prevent encroachment in the HCV areas. • Quarterly progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing reporting of monitoring results of known HCV attributes. • Periodic monitoring by conducting re-enumeration of all the trees in the permanent sample plots and to be conducted once every three years to get indication of changes in tree structure and species assemblages. • Periodic monitoring of endangered, endemic and migratory wildlife species will be practiced using Wildlife Management System adopted by the management team. Any changes in terms of population count or migratory pathways observed by either researchers or ground staffs, the management team must be alerted
1.4	<p>The limestone karst in Batu Timbang FR is an important nesting site for swiftlet, bats and other troglofauna.</p>	<ul style="list-style-type: none"> • Conduct periodic patrolling and surveillance in designated HCV areas to curb illegal activities such as encroachment and poaching. Any signs of encroachment should be reported and dealt with immediate actions. • In the event that any salt licks and potential nesting sites are found within the NGR area in the future, demarcation of HCV boundaries on the ground and installing clear signage along existing road, foot trails and navigable rivers/streams indicating critical values. 	<ul style="list-style-type: none"> • Periodic monitoring and control should be carried out to prevent encroachment in the HCV area. • In the event that any salt licks and potential nesting sites are found within the NGR project area in the future, periodic monitoring as prescribed above will be conducted.
2	<p>NGR project area forms a critical link that connects the three larger undisturbed natural forest of protected areas, namely Danum, Imbak Canyon and Maliau Basin forest reserves to support greater landscape connectivity of lowland areas.</p>	<ul style="list-style-type: none"> • Conduct periodic patrolling and surveillance in designated HCV areas to curb illegal activities such as encroachment and poaching. Any signs of encroachment should be reported and dealt with immediate actions. • Establish a long-term biodiversity monitoring system for critical forest ecosystem, flora and fauna. • Migratory pathway of wildlife on logging roads, along streams or wildlife trails in the forest should be marked on the map and kept to ensure wildlife are able to use it for movement within and between forest reserves. 	<ul style="list-style-type: none"> • Periodic monitoring and control should be carried out to prevent encroachment in the FMU. • Quarterly progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing reporting of monitoring results of known HCV attributes. • Periodic monitoring by conducting re-enumeration of all the trees in the permanent sample plots and to be conducted once every three years to get indication of changes in tree structure and species assemblages. • Periodic monitoring of endangered, endemic and migratory wildlife species will be practised, using Wildlife Management System adopted by the management team. Any changes in terms of population count or migratory pathways

			<p>observed by either researchers or ground staffs, the management team must be alerted. Similarly, this monitoring prescription also applies to endangered and endemic plants.</p> <ul style="list-style-type: none"> • Long term monitoring of NGR landscape using remote sensing technology and produce forest quality map to be conducted once every three years to detect changes within the reserve and also vicinity areas. If threats are detected, precautionary approached will be taken and potential mitigation measures will be incorporated in the management plan.
3	<p>There are considerable number of plants and animals species but Low in abundance value, including mammals, birds and insects that are listed as endangered or endemics especially those residing in the extreme lowland classified as mixed dipterocarp with mixture of kerangas forest and limestone vegetation.</p>	<ul style="list-style-type: none"> • Conduct periodic patrolling and surveillance in designated HCV areas to curb illegal activities such as encroachment and poaching. Any signs of encroachment should be reported and dealt with immediate actions. • Establish a long-term biodiversity monitoring system for critical forest ecosystem, flora and fauna. 	<ul style="list-style-type: none"> • Periodic monitoring and control should be carried out to prevent encroachment in the HCV areas. • Twice yearly progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing reporting of monitoring results of known HCV attributes. • Periodic monitoring by conducting re-enumeration of all the trees in the permanent sample plots and to be conducted once every three years to get indication of changes in tree structure and species assemblages.
4.1	<p>No area known in NGR to provide as immediate source of water to the surrounding community.</p>	<ul style="list-style-type: none"> • No HCV area is indicated 	<ul style="list-style-type: none"> • No HCV area is indicated
4.2	<p>All areas with slopes >25° and 30 m riparian buffer strips should be categorised as HCV 4.2 for their importance in erosion control.</p>	<ul style="list-style-type: none"> • Conduct periodic patrolling and surveillance in designated HCV areas to curb illegal activities such as encroachment and poaching. Any signs of encroachment should be reported and dealt with immediate actions. 	<ul style="list-style-type: none"> • Periodic monitoring and control should be carried out to prevent encroachment in the HCV areas. • Quarterly progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan.
4.3	<p>Forest barrier of 50 m inside the southern boundaries of NGR project area that bordering oil palm estate are categorised as HCV 4.3.</p>	<ul style="list-style-type: none"> • Conduct periodic patrolling and surveillance in all designated HCV areas to curb illegal activities such as encroachment and poaching. Any signs of encroachment should be reported and dealt with immediate actions. • The Forest Fire Management Plan has to be updated periodically. • Identification of low vegetation structure that is susceptible to catch fire, i.e. grasslands and shrubs along the 50 m band inside the FMU boundaries is crucial. • Forest restoration of Indigenous tree species as part of the remedial action to increase forest structural diversity and mitigate any forest fire incidence spreading into the FMU core area, especially area dominated with lalang grassland and ferns. 	<ul style="list-style-type: none"> • Periodic monitoring and control should be carried out to prevent encroachment in the forest barrier. • Twice yearly progress reports in reporting of the progress of activities as prescribed in the approved Annual Work Plan (AWP), encompassing reporting of monitoring results of known HCV attributes. • Ensure that all fire prevention procedures (monitoring, fire drills, public awareness campaign, etc.) to be practiced on a regular basis (at least once a year), especially during the drought season.
5	<p>No community basic need is indicated within NGRSFM.</p>	<ul style="list-style-type: none"> • No HCV area is indicated 	<ul style="list-style-type: none"> • No HCV area is indicated
6	<p>The mixed dipterocarp forest and limestone vegetation of VJR Batu Timbang are categorized as HCV 6 to depict the cultural value importance for nine <i>teriti</i> of Kg Kuamut</p>	<ul style="list-style-type: none"> • Establish a long-term biodiversity monitoring system for critical forest ecosystem (HCV 6). • NGR management team is to constantly conduct meeting with the village representatives to mitigate any potential issues pertaining to the management of HCV 6. 	<ul style="list-style-type: none"> • The designated HCV 6 should be jointly monitored and maintained by the NGR management team and the nine <i>teriti</i> of the edible bird's nest collection.

3.0 Summary of monitoring activities and actions taken according to HCV Attributes/ Elements by the Project Team:

HCV		Monitoring activities and actions taken by Project Team
1	1.1	<ul style="list-style-type: none"> ▪ Patrolling was conducted all year round ▪ Aerial surveillance conducted twice or more yearly ▪ Inspection of boundaries
	1.2	<ul style="list-style-type: none"> ▪ Re-brushing of main boundaries ▪ Establishment of enforcement gates to curb poaching activities and entering without permit
	1.3	<ul style="list-style-type: none"> ▪ Establishment of two Forest Checking stations for enforcement and monitoring ▪ Consultation with birds nest collectors' and committee was formed.
	1.4	<ul style="list-style-type: none"> ▪ Wildlife monitoring activities conducted extensively, reporting by quarterly and yearly. Five methodologies were used i.e. camera traps, recce walk, night drive survey, gibbon call and Opportunistic sighting. ▪ Establishing PSP Plots and yearly maintenance, re-enumeration conducted in every 3 years ▪ Proper signboards were erected at all main boundaries, as well as all identified HCV area
2		<ul style="list-style-type: none"> ▪ Patrolling was conducted all year round ▪ Aerial surveillance conducted twice or more yearly ▪ Inspection of boundaries ▪ Re-brushing of main boundaries ▪ Establishment of enforcement gates to curb poaching activities ▪ Establishment of two Forest Checking stations for enforcement and monitoring ▪ Wildlife monitoring activities conducted extensively, reporting by quarterly and yearly. Five methodologies used i.e. camera traps, recce walk, night drive survey, gibbon call and Opportunistic sighting. ▪ Establishing PSP Plots and yearly maintenance, re-enumeration conducted in every 2 years ▪ Proper signboards were erected at all main boundaries, as well as all identified HCV area ▪ Silviculture treatment ▪ Rehabilitation Planting
3		<ul style="list-style-type: none"> ▪ Patrolling was conducted all year round ▪ Aerial surveillance conducted twice or more yearly ▪ Inspection of boundaries ▪ Re-brushing of main boundaries ▪ Establishment of enforcement gates to curb poaching activities ▪ Establishment of two Forest Checking stations for enforcement and monitoring ▪ Wildlife monitoring activities conducted extensively, reporting by quarterly and yearly. Five methodologies used i.e. camera traps, recce walk, night drive survey, gibbon call and Opportunistic sighting. ▪ Establishing PSP Plots and yearly maintenance, re-enumeration conducted in every 2 years ▪ Proper signboards were erected at all main boundaries, as well as all identified HCV area
4	4.1	<ul style="list-style-type: none"> ▪ No area known in NGR that corresponds with HCV (4.1). However, yearly assessments of water quality at designated water samples plots were done. ▪ Patrolling was conducted all year round to curb illegal activities such as encroachment to steep areas and riparian ▪ Aerial surveillance conducted twice or more yearly
	4.2	<ul style="list-style-type: none"> ▪ Inspection of boundaries ▪ Re-brushing of main boundaries ▪ Establishment of enforcement gates to curb poaching activities ▪ Establishment of two Forest Checking stations for enforcement and monitoring ▪ Establishing PSP Plots and yearly maintenance, re-enumeration conducted in every 3 years ▪ Proper signboards were erected at all main boundaries, as well as all identified HCV area
	4.3	<ul style="list-style-type: none"> ▪ Forest Fire Management Plan was made available September 2016 forest fire awareness to stakeholders and contractors ▪ Fire drill was conducted on the 5th of April 2017 ▪ Periodic monitoring of Environmental was done according to prescription from the Environmental Impact Assessment report
5		No area known in NGR that corresponds with HCV (5).
6		<ul style="list-style-type: none"> ▪ Consultation with birds nest collectors and committee was formed. ▪ After several Bird Nest's Stakeholder Consultations had been conducted, the Social Forestry Committee had agreed to come up with a cooperation agreement. The purpose of the cooperation agreement is to have an agreement between SFD (NGR SFM Project and the Teritis' and Heirs of the Bird Nest's collectors) on on certain issues (i.e Rules & Regulations, State Forest Policy, etc), without disregarding the welfare of the Teritis' and Heirs of the Bird Nest's collectors.

