Appendix Five:
Evaluation of Selected Upstream Sites

Report on Ground-Truthing of Riparian Zones on Sites 2, 3, 5 & 8 Sungai Segama, Sabah

6-18 September 2020

1. The Objective of Rapid Assessment

1.1. Assess the quality of riparian forests for biodiversity in Site 5 (Kg. Litang) and Site 8 (Kg. Upak to Kg. Batu 8)

1.2. Assess threats and opportunities identified in the remote sensing and stakeholder workshops

1.3. Engage people along the river in discussion of the issues

2. Methodology of Assessment

- Experienced field team with decades of field natural historical experience on the rivers of Sabah's East Coast, and deeply familiar with the trees, wildlife and birds of this region, spent twelve days living on the river with local residents surveying the riparian by 15hp local boat, aided by GPS, binoculars, a drone and high-resolution camera.
- Wildlife and bird species were recorded continuously for 198km of riparian forest (99km of river) with location taken by GPS for each observation
- Riparian Forest was assessed through a stratified random sample with one transect of 100 meters for every 1,000 meters for the areas in Site 8 while in Site 5, the sampling was done for 100 meters for every 2,000 meters. In Site 2 and 3 single samples were taken non-randomly in key forest areas. Riparian forests were assessed for (a) tree species present above 5m height; (b) canopy height, © dominant canopy species, and (d) overall quality (as a percentage of expected climax vegetation). Species present were then assessed on a scale of 1 to 5 for the value of their fruiting for wildlife and birds using natural history experience.

3. Locations, Land Use and Communities Involved

- Site 8: Kg. Mosaic of Smallholdings, Village Lands & Highly Variable Riparian Forests around Kg. Upak, Kg. Pendising, Kg. Tayawari, Kg. Lituk Pulau, Kg. Bukit Belacon, Kg. Sapadulang and Kg. Batu 8
- Site 5: Mosaic of forest, smallholdings and commercial estates (belonging to Wilmar and Hap Seng) connected to a major protected area (Tabin Wildlife Reserve) around Kg. Litang
- Site 2 & 3: Fragmented high quality forest within oil palm estates belonging to IOI and Hap Seng

4. Period of Assessment

- Site 8: 7-10 September 2020
- Site 5: 13-17 September 2020

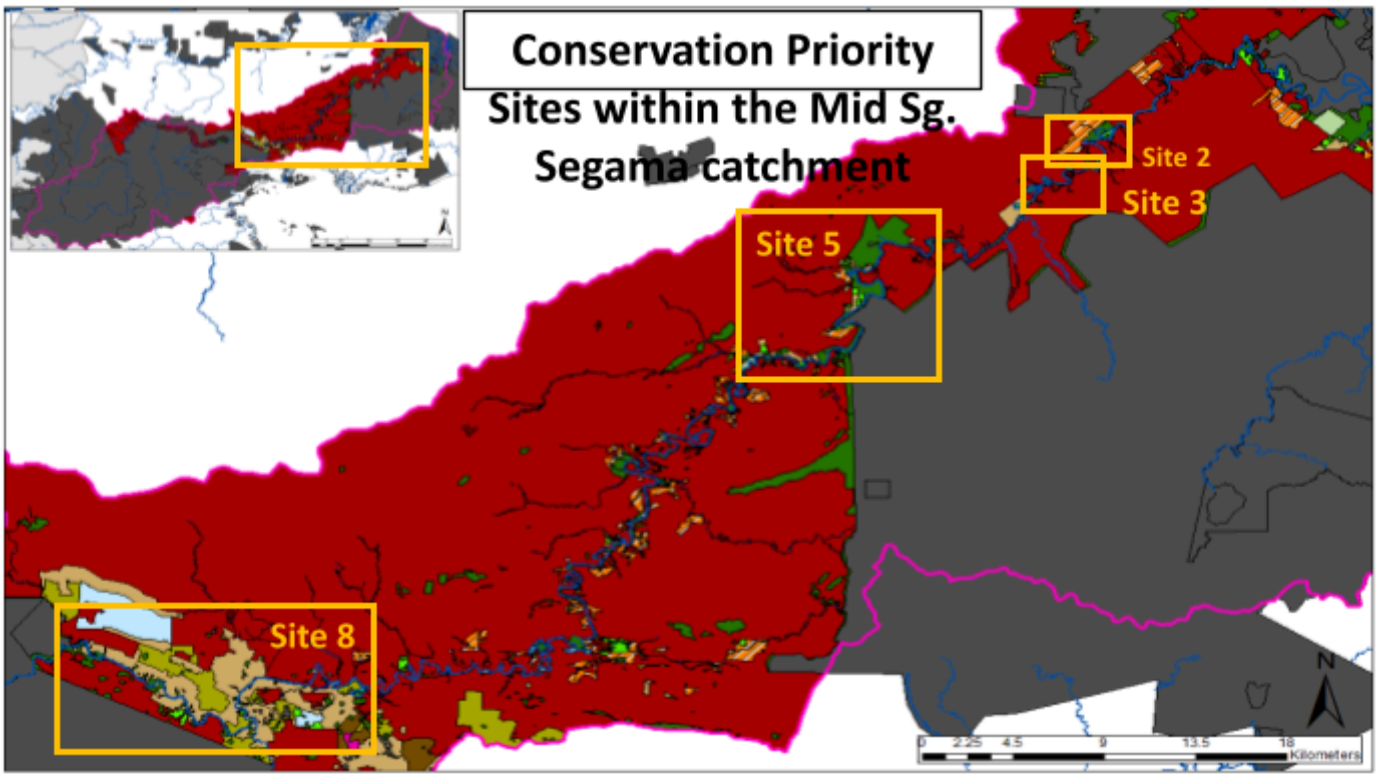
5. **Distance of Assessment Area**

- Site 8: Distance of 30 km (starting from the boundary of the Mansuli Forest Reserve down to Kg. Batu 8).
- Site 5: Distance of 44km (starting from West of Site 5 to the Hap Seng Ferry).
- Site 2 & 3: Distance of 18km of river (starting from the Hap Seng Bridge to the boundary of site 2)

