

GNF Final Report on the Community-based Reforestation Feasibility Study of Lake Jempang Shores in East Kalimantan, Indonesia

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THE CONSERVATION FOUNDATION
FOR RARE AQUATIC SPECIES OF INDONESIA

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PREFACE AND ACKNOWLEDGEMENTS

Our study area involved Jempang Lake, which is one of the largest lakes in the Mahakam River and wetlands area. This lake has an important water-regulatory system and functions as retarding basin for flood prevention in river and lakes. It is surrounded by freshwater and peat swamp forest, which has been destroyed for a great deal by forest fires in the past but currently partially regenerated with a majority of original tree species. Forest fires are triggered by lack of ground water due to conversion of the lowland forest situated on relatively higher ground directly adjacent to the swamp forest, that regulate the water flow (ground water) to these lower wetlands. In this way lowland forest is protecting peat swamps from complete drying out of peat swamps (which otherwise makes them very vulnerable to fires). However, this forest has been converted for a great deal for industrial oilpalm plantations and coalmining activities and only few community-owned land is available. Because of the diminished land, communities more intensively use the land for agriculture, which eventually resulted in critical soil and reduced productivity.

With the aid of the Global Nature Fund, RASI has conducted a feasibility study to assess critical areas that have most impact on sedimentation on the lakes and investigated its potential for community-based reforestation by combining species with harvestable products and non-harvestable tree species.

The study provided us with the proper information on locations where to conduct the reforestation activities and revealed the community interest. Moreover, recommendations will be placed at forestry departments and other interested parties.

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BACKGROUND

Area description

Lake Jempang (150 km²) is one of the lakes in the Middle Mahakam Lakes and Wetlands area (MMLW) situated between 180km and 350km from the mouth of the Mahakam. This area is one of Kalimantan's largest wetland areas and is a natural floodplain, encompassing 8.100 km², including the three major lakes, Jempang, Semayang (130 km²) and Melintang (110 km²) with a maximum total water surface reaching 600 km² at high water levels, and c. 32 minor lakes (each varying between 0,1 – 20 km² in size), and extensive peat and freshwater swamps. The lakes have an in and outwards water flow from and to the Mahakam and connecting freshwater swamps and tributaries. Due to alternating water levels the size of the lakes' water surface ranges from zero in extremely dry years to more than 60,000 ha. Their maximum depth is about 6-7m. Annual fluctuations can reach more than 6m.

Importance of Lake Water Catchment Area Preservation

- The lakes and surrounding swamp (forests) have an important water-regulatory system and function as retarding basin for flood prevention in river and lakes
- The lowland forest situated on relatively higher ground directly adjacent to the swamp forest regulate the water flow (ground water) to these lower wetlands, in this way protecting peat swamps from complete drying out of peat swamps (which otherwise makes them very vulnerable to fires). Area of high socio-economic value for the local human settlements (mainly fisheries on which c. 10.000 fishermen depend for their livelihoods, traditional forest products harvest, small-scale agriculture)
- A crucial breeding and migration site for at least 298 identified bird species. 86 species of freshwater fish, 24 mammal species & 300 tree species
- Freshwater dolphins congregate in lake/ river connecting tributaries and confluences and occur in two lakes at medium-high water levels.
- Rich cultural heritage

Deforestation of lake water catchment areas

Loss of 90% of original peat and freshwater swamp forest surrounding the lakes through forest fires, forest conversion (large-scale mining and oilpalm plantations, small-scale agriculture). In total 400.000 ha original (swamp) forest has been destroyed by forest fires in 1982 & 1997/1998. Regeneration of accidentally burnt forest that has not been for conversed showed a regeneration of c. 60-70% including original tree species, which is a good indication for reforestation potential.

Effects of forest loss

- Increased shallowness (highest in Jempang) by high rates of sedimentation, causing eutrophication and reduction in fish resources
- Massive water weeds (covering 50%-90% lake surface) causing transport problems
- Long-term floods during recent years in nearly all villages and towns over the entire length of the Mahakam River causing many losses and diseases because of the reduced function of the lakes and wetlands as flood retarding basin.
- Habitat and species diversity loss
- Some socio-economic problems have arised as a result of the diminished community owned land, which prevent the local community to perform their traditional occupations in the forest such as rattan harvesting, swallow nest collection and small-scale animal

hunting and other forest product harvesting (gaharu, fruits, medical plants), leading to new land conversions for agriculture and unsustainable fishing techniques.