4.0 Effectiveness of monitoring program and enhancements by each HCV Attributes:

Based on the summary and monitoring activities table above, the effectiveness of the monitoring activities can be elaborated as follows:

HCV 1 BIODIVERSITY VALUES

HCV 1.1 Protected Areas

The protected areas activities in the NGR SFM project are divided into several activities, such as the following:

i. Patrolling and enforcement, arrest, prosecution

Based on the Annual Report 2013 – 2018, occurrence of poachers trying to enter without permission into the project area had increased from (1) case in 2015, to (5) cases in 2017 (entering without permission). However, in 2018 no cases were recorded for trying to enter without permission into the project area. There were no arrests made from 2013 – 2016, but there were (5) arrest made in 2017 and decreased again to (3) case in 2018.

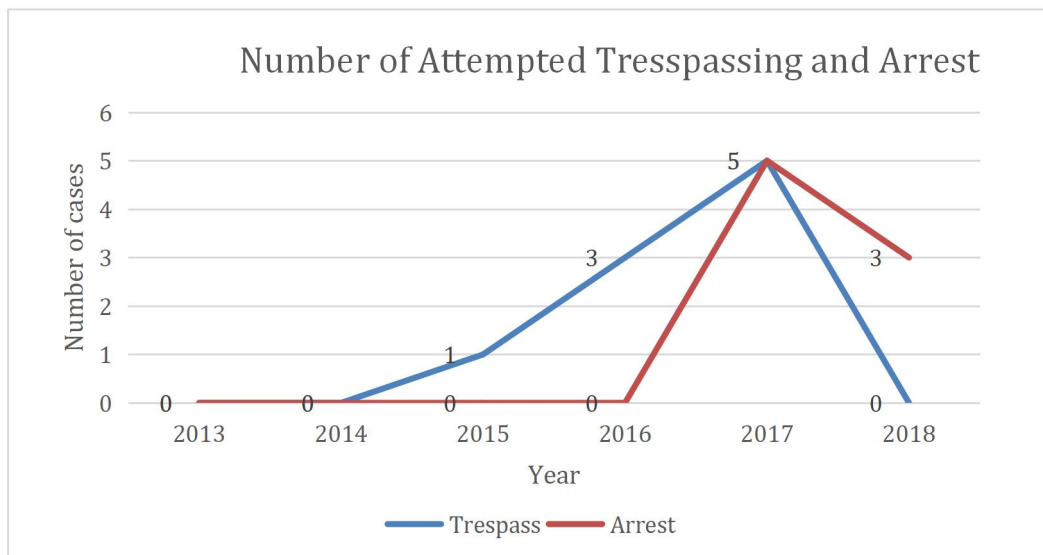


Figure 1

Based on data from 2015 – 2016 the number of attempted trespassing increased, so patrolling, enforcement, arrests, prosecution activities had been intensified. In 2017, the number of attempted trespassing equals the number of arrest. This indicates that all the poachers trying to enter without permission into the project area were captured. In 2018, there were no attempts of trespassing recorded. This indicates that patrolling, enforcement, arrests, prosecution activities were successful.

ii. Aerial Surveillance

Apart from that, the team conducted the aerial surveillance several times per year. Data from year 2014 – 2018 shows data of the frequency of the aerial surveys done. As shown in the graph, the aerial surveillance had not been consistent in yearly hours as it was sometimes difficult to arrange the schedule with the Sabah Air. The frequency as per graph below:

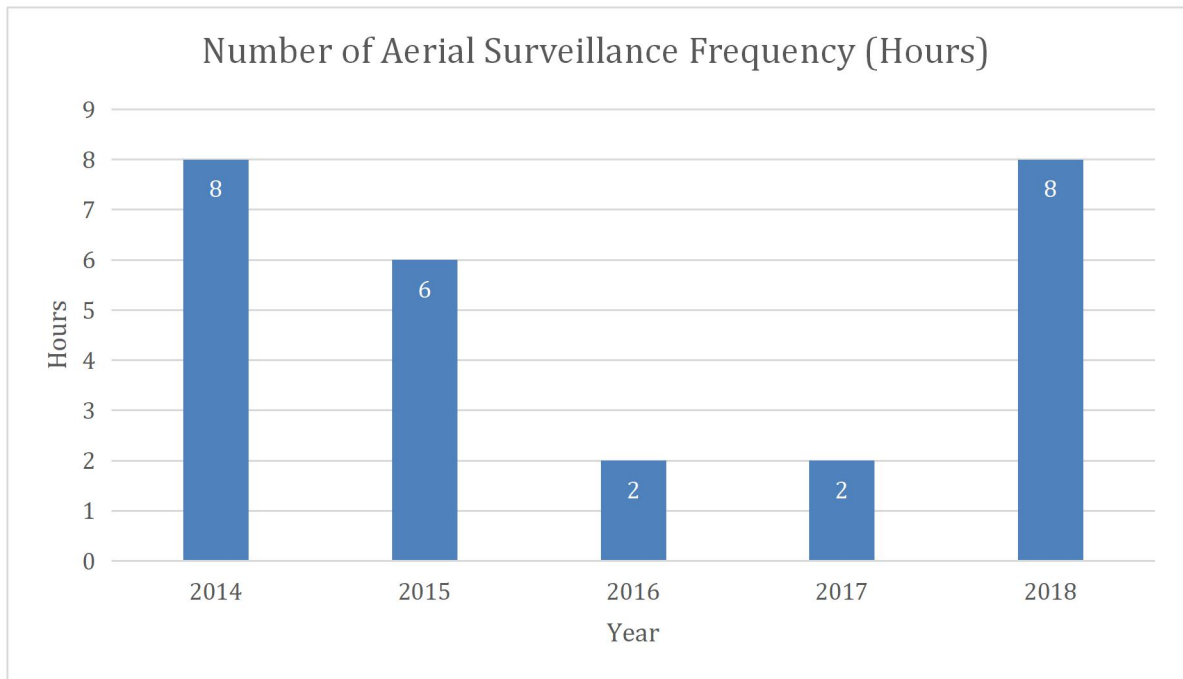


Figure 2



Picture 1: Aerial Surveillance

iii. Inspection of boundaries and re-brushing of NGR SFM Project

As stated in the AWP 2014 – 2017 and also Compliance Report 2014 – 2017, the inspection and re-brushing of main boundaries was conducted 10,000 meter per year. This corresponds to the responsibility of the team Management to protect the project area and installing of proper signages to ensure that all the stakeholders are aware of entering the area. There are few signages had been placed as follows :

- Project signboards on all entries
- Warning signboards on all entries.
- Safety signage.
- Riparian signage
- HCV signage.
- PSP signage.
- Enforcement signage.
- Prohibited activities signage



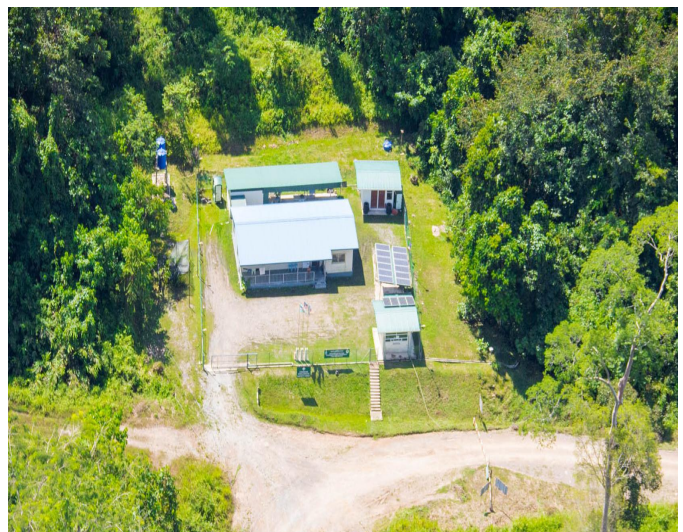
Picture 2: Inspection of Boundary

iv. Establishment of Forest Checking Station

The Project team has established enforcement gates and Forest Checking Stations, in regards to the team’s responsibility to safeguard the HCVs as a whole. The two established Forest Checking Stations are FCS Batu Timbang and FCS Imbok. FCS Bt Timbang was established due to the frequent number of complaints received on poachers entering from the northwestern route of the project area, while FCS Imbok covers the eastern side of the project area.



