

HUTAN – Kinabatangan Orang-utan Conservation Programme

YEARLY REPORT ACTIVITIES – 2017



HUTAN

*Kinabatangan Orang-utan
Conservation Programme*

HUTAN



HUTAN is a French grassroots non-profit organisation created in 1996 By Drs Isabelle Lackman and Marc Ancrenaz to develop and implement innovative solutions to conserve orang-utan and other wildlife species in Sabah, Malaysia. With the support of the Sabah Wildlife Department (SWD), HUTAN initiated the

Kinabatangan Orang-utan Conservation Programme (KOCP) in 1998 to (1) study orang-utan adaptation to forest disturbance and (2) design and implement sound conservation strategies for this species and its habitat.

To achieve our vision, we have developed a holistic strategy combining long-term scientific research, wildlife and habitat protection and management, policy work, capacity building, education and awareness, as well as community outreach and development. Today our team is composed of more than 60 highly skilled full-time staff hailing from the Orang Sungai community. Our grassroots approach aims to engage the local communities in the management of their own natural resources by empowering them with the necessary awareness and knowledge to contribute to the conservation and management of their wildlife and other natural resources. HUTAN is perceived as a training platform to enhance capacities of government and non-government staff in biodiversity monitoring and management, mapping and remote sensing, research techniques and etc.

HUTAN's primary area of intervention and influence covers the lower parts of the Kinabatangan floodplain, encompassing about 60,000 ha of forests (2/3 being protected) and 400,000 ha of oil palm plantations and man-made landscapes.



In this area, we are actively engaged in the development of a systematic conservation planning framework, involving private stakeholders such as oil palm plantations, government agencies and local communities.

We also collaborate with national and international agencies, initiatives and organizations to promote wildlife conservation and management in man-made landscapes outside of protected forests.



TABLE OF CONTENTS

Orang-utan monitoring and ecological study	p. 8
Conservation of the Bornean elephant	p. 12
Protecting hornbills in Kinabatangan	p. 16
Protecting the colonies of swiftlets in Pangi	p. 20
Documenting population trends of wildlife in Kinabatangan	p. 21
The KOCP Honorary Wildlife Wardens:	
Patrolling and Protecting wildlife and wildlife habitat	p. 23
Water quality monitoring and fisheries	p. 26
Reforestation efforts in Kinabatangan	p. 28
Education and awareness activities	p. 31
Enhance human capacity to better manage wildlife in Sabah	p. 35
Improving policy framework for orangutan and biodiversity conservation in Kinabatangan and Borneo	p. 37
Major outputs (writings, conferences) produced by KOCP in 2017	p. 39
ANNEX I: Developing a conservation planning framework for Kinabatangan	p. 43



In Memory of Azri bin SAWANG

It is with great sorrow that we announce the passing of Mr Azri Bin Sawang, 45, on the 7th February 2018 at the Kinabatangan hospital.

Azri was a founding member of Hutan's steering committee and leader of our Honorary Wildlife Warden project. He was a passionate advocate for community conservation. He also contributed to the development of a pioneering new method to conduct orang-utan aerial surveys and co-authored several scientific articles.

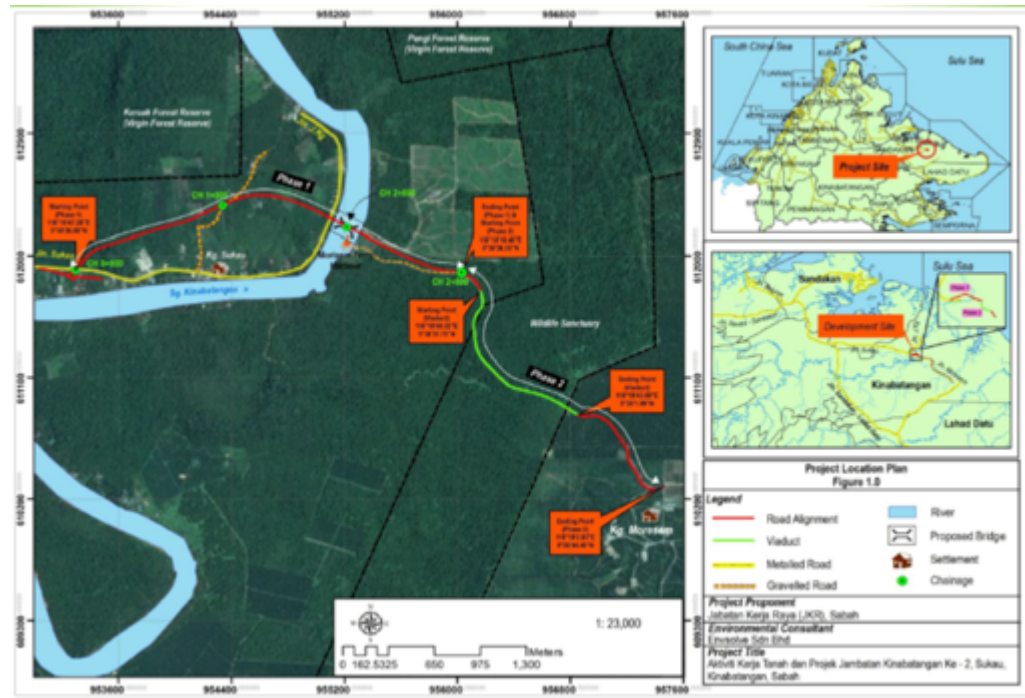
For almost 20 years, Azri has been a pillar of Hutan and an exemplary leader who inspired others not only by his dedication, courage and decisiveness but also for the calm, measured and inclusive way he conducted himself in work that was often challenging and difficult. He worked tirelessly to raise environmental awareness among Sabah rural communities and to uphold environmental laws, while creating practical examples where sustainable livelihoods support biodiversity conservation.

Though sadly Azri has left us too soon and before our task is complete, we will endeavour to continue in the example he has set for us. We will always remember him as our dear friend, brother and hero. Azri will be sorely missed and our most heartfelt condolences go out to his family.



The Sukau bridge project: Update.

The big conservation success for Sabah in 2017 was the final decision by the State government to scrap off the project of a Bridge and Highway that had been proposed to be built in Sukau (see Map below).



This project would have cut off the LKWS in two parts, preventing elephant to reach the eastern part of their current range, resulting in more conflicts and in a significant erosion and loss of the remaining biodiversity of Lower Kinabatangan.



Orang-utan monitoring and ecological study



Hutan's intensive Orang-Utan Research Site was established in 1998 in 8.7 sq.km of secondary forests located in the Lot 2 of the LKWS near Sukau. A team of ten intensively trained local research officers – the Hutan's Orang-Utan Research Unit, or OURs, led by Hamisah Elahan - takes turns to track orang-utans in the forest and to conduct eco-ethological observations. A wide range of data is collected on standardized datasheet including dietary observations, feeding behaviour, social aspects and ranging patterns.



- Orang-utan conservation status in Kinabatangan

Results from regular nest counts along permanent line transects showed that in 2017 the overall (yearly) orang-utan density at our study site averaged 2.66 ind./km², with monthly fluctuations between 1.75 and 3.68 ind./km². This value compares well with the average value observed for the period 2006-2016: 2.1 ind./km² in average. However, if the number of orang-utans seems to stabilize (or even slightly increase) in our study area, the results of aerial and ground surveys conducted in 2015 and 2016 across Lower Kinabatangan showed a continuous decline of the overall orang-utan population (see previous yearly report).

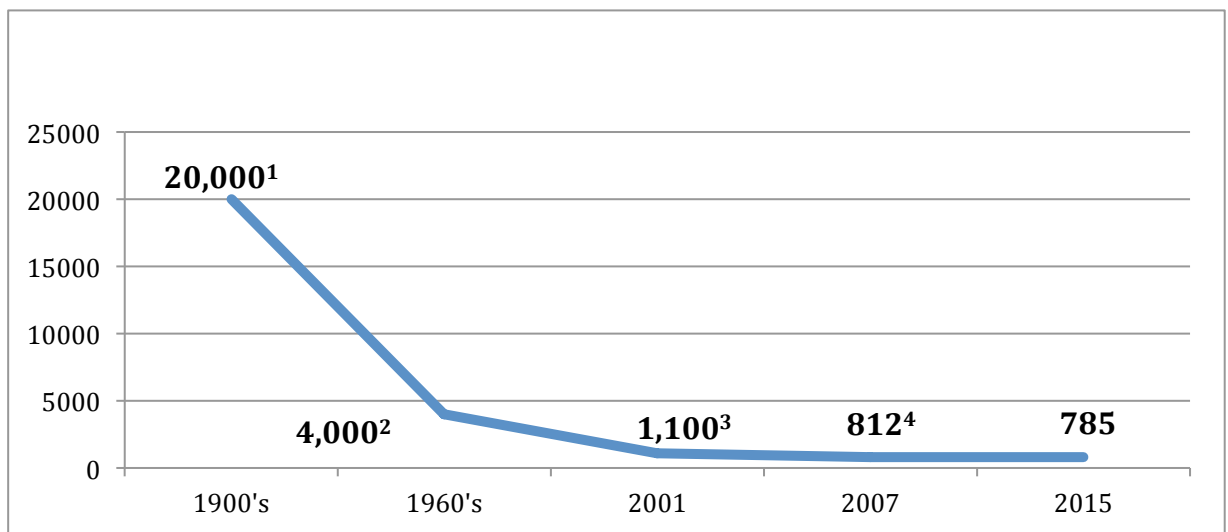


In 2001, the Kinabatangan orang-utan population was estimated to approximate 1,100 individuals¹. It declined to 812 individuals in 2007. **In 2015-2016, the Kinabatangan orang-utan population size was 785 individuals (95% Confidence Interval: 414-1,467 animals).** Despite intense conservation efforts, this population has declined by 30% in the last 15 years. The observed decline of the Kinabatangan orang-utan population is explained by habitat loss and fragmentation.

¹ Ancrenaz, M., Gimenez, O., Goossens, B., Sawang, A., and I. Lackman-Ancrenaz. 2004. Determination of ape distribution and population size with ground and aerial surveys: a case study with orang-utans in lower Kinabatangan, Sabah, Malaysia. *Animal Conservation*, 7: 375-385.

From 2005-2014, around 13,000 ha of forests that were not located within the network of protected areas of lower Kinabatangan were lost and converted to oil palm agriculture (see Annex 1). Most of these forests were connected with the current network of protected forests – either the LKWS or the Virgin Jungle Reserves found in the floodplain – and thus played a very important function in sustaining remaining wildlife populations. Forest conversion is for example responsible for the collapse of the orang-utan sub-population living in Lot 9 of the LKWS.

On-going research by KOCP shows that excess males that have taken refuge in forest patches following forest conversion will disperse into nearby agricultural landscapes after a few years, in search of new territories where they can settle down. So we can assume that over the years, some of the animals that accounted for the artificially inflated densities that were recorded in 2001 left the forest and dispersed into plantations (this particularly applies to Lots 1 and 2).



Estimated number of orang-utans living in Lower Kinabatangan over the past century.

¹ Goossens, B., Chikhi, L., Ancrenaz, M., Lackman-Ancrenaz, I., Audau, P., and M.W. Bruford. 2006. Genetic Signature of anthropogenic population collapse in orang-utans. *Plos Biology*, 4 (2): 285-291.

² Yoshida, K. 1964. Report of the preliminary survey on the orang-utan in North Borneo. *Primates*, 5: 11-26.

³ Ancrenaz, M., Gimenez, O., Goossens, B., Sawang, A., and I. Lackman-Ancrenaz. 2004. Determination of ape distribution and population size with ground and aerial surveys: a case study with orang-utans in lower Kinabatangan, Sabah, Malaysia. *Animal Conservation*, 7: 375-385.

⁴ KOCP/SWD. 2007. Wildlife surveys in the Lower Kinabatangan Wildlife Sanctuary. SWD, Kota Kinabalu.