GOALS, OBJECTIVES AND OUTCOMES

Overall Goal

Identification of critical areas for community-based forest rehabilitation/reforestation in the Lake Jempang water-catchment area that will have the largest impact in terms of restoring the water-regulatory function of the lake and wetlands in East Kalimantan, Indonesia and providing a secured natural habitat for the high biodiversity potential.

Objectives

A feasibility study will be conducted that will identify priority areas, suitable species for reforestation using a combination of indigenous non-commercial tree species together with indigenous tree species whose products (fruits, rattan, resin) can be harvested by local communities, assessing current land use and ownership in critical areas; assessing land-owners/users' interest in reforestation of the land and maintenance of native tree species consisting of maximal 70% indigenous tree species, which products can be harvested and 30% non-commercial indigenous species; assess the possibilities and costs of land-purchase.

These results with recommendations will be handed to government and to any potential CO₂ reduction buyers for future reforestation activities.

Ultimate Outcome After Actual Reforestation of Critical Land

Poverty reduction, secured habitat for many threatened animal species because the high presence of fruit trees will favour the survival of many of animal species, improved water flow from higher-ground forest to adjacent lower (peat) swamp forests preventing drying out and fires, reduced sedimentation from surface run-off water from lake catchment area into lake thereby reducing water weeds and fish resource decrease.

ACTIVITIES

Preparations

The first preparations involved radar and satellite image analysis and obtaining/ preparing maps of Lake Jempang with altitude/ soil and vegetation types, surface run-off, extent of clearing and identification of critical points, based on the factors above. In this way, 26 points of critical land sites were obtained, which would be the main target locations for reforestation activities because of their impact on the lake ecosystem. Figures 1 and 2 below indicate that point 10 is the most critical area based on the extent of clearing and slope. The area that is to some extent critical and potentially critical covers an area larger than Lake Jempang itself.

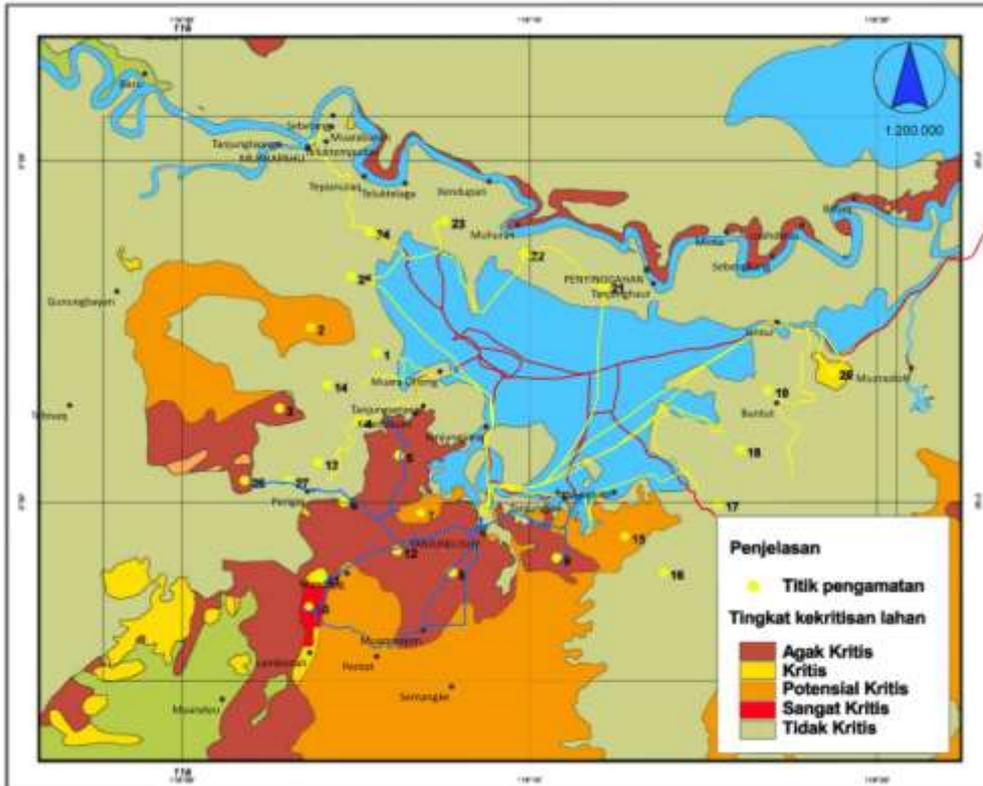


Figure 1. Map with Critical Land Points around Lake Jempang.