6. **Number of Samples**

- Site 8: 17 samples were obtained (focused on the upper section of site 8)
- Site 5: 15 samples were obtained
- Sites 2&3: 2 samples were obtained (non-random)

7. **Map of Sampling Sites**



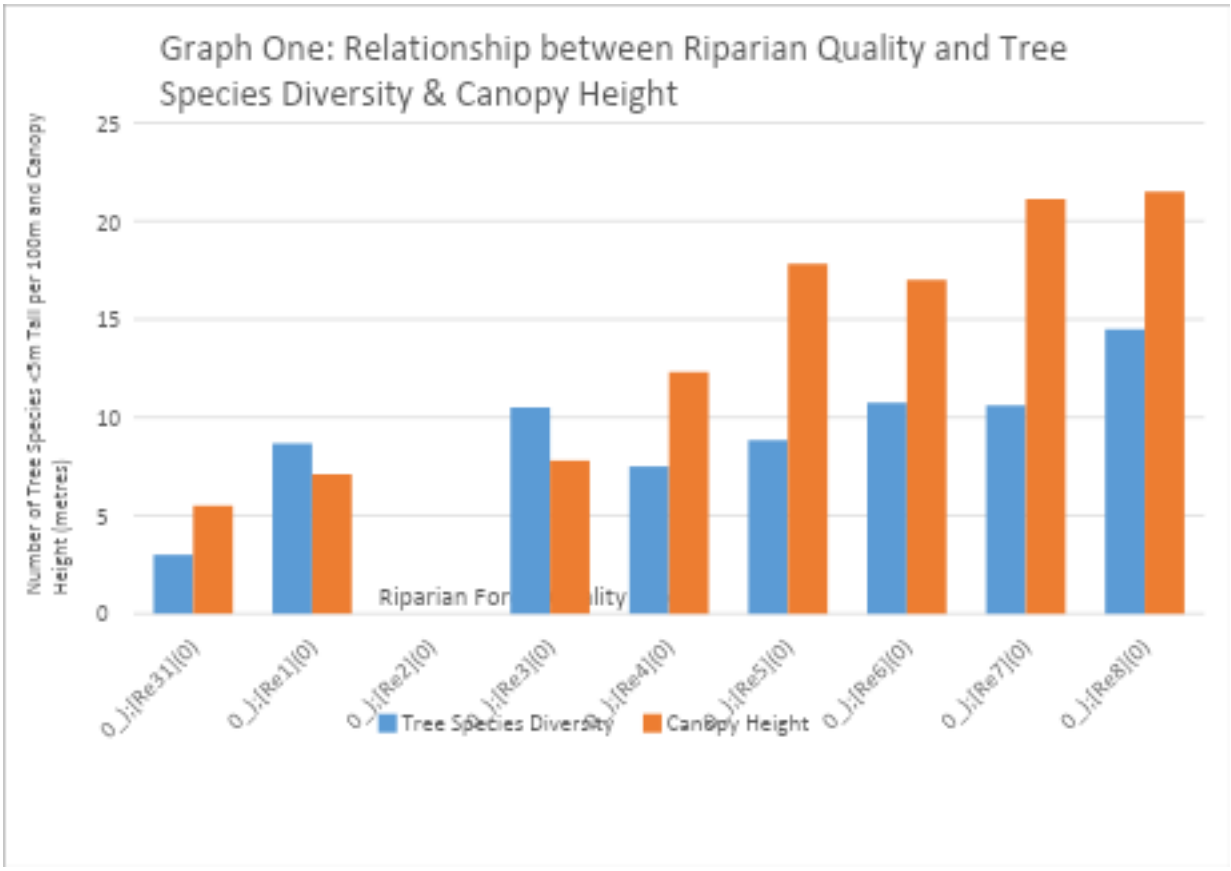
8. Results of Assessment

Overall ground-truthing confirmed the justifications for intervention in the sites 2, 3 5 and 8.

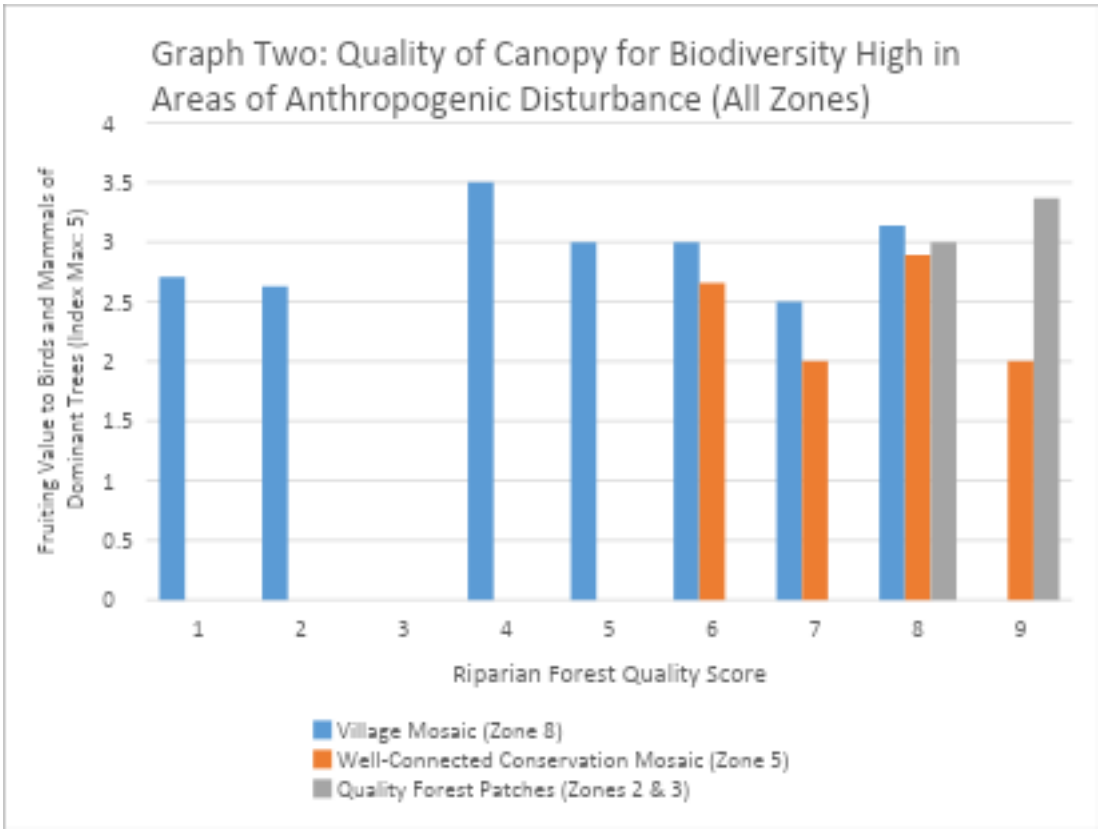
A large amount of data was collected in the ground-truthing exercize that will continue to be analysed and deployed under this project. This includes 188km of wildlife and bird observation records, the composition and structure of 34 transects of 100m length, and a large number of visits of sites of special concern. A small sample of the drone and other photographic images is provided in the appendix to this report. These images, especially those from the air, are of sufficient quality to design interventions in locations prioritized.