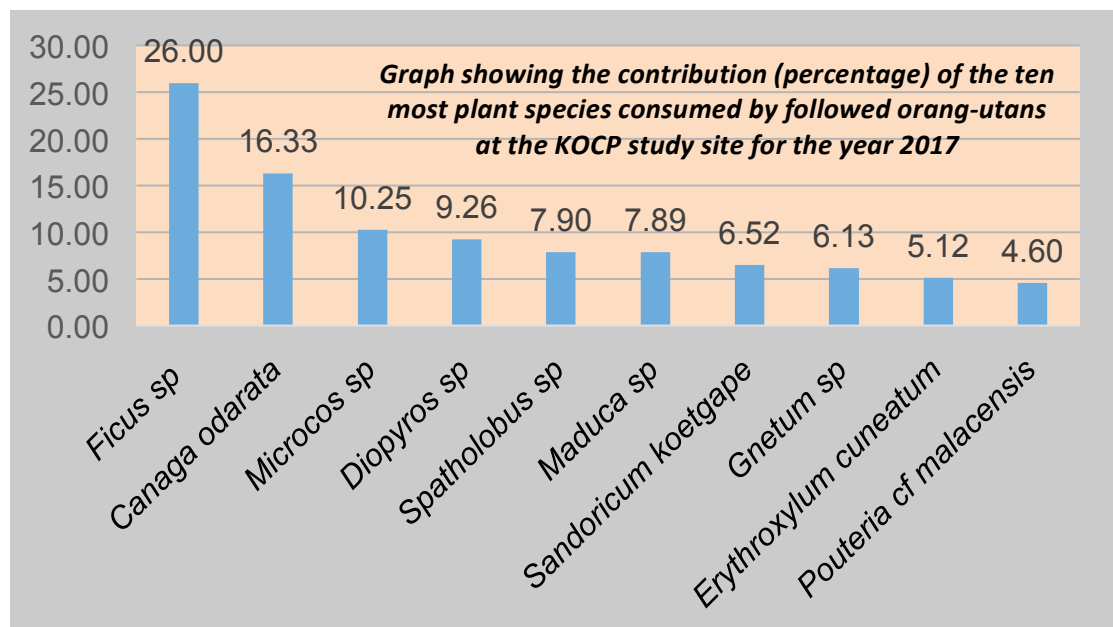
Flanged Orang-utan male walking on the ground at our study site (the team is currently experiencing the use of camera trap as a possible tool to determine orang-utan density and monitor population trends).



In 2018, the team followed a total of 28 individuals, and secured a total of 2,000 hours of direct observations on 20 different individuals. The team identified 94 different plant species (belonging to 36 families) being part of the diet of followed orang-utans.

The graph below shows the ten top species consumed in 2017. *Ficus spp.* taxa contributed 26% of all food sources consumed by followed orang-utans. Over the years, *Ficus spp.* has always been the major source of food for orang-utans living at our study site. This is explained by their asynchronous fruit productivity (i.e. individual plants don't bear fruits at the same time) and their polycyclic production (i.e. the plants produced fruits two times or more every year).

However, the contribution of other plant species to the orang-utan diet fluctuates following the years, depending on the identity of the individual orang-utans that are followed by the team; time of the year observations are made; weather patterns that influence the phenology of individual plant species; and forest regeneration dynamic. In 2017 for example, fruits from the species *Dracontomelon sp.* didn't make it to the top 10 species, although they are very often listed in the top 3 species of the diet. However *Cananga odorata* showed an unusually high contribution because this taxa went through three distinct fructification events during the year.

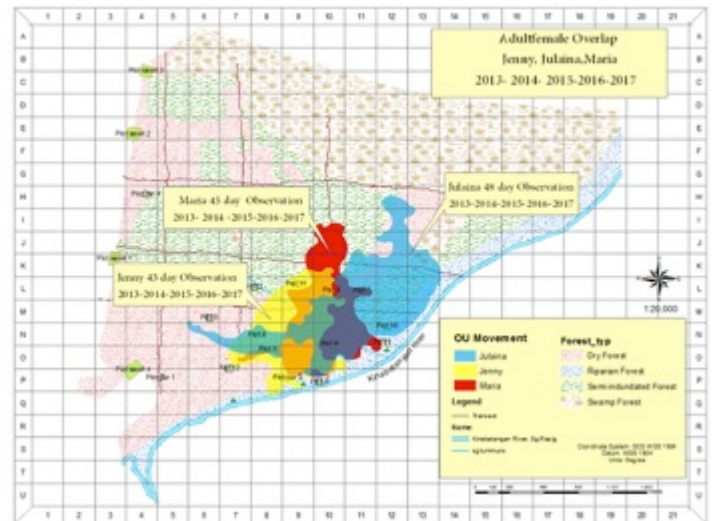


Our phenological monitoring reveals that fruit production in the forest is more even in the over-degraded forests of Lower Kinabatangan than in primary or slightly degraded forests, explaining the more regular food intake by orang-utans recorded at our study site, compared to the huge fluctuations observed in forests like Danum Valley. In Kinabatangan, orang-utans feed more on flowers and less on barks than at other sites. However they consume more vines and climbers (up to 35% of the diet at our site).

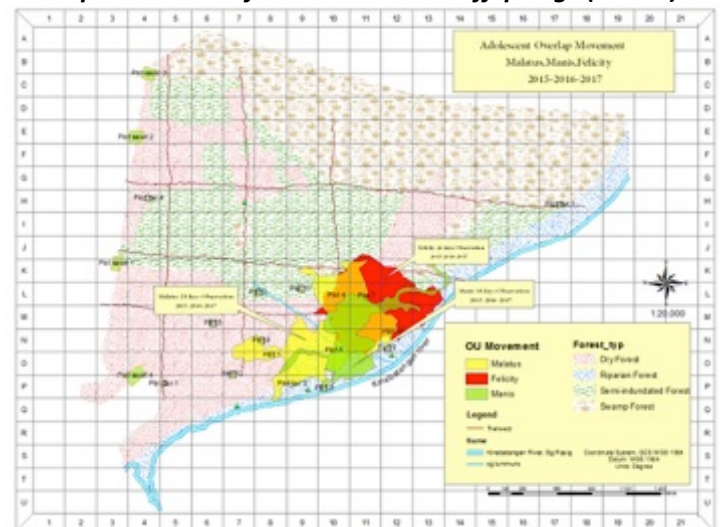
Orang-utan movements are dictated by the presence and occurrence of food sources: the animals do not move randomly in the forest but patrol along pre-established paths that they will use regularly to move across their territory. Flanged males also seem to have their favored routes, but their movements are determined primarily by the presence and location of females.

According to the team, females are able to recognize individual flanged males with their long-calls. Sometimes the females will ignore completely a long-call, or rush toward it (even if they have to leave their territory), or move in an opposite direction. It also appears that females prefer to be in the vicinity of flanged males than staying with unflanged males.

At our study site, adolescent and young sub-adult females are using part of their mother's territory and expand very little outside, resulting in a strong overlap between resident females. Until now, sufficient food resources in the area have supported strong social interactions between these young females that are regularly observed playing together. However, older resident females have established a hierarchy for food accessibility; Julaina seems to be dominant over other females and will displace them to get access to a source of food; followed by Indai, Jenny, Maria, and other females.



Map of the KOCF study site showing the overlap of four adult resident females (above) and their respective three female sub-adult offsprings (below)



In Kinabatangan, our results seem to indicate that social stresses are worsened by forest fragmentation and might be a more important limiting factor than resource availability.

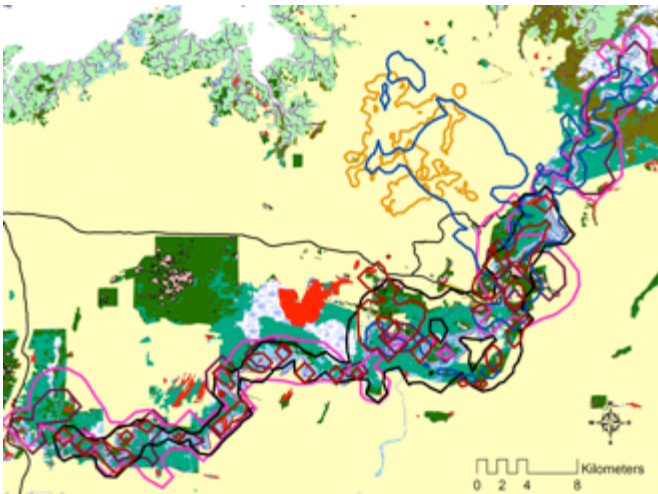
Conservation of the Bornean elephant

The Wildlife Survey and Protection team (WSP), led by Eddie Ahmad and assisted by Berjaya Elahan, is comprised of eight researchers. Their activities include biodiversity surveys and monitoring, patrolling and surveillance, as well as hornbill and elephant conservation.

Over the past two years, the WSP has collected data about the socio-ecological status of the elephant population living in Kinabatangan. Their work is supporting the scientific studies conducted by Nurzhafarina Othman (Malaysian PhD candidate) and Brittany Skara (MSc candidate). Our results show that:

- Elephant herds spend increasing amount of time in oil palm plantations (more than 50% of their overall time for some family units, such as “Ratu”). About 2/3 of this time is spent in two major hotspots. Hotspots’ location differs during the dry and the wet season. Overall, elephants spend more time in plantations during the wet season, probably because a significant part of the habitat available during the dry months is flooded at this time of the year. In plantations, they prefer clear open or recently planted habitats, which provide more grazing opportunities.
- Elephant behavior in plantations shows significant differences compared to natural forest habitat: they move more, rest less, are more alert and show very little social interactions compared to we record in natural forests. In average, elephants move over longer distances and the size of the groups are smaller as well.
- Overall, most social interactions between elephants were recorded in riparian areas where open areas and food resources as well as presence of water attract the animals and provide more opportunities for grouping (indeed the group size is larger in riparian areas than in other types of forest). This habitat may play a function of “social arena” for the animals





Map (courtesy of Danau Girang Field Center) showing the ranging pattern of several radio-collared elephant herds in Lower Kinabatangan. Green areas are various forest types and yellow areas are oil palm plantations.

Elephants in Kinabatangan may currently either expand their range or return to areas that were once very suitable for them (hotspots). Our data indicate that from a behavioral perspective, oil palm plantations offer a sub-optimal habitat to the elephants.

This information tends to indicate that the natural habitat available to the elephants in Kinabatangan is too small to support the current population (estimated at around 200-250 individuals: see 2016 Report).



These findings highlight the fact that there is a need to design more resilient mosaic landscapes: corridors designed within oil palm landscapes would offer a path for the herds to move between forest patches.

This new information is going to inform the Elephant State Action Plan, currently being revised for Sabah.

Brochure developed by KOCP to raise awareness about elephants.



In 2017, HUTAN and Melangkin Oil Palm estate entered a collaboration protocol to study the herd of elephants led by “Ratu” that is now living almost full-time in this plantation. Activities include elephant monitoring; data collection to assess what resources are needed to support the species outside of protected areas; elephant movement and identification of potential functional connectivity within the landscape; reforestation along rivers and streams to improve connectivity; development of practical recommendations and Standard Operation Procedures (SOPs) to be shared with the oil palm industry; capacity building for oil palm workers about HEC mitigation techniques.

In 2017, the WSP Unit engaged in several types of Human Elephant Conflict mitigation activities:

- *protection of graveyards*: maintenance and repair of the electrical fences surrounding the cemeteries of Sukau and Abai villages to prevent any destruction of the graves by elephants;
- *erection of electrical fences* at two planting sites to prevent elephants from destroying young seedlings (these fences are removed after three years, when the small trees are tall enough to sustain elephant trampling);
- *active HEC conflict mitigation* (involving patrolling at night, use of noise cannon and other deterrent tools) in Sukau (n=10 nights) and Abai (n=7 cases).



The level of HEC tends to decrease in Lower Kinabatangan but unfortunately, the number of conflicts is on the rise in many other areas across Sabah. As a result, the KOCP team is increasingly working outside of Kinabatangan to mitigate HECs.