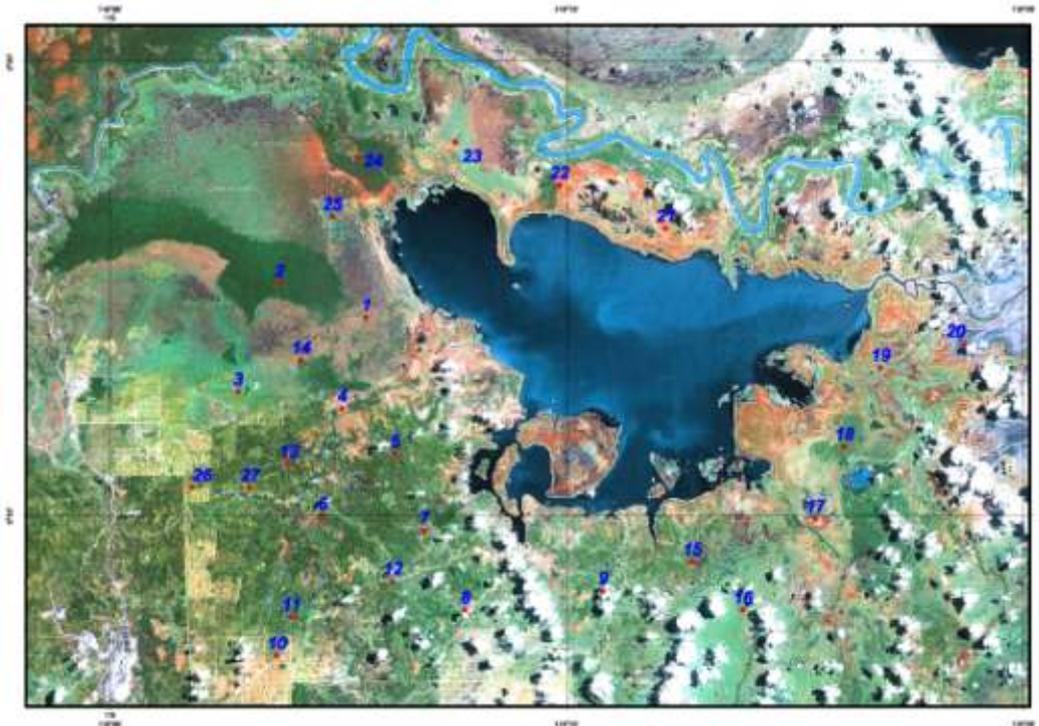


Figure 2. Satellite Image of Lake Jempang with critical land points

Field survey methods and analysis

All 27 identified critical areas based on satellite images were surveyed during the feasibility ground-check survey from 25 November to 6 December 2008 during high water conditions and from 3 – 14 November 2009 during low water conditions. The survey area was about 978 ha in size and involved ground checks in high altitude and low altitude areas near Lake Jempang. At each point, slope was measured, water and soil samples taken, ground cover recorded as well as biodiversity and land ownership. Water samples were taken at the nearest surface water source to the sampling coordinate taking one bottle of 500 ml, whereas soil samples were taken by digging a hole at the sampling point of c. 50 cm depth. The sample of c. 200 gram weight is stored in a small plastic bag. Both water and soil samples were signed with location name and time. Surveys were conducted by car, walking, and motorized canoes. By use of a clinometer the debit of rainfall and degree of erosion for each area was identified. Besides, the slope of each point, general condition and extent of clearing, land-ownership and soil condition. In addition, informal interviews were held with c.250 families during several separate visits to the villages that owns land to find out their opinion about community-based restoration.

Both water and soil samples were tested in a lab at the University of Mulawarman in Samarinda for various parameters (see tables 1 & 2).

RESULTS

Environmental conditions of the critical land points

From our field observations the following conclusions were made: The slope for critical land-points (4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,26,27) were between 15-22 degrees, which means that the critical points are rather steep and have enough potential for erosion because the areas all reached middle until high critical levels. The highest critical level was found for point 10 with a steepness of 23 degree. The points that are temporarily flooded (1,2,3,19,20,21,22,23,24,25) had 0.5-3 m deep water levels.

The original vegetation (before clearing) for each point was dominated by freshwater and peat swamp forest as well as tropical lowland forest. A large part of the land is being used for palm oil plantations and coal mining (30%) (points: 3,6,10,11,13,26 and 27), unused degraded land (50%), (points 1,2,4,14,16-25), rural settlements and agriculture (20%) (points 5,7,8,9,12 and 15). The large percentage of unused land is because the condition of this land, which is flooded 5 months in one year, causes the land to be non-commercial for humans. It is critical because the vegetation is dead due to forest fires and an increase in submergence height and period due to increased siltation and shallowness of the lakes as a result of forest loss at higher grounds.