Picture : Forest Checking Station Bt Timbang



Picture : Forest Checking Station Imbok

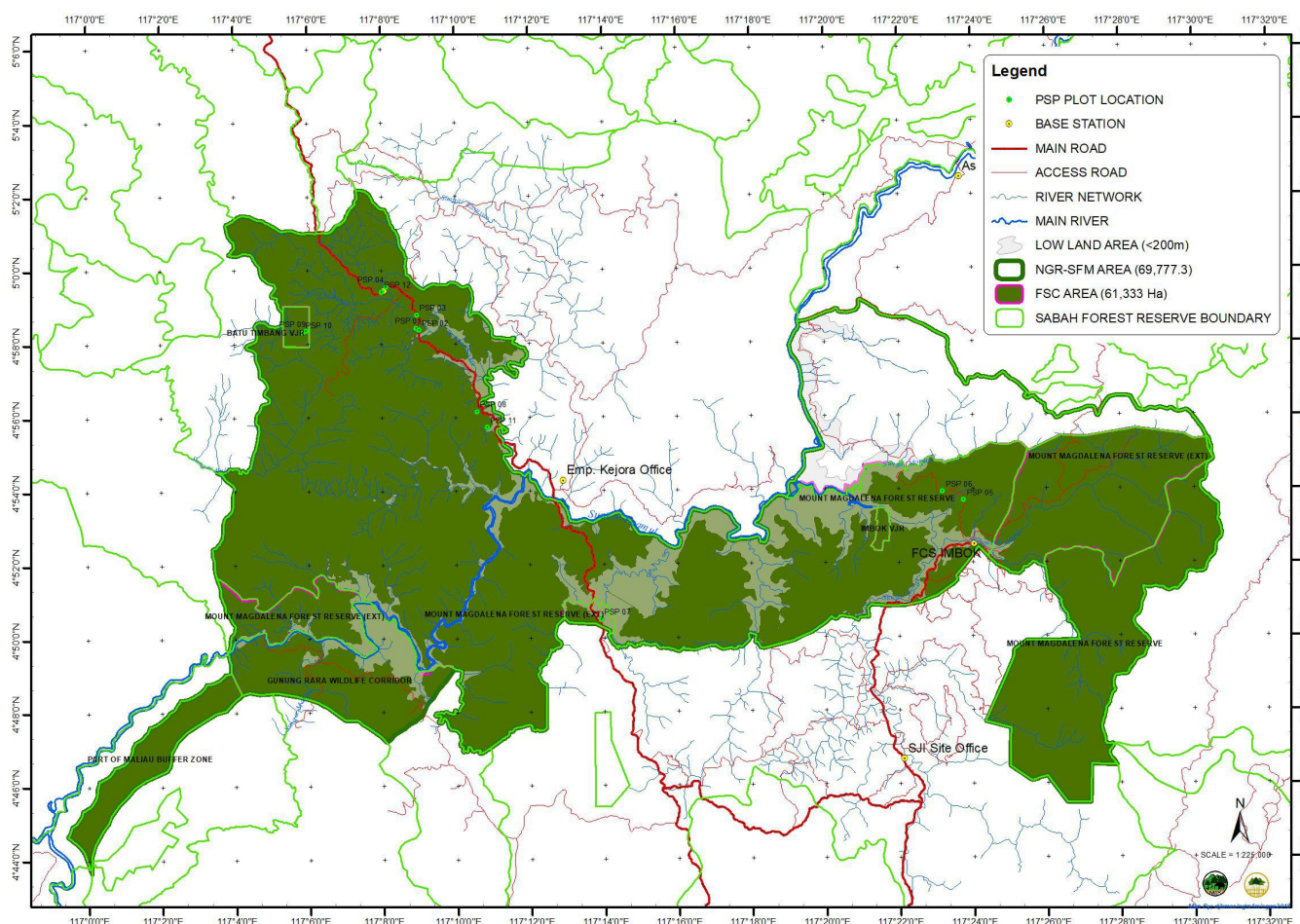
HCV 1.2 Threatened and Endangered Species

FLORA:

Long-term monitoring activities by using permanent sample plots (PSPs) are useful to determine long-term population trends of increase or decrease that can be related to human disturbance or short term fluctuations caused by variations in weather or unpredictable natural catastrophic events.

There are 11 existing PSP Plots, which were established in 2014. Re-enumeration will be done in 3 years, and the recent re-enumeration was done in 2017. Maintenance of the plots was done every year by the Project Field Staffs. The 11 PSP Plots are as the table below:

Plot No.	Latitude	Longitude	Altitude (m)	Soil Association	Forest Formation
1	N 04° 58' 26.0"	E 117° 08' 56.6"	197	Lokan	Lowland Mixed Dipterocarp Forest
2	N 04° 58' 22.6"	E 117° 09' 0.7"	190	Lokan	Lowland Mixed Dipterocarp Forest
3	N 04° 58' 47.3"	E 117° 08' 57.2"	190	Sook	Lowland Mixed Dipterocarp Forest
4	N 04° 59' 33.4"	E 117° 08' 07.8"	223	Lokan	Lowland Mixed Dipterocarp Forest
5	N 04° 53' 41.7"	E 117° 23' 45.7"	307	Crocker	Lowland Mixed Dipterocarp Forest
6	N 04° 53' 55.7"	E 117° 23' 11.7"	283	Crocker	Lowland Mixed Dipterocarp Forest
7	N 04° 50' 30.5"	E 117° 13' 54.8"	188	Kalabakan	Lowland Mixed Dipterocarp Forest
8	N 04° 56' 09.3"	E 117° 10' 34.6"	350	Maliau	Lowland Mixed Dipterocarp Forest
9	N 04° 58' 21.9"	E 117° 05' 57.4"	455	Gomantong	Lowland Mixed Dipterocarp Forest
10	N 04° 58' 19.6"	E 117° 05' 51.8"	532	Gomantong	Upland Mixed Dipterocarp Forest
11	N 04° 55' 43.9"	E 117° 10' 51.4"	267	Maliau	Lowland Mixed Dipterocarp Forest



Map 2: Map showing the locations of the (11) Permanent Sampling Plots within the Project Area

FAUNA:

The NGR SFM Team established (5) methods of wildlife monitoring, that is; (a) Recce Walk Survey; (b) Camera Trapping; (c) Night Drive Survey; (d) Opportunistic Sightings; & (e) Gibbon Call. Of these (5) wildlife monitoring methodology, we analysed (4) of the methods (excluding gibbon call). Below is a table of NGRSFM Wildlife RTE Indicator:

NGRSFM Wildlife RTE Indicator

No	Common name	Family	Scientific Name	WCE (SWD). 1997	CITES	Status IUCN Redlist	Comments	HCV PRIORITY SPECIES
1	Bearded Pig	Suidae	<i>Sus Barbatus</i>	III		Status: Vulnerable ver 3.1 Pop. trend: decreasing		√
2	Bornean gibbon	Hylobatidae	<i>Hylobates funereus</i>	II	I	Status: Endangered ver 3.1 Pop. trend: decreasing	Endemic in Borneo	√
3	Bornean pygmy Elephant	Elephantidae	<i>Elephas maximus borneensis</i>	II (I since June 2013)	I	Status: Endangered ver 3.1 Pop. trend: decreasing		√
4	Clouded leopard	Felidae	<i>Neofelis diardi</i>	I	I	Status: Vulnerable ver 3.1 Pop. trend: decreasing		√
5	Bornean Orangutan	Hominidae	<i>Pongo pygmaeus</i>	I	I	Status: Critically Endangered ver 3.1 Pop. trend: decreasing	Endemic in Borneo	√
6	Sambar Deer	Cervidae	<i>Cervus unicolor</i>	III	II	Status: Vulnerable ver 3.1 Pop. trend: decreasing		√
7	Bornean Sun bear	Ursidae	<i>Helarctos malayanus</i>	I	I	Status: Vulnerable ver 3.1 Pop. trend: decreasing		√
8	Sunda Pangolin	Manidae	<i>Manis Javanica</i>	II (I since 13th Feb 2018)	II	Status: Critically Endangered ver 3.1 Pop. trend: decreasing		√
9	Tembadau (Bornean Banteng)	Bovidae	<i>Bos Javanicus</i>	I	I	Status: Endangered ver 3.1 Pop. trend: decreasing	Endemic in Borneo	√
10	Banded linsang	Prionodontidae	<i>Prionodon linsang</i>	II	II	Status: Least Concern ver 3.1 Pop. trend: decreasing		
11	Banded Palm Civet	Viverridae	<i>Hemigalus dermianus</i>	II	II	Status: Near Threatened ver 3.1 Pop. trend: decreasing		
12	Binturong	Viverridae	<i>Arctictis binturong</i>	II	III	Status: Vulnerable ver 3.1 Pop. trend: decreasing		
13	Black Giant Squirrels	Sciuridae	<i>Ratufa affinis</i>	II		Status: Least Concern ver 3.1 Pop. trend: decreasing		
14	Bornean Mountain Ground Squirrel	Sciuridae	<i>Dremomys everetti</i>	II		Status: Least Concern ver 3.1 Pop. trend: decreasing		
15	Bornean-yellow muntjac	Cervidae	<i>Muntiacus atherodes</i>	III		Status: Near Threatened ver 3.1 Pop. trend: decreasing		
16	Red Muntjac or Barking Deer	Cervidae	<i>Muntiacus muntjak</i>	III		Status: Least Concern ver 3.1 Pop. trend: decreasing		
17	Common Palm Civet	Viverridae	<i>Paradoxurus philippinensis</i>	II		Status: Least Concern ver 3.1 Pop. trend: decreasing		
18	Common Porcupine or Malayan Porcupine	Hystriidae	<i>Hystrix brachyura</i>	III		Status: Least Concern ver 3.1 Pop. trend: decreasing		
19	Crab-eating Mongoose	Herpestidae	<i>Herpestes urva</i>	II		Status: Near Threatened ver 3.1 Pop. trend: decreasing		
20	Sunda Giant Squirrel	Sciuridae	<i>Ratufa affinis sandakanensis</i>	II		Status: Near Threatened ver 3.1 Pop. trend: decreasing		
21	Greater Mouse-deer	Tragulidae	<i>Tragulus napu</i>	III		Status: Least Concern ver 3.1 Pop. trend: decreasing		
22	Leopard Cat	Felidae	<i>Prionailurus bengalensis</i>	II	II	Status: Least Concern ver 3.1 Pop. trend: decreasing		
23	Lesser Mouse-deer	Tragulidae	<i>Tragulus kanchil</i>	III		Status: Least Concern ver 3.1 Pop. trend: decreasing		
24	Long-tailed Macaque	Cercopithecidae	<i>Macaca fascicularis</i>	II	II	Status: Least Concern ver 3.1 Pop. trend: decreasing		
25	Long-tailed Pocupine	Hystriidae	<i>Trichys fasciculata</i>	II		Status: Least Concern ver 3.1 Pop. trend: decreasing		
26	Malay Civet	Viverridae	<i>Viverra zangalunga</i>	II		Status: Least Concern ver 3.1 Pop. trend: decreasing		
27	Mask Palm Civet	Viverridae	<i>Paguma larvata</i>	II		Status: Least Concern ver 3.1		