Telupid District. For the past two years, elephants have repeatedly raided several villages located in the Telupid District, resulting in significant damages and emotional distress of the villagers. The “LEAP/Forever Sabah” group is coordinating the efforts of several partners to address these conflicts. HUTAN was invited to attend several discussions and workshops to enhance awareness about elephant and to support the development of a long-term strategy for HEC mitigation.

Beluran District: A partnership between “The Forest Trust”, IJM Plantations, surrounding communities (Kampung Uu Muanad) and HUTAN-KOCP was initiated in 2016. Last year, we held several discussions and participatory workshops with these partners to develop an adequate strategy to mitigate HEC in the villages. We also organized a series of trainings to enhance capabilities of community members to

mitigate conflicts directly. An integrated fencing management strategy is currently being developed with all partners.

Kinabatangan District: Kampung Lintang. Throughout the year, a herd of elephants originating from Tabin Wildlife Reserve repeatedly entered the village of Lintang and created havoc and conflicts there. The Sabah Wildlife Department and HUTAN spent more than two months on site to mitigate these conflicts. Emotional distress and resentment against elephants (as well as NGOs and state authorities) were high in this village following this long period of HECs. So HUTAN decided to organize several discussion sessions with the elders and heads of the village to explain the reasons of these conflicts and, based on our own local experience, how the community could live peacefully with the elephants. We started by mapping the entire area to show to the villagers the exact location of conflicts and their underlying reasons:

- new forest clearance (by large estates and small holders) resulting in the loss of a crucial pathway that was extensively used by elephants until recently;
- current location of electrical fences that prevent movements and hamper permeability of the landscape;
- flooding, reducing the size of the landscape available to the animals.

It will be a long way to identify how elephants and people can share the same environment, but HUTAN has decided to commit resources and time to achieve a sustainable situation over the next few years.



Map prepared for the villagers of Kampung Lintang to show them the location of major conflicts, the land recently opened up and the positioning of electrical fences.

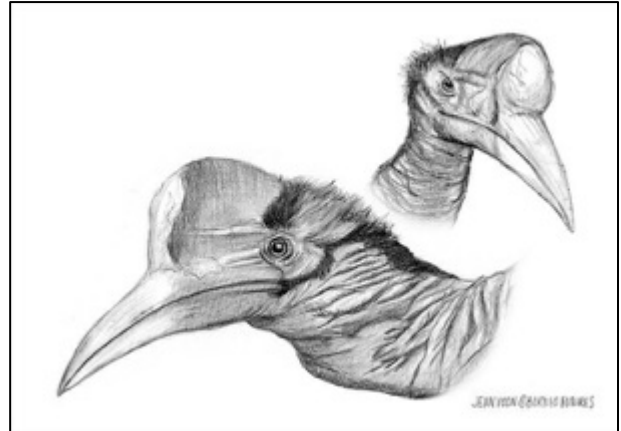
Pictures below show the WSP team on site in Telupid and Lintang



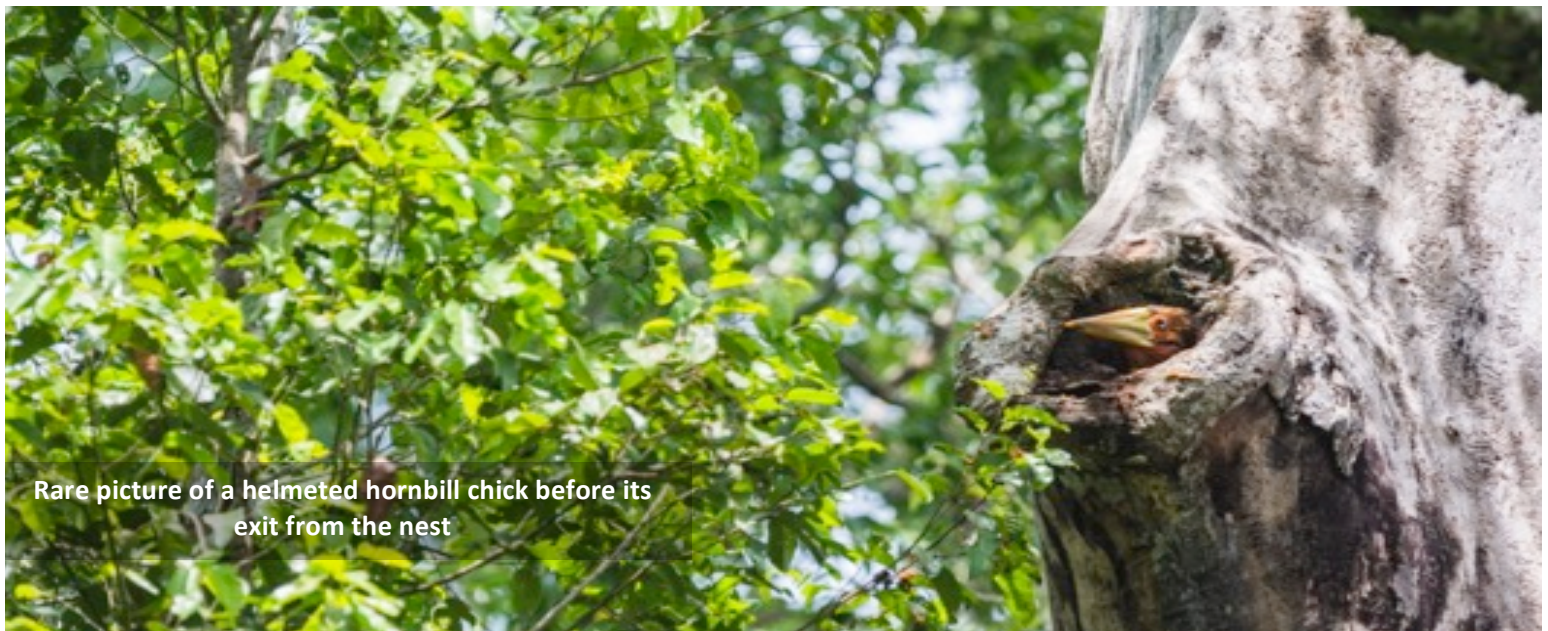
Protecting hornbills in Kinabatangan

KOCP is monitoring hornbill presence along a permanent stretch of river six days every month from a boat. Based on our results (notably absence of juveniles), our monitoring data suggest that most pairs of birds are breeding between April and September. Although the number of sightings of large hornbill species has been relatively stable for the past few years, our monitoring shows seasonal variation of abundance in the floodplain that corresponds to local migrations and fluctuations of food availability.

The Helmeted hornbill (*Rhinoplax vigil*) is currently Critically Endangered in the IUCN Red List primarily because of the trade for its solid cask, also called “red ivory”. The only known cavity used by this species in Borneo is located close to Sukau. A pair of helmeted hornbills used this cavity to raise a chick between April and November 2017. The WSP team carefully protected, monitored and observed this rare event. A total of 21 plant species (dominated by fruits of *Ficus* spp.) were brought by the parents to feed the chick. The pair also fed extensively on stick insects during the nesting phase. The young chick exited the nest in early November (see picture below).



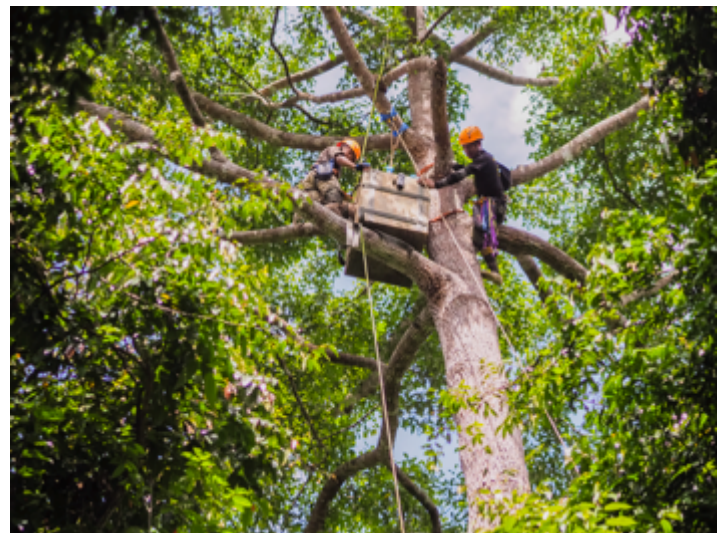
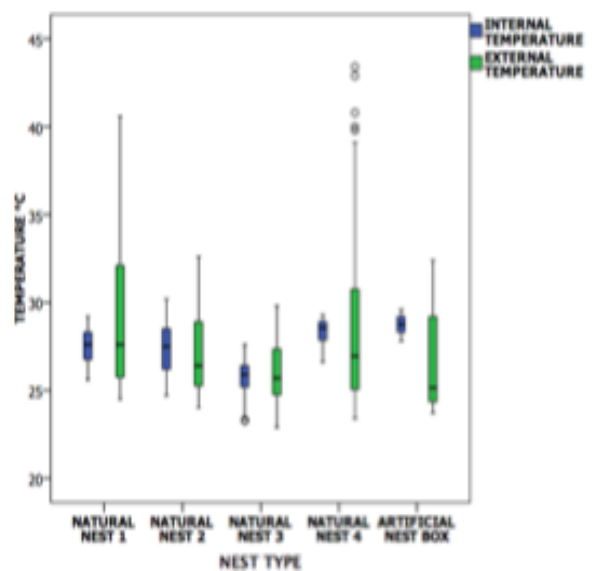
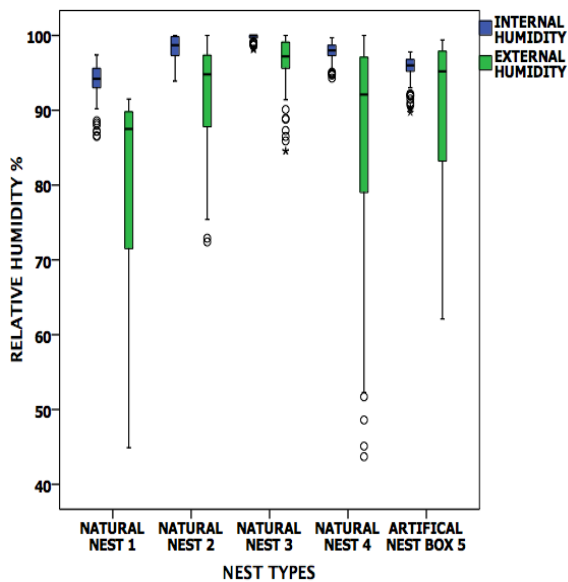
Being one of the only known natural cavities for this species, KOCP is monitoring the tree very closely. It is the fourth consecutive time that the pair of helmeted hornbills uses this cavity for nesting (a total of three chicks was produced out of these four nesting events).



Rare picture of a helmeted hornbill chick before its exit from the nest

In 2014, KOCP installed five artificial nest boxes to support hornbill's breeding potential of the overdegraded forests of Lower Kinabatangan. Regular monitoring of these artificial nest boxes showed that temperature and humidity inside these nest boxes were fluctuating much more widely than within natural cavities, which may have explained the overall low occupation rate of this first generation of nests (see previous reports).

In May 2017, a team of keepers from Chester Zoo, Phoenix Zoo and Zoo Parc de Beauval visited our project and built a second generation of artificial nest boxes. Internal temperature and humidity of this second generation appeared to be more stable and more similar to conditions that are met in natural cavities (see graphs below). Two of these new nests were set up in trees last May. Another seven artificial nest boxes are currently being built and will be set up in the forest before the start of the next breeding season (around April).



Two pairs of oriental pied hornbills used two of the five artificial nests installed in 2014, and each pair produced a chick. However since pied hornbills are very versatile and adapt fairly well to disturbed environment, they are not our target species. We rather try to increase breeding opportunities for larger species of hornbills.