Soil in the survey area is dominated by red-yellow, podsollic soil (clay), which is old soil, whereas soil near the lakes is peat soil with high acidity (pH 3-5,6) because there are no active, volcanic areas in Kalimantan. Because of the high acidic soil, every time when forest is being opened (deforestation) nutrients are being washed away by rain (erosion) whereas during the dry season this soil is very vulnerable to fires and the additional presence of coal may cause submerged fires, where are really hard to stop. During the wet season, the soil condition at the observation sites is containing enough water, c. 70%. The clay texture is elastic and has a low absorption for water as it is saturated. During the dry season the soil condition is dry and appears broken; its texture is hard and not elastic because it contains little water. The soil moisture is decreasing drastically to only 15% and can be reduced to 8% at the areas without any vegetation cover.

Water quality analysis results are presented in table 1.

Table 1. List of Chemical parameters of run off water at observation points.

No	Parameter		Ground points						Lake Points						PP No. 82 thn 2001*	SK Gub No 339 1988**
			1	4	7	10	11	15	20	21	22	23	24	25		
1.	pH		6,2	5,5	5,5	4,2	5,7	5,0	5,0	5,0	5,0	5,0	5,0	5,0	6 - 9	5 - 9
2.	Dissolved Oxygen (DO)	mg/l	6,08	5,80	6,10	5,80	5,76	6,14	5,50	5,42	5,98	5,24	5,41	5,10	6	≥ 6
3.	Biochemical Oxygen (BOD)	mg/l	3,4	1,40	2,03	1,39	1,21	1,42	1,12	1,54	1,19	1,80	1,31	1,91	2	6
4.	Chemical Oxygen (COD)	mg/l	20,00	12,73	17,57	20,83	25,45	15,66	21,92	23,68	21,48	11,40	11,58	5,26	10	10
5.	Iron (Fe)	mg/l	0,22	0,27	0,60	0,55	0,23	1,28	0,92	1,19	0,71	0,14	1,32	1,35	0,3	1,5
6.	Manganese (Mn)	mg/l	0,08	0,02	0,03	0,08	0,07	0,66	0,35	0,33	0,30	0,48	0,48	0,51	0,1	0,05-0,5
7.	Nitrate (NO ₃ -N)	mg/l	0,23	0,53	0,60	0,50	1,43	3,81	0,26	0,27	0,29	0,24	0,28	0,27	10	5 - 10
8.	Total Fosfate	mg/l	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0,2	-

* National standard; ** Provincial standard

Nb. Note that water samples were only taken for a selection of representative points, because some points involved nearby points of similar environmental conditions.

- The yellow column shows the results of water quality analysis at critical land points, whereas the green points shows results from points located within the lake.
- When comparing the results with the standard that was set by the Central Government (second white column from right), it shows that the results approach or exceed these standards such as COD, which is indicating that there is a contamination of pollutant in the soil (run-off). In general, the pollutant is Iron and Manganese, which is quite high during the rainy season.
- At point 15 the level of Mn is high enough and may indicate a deposit of coal in this area.
- A large part of the observation points are in areas, which are influences by mining activities and the possibility of environmental pollution is high enough.



Figure 3. Condition around one observation point near Lake Jempang

Degree of Land Degradation

From our field observations, we noticed that a large part of our sampling points were severely degraded, especially in the area of or near the palm oil plantations and coal mining. The extensive degradation is illustrated in the figure below.



Figures 4,5. Land degradation caused by the palm oil plantations.

Soil analysis in the Jempang Lake area

Soil in this area is consisting for 90% of peat soil. Peat soil usually has a pH between 4.5-5.6. This is caused by the fact that the soil is very old causing an imperfect decomposition of biomass, which causes biomass to accumulate into very thick layers and form a peat swamp soil of low fertility. Forest conversion by logging, plantation or coalmining companies increase the degree of soil degradation because of erosion that occurs during the rainy season. High erosion is bringing sediments and nutrients from the topsoil to the river and ends up in the lake, where it is deposited. Sedimentation in the lake reduces the water storage capacity and fertilizes waterweeds such as water hyacinth.

During the rainy season, the water storage capacity of soil is reduced, causing extensive flooding, which is disturbing transportation and human households. During the dry season, the soil texture is very dry and hard because of lack of moisture. On several sampling points the soil looks cracked and very hard, which is a large difference with the wet season when soil is very wet and slippery.