						Pop. trend: decreasing		
28	Otter Civet	Viverridae	<i>Cynogale bennettii</i>	II		Status: Endangered ver 3.1 Pop. trend: decreasing		
29	Pig-tailed macaque	Cercopithecidae	<i>Macaca nemestrina</i>	II	I	Status: Vulnerable ver 3.1 Pop. trend: decreasing		
30	Plantain Squirrel	Sciuridae	<i>Callosciurus notatus</i>	II		Status: Least Concern ver 3.1 Pop. trend: decreasing		
31	Prevost's Squirrel	Sciuridae	<i>Callosciurus prevostii</i>	II		Status: Least Concern ver 3.1 Pop. trend: decreasing		
32	Red Giant Flying Squirrel	Petauristinae	<i>Petaurista petaurista</i>	II		Status: Least Concern ver 3.1 Pop. trend: decreasing		
33	Short-tailed Mongoose	Herpestidae	<i>Urva brachyurus</i>	II		Status: Near Threatened ver 3.1 Pop. trend: decreasing		
34	Slow loris	Lorisinae	<i>Nycticebus menagensis</i>	II	I	Status: Vulnerable ver 3.1 Pop. trend: decreasing		
35	Small-clawed Otter	Mustelidae	<i>Aonyx cinerea</i>	II	II	Status: Vulnerable ver 3.1 Pop. trend: decreasing		
36	Smooth Otter	Mustelidae	<i>Lutra perspicillata</i>	II		Status: Vulnerable ver 3.1 Pop. trend: decreasing		
37	Thick-Spined Porcupine	Hystricidae	<i>Hystrix crassispinis</i>	II		Status: Least Concern ver 3.1 Pop. trend: decreasing	Endemic in Borneo	
38	Thomas's Flying Squirrel	Petauristinae	<i>Aeromys thomasi</i>	II		Status: Least Concern ver 3.1 Pop. trend: decreasing	Endemic in Borneo	
39	Tufted ground squirrel	Sciuridae	<i>Rheithrosciurus macrotis</i>	II		Status: Vulnerable ver 3.1 Pop. trend: decreasing		
40	Water Monitor		<i>Varanus salvator</i>	III				
41	Yellow-throated Marten	Mustelidae	<i>Martes flavigula</i>	II		Status: Least Concern ver 3.1 Pop. trend: decreasing		
42	Asian Koel		<i>Eudynamis scolopacea</i>					
43	Black Hornbill		<i>Anthracoceros malayanus</i>					
44	Blue-Headed Pitta		<i>Pitta baudii</i>				Endemic in Borneo	
45	Bornean Banded Pitta		<i>Pitta guajana</i>				Endemic in Borneo	
46	Bornean Crested Fireback		<i>Lophura Ignita</i>				Endemic in Borneo	
47	Bornean Ground Cuckoo		<i>Carpococcyx radiatus</i>				Endemic in Borneo	
48	Crested Serpent Eagle		<i>Spilornis cheela</i>					
49	Darter		<i>Anthracoceros malayanus</i>					
50	Emerald Dove		<i>Chalcophaps indica</i>					
51	Great Argus		<i>Anhinga melanogaster</i>					
52	Great Egret		<i>Ardea alba</i>					
53	Greater Coucal		<i>Centropus sinensis</i>					
54	Purple Heron		<i>Ardea purpurea</i>					
55	Rhinoceros Hornbill		<i>Buceros rhinoceros</i>					
56	White-crowned Shama		<i>Copsychus stricklandii</i>				Endemic in Borneo	

Ref 1: Convention on International Trade in Endangered Species of Wild Fauna and Flora. The CITES Appendices.

<http://www.cites.org/eng/app/index.php>. Retrieved 22nd March 2018

Ref 2: The IUCN Red list of Threatened Species; www.iucnredlist.org. retrieved 22nd March 2018

Note:

5 sp. (sch. I) totally protected:-(1)Bornean Pygmy Elephant, (2)Clouded Leopard, (3)BorneanOrangutan, (4)Bornean Sun Bear & (5)Tambadau/Banteng

28 Sp. Sch. II (species protected - license limited):-(1)Bornean Gibbon, (2)Banded Linsang, (3)Binturong, (4)Long Tailed Porcupine,Malay Civet,...

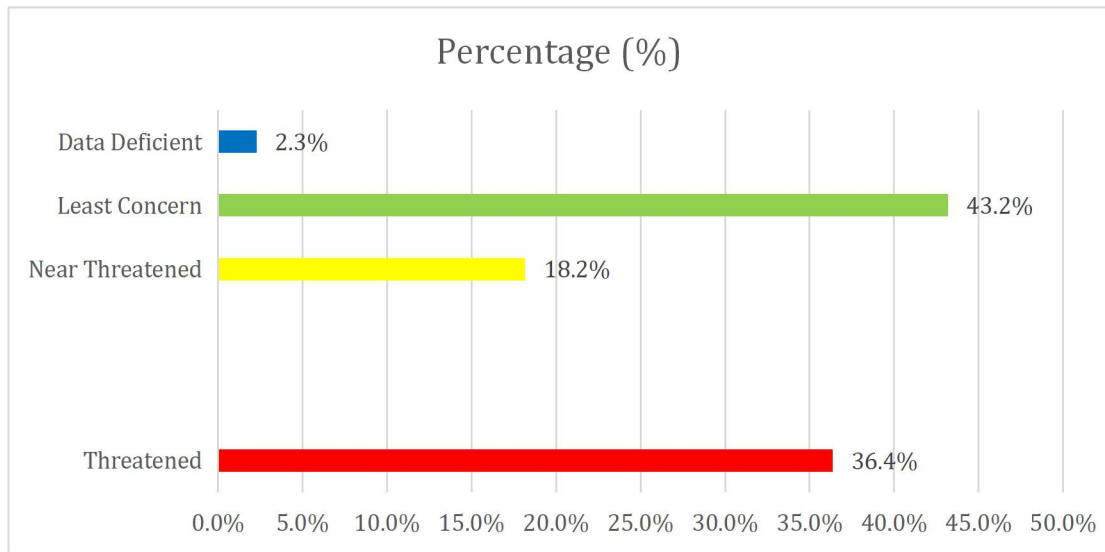
9 sp. sch. III (hunt with license):-(1)bearded pig, (2) sp. barking deer, (3) Sambar Deer, (4) sp. mouse deer, Water Monitor, common porcupine,...

9 Sp. (HCV Priority):-(1)Bearded Pig,(2)Bornean Gibbon, (3)Bornean Pygmy Elephant, (4)Clouded Leopard, Bornean Orangutan, Sambar Deer, Bornean Sun Bear, Sunda Pangolin& Tambadau.

10 Sp. (Edemic in Borneo):-**5 Mammals**-(1)Bornean Gibbon, (2)Bornean Elephant, (3)Tambadau, (4)Thick-Spined porcupine, (5)Thomas's Flying Squirrel :-**5 Birds Sp.**(1)Bornean Banded Pitta, (2)Blue Headed Pitta, (3)Bornean Ground Cuckoo,Cersted Fireback & White-crowned Shama

Based on the data collected from all the wildlife monitoring methods, the status of NGR RTE by percentage are as follows:

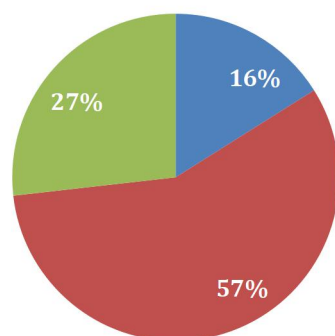
Status NGR RTE					
Status IUCN Redlist	No. of Wildlife Species (Mammals)	Percentage (%)	Remarks	Percentage (%)	
Critically Endangered	2	4.5%	Threatened	36.4%	
Endangered	4	9.1%			
Vulnerable	10	22.7%			
Near Threatened	8	18.2%	Near Threatened	18.2%	
Least Concern	19	43.2%	Least Concern	43.2%	
Data Deficient	1	2.3%	Data Deficient	2.3%	
Total	44	100%		100%	



Compare Species

STATUS	# OF SPECIES	PERCENTAGE (%)
HCV PRIORITY SPECIES	9	16%
OTHER MAMMAL'S SP.	32	57%
BIRD'S SP.	15	27%
Total	56	100%

CARTA PERBANDINGAN DATA SPESIS DARI 2014-2017



■ HCV PRIORITY SPECIES ■ OTHER MAMMAL'S SP. ■ BIRD'S SP.

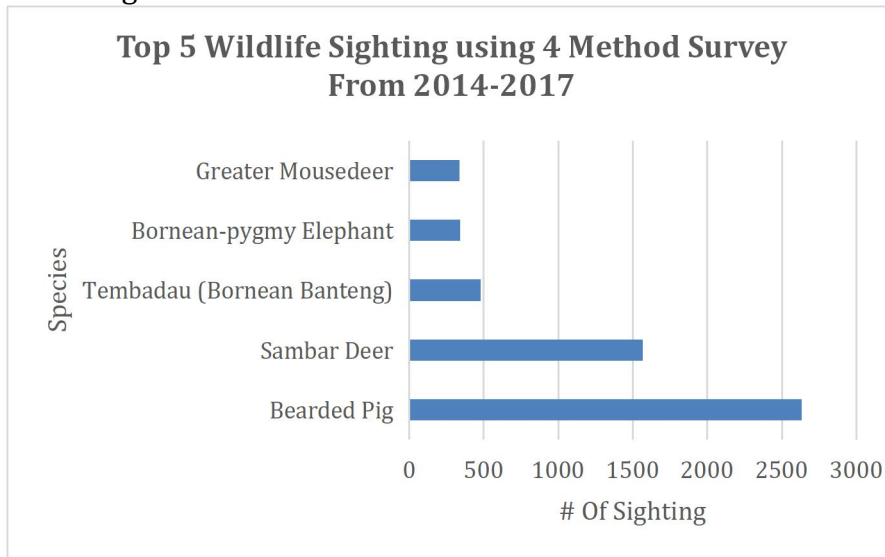
There are 9 HCV Priority species found in NGR SFM Project Area; (Bearded Pig, Borneon Gibbon, Borneon Pygmy Elephant, Clouded Leopard, Borneon Orangutan, Sambar Deer, Borneon Sun Bear, Sunda Pangolin and Tembadau/Borneon Banteng). This consists of 16% of species found in NGR SFM Project area based on the data collected. Other Mammals is 57%, and birds consists of 27% surveyed.