A pair of rhinoceros hornbills started to visit one of the boxes (called “Raspang”) very regularly since 2015. Although both the male and the female entered the box at numerous occasions, the birds never used it for breeding until last year. In April 2017, the male sealed the entrance of the box and started to feed the female that was enclosed inside the box. Our close monitoring showed that the female left the nest in June 2017, but the chick remained in the box until September 2017 before exiting the nest as well. The long period between the exit of the adult female and of the young could result from the warm and wet conditions encountered within the artificial nest box.

This is the first documented successful use of an artificial nest box in the wild by a pair of rhinoceros hornbills, and the team is very proud of this achievement.



The male rhinoceros hornbill feeding the chick at the artificial nest box set up by HUTAN in the Lower Kinabatangan



In 2017, KOCP hornbill conservation activities were covered in several local newspapers (here the copy of an article published in a national Chinese newspapers).

A professional TV crew spent also four weeks on site to capture the exit of the helmeted chick from its nest. The images will be used to produce a movie expected to be released in 2018-2019.



The team is carrying one of the latest generation artificial nest in the forest (each box weighs more than 200 pounds).

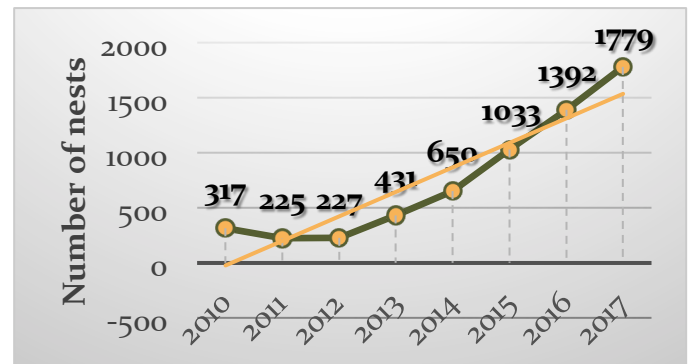
Protecting the colonies of swiftlets in Pangli



Edible nest swiftlet (Aerodramus fuciphagus) hatching in her nest made up with the bird's pure saliva.

In the late 1990's and early 2000's most of the swiftlet colonies found in Lower Kinabatangan went extinct because of uncontrolled harvesting of the nests. In December 2009, Hutan and the SWD developed a recovery programme of the edible nest swiftlet population found in the Pangli Forest Reserve near Sukau. This long-term project aims at combining conservation benefits with economic proceeds to the Sukau community through employment and sustainable harvest of the nests. Since 2010, a team of 13 permanent staff assisted by 10 interns has the mission to protect the colonies of swiftlets living in the cave system of Pangli. The team is on duty 24 hours a day all year long to prevent poachers from stealing the nests and destroying the bird clutches.

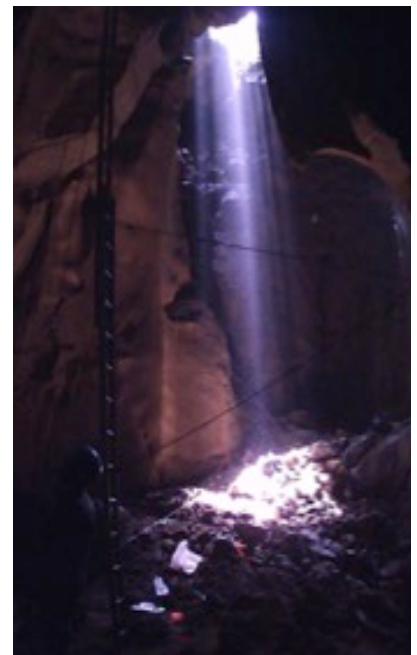
The number of breeding pairs of swiftlets in Pangli has increased by a factor 5 since the beginning of this project (see graph), showing that active protection is supporting the recovery of this species.



To minimize disturbance, we are not harvesting the nests for commercial purposes. However once a year, in August, the team cleans the caves and removes the old nests, following the breeding season. Being harvested after being used by the birds, these nests have no commercial value. In 2017, Ken Krank, professional climber installed safety bolts in the caves to improve human safety.



Once the number of pairs of birds will be high enough to support a self-sufficient income, the management of this project will be entrusted to the villagers. This project will then contribute directly to the local economy, and indirectly to forest protection since the birds need the forest to feed on insects.



Documenting population trends of wildlife in Kinabatangan

In 2017, KOCP finalized a series of field expeditions throughout the entire Kinabatangan Sanctuary. The major results of our surveys are summarized here.

Less than 300 family groups of gibbons are surviving today in the Lower Kinabatangan: this is a five to ten fold decline compared to 30 years ago

Depending on the Lots of the LKWS, our call surveys yielded an overall gibbon group density between 0.2 and 1.5 group/km². The overall average for the entire LKWS was 0.84 group/km². **This density shows a five to ten fold decline in less than thirty years in Lower Kinabatangan.**

Major threats faced by gibbons in the area include forest loss and habitat fragmentation. Being strictly arboreal animals, gibbons cannot cope with forest degradation and fragmentation. Unlike orang-utans, gibbons do not walk on the ground and their dispersal abilities in the highly fragmented Kinabatangan landscape are greatly limited.

Today, gibbons are facing local extinction in Kinabatangan. Reconnecting isolated forest fragments and increasing the size of protected forests is a necessity to secure a viable gibbon population in lower Kinabatangan.

	2007	2015/2016
Lot 1	1.24 (0.95) – n=4	n.a.
Lot 2 (Study Site)	1.35 (0.80) – n=7	1.50 (0.50) – n=3
Lot 2 (Tandu Batu)	0.50 (0.86) – n=3	0.17 (0.29) – n=3
Lot 3	1.33 (0.29) – n=3	0.50 (0.84) – n=6
Lot 4	2.23 (1.22) – n=4	1.00 (0.89) – n=6
Lot 5	1.27 (1.80) – n=4	< 0.5 – n=3
Lot 6	0.83 (0.29) – n=3	0.33 (0.57) – n=3
Lot 7	< 0.5 – n=2	n.a.
Lot 8	n.a.	0.17 (0.29) – n=3
Lot 10A	0.67 (0.29) – n=3	1.33 (0.58) – n=3
Average*	1.12 (0.52) – n=33	0.67 (0.53) – n=30
Average **	1.40 group/km ²	0.84 group/km ²

Table 1: Density (nb of groups calling/km²) recorded by the two listening teams during each survey: results show the average number of groups heard per day (standard deviation) - n=number of days of survey at each location. Average is the density of groups calling in the morning. Average ** is the density of groups found in the forest.*

Leaf monkeys are declining while proboscis and macaques maintain their number

Sightings of silver and red leaf monkeys are declining in Kinabatangan, this decline being stronger in the lower parts of the floodplain. The pale morph of silver leaf monkey that used to be a common sighting along the riverbanks is becoming increasingly rare. Reasons for the decline could include competition with macaques, changes in forest ecology and food production, etc. Rehabilitating riparian areas and planting fig- and other fruit-trees will certainly support these species in lower Kinabatangan.

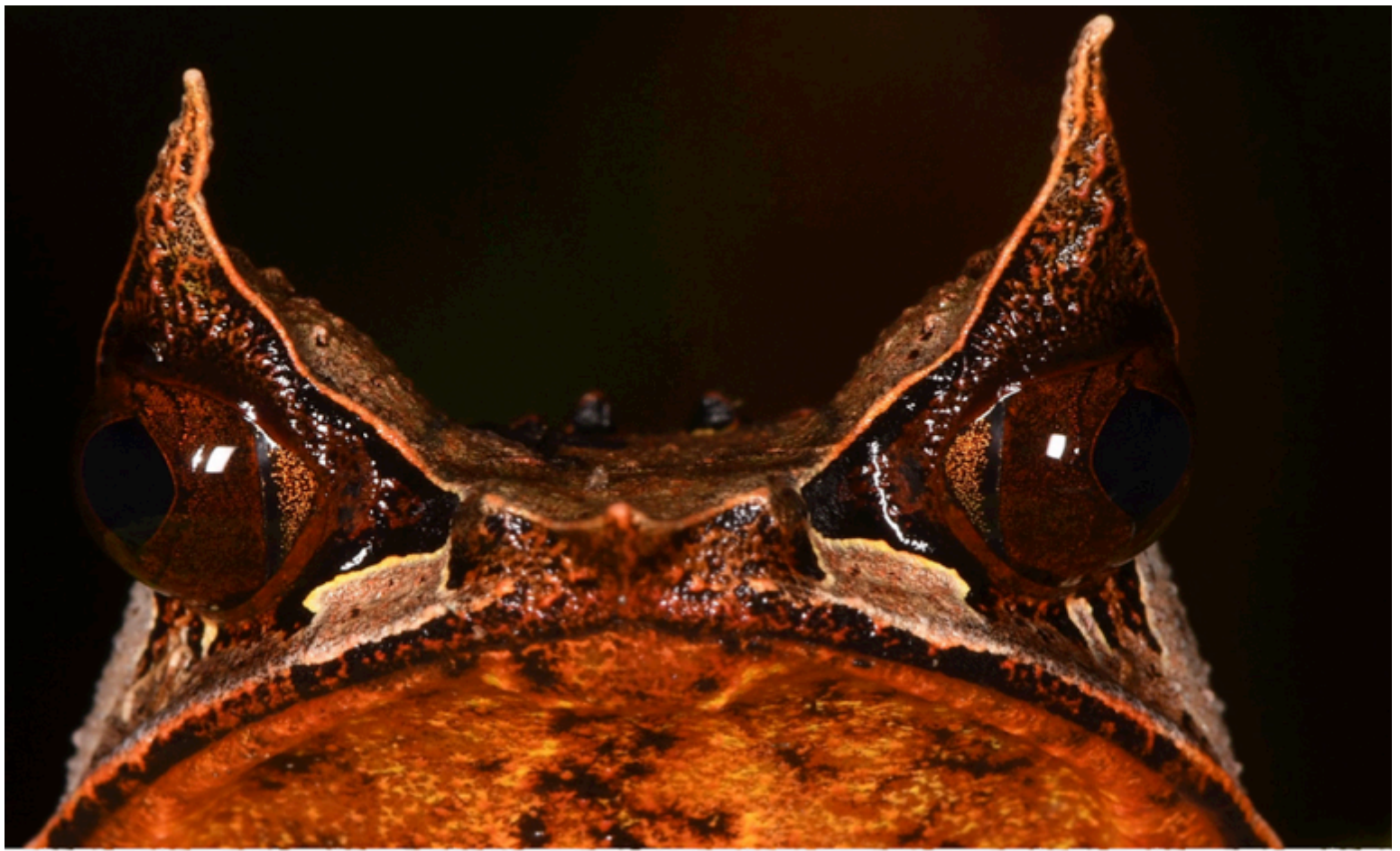
Overall, the results of our proboscis monitoring show that the population has been stable over the years in the vicinity of Sukau (Lots 1 to 4 of the LKWS). However several sub-populations are declining fast, especially in the upper parts of the floodplain, where forest fragmentation and destruction of the riparian habitat have a negative impact on the group size and the survival of the monkeys. Our results were confirmed during the recent Proboscis monkey PHVA conference organized in Kota Kinabalu in February 2017. This PHVA laid the frame for the “Proboscis Monkey State Action Plan” that is currently being developed. This document will outline priority actions to retain viable populations of this iconic species in Kinabatangan and in other key areas across Sabah. A major emphasis in this Plan is given to restore river banks and ensure better connectivity across the landscape.

Small mammal and amphibian communities show a strong decline of forest specialist species but an increase of commensal and invasive species.