The analysis results of the soil samples are presented in table 2. The results indicate that the percentage of important elements is very low, which is caused by the fact that the soil at the observation points is bare and rain can directly touch the soil causing erosion or mineral 'washing'. This causes the low soil fertility when trying to grow crops. Therefore, before conducting reforestation the soil needs to be treated by fertilizers to supply necessary elements such as N, P, Ca and K so that the plants will grow better.

Tabel 2. Soil analysis results per sample point:

Elements	Unit	Ground points						Lake Points					
		1	4	7	10	11	15	20	21	22	23	24	25
pH		5,8	6,7	6,9	6,7	5,9	6,9	5,8	6,0	6,1	6,0	6,0	6,2
Nitrogen (N)	%	0,3 (L)	0,3 (L)	0,1 (L)	0,0 (VL)	0,0 (VL)	0,1 (L)	0,2 (L)	0,2 (L)	0,1 (VL)	0,4 (L)	0,3 (L)	0,1 (VL)
Phospor (P)	ppm	15 (H)	15 (H)	23 (VH)	23 (VH)	15 (H)	15 (H)	11 (H)	10 (H)	14 (H)	15 (H)	13 (H)	12 (H)
Kalium (K)	ppm	55 (VL)	15 (VL)	23 (VL)	28 (VL)	27 (VL)	50 (VL)	50 (VL)	23 (VL)	23 (VL)	56 (VL)	56 (VL)	40 (VL)
Calsium (Ca)	Meq/ 100 g	2,6 (L)	3,20 (L)	2,5 (L)	1,8 (L)	2,5 (L)	2,2 (L)	0,3 1	0,32 (VL)	0,40 (VL)	0,59 (VL)	0,32 (VL)	0,31 (VL)
Magnesium (Mg)	Meq/ 100 g	0,8 (L)	0,3 (VL)	0,2 (VL)	0,2 (VL)	0,2 (VL)	0,3 (VL)	0,4 (L)	0,2 (VL)	0,2 (VL)	0,2 (VL)	0,3 (VL)	0,2 (VL)

Legend: VH : Very High
 H : High

 VL : Very low
 L : Low

Land-ownership and community response for forest restoration

A large part of the survey area is owned by the government (c. 50%), then companies (c. 30%) and lastly local communities (c. 20%). As much as 250 family heads from the villages Tanjung Isuy, Tanjung Jan, Tanjung Jone, Muara ohong, Serang, Mancong, dan Perigiq have been censused and agree to sign to join the program for community-based restoration (Appendix 1), where they will plant trees that we recommend as long as the seedlings and preparation material is being supplied by the government or a competent NGO. Each family agrees to hand 2-3 Ha of land, which they own, so that the total land that can be restored is 500-750 Ha. Tree species which are mostly requested by the community are presented in table 2. The community agrees not to fell trees or take wood from the restoration areas until its productive period is finished (for fruit trees), after which new seedlings will be planted. Tree species such as Bengkirai, Meranti, Ulin may be harvested after 30 years and replanted whereas Jati may be harvested after 14 years and replanted. The land will be planted with a mixture of different tree species.



Figure 6-7. Interview process and socialization program restoration of Lake Jempang in villages



Figures 8,9. Cultivation land owned by community of Tanjung Isuy.

Table 2. List of favorite planting species by the community land owners.

Forest tree species	Tree species with harvestable products
Jati (<i>Tectona grandis</i>)	Durian (<i>Durio sp</i>)
Bengkirai (<i>Shorea albida</i>)	Kakao (<i>Cacao sp</i>)
Ulin (<i>Eusyderoxylon zwageri</i>)	Karet (<i>Ficus elastica</i>)
Meranti Merah (<i>Shorea leprosula</i>)	Rambutan (<i>Nephelium lappaceum</i>)
	Mangga (<i>Mangifera indica</i>)
	Nangka (<i>artocarpus heterophyllus</i>)

Impacts of Land Degradation

Rainy Season's Survey

The impacts of environmental degradation are already experienced by the local community living near the coal mine or palm-oil plantations. Negative impacts amongst others are that during the rainy season flooding is increasingly frequent and high, which makes it difficult for the indigenous Dayak community to grow crops because their fields are submerged. The access between villages is often cut resulting in limited availability and high prices for commodities.



Figure 10. Access to the village is cut by the flood.

For villages directly situated on Ohong River and Jempang shore, community complains about the degraded water quality impacting on fisheries. The degradation amongst others is thought to be caused by the waste water from cleaning coal and pesticides used for palm-oil plantations entering the river and lake system during the rainy season.