Prior to descriptions of the individual sites we provide here a quick summary of key findings on these riparian forests and their structure, composition and biodiversity.

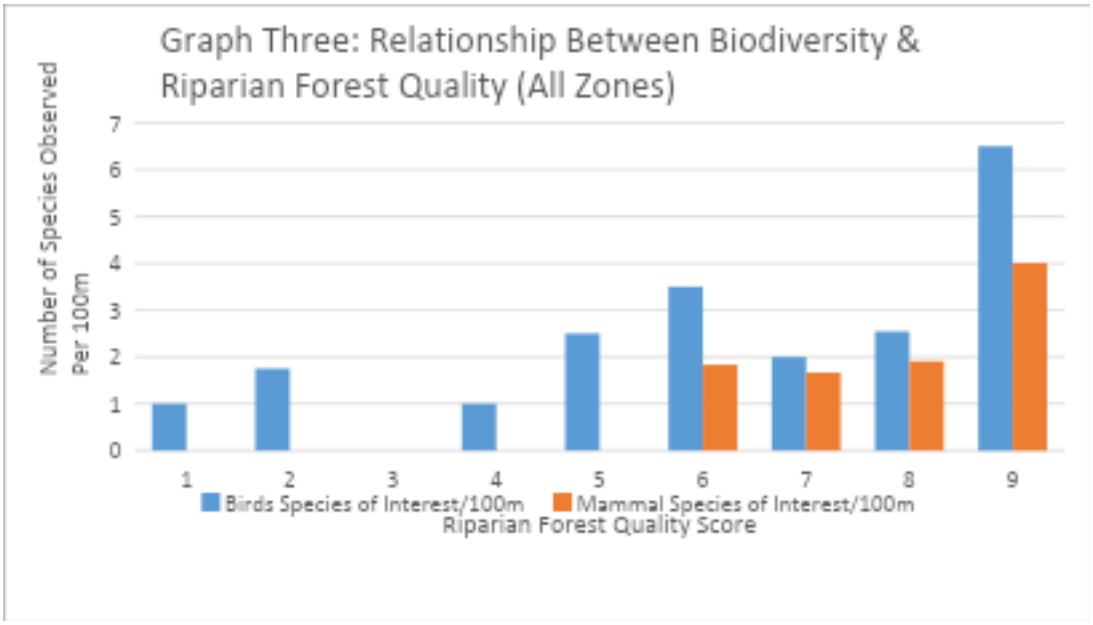
Riparian Forest Quality was divided into ten structural categories (as percentiles of climax vegetation). As shown in Graph One canopy height steadily increased, with near pristine riverine forest in this region having a canopy height of around 22m Interestingly while tree species diversity (over 5m) did increase with forest quality even areas of low structural integrity (20-50%) showed broadly similar diversity. Similarly evidence that diversity is not destroyed by community land-use mosaics is that we observed 38 species in 17 plots in site 8 and 42 species in 15 plots in site 5. Such partial degradation is typical of community zones and it suggests that under a mosaic of land-use and impacts loss of forest is not so severe as to limit natural generation of a diverse riparian. This is encouraging.