Results of small mammal trapping showed a decline of the number of species and individuals trapped compared to our baseline assessment of early 2000's, especially with the rat community. This could be explained by a lower abundance of food resources, and/or by other more complex ecological factors, such as multi-year seasonal fluctuation of food resources; weather changes; alteration of the prey-predator dynamics; etc. **The most degraded survey sites were characterized by a lower diversity of their rodent community and a larger presence of commensal and invasive species like the common house mouse and Asian house rat.**

For Amphibians, our results confirmed the strong differentiation between frog assemblages in forests and non-forest sites. **Frog surveys indicated that commensal frog species and habitat generalists were dominating the non-forest sites. Forest-dwelling species do not seem to be adapting well to overdegraded habitats and non-forest landscapes.**



**The KOCP Honorary Wildlife Wardens:
Patrolling and Protecting wildlife and wildlife habitat**

Since 2005 Hutan works with the Sabah Wildlife Department on a model project to involve directly local community members in the management and protection of the Lower Kinabatangan Wildlife Sanctuary. The Sabah Wildlife Conservation Enactment 1997 allows the Sabah Wildlife Department to appoint selected members of the public as “Honorary Wildlife Wardens” (HWW). The HWW are originally trained by the SWD and work voluntarily to enforce the State wildlife law.

As part of their duties, the team is regularly patrolling the River by boat, and land by car or on foot in search of any type of encroachment. In 2017, the team recorded and reported several cases to the authorities involving snares, signs of illegal logging (small scale), poaching (empty shell cases) and various encroachments with the official boundaries of the LKWS. The team erected several signboards at three hotspots regularly used by poachers to enter the protected forests of the LKWS.

Early 2017, and for the first time since we started our programme 20 years ago, the HUTAN-KOCP teams came across two orang-utans with a snare around their wrist. The first case was an unflanged orang-utan male detected in February, while the second individual was a flanged male encountered at our study site in April. Both animals were found close to the boundary with an oil palm plantation. In both cases, we called the Wildlife Rescue Unit from the SWD to remove the snares. Unfortunately, the WRU failed to capture the injured animals in both cases. We were not able to locate the animals following these failed capture attempts, and we don't know if the animals survived their wounds.

Snares were most probably set up in plantations or in nearby forests by plantation workers who tried to catch wild boars or deer. Snaring is a growing threat for orang-utans, carnivores, elephants and other large terrestrial vertebrates in Kinabatangan.

Our research shows that orang-utans are more terrestrial than we thought previously, and that these animals can walk extensively within oil palm plantations. Snares are therefore a major threat to sustain viable populations in these landscapes, and it is urgent to stop these illegal practices.



The KOCP Wardens took part of the investigation led by SWD about a case of elephant poisoning in Malua Forest Reserve, and two cases of elephant killing in Lower Kinabatangan. Unfortunately no culprit was identified and no one has been convicted yet.

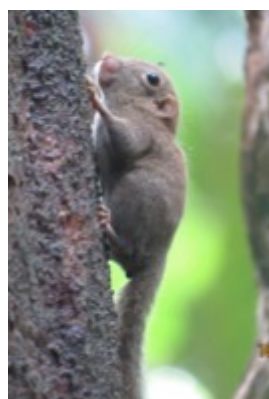
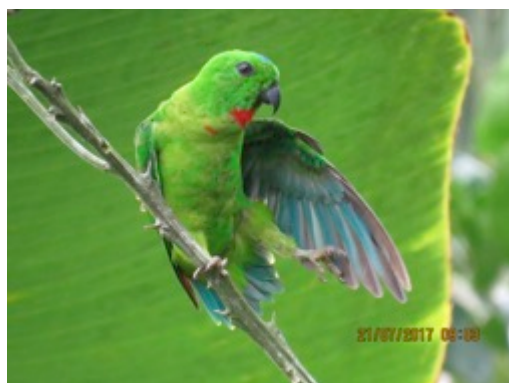
Elephant poaching is increasing in Sabah. We currently estimate that a minimum of 20 individuals are shot or poisoned every year because of conflict or because of the ivory trade (this represents between 1 and 2% of the total population found in the state). This situation is worrying, from a welfare perspective (animal suffering), from a conservation perspective (the removal of large bulls may have a long-term impact on the genetic fitness of the overall population), and from a human safety perspective (since elephant killing increases the stress and aggression levels within the remaining herds).

We fear that this is only a matter of time before elephants start attacking people, injuring or even killing them. It will then become even more difficult to convince communities to accept a possible co-existence with the pachyderms.



In 2017, the Sabah Forestry Dpt was mandated by the Government to fight wildlife trade. The Dpt is developing a new anti-poaching and investigation unit that will collaborate closely with the teams of Honorary Wildlife Wardens. The goal is to identify the poaching rings that are operating in Sabah and to stop them.

To reinforce our own capacity, HUTAN invited Dr Wai Ming Wong from the NGO “Panthera” to train the WSP team members in the SMART technology. SMART is a software tool that augments site-based conservation data collection and management responses. It provides protected area authorities and community groups with the ability to empower staff, and increase efficiency and effectiveness in monitoring, evaluating and reporting illegal activities. HUTAN staff followed two one-week sessions delivered by Dr Wai-Ming Wong about this technology in June and in December 2017. The team went through the data collection process, the data entry and analysis and data storage. The team is now equipped to use SMART in conjunction with camera trap surveys, wardening and other regular field-based activities to record and collect information on illegal activities, and other potential threats to wildlife. By identifying hotspots of illegal activity, this information will be used to augment HUTAN’s and the Sabah Wildlife Department’s (SWD) ability to develop well-informed management responses to mitigate threats.



Water quality monitoring and fisheries



Since 2013, Hutan's Wildlife Surveys and Protection Unit has collaborated with the Kinabatangan River Spirit Initiative to monitor water quality of the Kinabatangan River.

In 2017, the WSP and Pangi team members have collected water samples at 21 fixed locations in the Kinabatangan River and its tributaries twice a month. Data collected included dissolved oxygen, pH, conductivity, turbidity, temperature, levels of nitrogen and phosphorus.

Results showed repeated episodes of abnormally low levels of dissolved oxygen and pH, as well as high levels of nitrogen and phosphorus, especially in the tributaries of Kinabatangan. Recorded levels were sometimes not compatible with the survival of freshwater fishes. Surveys with fishermen showed that fewer and fewer tributaries are exploited for fishing, corroborating our results. Although it proves difficult to identify the exact source of these pollutants, we assume that run offs from nearby oil palm estates (palm oil mill effluents and/or fertilizers and other chemicals) affect negatively the quality of the water. This pollution is resulting in the collapse of local fisheries that used to be the main livelihood of local communities.

In April 2017, HUTAN-KOCP organised a workshop for KOCP staff and local fishermen to gain a better understanding of the current status of fisheries in the area. For two days, the team worked on fish taxonomy, discussed issues and potential ways to improve the situation. During the field work, the team caught a female of the species *Arius maculatus*. We were surprised to see that this female was a mouthbreeder, behavior that hasn't been recorded in Borneo previously (to our knowledge).



Arius maculatus with eggs regurgitated after the capture of the fish

Recent study in the Lower Kinabatangan region identified a minimum of 78 species out of 150 freshwater species recorded in Sabah¹. The high endemism of fish species makes it important to monitor and conserve the macro and micro habitats in surrounding wetlands, oxbow lakes, tributaries and the main river of Kinabatangan. Moreover, the critically endangered *Glyphis fowlerae* (Borneo river shark), *Pristis microdon* (argetooth sawfish), *Pristis zijsron* (longcomb sawfish) and *Urogymnus polylepis* (giant freshwater whipray) have also been recorded in the Kinabatangan but only elders could remember encountering these species decades ago while the younger Orang Sungai people have no recollection of the species².

¹Ng, C.K.C., Abdullah, F., Biun, H., Ibrahim, M.K., Mustapha, S. and Sade, A. 2017. Review: A working checklist of the freshwater fish diversity for habitat management and conservation work in Sabah, Malaysia, North Borneo. *Biodiversitas* 18(2): 560-574.

²Poh, T. M. 2013. *Kinabatangan River Spirit Initiative: Contributing to Freshwater Conservation and Sustainable Livelihoods in the Lower Kinabatangan River*. Final Report, The Rufford Small Grants Foundation.



Traditional fishing techniques



Team identifying fish species captured during the training

Reforestation efforts in Kinabatangan

Forest degradation and fragmentation in the Lower Kinabatangan are currently one of the major threats to the long-term survival of most wildlife species in the area. Since January 2008, Hutan has engaged in a long-term project to rehabilitate crucial orang-utan habitat in the Lower Kinabatangan. The project aims at recreating a functional forest ecosystem along the Kinabatangan River. At the end of 2017, the KOCP Reforestation Unit was made up with six women and a man hired on a full-time basis, assisted by two to three interns from the village who were attached on a monthly basis to the unit. We were also supporting an additional three full-time positions to take care of the KOCP Tree Nursery.

"The first time I heard that Hutan was hiring women for reforestation work, I thought that as a mother of 10 without any proper school education, I could not even dream being hired. But we were very poor and there were hardly any job opportunities for women in the village. So I took my chance and after some trials in the field, I finally got the job."

"It is only after a while that I started to realise the importance of this work for our environment, the wildlife and ultimately for the survival of our village and our region. I have learnt a lot and I am now very proud of my work. It is often very hard physically, but I hope I can continue to do this work until I am an old woman."

"At first, I very much doubted that we could really plant so many trees and that they would survive. But after 6 years of hard work and dedicated care, I am very proud of what we have achieved so far. I never thought we would be able to actually grow whole new forests, but we did, us, a team of women. Now we have no limits and I hope that we can plant many more thousands of trees. It is our responsibility to the world to make sure our seedlings become large big trees, which will live long after us."

Testimony from Marianna Singgong, Head of Reforestation Field Operations (works since 2009)



The Reforestation team is in charge of planting, maintaining and monitoring seedlings of native tree species at selected reforestation sites within or adjacent to the Lower Kinabatangan Wildlife Sanctuary. The seedlings are purchased from villagers originating from Kampung Sukau, Abai and Bilit in order to support the local economy. They are then gathered at the KOCP Tree Nursery until we move them to the planting sites. The Unit is currently taking care of seven reforestation plots, covering a total of about 100 acres. The reforestation team maintains each reforestation plot (cleaning and weeding) for 3 to 5 years after planting. Two of the planting sites are protected with an electric fence to prevent elephants and other wildlife (wild boar, deer) to enter the plots and destroy the seedlings. These fences are removed after three years, when the small trees are tall enough to sustain wildlife.



In 2017, the reforestation team planted more than 16,000 seedlings representing 20 native species. Today, the team is taking care of more than 100,000 seedlings. Last year, the mortality rate of newly planted seedlings was higher than in previous years (it reached up to 60% in certain blocks) because of an extended period of flood followed by an extended drought. The team decided to plant new seedlings early 2018 to replace the dead plants.

"After leaving school at 15, I worked in factories, in Sandakan and even Kuala Lumpur, and also as a general worker at a tourist lodge. When I heard that Hutan was looking for women to form a new reforestation team, I immediately applied. My only qualification was that I was used to work in my family's vegetable garden."

"The first 2 months of work were very hard, but then I got used to the challenging physical work. We were sent for intensive training at other established reforestation projects and at the Sabah Forestry Department. I even followed a course on community forestry in Thailand. This is how I first learnt the technical aspects of the job. Now we conduct our own research on different planting and maintenance methods and we have become recognised experts in our field. Many students or staff from other projects come to learn from us."

"My motivation for working with the reforestation unit is not the money I earn. My inspiration is the experience I gain and the ability to contribute to make the planet a better place. I am not only doing this work for myself, but also for the wildlife and the forests, which produce oxygen for the world. If people from across the globe support our work, it must mean that the trees we plant are important."

"I have met some people doing reforestation who don't really care if their seedlings die or not. For me, I feel I must take care and look after our seedlings as my own children, until they become young trees and start to bear fruits. It can take many years. The fruits are like my grandchildren. "

Testimony from Norinah Braim, Head of Reforestation Logistics (works since 2009)



Every month the team is monitoring two plots that were established in 2008 and 2010; they survey a subset of 4,500 different trees and record their growth and general condition. Five years after planting, most trees can reach a height of 8 to 12 m and a dbh of more than 20 cm.



VK Planting site in 2013



and in 2017



View of a plot planted in 2011.

The team is also recording new seedlings that grow in these plots. We planted 12 different tree species at both monitoring sites, but today we have identified seedlings of 29 different species in these two plots, showing that new species of trees are starting to grow during a “secondary wave of colonization”. These new seedlings are originating from seeds disseminated by animals visiting our reforestation plots (birds, monkeys, orang-utans and other species).