Dry Season's Survey

During the dry season, the average temperature ranged approximately between 32-35°C, with humidity reaching 90%. Because of the lack of rainfall and high evaporation, the water volume of Lake Jempang drastically decreased. In comparison, the depth during rainy season is between 4-7m, but in the dry season the depth drops to 0,0-0,5 m. The amount of water in the river and small rivers also dropped and some part of the river cannot be used for transportation. These conditions are increasing the risk of forest fires into highly critical. Below are some of pictures taken during the dry season' survey.



Figure 11. Berawan River during the dry season is becoming shallow and narrow, making transport difficult



Figure 12. Transportation way along River Ohong accessing Jempang Lake has also become narrow.



Figure 13. Villagers' land has become very dry and many crops died from lack of rain water



Figure 14. The condition of villager's land after forest fire

Size of Jempang Lake during rainy and dry season

The normal surface area of Jempang Lake is 15.000 ha. The water surface area of Jempang at different water levels can be seen from figure 15, which is based on GIS mapping. Areas in Jempang Lake that could be and were surveyed during the rainy season by means of a motorized vessel are indicated by the red track line. During the rainy season the water surface area expands for c. 30%. On the other hand, during the dry season the size of Jempang Lake is almost 40% of its normal size. Lake areas that were still accessible by means of a boat during the dry season are indicated by the blue track line. The difference in lake water surface between rainy and dry season can reach 50%. This is caused by the high sedimentation and erosion rate, which occurs in the area of the lake inlets, which mostly originates from the Mahakam.

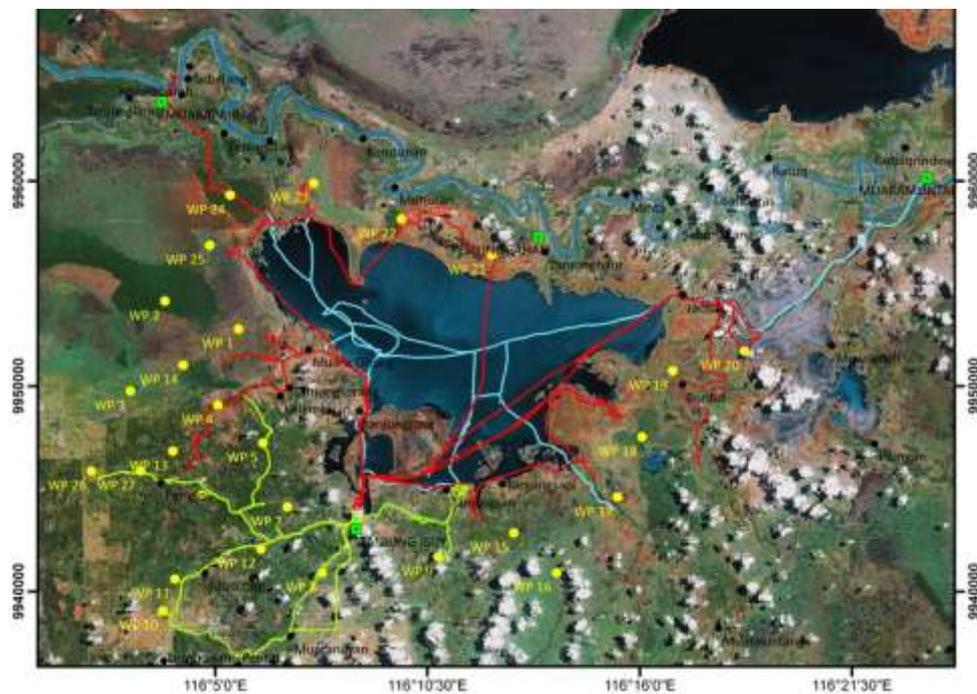


Figure 15. Map of feasibility survey track and points during rainy and dry season
 Legend: Red: Rainy Season aquatic track; Blue: Dry season aquatic track; Yellow: Land-based tracks covered by car during both seasons.