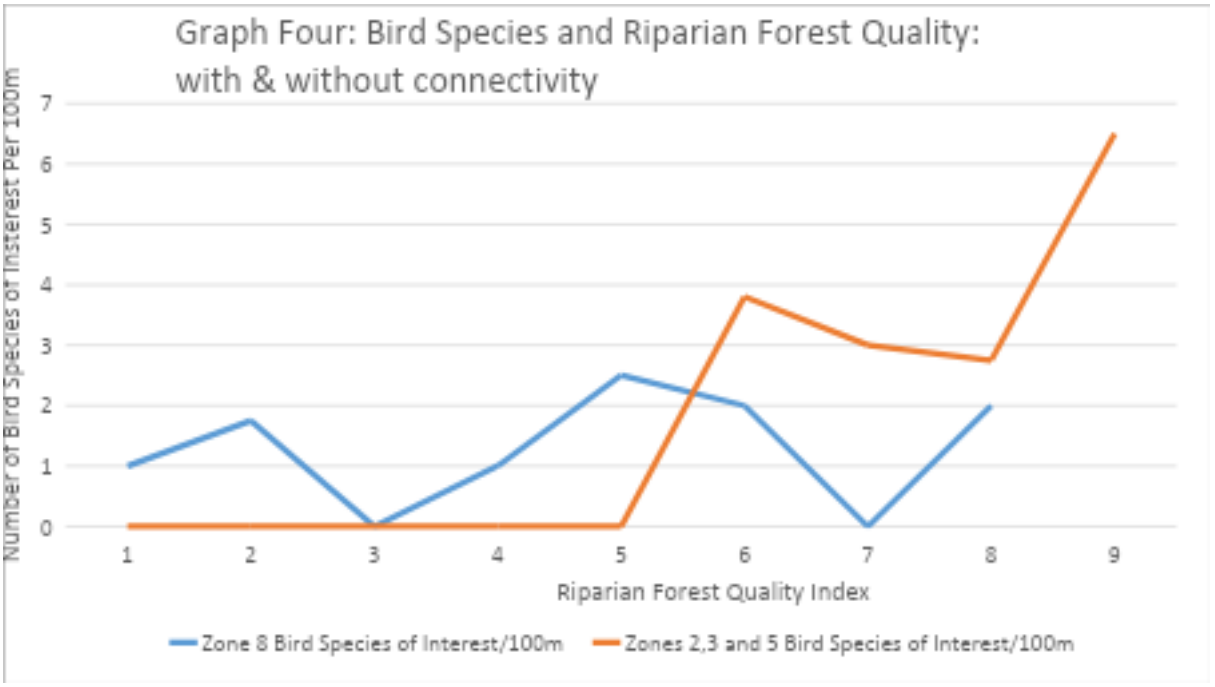
This observation is strongly reinforced by an analysis of what particular species dominate the canopy in each transect (Graph Two). What is observed is that fruit tree species known to be of high value to birds and mammals in the Segama habitat are just as likely to be present and dominant in the more degraded riparian in community zones like site 8 as they are in near pristine natural forest (sites 2-5). Of course a fully forested riparian will have more such trees, but from the point of view of medium-term restoration, riparian forests in community zones show good potential for the return of biodiversity. It is noticeable that fig trees are often the one large species left when communities clear riparian areas and that these provide huge biodiversity benefits. On the palm oil estates we observed these trees are being killed by workers for illegal riparian smallholdings and this should be addressed.

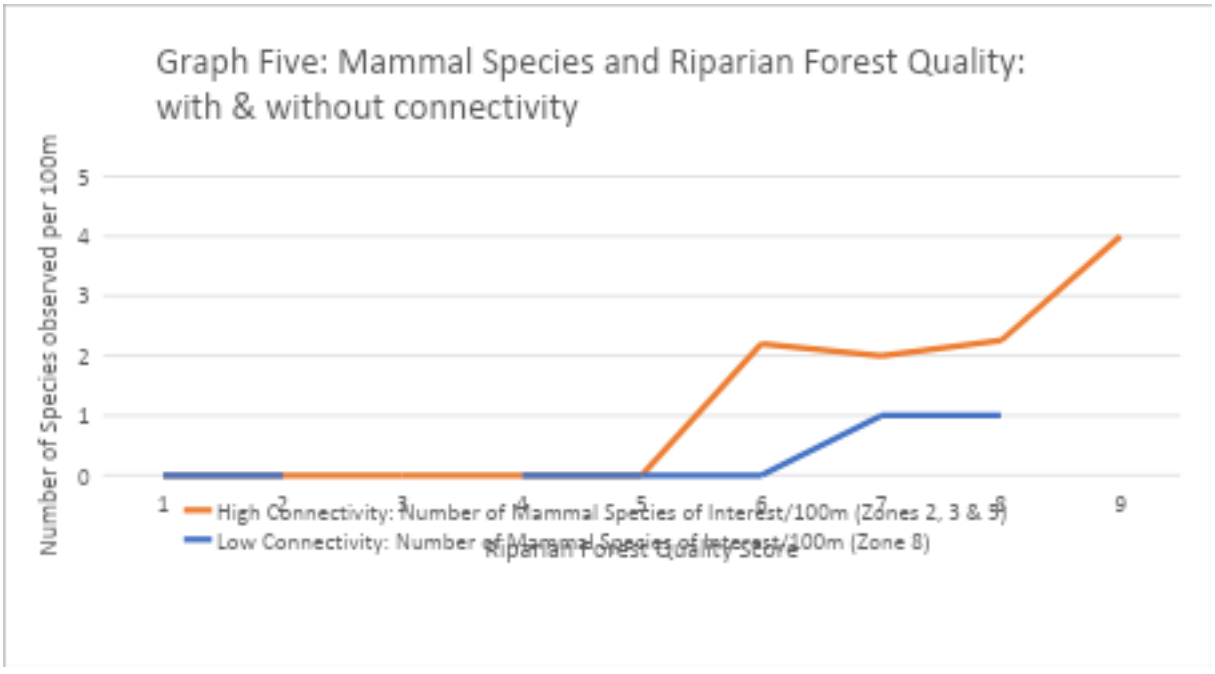


The ability of degraded riparian forests that still retain botanic and fruit tree diversity to support other biodiversity is analysed in Graph Three. What this shows is the diversity of important bird species is much more able to thrive in degraded riparian forest than is the diversity of important mammal species (such as silver leaf and proboscis monkeys), which are only present in forests above 60% structural integrity.



The ability of a patch of forest to sustain biodiversity is apparently related to its connectivity to other patches of high quality forest. Graphs Four and Five show this impact for birds (where it is modest) and for mammals (where it is high). This effect explains why number of mammal species observed in connected areas such as in site 5 is two to three times higher even in forests of the same quality as in zone 8. This finding is relevant to this study because it shows (a) the biodiversity value of using riparian conservation and restoration to improve connectivity, (b) the exceptional value of the forests in sites 2, 3 and 5 for conservation of threatened species in Sabah (such as proboscis monkey).