Last year, the team designed a wildlife monitoring program to identify animal species occurrence in our plots. For each session, the team follows a “Zig-Zag” transect and records all types of direct and indirect wildlife sightings: footprints, dungs, feeding signs, nests, etc. This monitoring indicates the presence in our plots of an increasing number of species (11 species of mammals identified and more than 50 species of birds for last year). Orang-utans (or their signs, like nests) are now regularly recorded in the two plots. They feed on fruits produced by the trees planted in these plots, or build their nest for the night.



Orang-utan nest within a reforestation plot



Footprint of elephant



and rusa deer recorded within the reforestation plots

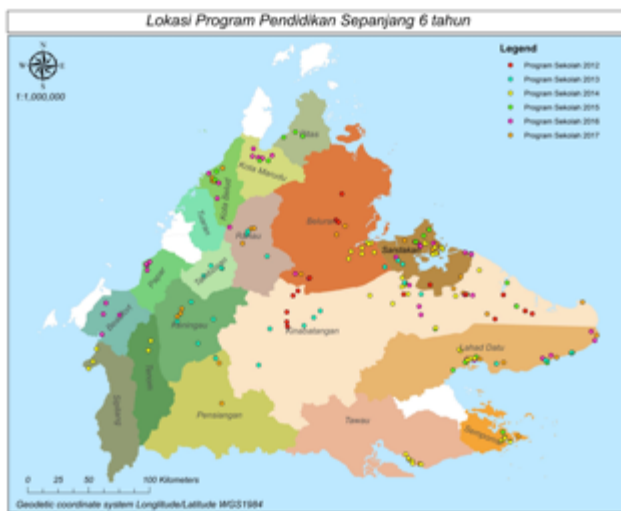


The HUTAN Reforestation team welcomes a group of guests from overseas for tree planting activities

Education and awareness activities

To address the general lack of awareness on conservation issues in the Lower Kinabatangan and in Sabah, we established the HUTAN Environmental Awareness Project (or HEAP) to concentrate on environmental education. HEAP's main goal is to incorporate and support HUTAN's overall mission, i.e. "to achieve long - term viability of wildlife living throughout Sabah". HEAP's activities are encompassing environmental education and capacity building; they are strengthening the impact and effectiveness of other HUTAN's units. Since the establishment of HEAP in 2007 this Project has widely expanded its range of activities as well as its geographical reach, with the creation of a mobile unit reaching out to schools and communities throughout Sabah.

In 2017, HEAP conducted a total of 58 environmental educational programmes with 29 primary and 29 secondary schools within 10 districts of Sabah, reaching out a total of 12,370 students and 914 teachers (see Map below). Most of these programmes were organized directly by HEAP, while the team also took part in education programmes organized by other partners, such as NGOs (Bornean Sun Bear Conservation Centre, Greens Semporna, and Reef Guardian), and government agencies (Sabah Wildlife Department, Sabah Forestry Department, Wildlife Rescue Unit).



Map of Sabah showing the location of schools visited by HEAP over the years

Typically, our education programmes include exhibitions (display of artefacts from the forest, of replica of animals and bones, posters and flyers that are produced in-house, etc.), lectures, videos, environmental games and other activities tailored according to the age of our audience. Education activities were developed according to the HEAP Master Plan that was designed with the assistance of national and international partners. The HEAP team is regularly assessing the impacts of their education activities through a combination of questionnaires (to test knowledge), behavior changes, program's perception by both students and teachers, etc.

Last year, HEAP was involved in the development and delivery of several “Community Policing Programmes”. This initiative, co-organized by HUTAN-KOCP, the Sabah Forestry and Wildlife Departments and the Royal Malaysia Police, targets workers and their families who are living in the palm oil estates of Sabah. The purpose is to raise awareness about issues currently encountered in the State; be it human-wildlife conflict, illegal logging, illegal poaching of endangered wildlife and drug abuse amongst communities, etc. In addition, this program highlights existing laws and their enforcement on mentioned crimes and proper practices for communities to follow on mitigating the issues. This program also provides a space for communities to address questions and discuss dilemmas that they are facing in their daily lives. This year, the Community Policing Program was held in three different oil palm plantations along the Kinabatangan area.



Community Policy event organized in an oil palm estate

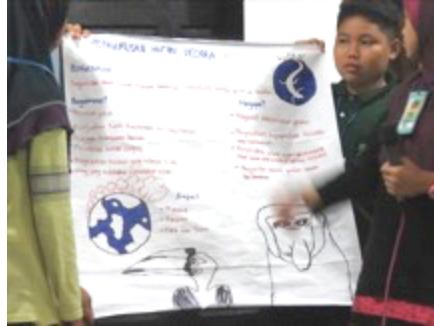


The Borneo Bird Festival is one of the nature festivals organized in Sabah; it celebrates the magnificent birds of Borneo and the island’s astonishing nature. In 2017, the Borneo Bird Festival programme was held in Imago Mall, Kota Kinabalu. For two consecutive days, the festival combined nature and wildlife talks, booth exhibits, showcases of birding and camera equipments, and photography contests. HUTAN-KOCP held a booth and ran a series of fun-activities and delivered public talks about hornbills and nature conservation. Our booth exhibit attracted more than 200 visitors of various age level over the two-days event, and more people listened to the presentations.

Education materials developped and produced by HEAP for the Borneo Bird festival



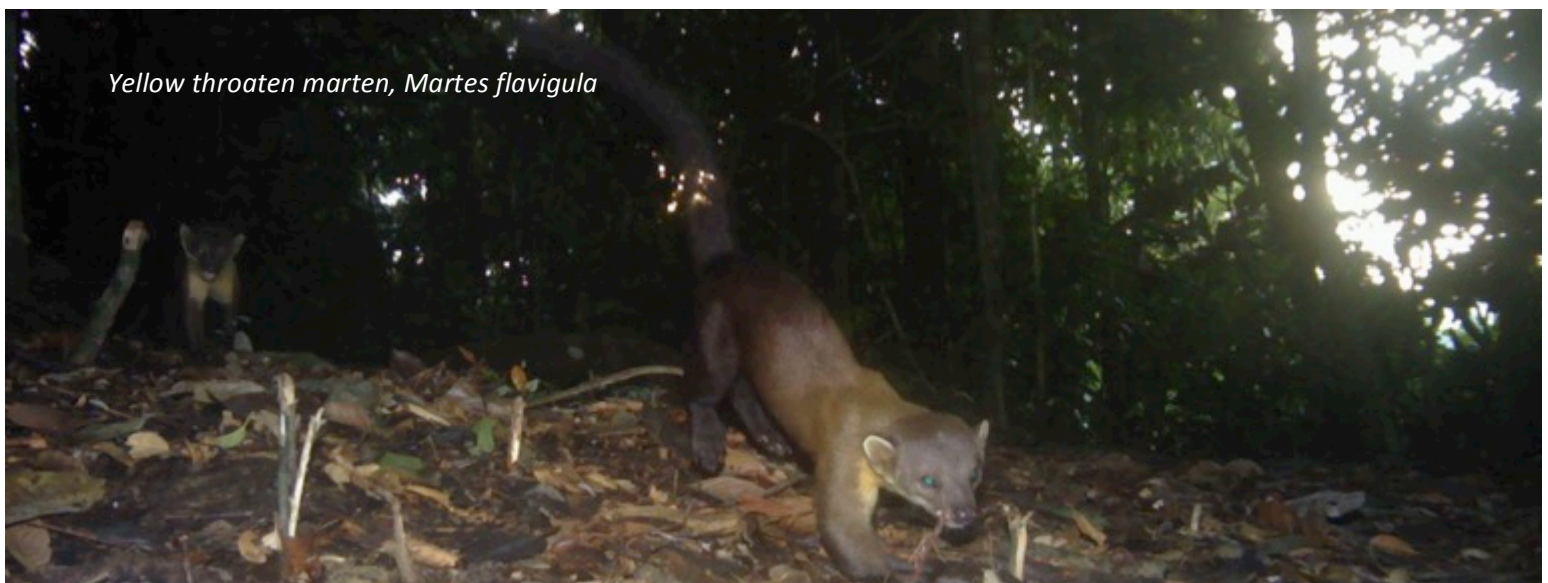
On the 6th of October 2017, HEAP organized a motivation camp unit at Sukau for 12 year-old students from Lahad Datu IV Primary School. A total of 24 students and 6 teachers took part in this 3 day - 2 night camp packed with activities including group discussions on environmental issues, games, tree planting, jungle trekking and presentations.



On November 22nd, HEAP signed a Memorandum of Understanding (MoU) with the Lahad Datu IV Primary School and several government agencies and NGOs. This MoU intends to improve the performance of the school in the achievement of a green environment. HEAP proposed to beautify and enhance the Nature Park of the school by building a replica of an orang-utan bridge. The objective of this project is to explain the use of the bridge by orang-utans (as well as other wildlife) for their movements (home range)

between fragmented landscapes, and the consequences of habitat fragmentation and degradation on wildlife survival. HEAP also donated a replica of an hornbill artificial nest box. HEAP is also currently developing a reforestation plot within the school premises to sensitize the children about the importance of trees to sustain humankind.

HEAP also reactivated the "KOCJ Junior Rangers Programme" with a group of 20 youth from the local communities. On a monthly basis, this group is exposed to various conservation and research activities, such as wildlife surveys, reforestation and tree growth monitoring, orang-utan or elephant ecology, etc.



Yellow throaten marten, Martes flavigula

Enhance human capacity to better manage wildlife in Sabah

HUTAN gives a special emphasis to local capacity building. KOCP staff is attending training sessions on a regular basis to build stronger capacities and to become empowered with the necessary skills to carry out their conservation activities.

In 2017, the KOCP staff attended 15 different training sessions, including freshwater fish identification and conservation; GIS; camera trapping and wildlife survey; wildlife crimes and law enforcement; water quality monitoring; tree climbing techniques; statistics, video editing.

In 2017, KOCP created a “Task Force” in charge of producing videos for awareness purposes. Over the past few years, the “Borneo Film Festival” team of professional videographers has trained the Task Force and several other researchers from all KOCP units about video making, production and editing, and today, HUTAN-KOCP can produce its own videos. During the last two years the team has produced eight different videos: two about orang-utan, two about elephant, one about the local trade of hanging parrots, two about reforestation, and one about the future for Kinabatangan. Berjaya Elahan (WSP team member) was invited to attend the Road Show organized in October by the “Borneo Film Festival” in West Malaysia, during which one of the videos produced by KOCP about “Jenny the orang-utan” was broadcasted.

In December 2017, Dr Graeme Gillespie, Danielle Stockeld and Dr Wai-Ming Wong organized an intense training program about camera trapping that benefited the WSP team. Following this training, the team deployed 12 camera traps in December as a pilot. With their newly acquired skills, WSP will be in charge of implementing a long-term camera trap monitoring of carnivores and other terrestrial mammals (including orang-utans) in Kinabatangan. This programme will mobilize about 80 camera traps and will be initiated in March 2018.



***Dr Wai-Ming Wong
(from Panthera) teaching the WSP Unit about
camera trapping (two training sessions were
delivered in June and December 2017).***

In May 2017, Eddie Ahmad, Head of the WSP Unit and in charge of the Camera Trapping Program attended an internship at the Northern Territory Dpt of Environmental and Natural Resources (DENR) in Australia. For three weeks, Eddie learnt about wildlife monitoring techniques and camera trap management used by the Australian Services to survey population trends in the long-term. For ten days, Eddie followed in the field Dr Graeme Gillespie, Director Terrestrial Ecosystems – DENR, and spent a week with Danielle Stockeld, in charge of the camera trap program for DENR to learn about management and analysis of complex and large data sets.