Figure 3: Carta Perbandingan Data Spesies

Top 5 Wildlife From 2014 to 2017

No	Scientific Name	Common name	RWS	CT	NDS	OS	TOTAL
1	<i>Sus Barbatus</i>	Bearded Pig	232	2219	61	120	2632
2	<i>Cervus Unicolor</i>	Sambar Deer	174	1272	59	60	1565
3	<i>Bos Javanicus</i>	Tembadau (Bornean Banteng)	11	459	1	9	480
4	<i>Elephas Maximus</i>	Bornean-pygmy Elephant	47	114	45	137	343
5	<i>Tragulus Kanchil</i>	Greater Mousedeer	35	294	1	6	336

Figure 4:



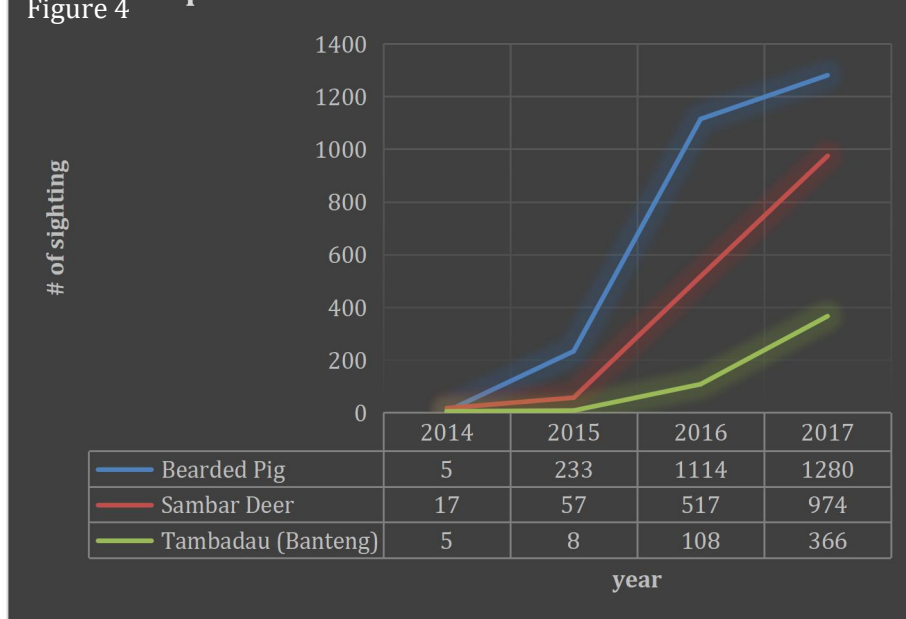
Based on the analysis, Bearded Pig recorded the most sightings in (3) of the methods (Recce Walk Survey, Camera Trap and Night Drive Survey). Whereas the Borneon pygmy Elephant recorded the most through Opportunistic

Top 3 Wildlife Frequen From 2014-2017

		2014	2015	2016	2017
1	<i>Sus Barbatus</i>	5	233	1114	1280
3	<i>Cervus Unicolor</i>	17	57	517	974
4	<i>Bos Javanicus</i>	5	8	108	366

Figure 4

Top 3 Wildlife Dominan from 2014 to 2017

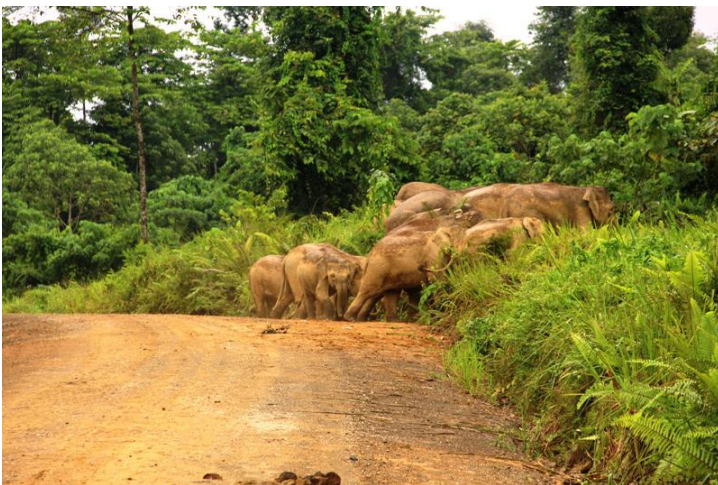
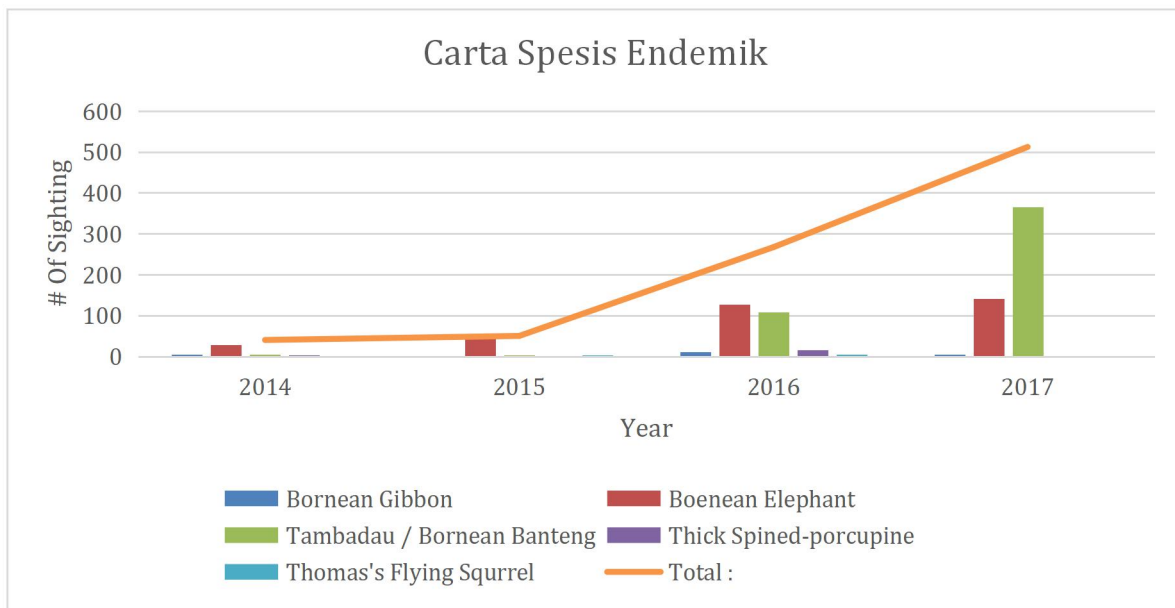


Based on the analysis, Bearded Pig recorded the most sightings in (3) of the methods ((Recce Walk Survey, Camera Trap and Night Drive Survey). Whereas the Borneon pygmy Elephant recorded the most through Opportunistic sighting method.

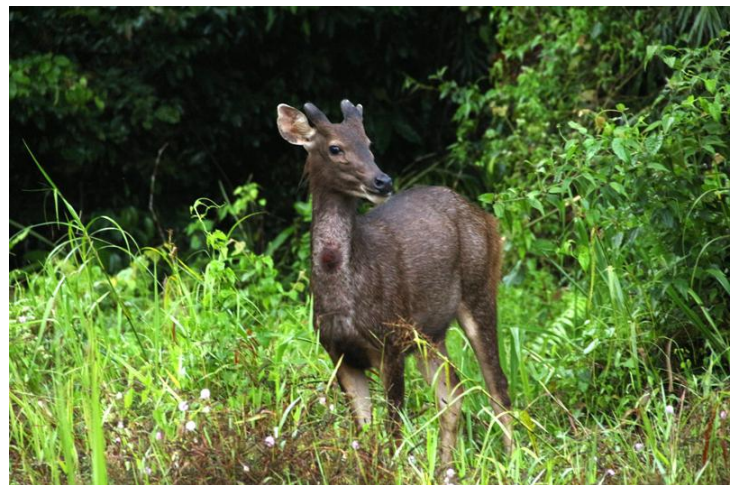
HCV 1.3 Endemism

There are five known endemic species of wildlife found in the Project Area. Based on the analysis result of the wildlife monitoring, there have been a steady increase of sightings of (2) endemic species. Irregular projection was detected for (3) o the species.

	2014	2015	2016	2017
Bornean Gibbon	5	0	11	5
Boenean Elephant	29	46	127	141
Tambadau / Bornean Banteng	5	1	108	366
Thick Spined-porcupine	1	0	16	0
Thomas's Flying Squirrel	0	3	5	0
Total :	40	50	267	512