Riparian Forests in Site 8

Site 8 comprises a mosaic of communities with their smallholdings and we found a highly variable quality of riparian, ranging from locally conserved areas that were nearly pristine to highly degraded sites. Overall nearly half the riparian was degraded, a third was of fair and the rest good. (However, in addition there are large areas of the downstream site 8 where riparian is very poor.) Interestingly we found that tree diversity remains high in all but the most degraded sites, and that in part because this is a human impacted landscape fruit tree diversity remains high even when there are few trees. This means that bird diversity remains high, and there are patches of presence of rare and valuable mammal species. Some community members are actively encouraging riparian restoration through their silvicultural and agricultural practices and this can be studied and encouraged.

The schedule below shows the data obtained from the sampling that has been conducted:

Schedule 1 Data of Riparian Sampling for Site 8

Sample No.	Coordinates	Tree Species Density/100m	% of Forest Quality	Average Tree Height (m)	Dominant Species
033	5° 7'51.41"N 118° 8'42.89"E	12	70% (good)	22.5	*Tangag, Bayur, Bongkol* and *Tangkol*
034	5° 8'1.72"N 118° 9'24.89"E	3	5 % (severely degraded)	5	*Tangag, Tangkol* and oil palm
036	5° 7'31.33"N 118° 9'38.92"E	3	5 % (severely degraded)	5	*Tangkol, Bongkol* and *Ficus racemose*
037	5° 7'26.60"N 118°10'0.44"E	10	75% (good)	22.5	*Durian, Tangag* and mango
038	5° 7'21.74"N 118°10'12.01"E	11	65% (medium)	17	*Tangag* and *Bongkol*
039	5° 7'3.87"N 118°10'39.60"E	3	0% (severely degraded)	5	*Tangag* and *Bongkol*
040	5° 6'40.97"N 118°11'3.04"E	11	55% (medium)	22	*Tangag* and *Ficus sps.*
041	5° 6'47.1"N 118°11'25.4"E	8	35% (degraded)	8.5	*Tangag* and *Ficus sps*
042	5° 6'17.1"N 118°11'38.7"E	3	5% (severely degraded)	7	*Tangag*

043	5° 5'54.97"N 118°12'6.87"E	4	10% (severely degraded)	3.8	*Taikan* and *Macaranga sps*
044	5° 5'34.02"N 118°12'18.96"E	11	10% (severely degraded)	3.8	*Bongkol* and *Topog*
045	5° 5'46.4"N 118°12'45.4"E	11	10% (severely degraded)	3.8	*Macaranga sps*
046	5° 05'23.8"N 118°13'06.5"E	5	70% (good)	27	*Binuang* and *Ficus sps*
047	5° 05'22.6"N 5° 7'15.63"N	13	35% (degraded)	7	*Ficus sps*
1	5° 6'38.85"N 118°13'45.84"E	9	45% (medium)	17	*Tangag* and *Binuang*
3	5° 6'53.47"N 118°14'8.72"E	6	45% (medium)	7.5	*Ficus sps* and *Binuang*
5	5° 6'44.71"N 118°14'49.48"E	4	15% (degraded)	17	

Analysis of Samples Site 8

- Kg. Upak has 2 types of forest habitat, which is riparian forest and limestone forest. This makes Kg. Upak rich in a diversity of flora and wildlife.

- Forest density is very low for Kg. Pendising to Kg. Batu 8 due to opening the land for oil palm plantations and other crops such as vegetables and fruits.

- The total number of tree species that are found along the assessment area is 36 species divided into 4 main families; which are *Moraceae*, *Rubiaceae, Malvaceae* and *Tetramelaceae*.

- Overall, the dominant tree species for the riparian forest that has been sampled consists of *Cleanhovia hospita, Octomules sumatrana, Ficus spp* and *Nuclea subdita*.

- The density percentage of trees in areas that belong to the community is slightly higher compared to those in oil palm estates.

- Three of the main tree species are Binuang (*Octomules sumatrana)* with an average height of 10 to 35 meter, follow by *Ficus racemosa* at 10 to 25 meters and *Nuclea subdita* at 5 to 15 meters.

- Areas nearer to the bridge (upstream from the PEKA water supply intake for Lahad Datu) have very low density and zero natural regeneration due to farming and oil palm plantations. This lack of natural regeneration is probably due to the extensive use of pesticides and herbicides by locals.

- This area also has a diversity of *Ficus* species, with a total of 7 species identified, with two additional fig species unidentifiable during the assessment.

Key Findings Site 8

- The riparian forests of Site 8 are mostly fragmented and has low species density, however, some of these fragmented forests still support a high level of biodiversity such as Batu Balos, a limestone forest that serves as a sacred site to the local community and home to at least 2 groups of Gibbons. This location is of particular interest because it is being gradually removed by quarrying for marble. Another community managed forest is Bukit Pendising, a good example of riparian forest maintained by the people of Pendising.

- Despite heavy human activities such as palm oil estates, sand and marble mining, the area still contain some resilient levels of biodiversity with 30 species of birds and 8 species of mammals and 1 reptile. Borneon gibbons, silver leaf monkeys and important species of Hornbills were recorded during the 2 days survey. Survey also found some 20% of the riparian forest that is left have been potentially conserved by community landowners.

- However, from Bukit Pendising downriver to Batu 8, majority of the riparian forest was lost due to erosion, palm oil estates and sand mining. Species density is very low in riparian areas where palm oil or other crops are grown, the lack of natural regeneration in this area is an indication of heavy use of herbicides in agriculture.

- Some community members are practicing an indigenous innovation that is worth our attention. They remove vines and groundcover to enable them to plant fruit trees (as well as other crops like chillies), and this promotes natural regeneration of native tree species such as Ficus resamosa, Nauclea sabdita to grow on the river banks (though some of these banks are unstable). Some communities are also deliberately planting Octomeles sumatrana to mitigate erosion in the riparian and deliberately leave abandoned old palm oil trees that have been colonized by strangling figs to enable the forest to regrow.