Meanwhile, the teams of KOCP field researchers have organized several training sessions that benefited villagers, staff from NGOs, government agencies and from the private industry:

- HEC mitigation conflicts: for the communities of Lintang, Ulu Muanad and Telupid (see above);
- Wildlife monitoring (two five-days sessions in April and in November) for the staff from the Forestry Department posted in the Segama Wetlands RAMSAR Site and community members living within the RAMSAR site (n=25 pax);
- Wildlife monitoring for the staff of Bornion Timber (Rubber plantation; n=12 pax);
- Wildlife and Elephant Management: staff from the Forestry Dpt of Sarawak (n=20 pax);
- Groups of international students about HEC (DragonFly Project – Miami University – 2 groups of 20 pax each; 1 group of 25 students from Sweden; 2 groups of Malaysian students from UPM and from UMS – Malaysia- (> 20 pax); Malaysian teachers from the EE Race project, n=7 pax).

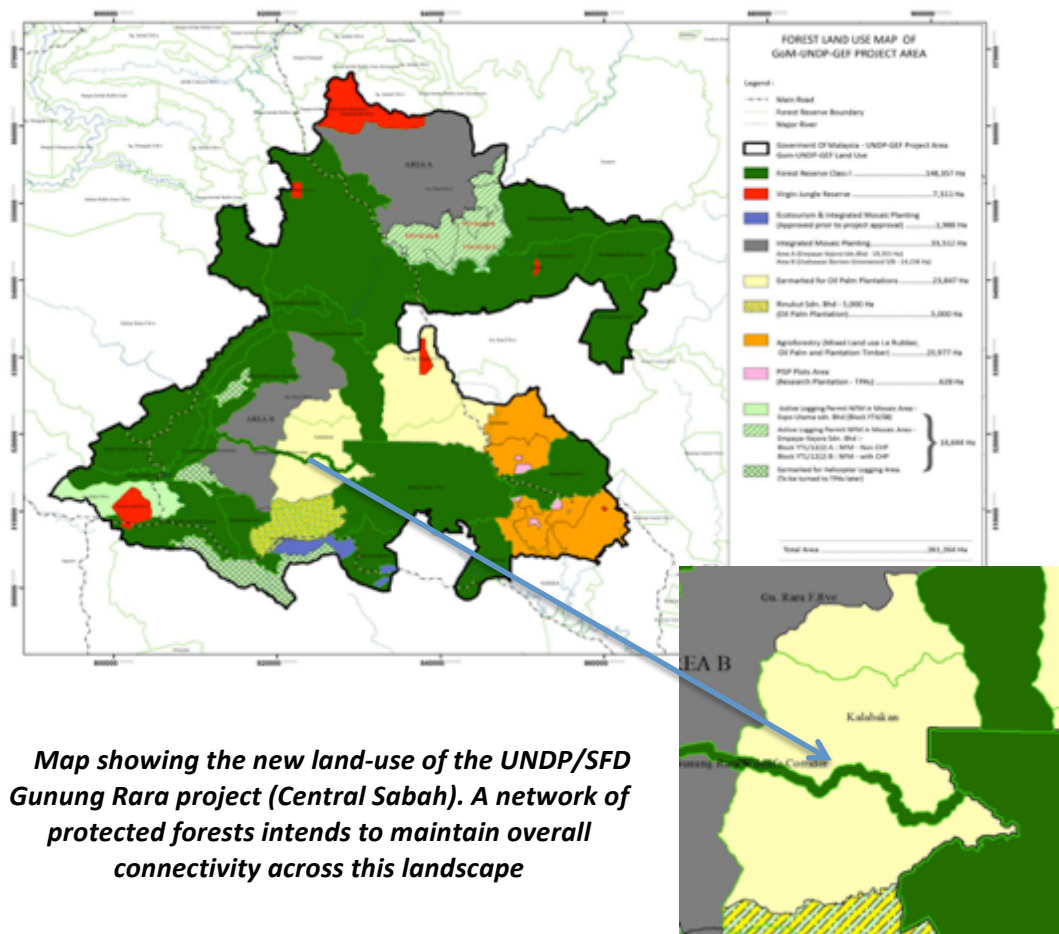


<p>Improving policy framework for orangutan and biodiversity conservation in Kinabatangan and Borneo</p>

HUTAN is a member of the Scientific Committee for the UNDP “Biodiversity Conservation in Multiple-Use Forest Landscape” project conducted in the Gunung Rara complex area. The project area is about 260,000 ha, is home to several elephant herds and several hundred orang-utans. Over the past few years, regular inputs provided by the Scientific Committee to the State authorities led to the design of a new land-use plan for the area (see Map below). Today, the entire area is roughly split between:

- 150,000 ha of fully protected forest
- 35,000 ha of mosaic planting
- 30,000 ha earmarked for oil palm development
- 25,000 ha of agroforestry (primarily rubber)
- 16,000 ha of timber exploitation

Importantly, the government recognized the needs to create or retain corridors of forests across the entire landscape to allow for elephant movements at the larger scale, and set aside several of these corridors.



In April 2017, we received the visit of Dr Vivek Menon and Sandeep Kumar from the IUCN SSC Asian Elephant Specialist Group. A Task Force spearheaded by Dr Nurzhafarina Othman was created to develop the new Sabah State Action Plan (HUTAN is part of this task Force).

The Sabah Forestry Department, LEAP/Forever Sabah, WWF Malaysia, HUTAN and Anika Desiran Sdn Bhd signed an official MoU for the sustainable management of Forest Management Unit 5 (“Trus Madi forest”) during the “Heart of Borneo” International Conference in October 2017 in Kota Kinabalu. The signatories pledged to work together to improve current exploitation practices (timber harvesting; industrial tree planting) within this FMU and maintain current levels of biodiversity. This FMU is home to orang-utans, clouded leopards, and many other endangered species, including elephants.

HUTAN is part of the Steering Committee for the Jurisdictional Approach for Certified Palm Oil (following the decision by the government to produce only certified palm oil by 2025). Results of our work are used to inform this platform and to design a State-level framework to support biodiversity conservation and agriculture development.

Being part of the RSPO Board, HUTAN is actively engaged in the process to move forward RSPO Next, with reinforced principles and criteria that are crucially needed to achieve sustainable production of palm oil.



HUTAN is a founding member of the “PONGO Alliance Initiative” established in November 2018 as an alliance of oil palm growers and NGOs interested to seek ways to make oil palm plantations and wildlife conservation compatible with the vision of *“Making resilient landscapes for wildlife and people a reality”*.



HUTAN is also a founding member of the IUCN Palm Oil Task Force, which is currently tasked to develop an information document about the real impact of oil palm development on biodiversity.

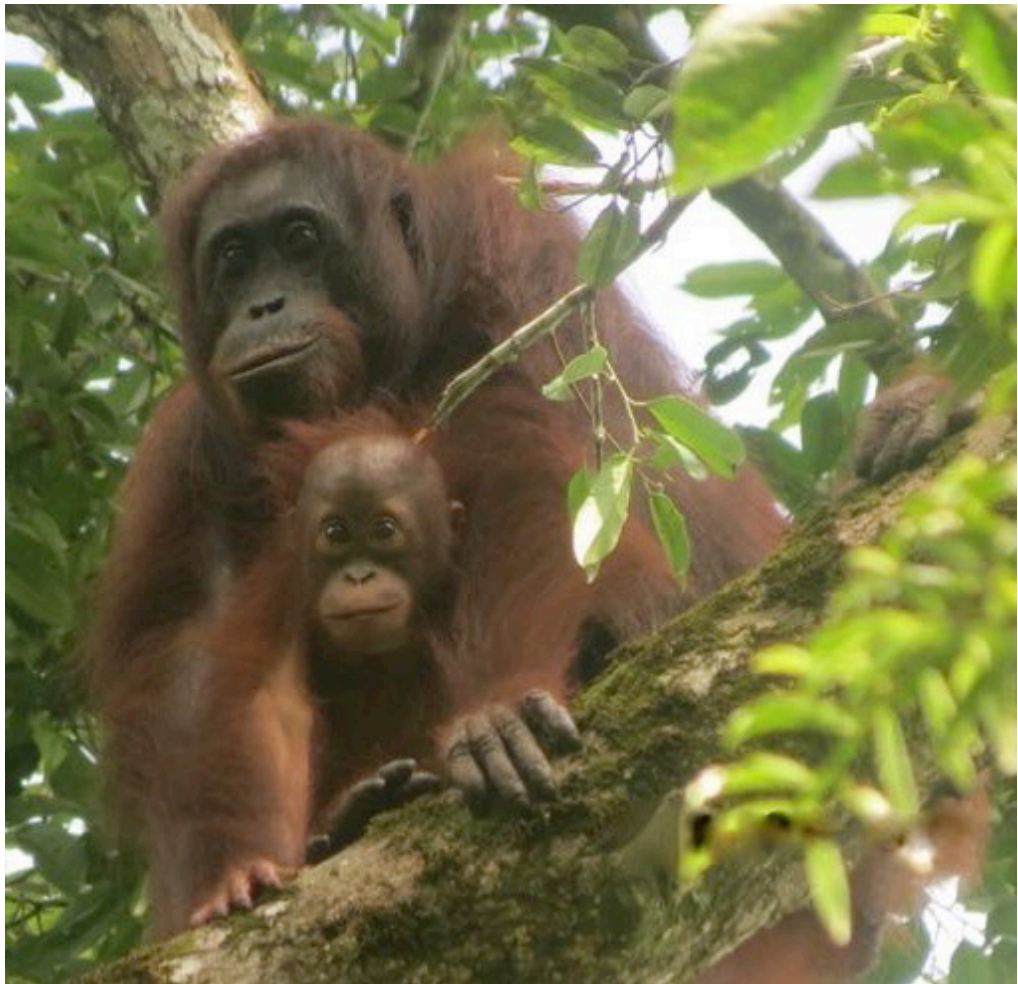
By committing time and efforts to these initiatives we aim at improving production practices in order to sustain in the long-term populations of orang-utans and other species in mixed agricultural landscapes.

HUTAN and the group “Living Landscape Alliance” (specialized in remote sensing modeling) spearheaded an in-depth policy gap analysis that was synthesized in two policy documents entitled “Orangutan, Oil palm and RSPO: Recognizing the importance of the threatened forests of the Lower Kinabatangan, Sabah, Malaysian

Borneo”² and “Addressing the Impact of Large-scale oil palm plantations on orangutan conservation in Borneo: A spatial, legal and political economy analysis”³.

These analysis were disseminated through newspaper articles and discussions organized with the Sabah Forestry Dpt; the Sabah Wildlife Dpt; the Land and Survey Dpt; the Ministry of Environment and Tourism; the Ministry of Agriculture; the Ministry of Natural Resources and the Chief Minister Office.

A brief summary of our findings can be found in Annex 1 to this report. All the documents are freely available from the Borneo Futures website.



² Abram, N.K. and M. Ancrenaz. (2017) Orangutan, Oil palm and RSPO: Recognising the importance of the threatened forests of the Lower Kinabatangan, Sabah, Malaysian Borneo. Ridge to Reef, Living Landscape Alliance, Borneo Futures, Hutan, and Land Empowerment Animals People. Kota Kinabalu, Sabah, Malaysia.

³ Jonas, H., Abram, N.K. and M. Ancrenaz. (2017) Addressing the Impact of Large-scale oil palm plantations on orangutan conservation in Borneo: A spatial, legal and political economy analysis. IIED, London.

Major outputs (writings, conferences) produced by KOCP in 2017

Although HUTAN is not an academic organization, we thrive to produce high-quality science that will support our conservation efforts by informing the global community and the land deciders in Sabah.