Picture : a herd of Borneon Pygmy Elephants taken during opportunistic sightings



Picture : Sambar Deer taken during opportunistic sightings



Picture: Orang Utan – Camera Trap



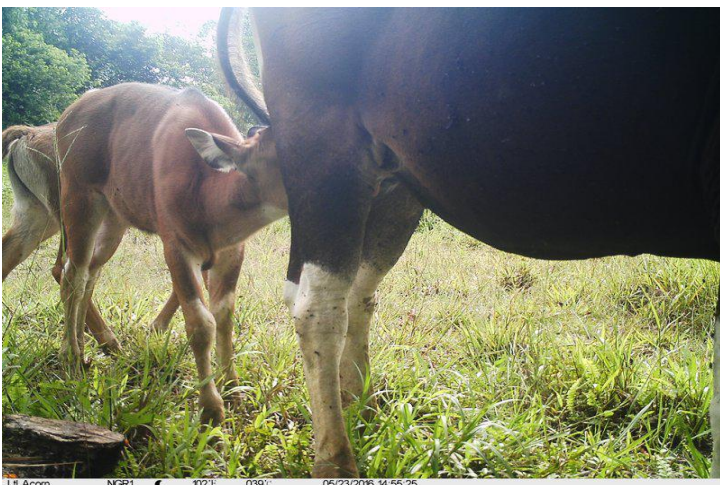
Picture: Marbled Cat – Camera Trap



Picture: Sun Bear – Camera Trap



Picture: Borneon Bay Cat – Camera Trap



Picture: Tembadau/ Banteng – Camera Trap



Picture: Borneon Ground Cuckoo – Camera Trap

HCV 1.4 Critical Temporal Use

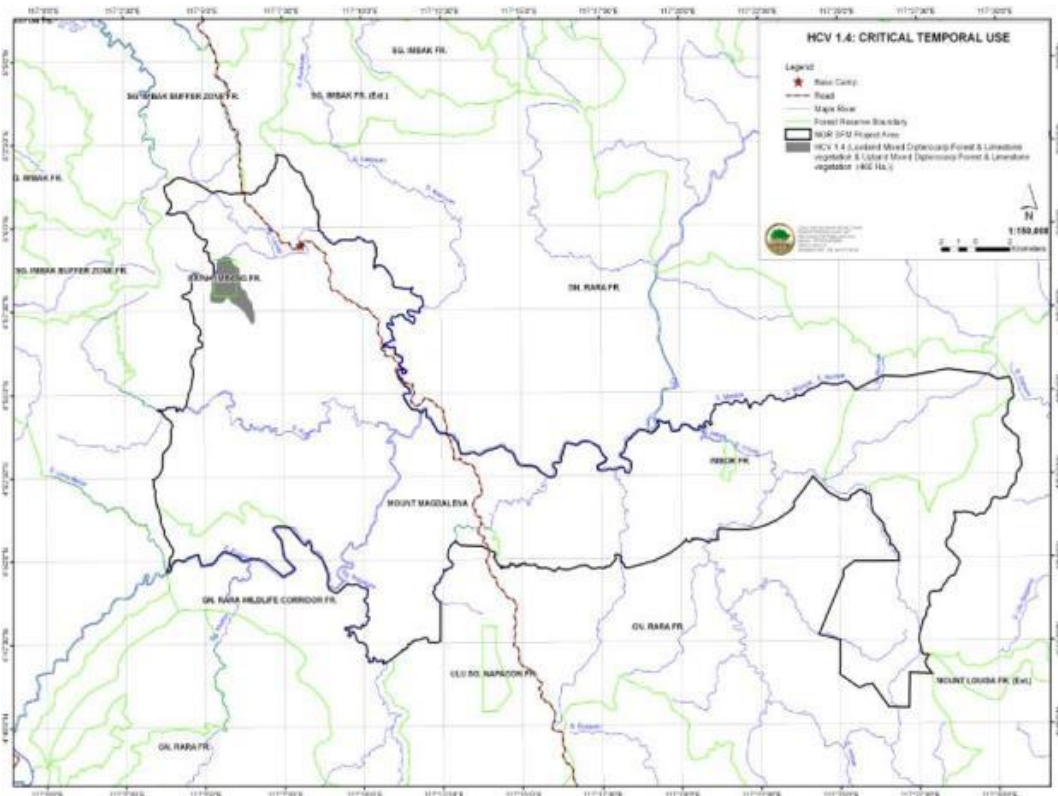
The limestone karst in Batu Timbang FR is an important nesting site for swiftlet, bats and other troglofauna. Team management is required to monitor this critical nesting site especially on illegal harvesting of bird's nest during the management period of the project area.

Therefore, it is significant for establishment of the enforcement gate, i.e FCS Bt Timbang to monitor the entering of the bird's nest collector to Bt. Timbang cave. The FCS is manned 24 hours seven days a week by rotation of staffs. The bird's nest scalling data such as the table 1 below:

Table . The harvesting of bird's nest scalling in FCS Bt. Timbang

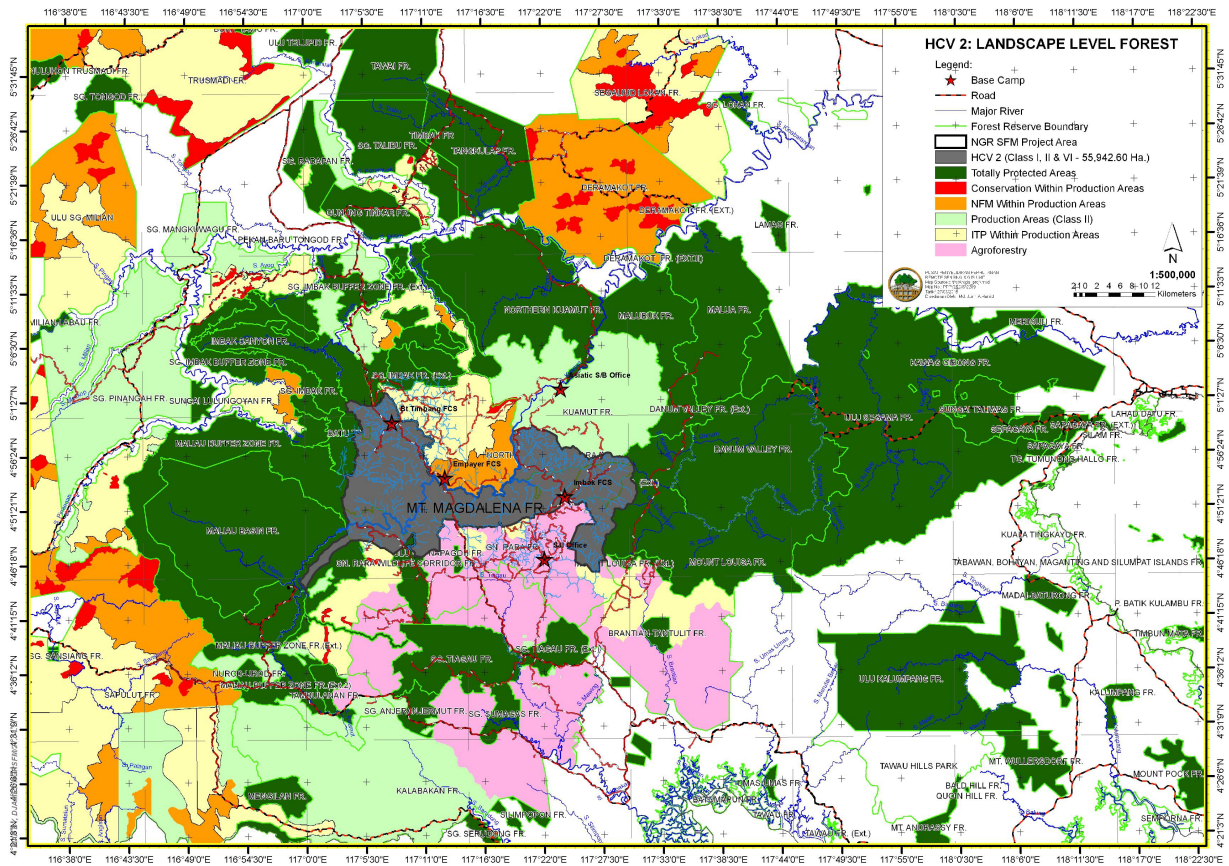
Year	Cave in Bt. Timbang (kg)		
	Tendalaw	Intan	Mabpar
2015	85	40	0
2016	-	-	-
2017	20	7	0

Based on the bird's nest scalling data, about 152 kg were taken out from the Bt. Timbang cave to date. From the data above, in year 2015 – 2017 harvesting of bird's nest was conducted at three caves in BT. Timbang (Tendalaw cave, Intan cave, and Mabpar cave). In 2016, the teriti had not reported any bird's nest harvesting to FCS Bt. Timbang. Apart from that, the team has conducted meetings and consultations with the Bird's Nest Collector to give cooperation. We have raised this issue during the consultation process, in attendance of the Sabah Wildlife Department representative from Kinabatangan Office.



Map 3: HCV 1.4 critical temporal use – Btu Timbang VJR

HCV 2 LANDSCAPE-LEVEL FOREST

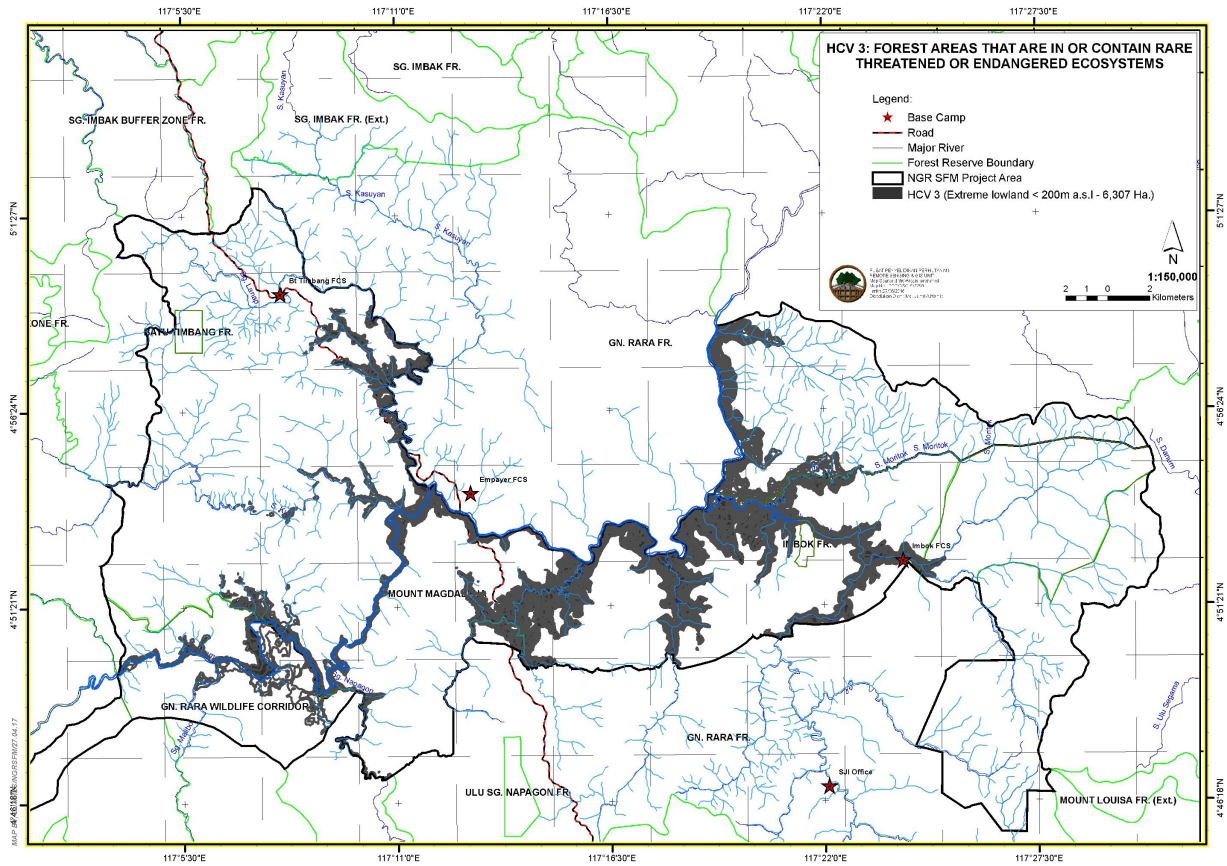


Map 4: Map of HCV 2 - Landscape Level Forest

Periodic patrolling and surveillance was done as elaborated in HCV 1 activities done (page 6) in this report. Biodiversity monitoring were also done with the establishment of 12 PSP plots and five wildlife monitoring methods (1. Camera Trapping; 2. Recce walk; 3. Night drive survey; 4. Gibbon call; and 5. Opportunistic sightings). The results of the monitoring were elaborated in page 10 – 16 of this report under HCV 1.2 and HCV 1.3.

Map 4 shows the current status of all Forest Reserve surrounding the Project area. All activities pertaining to the fulfillment of monitoring for HCV were all done in tandem with all the other HCV's.