- There are 11 sand mining operations recorded during the survey, 4 in the upstream of the Lahad Datu water intake plant and 7 in Sapadulang and Batu 8. Some sand mining operations have much better practices than others. Destructive practices being followed by some sand miners include digging sideways to undermine the banks which causes subsidence into the rivers that then leads to increased sediment load as well as loss of river bank vegetation and farming land. This type of mining is also of marginal economic value because such sand is typically low quality and large tonnages have to be removed to produce small volumes of commercially usable sand. After extraction, therefore, large piles of waste are then heaped by the river causing further pollution when it rains. We

observed in the field that poor equipment, poor management skills, and failure to follow basic SOPs by a minority of companies comprises most of the problem.

Recommendations (Site 8)

- **ICCA**- Batu Balos and Bukit Pendising have the characteristics of an ICCA since the area is still forested and contains dipterocarp species and wildlife such as Gibbons, Hornbills and other wildlife and serve as a sacred site for the Dusun Suphan. However, there is a need to identify the legal status of the land and communicate the importance of ICCA to the local community.

- **Establishment of riparian forest corridors**- There is an opportunity to restore the riparian in this area with holistic approach by gathering all stakeholders to find ways to address the further loss of riparian forest and establish a corridor to support the diversity of life along the Segama river. The potential to create a corridor is high since many people have relocated to the main road and have left the riparian areas. In many areas the degraded riparian has high restoration potential because an underlying diversity of trees, with many fruit trees, is still present and enrichment planting with figs is also possible. Mixed fruit tree forests on smallholdings can be valuable to riparian biodiversity.

- **Maintain forested land and fruit orchards-** The legal status and owners of land that is still forested, underproductive palm oil or fruit orchards along Site 8 needs to be identified so that collaboration becomes posisble to maintain high-value areas value that supports biodiversity. This includes leaving old palm oil trees that have been colonized by figs.

- **Sand Mining-** Operators and owners of this activity has to be identified to ensure all have valid permits and comply with the SOPs. Research needs to be focused on evaluating the long-term effects of sand-mining to aquatic life and income of local fisherman.

- **Borneo Marble-** Communities reported significant noise pollution and associated threats to the sacred site of Batu Balos that is also a habitat for Borneon Gibbon.

- **Tourism -** Kampung Upak is a suitable place for Tourism, located strategically by the main road and easily accessible from the city. This can be a good alternative to Tabin or Danum Valley and offer a unique experience cruising up the Segama river from Upak to visit sacred sites as well as birding and wildlife expeditions up the Segama river up to Mensuli Forest Reserve. Communities near the main bridge can also attract the attention

of domestic tourist by offering unique products by the road and offer a view of the Segama river.

- **Community-based participatory mapping.** To ensure full and effective participation of the communities, so that they may realise issues related to natural and cultural resources and their traditional territory. Community-based participatory mapping is a critical step for them to map their assets, traditional names of sections of the river, historical places etc.

Riparian Forests in Site 5

Findings from the assessment shows almost the stretch of riparian forest is still in good condition and high species density. The schedule below shows the data obtained from the sampling that has been conducted:

Schedule 3 Data of Riparian Sampling for Site 5

Sample No.	Coordinates	Tree Species Density/100m	% of Forest Quality	Average Tree Height (m)	Dominant Species
052	5° 7'15.63"N 118°10'23.48"E	12	65% (good)	17	*Bongkol* and *Tangag*
060	5°18'40.14"N 118°30'38.18"E	13	75% (good)	22	*Bayur* and *Bongkol*
063	5°18'3.73"N 118°29'44.28"E	7	55% (medium)	17	*Bayur* and *Bongkol*
068	5°17'18.31"N 118°30'1.74"E	7	70% (good)	22	*Bayur, Ficus racemosa* and *Bongkol*
116	5°15'38.38"N 118°26'55.26"E	10	55% (medium)	17	*Bongkol* and *Tangag*
109	5°16'26.57"N 118°26'59.88"E	8	55% (medium)	17	*Tangag, Ficus racemosa* and *Bongkol*
105	5°16'43.35"N 118°27'20.06"E	10	75% (good)	17	*Ficus racemosa* and *Bongkol*
103	5°16'46.32"N 118°28'13.08"E	17	80% (good)	17	*Bongkol* and *Tangag*

102	5°16'40.90"N 118°28'38.01"E	9	55% (medium)	17	*Tangag, Ficus racemosa* and *Bongkol*
100	5°17'2.52"N 118°29'18.32"E	8	55% (medium)	17	*Bayur, Tangag* and *Bongkol*
203	5°20'5.75"N 118°31'45.87"E	13	70% (good)	12	*Topog, Tangag* and *Bongkol*
206	5°20'18.65"N 118°32'1.76"E	8	70% (good)	22	*Bongkol* and *Tangag*
215	5°20'22.27"N 118°32'42.23"E	14	75% (good)	22	*Bongkol* and *Tangag*
225	5°19'47.87"N 118°33'2.61"E	9	65% (good)	17	*Tangag, Ficus racemosa* and *Bongkol*
231	5°20'0.59"N 118°32'57.22"E	14	70% (good)	22	*Tangag, Ficus racemosa* and *Bongkol*

Analysis of Samples (Site 5)

- Forest density and tree species on the North of Site 5 up until Hap Seng's ferry port is very high, whereby some areas are almost in prime condition.
- The total number of tree species found along the assessed are 42 species.
- In total, the dominant species for sampled riparian forest consist of *Cleanhovia hospita, Petrospermum javanicum, Ficus spp* and *Nuclea subdita*.
- The percentage of degradation on riparian forests in Site 5 (Kg. Litang) is very low compared to the villages in Site 8.
- Three main tree species found in this site are *Bayur (Petrospermum javanicum)* with an average height of 10 to 35 meter, followed by *Ficus racemosa* with heigh of 10 to 25 meter and *Nuclea subdita* with a height of 5 to 15 meters.