Biodiversity

During the field observations, the following fauna was encountered near the sampling points, such as:

Fauna:

English Name	Latin Name	Local Name
Lesser Adjutant*	<i>Leptoptilos javanicus</i>	Bangau Tongtong
Borneo Monitor Lizard*	<i>Varanus borneensis</i>	Biawak Kalimantan
Brahminy Kite*	<i>Haliastur indus</i>	Elang Bondol
White-bellied sea-eagle*	<i>Haliaeetus leucogaster</i>	Elang laut perut putih
Grey-headed fish-eagle*	<i>Ichthyophaga ichthyaetus</i>	Elang ikan kepala kelabu
Proboscis Monkey*	<i>Nasalis larvatus</i>	Bekantan
Silver langur*	<i>Presbytis cristata</i>	Lutung Perak
Long-tailed macaque	<i>Macaca fascicularis</i>	Kera ekor panjang
Giant Squirrel	<i>Ratufa affinis</i>	Tupai raksasa
Hairy-nosed Otter*	<i>Lutra sumatrana</i>	Berang belang Sumatra
Smooth Otter*	<i>Lutra perspicillata</i>	Berang belang biasa
Oriental Pied Hornbill*	<i>Anthracoceros albirostris</i>	Kengkareng perut putih

*: Protected

Flora :

English Name	Latin Name	Local Name
Red Balau	<i>Shorea balangeran</i>	Bengkirai
Mascal wood	<i>Vatica rassak</i>	Resak
Durians	<i>Durio carniatus</i>	Durian
Borneo Kauri	<i>Agathis borneensis</i>	Agatis
White Teak	<i>Shorea albidia</i>	Meranti putih
Brush box	<i>Tristania sp.</i>	
Macaranga	<i>Macaranga triloba</i>	Mahang
Teak	<i>Ficus sp.</i>	Karet
Ramin	<i>Gonystillus macrophylla</i>	Ramin
	<i>Alstonia sp.</i>	

Pictures of some fauna encountered during the survey :



Borneo Monitor Lizard



Grey-head Fish-eagle



Hairy nose otter



Oriental Pied Hornbill



Proboscis monkey



Silvered Langur

FUTURE PLANNING

1. Restoration of critical land with forest and fruit trees has already reached a community agreement and is ready for implementation when there is money made available by the government or foreign donors.
2. Safeguarding of remaining forest, i.e. Metau Forest has been socialized and well received by local communities and district government. A land-based research is required to mark the exact boundary coordinates and map the tree species and wildlife, needed to obtain an official protected district status.
3. Cooperation with the university and educational institutions regarding research and long-term planning of sustainable forest management.
4. Restoration of Lake Jempang through planting and rehabilitation of nearby forest such as freshwater swamp, peat swamp and tropical lowland forest.
5. Making an observation station to for fires, in the form of a 30-m high tower, which can be used for fire detection, observing birds and ecotourism purposes.

APPENDIX I

Preliminary list of landowners, who are willing to participate in follow-up restoration projects. NB. List is not yet complete yet.

1.	LAKON	UMUR 61	2	EXTAR
2.	PICIS	UMUR 50	2	EXTAR
3.	SUNTIK	UMUR 40	2	EXTAR
4.	IJUS	UMUR 55	2	EXTAR
5.	ARJANI	UMUR 56	2	EXTAR
6.	TESO	UMUR 59	2	EXTAR
7.	TECAN	UMUR 54	2	EXTAR
8.	LAN	UMUR 50	2	EXTAR
9.	IRUM	UMUR 38	2	EXTAR
10.	AMIRAN	UMUR 39	2	EXTAR
11.	ERI	UMUR 27	2	EXTAR
12.	UWIK	UMUR 25	2	EXTAR
13.	LAYAN	UMUR 39	2	EXTAR
14.	MAYAN	UMUR 69	2	EXTAR
15.	AKUTA	UMUR 50	2	EXTAR
16.	SISENG	UMUR 31	2	EXTAR
17.	NIASKUR	UMUR 31	2	EXTAR
18.	ganceng	UMUR 75	2	EXTAR
19.	iput	UMUR 55	2	EXTAR
20.	solong	UMUR 35	2	EXTAR
21.	ucan	UMUR 57	2	EXTAR
22.	kumpul	UMUR 67	2	EXTAR
23.	JANAH	UMUR 27	2	EXTAR
24.	NUVANI	UMUR 37	2	EXTAR
25.	JARAS	UMUR 59	2	EXTAR
26.	BAROI	UMUR 70	2	EXTAR
27.	PUNUN	UMUR 75	2	EXTAR
28.	SEPA	UMUR 50	2	EXTAR
29.	TOMAS	UMUR 35	2	EXTAR
30.	MAI	UMUR 27	2	EXTAR
31.	JUMRAM	UMUR 35	2	EXTAR
32.	KASDI	UMUR 25	2	EXTAR
33.	Sibng	UMUR 45	2	EXTAR
34.	Pangmai	UMUR 25	2	EXTAR
35.	PUDANG	UMUR 35	2	EXTAR
36.	TEBUS	UMUR 45	2	EXTAR
37.	TOTENG	UMUR 63	2	EXTAR
38.	NUL	UMUR 39	2	EXTAR
39.	MIS	UMUR 31	2	EXTAR
40.	Depi	UMUR 55	2	EXTAR
41.	CANG	UMUR 27	2	EXTAR
42.	BISON	UMUR 55	2	EXTAR
43.	NINI	UMUR 27	2	EXTAR
44.	ROBIN	UMUR 25	2	EXTAR
45.	ACIK	UMUR 28	2	EXTAR
46.	MIMI	UMUR 31	2	EXTAR
47.	SALUNG	UMUR 29	2	EXTAR
48.	SIK	UMUR 55	2	EXTAR
49.	TONI	UMUR 36	2	EXTAR
50.	MATI	UMUR 59	2	EXTAR