HCV 3 ECOSYSTEM



Map5: HCV 3 - Forest Areas that are in or Contain Rare Threatening or Endangered Species

1. PSP Plots activity within the project area started in the year 2014. Maintenance work for each PSP Plots were conducted every year as per below:
 - i. Ensuring the tie point is still in its position
 - ii. Ensuring the plat indicating endemic tree species is still in its position
 - iii. Re-paint all marked tree within the radius plot area of 20 m
 - iv. Re-paint each number on the tree
 Re-enumeration was done every 3 years. The first re-enumeration was conducted in March 2017. The data is as per below:

2. To date, there are 12 PSP Plots established within the Project Area. 11 PSP Plots established in 2014 and one newly PSP Plot established in 2017. All the plots represented by certain type of forest condition as follow:
 - a) Lowland mixed dipterocarp forest: 11 PSP Plots
 - b) Upland mixed dipterocarp forest: 1 PSP Plot

HCV 4 SERVICES OF NATURE

HCV 4.2 Erosion Control

1. To date, there is no major erosion issues regarding of areas with slopes $>25^\circ$ and 30 m riparian buffer within the Project Area. The only potential erosion area of slope $>25^\circ$ is located at Bt Timbang area near the main roadside which is heading to FCS Bt Timbang. Continuous monitoring and installation of warning signage's were conducted not only at the potential erosion area but also the 30 m riparian buffer within the project area.
2. Three PSP Plots were establish within the slopes $>25^\circ$ area. To date, no erosion issues occurs at the PSP Plots area.
3. The report on the Assessment of water quality in Northern Gunung Rara SFM Area is shown as below:

REPORT ON THE ASSESSMENT OF WATER QUALITY IN NORTHERN GUNUNG RARA (NGR) FOREST RESERVE 2017

by

Noor Azmizah Binti Andaman, Reuben Nilus & Jabanus Miun

INTRODUCTION

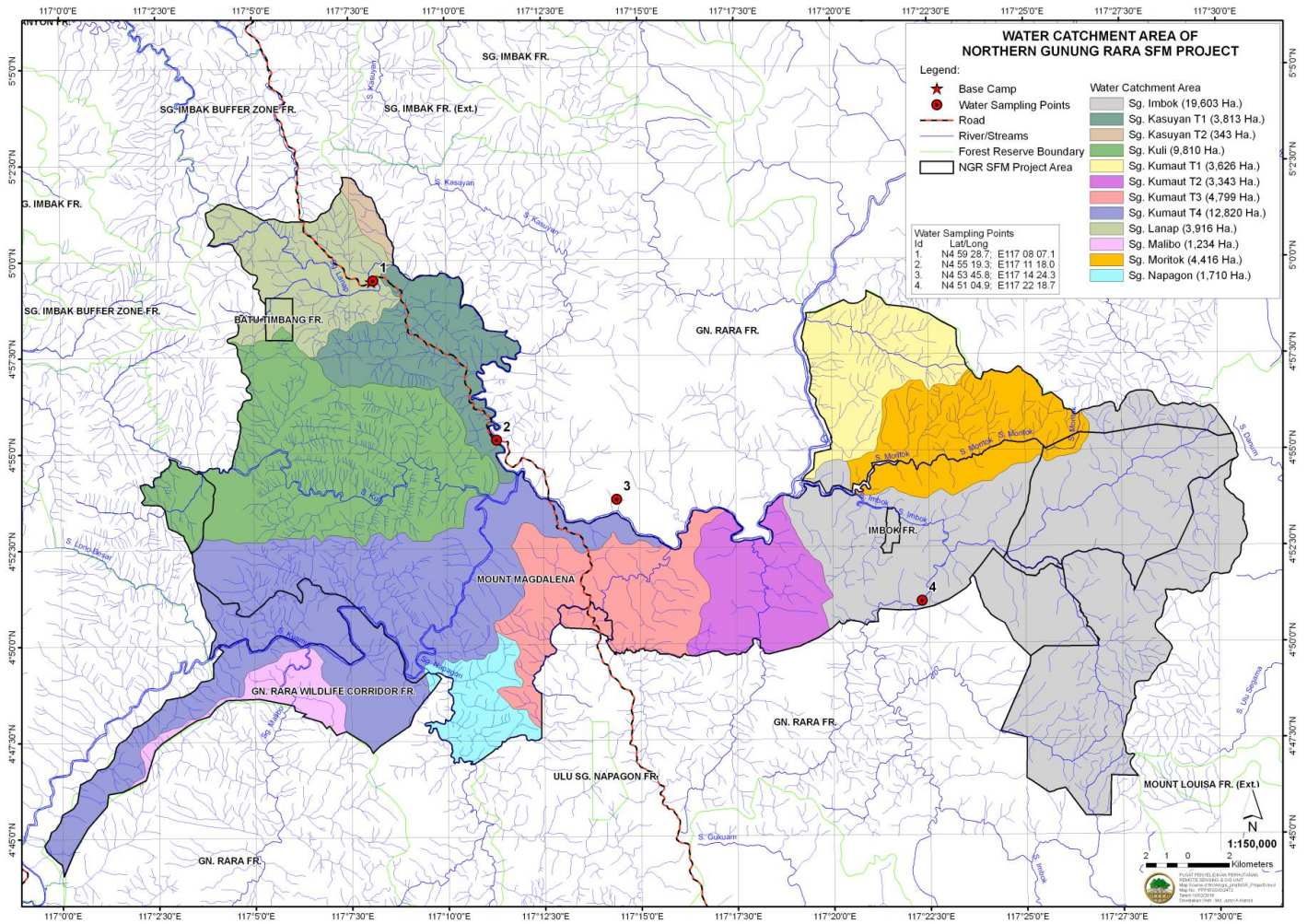
An environmental baseline sampling was carried out by Hydrology Unit of Forest Research Centre to characterize the water quality of 4 rivers, which drained thru the Northern Gunung Rara (NGR) Sustainable Forest Management project area. These rivers are Sg.Lanap, Sg. Kasuyan, Sg. Kuamut and Sg. Imbok. This assessment is part of the study component required for the Forest Management Plan for NGR project area.

LOCATION OF STUDY AREA

A total of 4 sampling points represent the project watershed and its sub-catchment areas which predominantly drain through the project site (Figure 1). These sampling points are labelled W1 to W4 (Table 1). The chemical analyses and water quality classes for all parameters tested for the sampling points in the project area are listed in Table 2.

Table 1. The location of water quality sampling points in NGR FR (see Map, Figure 1).

Sampling Point	Location	GPS location		Date of Sampling	Surrounding Condition
		Latitude	Longitude		
W1	Sg. Lanap	04°59'28.7"	117°08'07.1"	20/10/2017	Secondary forest
W2	Sg. Kasuyan	04°55'19.3"	117°11'18.0"	20/10/2017	Secondary forest
W3	Sg. Kuamut	04°53'45.8"	117°14'24.3"	20/10/2017	Secondary forest
W4	Sg. Imbok	04°51'04.9"	117°22'18.7"	20/10/2017	Secondary forest



Map 6: Locations of Water Sampling Plots in NGR SFM Project Area



RESULTS: Water Quality

The chemical analyses and water quality classes for all parameters tested for four sampling points in the project area are listed in Table 2.

Table 2. The results of chemical analyses and water quality classes for all parameter tested for sampling location W1-W4 in NGR project area . Note: Biological Oxygen Demand (BOD in mg/l), Chemical Oxygen Demand (COD in mg/l), Ammoniacal Nitrogen (AN in mg/l), Suspended Solid (SS in mg/l), Dissolved Oxygen (DO in mg/l), fecal coliform (MPN/100mL), total coliform (MPN/100mL), and oil & grease (mg/l).

Sampling Location	Dissolved Oxygen, DO (mg/l)	Biological Oxygen Demand (BOD5 in mg/l)	Chemical Oxygen Demand (COD in mg/l)	Suspended Solid (SS in mg/l)	pH Value	Ammoniacal-Nitrogen (as N3-N in mg/l)	Oil & Grease (mg/l)	Total Coliform Count (MPN/100mL)	Fecal Coliform Count (MPN/100mL)
W ₁	3.9	1	10	5	7.24	0.39	1.5	330	330
W ₂	3.47	1	10	5	7.21	0.14	1.5	330	330
W ₃	1.8	1	10	31	7.1	0.07	1.5	16000	2800
W ₄	5.7	1	10	24	7.33	0.09	1.5	2400	1300
Minimum	1.8	1	10	5	7.1	0.07	1.5	330	330
Maximum	5.7	1	10	31	7.33	0.39	1.5	16000	2800
Mean	3.73	1.00	10.00	16.83	7.22	0.19	1.50	5898.33	1315.00
NWQSM*	W1 & W2: Class III W3: Class IV W4: Class II	Class I	Class I	Class I	Class I	W1: Class IIB W2- W4: Class I	NA	W1, W2, W4: Class I W3: Class IIB	W1 & W2: Class IIA W3 & W4: Class IIB

* National Water Quality Standards for Malaysia

Water Quality Index (WQI)

The results of water quality index for W1 to W4 sampling points are listed in Table 3.

Table 3. The water quality index (WQI) for W1 to W4 sampling points in NGR FR. (Note: DO % saturation values were calculated based on dissolved oxygen saturation factor of 8.26 mgL⁻¹ at temperature 25° C).