Key Findings (Site 5)

- Forest density and tree species from the Northwest to the Northeast of Site 5 downriver to Hap Seng's ferry port is very high, whereby some areas are almost in prime condition.

- Underproductive sites WP 140, 141, 142 and 143 on the North Bank where Hap Seng operates shows approximately less than half of the optimum 32 palms per hectare. The remaining palms in these areas are now mature. While under-productive sites WP 114 and 115, south bank, where Sabah Mas operates, have been converted into a grazing area for deer while a new oil palm planting was initiated with bunds.

- The abundance of wildlife observed in site 5 is extremely high, this was mainly due to high-quality riparian forest and absence of human activities. We observed 60 species of birds and eight mammals species, with important species like proboscis monkeys with numerous large troops (see Maps in Appendix Two). Tourism has been relatively unexplored by the community who has approx. 1700 acres of forest land and located across the river from Tabin Wildlife Reserve.

- The fishery resource dependent by local fisherman is observed to be low as only a handful of community members in Litang are still fishing.

Recommendations (Site 5)

- **Community Forestry**

  Kampung Litang has the potential of an due to large tracts of forest remain in the area. The community has struggled with land tenure in the past and has faced high levels of wildlife conflict. Development for palm oil is almost impossible thus an exploration of other alternatives is crucial.

- **Encroachment of riparian forest**

  The opening up of forest land and expansion of palm oil or other crops that continue to damage riparian forest south of the village must be carefully monitored to prevent the opening of land in riparian areas. It is highly recommended that the community be trained as Honorary Forest and Wildlife Wardens and establish a unit in Kg Litang so that they can help the government to enforce the law and prevent damage to the riparian forest. To address the encroachment of riparian forest in palm oil estates. Owners of the company must take initiative to enforce zero plantings in riparian areas as stated in the SOP about no planting in riparian areas. Discussion with must be done with the companies to ensure full compliance with RSPO.

- **Forest restoration**

  Degraded forest area in site 5 needs to be evaluated and mapped to ease the management of restoring the area. The area targeted for forestation has to be divided into community and palm oil restoration zones. **Enrichment planting** by applying **gap planting methods** is the best way forward while silviculture treatment has to be carefully selected to avoid removal of valuable vines and roots such as Liana and other fruiting roots. **Nurseries** for

three seedlings are to be established with several options to be decided with the community such as whether to do this communal or in groups.

- **Conserve other forests such as fruit orchards and old palm oil tree.**
  Private landowners still have forest and unproductive palm oil as well as fruit orchards along the riverbank. The legal tenure of these areas is to be identified and engaged together to support the long term viability of diversity of life in this area.

- **Tourism Development**

Kg Litang is highly suitable for tourism. The village is within the tourism belt of the east coast of Sabah and has an abundance of wildlife and beautiful forest, unique cultures and history and it sits just across the river from the largest wildlife reserve in the country and easily accessible from Lahad Datu.

- **Community-based participatory mapping**

To ensure full participation from communities so that they may understand current issues relating to their natural resource and their territories. Community-based participatory mapping processes is a very important step for the community to document their knowledge about their territories and make it easier for their planning and development.

Riparian Forest in Site 2 & 3

In both sites there are areas of forest riparian and oxbow lakes, and in site two these are of higher quality. Both sites have areas without riparian, some of which appear to have been cleared many years ago, and others being cleared currently along the south bank by people who claim to work at Hap Seng Plantations.

Schedule 5: Data of Riparian Sampling for Site 2&3

Sample No.	Coordinates	Tree Species Density/100m	% of Forest Quality	Average Tree Height (m)	Dominant Species
231	5°20'0.59"N 118°32'57.22"E	14	70% (good)	22	*Tangag, Ficus racemosa* and *Bongkol*
246	5°21'26.27"N 118°34'30.02"E	6	75% (good)	17	*Topog, Tangag* and *Bongkol*

Analysis of samples Sites 2 & 3

- Forest density and tree species in this area is relatively high despite fragmentation. It is better in site 2 compared to site 3. Biodiversity is high in both sites, especially site two (see Maps in Appendix Two.

- The total number of tree species found along the assessed are 11 species (but this is in only two sample areas).

- In total, the dominant species for sampled riparian forest consist of *Cleanhovia hospita, Petrospermum javanicum, Ficus sps* and *Nuclea subdita*.

- Some areas have highly degraded riparian forests in Site 2 & 3.

- Three main tree species found in this site are Bongkol (*Nauclea sabdita)* with an average height of 10 to 15 meters, followed by Salungapid (*Molotus moticus*) with an average height of 10-15 meters and *Ficus racemosa* with height of 10 to 25 meters.

Key Findings Sites 2 & 3

- The riparian forest in both banks is still in good quality as potentially serve as a seed bank to help other riparian areas to recover. However, human activities in the riparian forest are not controlled.
- Our observation found that some portions of the south bank show that people have been using these riparian areas for at least decades. This was evident from the age of mango trees and coconuts observe along the river.
- Unidentified people were observed to inhabit riparian areas also used herbicides to kill plants to plant banana, corn, tapioca and others. This includes the killing of tree to remove shade.
- Observation in site 2 also revealed new riparian areas were destroyed by unidentified people and this is blocking the movement of primates along the south bank.
- An area of 230 ha in Site 2 belonging to IOI had been identified as unproductive palm due to swamp forest.