PAULUS	UMUR 57	2 EXTAR
NIRIPA	UMUR 35	2 EXTAR
SYAIPUL	UMUR 37	2 EXTAR
NONENIQ	UMUR 39	2 EXTAR
ATI	UMUR 25	2 EXTAR
CAH	UMUR 30	2 EXTAR
ANGAH	UMUR 27	2 EXTAR
DARMI	UMUR 30	2 EXTAR
OMI	UMUR 27	2 EXTAR
OKAH	UMUR 20	2 EXTAR
MUJAH	UMUR 39	2 EXTAR
YOH	UMUR 75	2 EXTAR
YDIN	UMUR 55	2 EXTAR
ARBI	UMUR 39	2 EXTAR
AMARUDIN	UMUR 56	2 EXTAR
YOK	UMUR 25	2 EXTAR
SARAH	UMUR 35	2 EXTAR
KARINQ	UMUR 59	2 EXTAR
UNDING	UMUR 42	2 EXTAR
BAS	UMUR 49	2 EXTAR
MUYANG	UMUR 35	2 EXTAR
PEY	UMUR 25	2 EXTAR
MORANG	UMUR 45	2 EXTAR
JUAI	UMUR 39	2 EXTAR
LI	UMUR 30	2 EXTAR

76	BERIN	UMUR 79	2 EXTAR
77	LAT	UMUR 30	2 EXTAR
78	KARIE	UMUR 29	2 EXTAR
79	MUDIM	UMUR 91	2 EXTAR
80	MISAR	UMUR 39	2 EXTAR
81	MIDUN	UMUR 27	2 EXTAR
82	TEHAI	UMUR 30	2 EXTAR
83	MUNIR	UMUR 60	2 EXTAR
84	BIDIN	UMUR 55	2 EXTAR
85	ACAP	UMUR 50	2 EXTAR
86	BENI	UMUR 27	2 EXTAR
87	BONI	UMUR 29	2 EXTAR
88	WOP	UMUR 24	2 EXTAR
89	MATI	UMUR 35	2 EXTAR
90	CHICIT	UMUR 39	2 EXTAR
91	NISAR	UMUR 37	2 EXTAR
92	NISA	UMUR 60	2 EXTAR
93	SAPURNA	UMUR 50	2 EXTAR
94	TORIS	UMUR 50	2 EXTAR
95	OSAN	UMUR 60	2 EXTAR
96	DAM	UMUR 39	2 EXTAR
97	TASAH	UMUR 37	2 EXTAR
98	KUSEK	UMUR 35	2 EXTAR
99	PELEK	UMUR 30	2 EXTAR
100	IBAN	UMUR 27	2 EXTAR

103	UDIM	UMUR 35	2 EXTAR
104	YADI	UMUR 25	2 EXTAR
105	SUR	UMUR 30	2 EXTAR
106	SURYA	UMUR 37	2 EXTAR
107	SIPUL	UMUR 25	2 EXTAR
108	LIKIT	UMUR 20	2 EXTAR
109	MASKUN	UMUR 55	2 EXTAR
110	ANICAH	UMUR 37	2 EXTAR
111	ONOL	UMUR 45	2 EXTAR
112	LIGAT	UMUR 39	2 EXTAR
113	SONI	UMUR 35	2 EXTAR
114	UWANG	UMUR 39	2 EXTAR
115	SITAR	UMUR 30	2 EXTAR
116	YUOH	UMUR 25	2 EXTAR
117	SAPA	UMUR 45	2 EXTAR
118	BAK	UMUR 55	2 EXTAR
119	LAWIE	UMUR 31	2 EXTAR
120	WACONG	UMUR 55	2 EXTAR