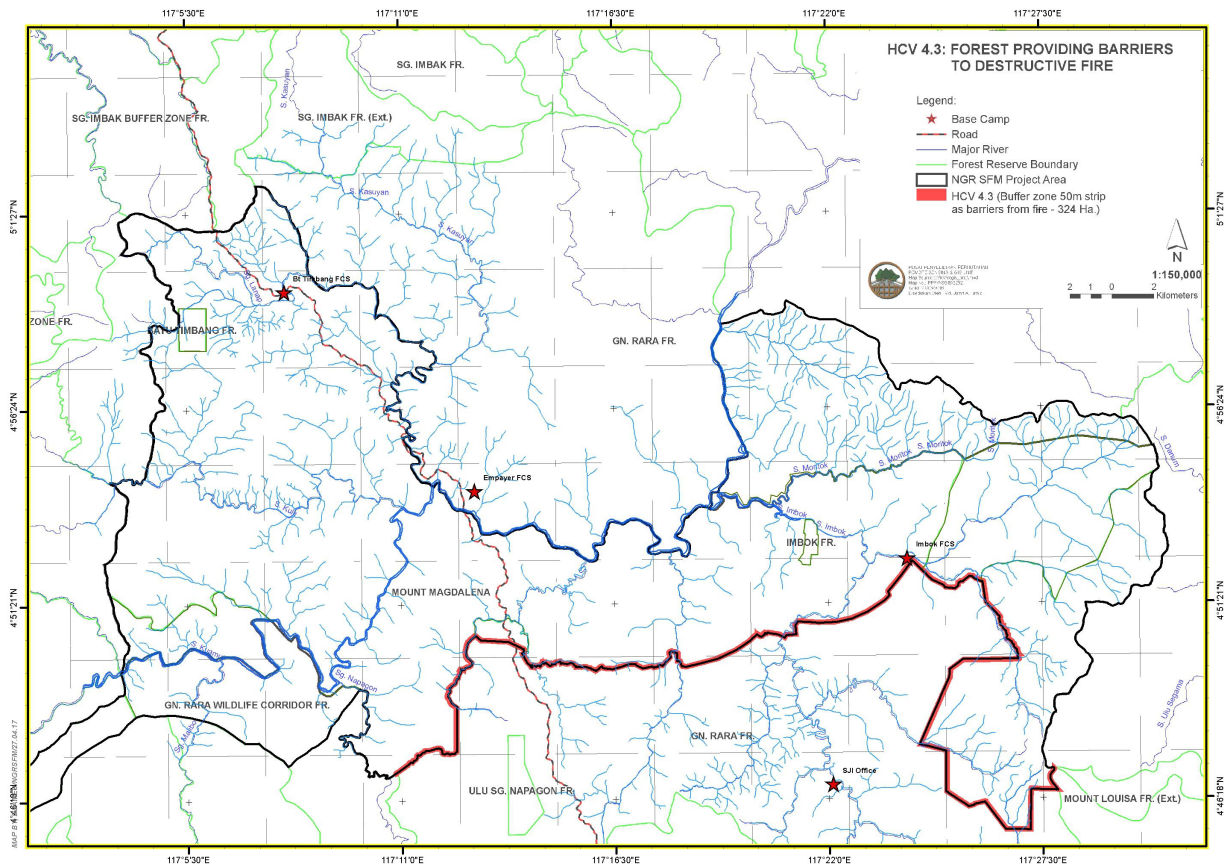
Sampling Location	DO%	BOD	COD	SS	pH	NH3-NL	SIDO	SI BOD	SI COD	SI AN	SI SS	pH SI	WQI	CLASS	WQ STATUS
W ₁	47.20	1	10	5	7.24	0.39	45	96	86	67	95	98	79	II	SP
W ₂	41.99	1	10	5	7.21	0.14	38	96	86	86	95	99	80	II	SP
W ₃	21.78	1	10	31	7.1	0.07	12	96	86	93	81	99	73	III	SP
W ₄	68.98	1	10	24	7.33	0.09	77	96	86	91	84	98	88	II	C
AVERAGE	44.99	1.00	10.00	16.25	7.22	0.17	42.11	96.17	85.80	82.39	88.17	98.55	79.56	II	SP

(Note: C = CLEAN SP = SLIGHTLY POLLUTED)

Based on the river water quality index, sampling point W1 and W2 river water quality falls within Class II, while W3 sampling point falls within Class III, and all falls within slightly polluted river. Only W4 sampling point is within Class II under Clean river. Nonetheless, water that categorized as Class II required conventional treatment such as boiling before it can be used for domestic consumption.

It is recommended that the management team to periodically check for sampling point W1 as the ammoniacal nitrogen reading is slightly higher than the reading from year before. The management team also need to carry out periodic inspection and monitoring at all the sampling points to prevent deterioration of the water quality. The management team also needs to install signage at all the sampling point to prevent visitors or passerby traversing the road from dumping waste into the watercourse. The management also may need to carry out periodic inspection and monitoring on existing sewage and septic tanks in all office and living quarters within the project area to prevent deterioration of the waste treatment system.

HCV 4.3 Barriers to Destructive Fire



Map7: HCV 4.3 - Forest Providing Barriers to Destructive Fire

Most of southern border of NGR FMU is bordering oil palm estate. Furthermore, secondary vegetation dominates most of the peripheral area of the reserves. A 50 m band of moderate to high forest structure inside the project area that border local communities land and oil palm estate are categorised as HCV 4.3.

This corresponds to the responsibility of the team Management to protect the project area is to ensure that all the stakeholders are aware of entering the area. The team management have conducted several measures such as:

- Forest Fire Management Plan (FFMP) was made available September 2016 forest fire awareness to stakeholders and contractors. At this time of writing, the FFMP was still in a draft, as the SFD HQ had provided new standard format for the FFMP in 2018. Therefore the FFMP is still in draft process pending for approval from SFD HQ.
- Main Stakeholder Consultation was made all year round to discuss about forest fire awareness to stakeholders and contractors.
- Fire drill training was conducted on the 5th of April 2017.
- Patrolling was conducted all year round to curb illegal activities such as encroachment to steep areas and riparian.
- Collecting the data from Forest Fire Danger Rating System (FFDRS) to analysis the fire hotspot. It is compulsory for every Forestry Offices to submit FFDRS report every day to HQ. The data collected from our weather station everyday from our office in Brantian, directly to the SFM Office, SFD HQ.

HCV 6 CULTURAL IDENTITY OF LOCAL COMMUNITIES

Bird's nest collection in the limestone caves of VJR Batu Timbang is one of the main sources of income of the nine teriti. These caves are located at 4° 58' N, 117° 05' E on a 300 m height hill of the reserve and important nesting area of the edible bird's nest of *Aerodramus fuciphaga* (White Nest Swiftlet) and *Aerodramus maximus* (Black Nest Swiftlet). Due the presence of these species the reserve is gazette as Virgin Jungle Reserve to protect their habitat.

The only access to the caves is by river and by foot. From the mouth of Kuamut on the Kinabatangan river (Kg. Kuamut) to the mouth of the Kasuyan River takes about 1 hour 30 minutes depending on river water level.

To monitor the bird's nest collectors, the team of management have conducted several measures such as:

1. Forming Bird's Nest stakeholder consultation committee

Consultation with bird's nest collector and forming a committee. To date, six times of meeting and consultation with the Bird's Nest Collector were conducted. The Bird's Nest Collectors Committee was formed and produced a resolution, which was agreed between SFD (NGR SFM Project and the Teritis' of the Bird's Nest Collectors). Certain issues (i.e Ruler & Regulation, State Forest Policy, etc), without disregarding the welfare of the Teritis' of the Bird's Nest Collectors had been included in the cooperation agreement.

2. Endorsement of Certificate Of Identity (COI)

Based on directivity from Chief Consevator of Forest vide RUJ:JPHTN/PP700-1/3/21/KLT6(87) dated 02.02.2016 the nine teriti must apply the COI permit when entering the forest serve to collect the bird's nest at The VJR Bt. Timbang.

To date the Sabah Forestry Department was collected RM 130 from the COI endorse from the teriti.

3. Quarterly Monitoring at VJR Bt. Timbang

To ensure the teriti complied with the Rules & Regulation, State Forest Policy, the team of management has conducted Quaterly monitoring to VJR Bt Timbang Cave to make inspections. Due to the bad road condition going into the Birds Nest Cave, VJR Bt. Timbang, it is far and difficult to arrive at the top of VJR Bt. Timbang, and thus resulting in difficulties to organize and do a proper inspection more often.



5.0 Result or Outcomes for HCV Management Prescription and Effectiveness of Monitoring and Enhancement:-

High Conservation Value (HCV)	Effectiveness of Monitoring and Enhancement
HCV 1.1 Protected Areas	Program of Patrolling, aerial surveillance, Inspection of boundaries and re-brushing of NGR SFM Project and Establishment of Forest Checking Station shows that the management have manage to implement the enforcement program adequately. Nevertheless the management still must enhance the enforcement practice i.e. increase the rate of patrolling within the area and outside the project area, identify possible route of poachers coming in the area. Furthermore the frequency of aerial surveillance must be increased and installing of proper signage along the main boundaries of NGR-SFM must be maintained.
HCV 1.2	(Flora): PSP plots re-enumeration was done in 2017 by Forest Research Center. Project Team did maintenance every year. Additional PSP plots are to be established in Northern Gn Rara Forest Reserve. Round 2 of Scientific Expedition recommended for the whole project area covering new Forest Reserve. (Fauna): Four initial methods were established, with another additional method were established (Opportunistic Sightings) on 2017. Gibbon Call Method needs to be analyzed, and camera trap to be added.
HCV 1.3	(Fauna)Top five endemic species of fauna were identified through the wildlife monitoring analysis. Monitoring should be progressively continued. (Flora) Endemic plots were maintained and marked. Three plots of endemic flora species were identified. Round 2 of Scientific Expedition recommended for the whole project area covering new Forest Reserve.
HCV 1.4 Critical Temporal Use	Based on the Table.1 (page 2) in the year 2016 and 2018 no data were recorded. It is because, the teriti not reported of bird's nest harvesting to FCS Bt. Timbang. Apart from that, the team must conduct of meeting and consultation with the Bird's Nest Collector twice a year to aware them.
HCV 2	Continuous monitoring, patrolling and surveillance were done. Consider using drone monitoring/ drone mapping for HCV, and establishment of SMART Monitoring also should be considered.
HCV 3	PSP Plot re-enumeration were done in 2017, and PSP Plots maintenance were done every year. Analysis of PSP data should be done to provide insight of the forest growth data in site project.
HCV 4.2	Continuous monitoring should be done progressively. Water sampling plots are to be maintained and marked. Frequency of patrolling should be increased.
HCV 4.3 Forest Providing Barriers to Destructive Fire	To enhance Forest Fire awareness program, the management must conduct twice a year of the Main Stakeholder Consultation. Apart from that, the management staff and the all stakeholder staff outside the NGR SFM project area must be involved with the Fire Drill training.
HCV 6. Cultural Identity of Local Communities	The team management must conducted of meeting and consultation with the Bird's Nest Collector twice a year to aware them. Besides that, the frequently of Quarterly Monitoring at VJR Bt. Timbang must be increased to monitor the birds nest collector and to avoiding them from non-compliance with the rule and regulation of Sabah Forestry Department.