Recommendations Sites 2 & 3

- Build a relationship with palm oil companies in addressing riparian forest encroachment issue.
- Identify people who encroach the riparian forest.
- Facilitate processes between palm oil companies to exchange experiences with one another in managing and restoring the riparian forest.
- Explore opportunities to restore 6.6 km of riparian areas in the North Bank.
- Identify the legal status of prime riparian forest in site 2 for legal protection

Appendix 1: Tree species list of sampling sites

Schedule 2 Tree Species on Site 8

No	Local Name	Species Name	Family Name

1	Terosob	*Dracontomelon dao*	
2	Mangga	*Mangifera pentandra*	*Anacardiaceae*
3	Belunu	*Mangifera caesia*	
4	Terimbai	*(Ficus)*	
5	Tangkol	*Ficus rasemusa*	
6	Tandiran	*(Unknown)*	
7	Topog	*Ficus septica*	
8	Nunuk	*Ficus annulata*	*Moraceae*
9	Bongkol Booh	*Ficus*	
10	Togop	*Artocarpus camansi*	
11	Madang-madang	*Artocarpus odoratissimus*	
12	Laran	*Neolamarckia cadamba*	
13	Bongkol	*Nauclea sabdita*	*Rubiaceae*
15	Taikan	*Macaranga mauritiana*	*Euphorbiaceae*
16	Tambirog	*Alstonia Scholaris*	*Apocynaceae*
17	Pulai	*Alstonia Scholaris*	
18	Bayur	*Pterospermum acerifolium*	
19	Durian	*Durio graveolens Becc*	*Malvaceae*
20	Tangag	*Kleinhovia hospita*	
21	Kerigkin	*Dilenia Bornensis*	*Dellleniaceae*
22	Kerigkin	*Dilenia Excelsa*	
23	Fish- tail palm	*Caryota no*	
24	Ongkod	Corypha umbraculifera	*Arecaceae*
25	Pinang	*Areca catechu*	
26	Seraya Urat Mata	*Parashorea Malaanonan*	*Dipterocarpaceae*
27	Binuang	*Octomeles sumatrana*	*Tetramelaceae*
28	Merbau	*Sympetalandra borneensis Stap*	*Fabaceae*
29	Lengium	*Oroxylum indicum*	*Bignoniaceae*
30	Jati	*Tectona grandis*	*Lamiaceae*
21	Pisang Hutan	*Musa balbisiana*	*Musaceae*
32	Merupis	*Not Identified*	*Not Identified*
33	Talutu Tunggal	*Not Identified*	*Not Identified*
34	Salingkarat (*Bamboo)*	*Not Identified*	*Not Identified*
35	Tirisan	*Not Identified*	*Not Identified*
36	Pelindung	*Not Identified*	*Not Identified*
37	Ulang Tiruan	*Not Identified*	*Not Identified*
38	Rungu	*Not Identified*	*Not Identified*
39	Taga	*Not Identified*	*Not Identified*

Schedule 4 Tree Species on Site 5

No	Local Name	Species Name	Family Name
1	Tangkol	*Ficus rasemusa*	
2	Ficus uk 1	*Ficus*	
3	Ficus uk 2	*Ficus*	
4	Nunuk	*Ficus annulata*	*Moraceae*
5	Topog	*Ficus septica*	
6	Tandiran	*Ficus*	
7	Madang-Madang	*Artocarpus odoratissimus*	

8	Topog	*Artocarpus camansi*	
9	Bongkol	*Nauclea sabdita*	*Rubiaceae*
10	Sapat	*Mitragyna speciosa*	
11	Simpoh gajah	*Dillenia indica*	
12	Kerigkin	*Dilenia Excelsa*	*Dellleniaceae*
13	Jambu-jambu	*Dilenia Bornensis*	
14	Durian	*Durio graveolens Becc*	
15	Tangag	*Kleinhovia hospita*	*Malvaceae*
16	Bayur	*Pterospermum acerifolium*	
17	Terosob	*Dracontomelon dao*	*Anacardiaceae*
18	Renghas	*Gluta beccarii*	
19	Salungapid	*Mallotus Muticus*	*Euphorbiaceae*
20	Pogel	*Not Identified*	*Not Identified*
21	Rotan Dabur		
22	Jelotong Paya	*Dyera costulata*	
23	Pulai	*Alstonia Scholaris*	*Apocynaceae*
24	Tambirug	*Alstonia angustifolia*	
25	Keruing daun lebar	*Dipterocarpus costulatus*	*Dipterocarpaceae*
26	Kapur	Dryobalanops aromatica	
27	Salangan Kangkung	*Planchonia valida*	*Lecythidaceae*
28	Binuang	*Octomeles sumatrana*	*Tetramelaceae*
29	Nyatoh paya	*Pouteria linggensis*	*Sapotaceae*
30	Langium	*Oroxylum indicum*	*Bignoniaceae*
31	Mata kucing	*Euphoria malaiense*	*Sapindaceae*
32	Biru (Palm)	*Licuala bintuluensis*	*Arecaceae*
33	Rotan Saga	*Calamus caesius*	
34	Pisang-Pisang	*Alphonsea maingayi*	*Annonaceae*

Schedule 6 Tree Species on Site 2&3

No	Local Name	Species Name	Family Name
1	Bongkol	*Nauclea sabdita*	*Rubiaceae*
2	Tangkol	*Ficus resamosa*	*Moraceae*
3	Salung Apid	*Molotus moticus*	*Euphorbiaceae*
4	Asam asam	*Not Identified*	*Not Identified*
5	Renghas	*Gluta beccarii*	*Anacardiaceae*
6	Bayur	*Pterospermum acerifolium*	*Malvaceae*
7	Jambu-jambu	*Dilenia Bornensis*	*Dellleniaceae*
8	Lunang	*Not Identified*	*Not Identified*
9	Tangag	*Kleinhovia hospita*	*Malvaceae*
10	Sapat	*Mitragyna speciosa*	*Rubiaceae*
11	Pisang-pisang	*Alphonsea maingayi*	*Not Identified*
12	Ongkod (Wild palms)	*Not Identified*	*Not Identified*