Last year, we published the following scientific articles in peer-reviewed journals:

- Morgan, C.L., Guerrero, A.M., Ancrenaz, M., Meijaard, E., Wilson, K.A. 2017. Not more, but strategic collaboration needed to conserve Borneo's orangutan. *Global Ecology and Conservation*, 11: 236-246. doi: 10.1016/j.gecco.2017.07.004.
- Davies, A.B., Ancrenaz, M., Oram, F., Asner, G.P. 2017. Canopy structure drives orangutan habitat selection in disturbed Bornean forests. *Proceedings of Natural Academy of Science*, doi 10.1073/pnas.1706780114.
- Santika, T., Ancrenaz, M., Wilson, K.A., Spehar, S., Abram, N.,, Meijaard, E. 2017. First integrative trend analysis for a great ape species in Borneo. *Scientific Reports*, 7: 4839. DOI: 10.1038/s41598-017-04435-9.
- Hudson, L.N., Newbold, T., Contu, S., Hill, S.L.L., Ancrenaz, M., Purvis, A. 2017. The database of the PREDICTS (Projecting Responses of Ecological Diversity In Changing Terrestrial Systems) project. *Ecology and Evolution*, 7: 145–188. doi: 10.1002/ece3.2579.
- Ancrenaz, M., Oram, F., and I. Lackman. 2017. Orangutan (Pongo). In *The International Encyclopedia of Primatology*. A. Fuentes ed. DOI: 10.1002/9781119179313.
- Husson, S., Ancrenaz, M., McFie E., Utami-Atmoko S.S., Wish, S. 2017. Bornean Orangutan. In *Primates in Peril: The World's 25 Most Endangered Primates 2016–2018*. Schwitzer, C., Mittermeier, R.A., Rylands, A.B., Chiozza, F., Williamson, E.A., Macfie, E.J., Wallis, J. and Cotton, A. (eds.). IUCN SSC Primate Specialist Group (PSG), International Primatological Society (IPS), Conservation International (CI), and Bristol Zoological Society, Arlington, VA. 99 pp, pp 75-79.

We also published several reports intended for global dissemination:

Abram, N.K. and M. Ancrenaz. (2017) Orangutan, Oil palm and RSPO: Recognising the importance of the threatened forests of the Lower Kinabatangan, Sabah, Malaysian Borneo. Ridge to Reef, Living Landscape Alliance, Borneo Futures, Hutan, and Land Empowerment Animals People. Kota Kinabalu, Sabah, Malaysia.

Jonas, H., Abram, N.K. and M. Ancrenaz. (2017) Addressing the Impact of Large-scale oil palm plantations on orangutan conservation in Borneo: A spatial, legal and political economy analysis. IIED, London.

Meijaard, E., M. Ancrenaz, and K. A. Wilson. (2017). The trillion dollar gamble on Borneo. *Strategic Review* 7:12-28

Meijaard, E. and M. Ancrenaz. (2017). Survival of nearly 10,000 orangutans in Borneo in oil palm estates at stake. Mongabay, 27.02.2017.

Meijaard, E., Morgans, C., Husnayaen, Abram, N., and M. Ancrenaz (2017). An impact analysis of RSPO certification on Borneo forest cover and orangutan populations. Pongo Alliance, 38 pp.

Ancrenaz, M., Meijaard, E., Wich, S. and J. Simery. (2016). Palm oil paradox: sustainable solutions to save the great apes. UNEP/GRASP, Nairobi. 57 pp: <http://www.un-grasp.org/videos-resources/publications/>



All these articles and more information are available at the Borneo Futures website, an initiative co-founded and co-directed by Marc Ancrenaz.



During the year, we also wrote several press releases that were published in local, national and international newspapers and magazines on various topics, including sustainable palm oil, the new Critically Endangered status of the Bornean Orangutan, the status of the orang-utan population size in Kinabatangan, the bridge/highway issue in Sukau, the real cost of deforestation, and etc. Most of these stories were also covered on social media and are available at the Borneo Future Website or Face book page.

Several radio and TV interviews were organized in France to highlight the crisis faced by biodiversity in Borneo and the potential that sustainable palm oil may have to contribute to the solution.

Non-written outputs produced by HUTAN included more than 30 lectures and presentations delivered at various national and international conferences and workshops about conservation activities in Sabah (including the Heart of Borneo Conference; the RSPO RT Conference; etc.).

Some of the recent events attended by KOCP local researchers included (the following list is not exhaustive):

- Proboscis Monkeys PHVA, Kota Kinabalu (February 2017)
- Kinabatangan Tourism Strategy, Sandakan, Sabah (April 2017)
- REDD Plus workshop, Kota Kinabalu (May 2017)
- Hornbill International Conference, Kuching – Sarawak (May 2017)
- Clouded Leopard Conference, Kota Kinabalu (July 2017)
- Tambadau Conference, Kota Kinabalu (November 2017)
- Project Impact, Langkayan island (November 2017)

HUTAN wish to thank our long-term partners who supported our activities in 2017:

More than 100,000 USD:

Arcus Foundation

50,000-100,000 USD:

Houston Zoo – North England Zoological Society (Chester Zoo) - Utah Zoological Society - Woodland Park Zoo - World Land Trust

25,000-50,000 USD:

Basel Zoo – USFW Great Ape Conservation Fund – USFW Asian Elephant Conservation Fund - Synchronicity Earth - The Orangutan Project - Zooparc de Beauval

5,000-25,000 USD:

Arizona Conservation Center (Phoenix Zoo) – AZA TAG – East Coast Zoological Society (Brevard Zoo) - Cleveland Zoological Society – Columbus Zoo – Culture of Resistance - Holonics Hospital – Zoo la Palmyre – Oregon Metroparks Zoo – Public Trust Keidanren Nature – Saint Louis Zoo –Stichting Ouwehand Zoo – Nashville Zoo - Wildlife Conservation Network

<5,000 USD:

Apenheul Zoo – Intrepid Travel – Les Amis du Zoo de Vincennes – Fondation Ensemble – Private donors



ANNEX I:

Developing a conservation planning framework for Kinabatangan

Our analysis shows that all forests found in the Lower Kinabatangan floodplain provide essential habitats for wildlife and facilitate connectivity between the protected areas: see Map 1 showing the current fragmentation status of protected forests in Lower Kinabatangan. If these forests are lost, human-wildlife conflicts will increase and wildlife populations will further decline.

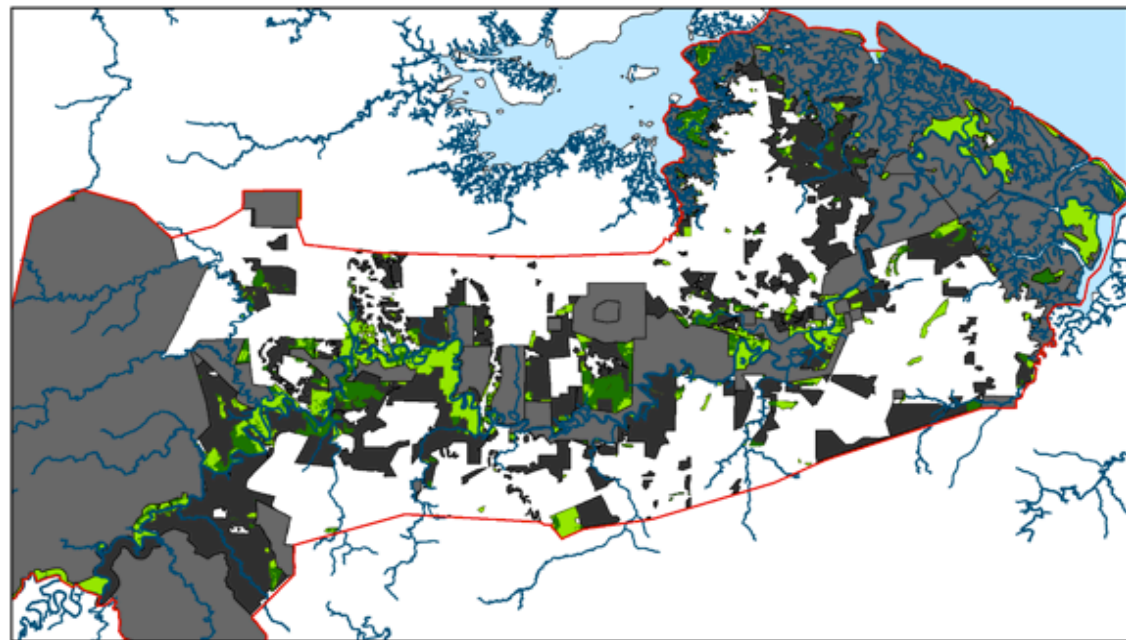
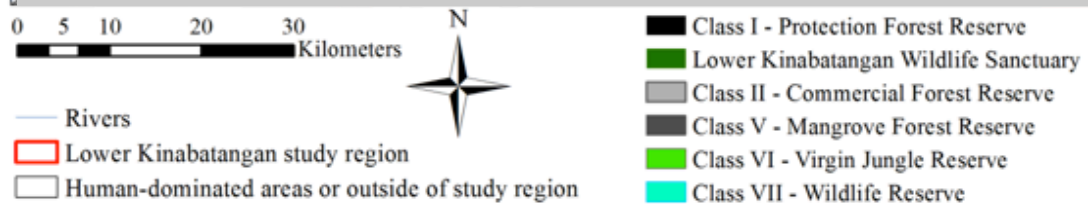
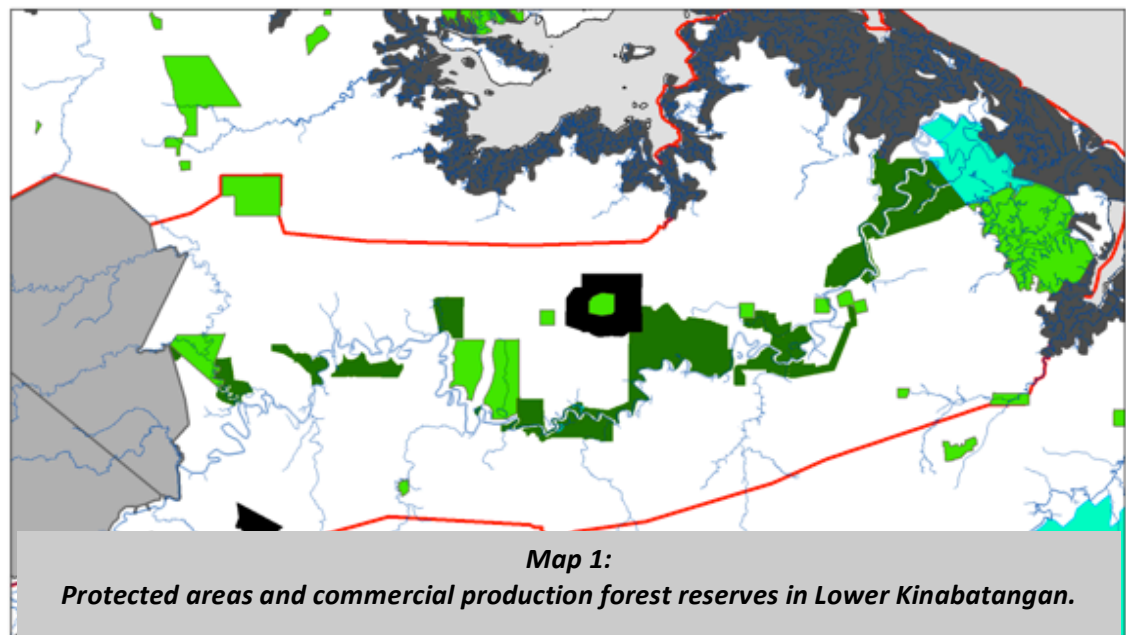
In 2005 however, forest cover had been dramatically reduced and approximately 36,000 ha of forest remained outside the gazetted Lower Kinabatangan Wildlife Sanctuary and other protected areas. From 2005-2014, around 13,000 ha of these

Since independence, successive governments in Sabah have considered agricultural development as the best way to alleviate rural poverty; and converting forests for agriculture has been considered the main route to achieve this objective. As a result, forests not included in the “Permanent Forest Reserve” (PFR) were converted at an alarming rate.

In 1973, forest cover was equally distributed between PFRs (49 per cent) and land outside PFRs (51 per cent) in Sabah. By 1992, forest cover outside PFRs had fallen to 15 per cent.

forests were lost. Most of these forests were connected with the current network of protected forests – either the LKWS or the Virgin Jungle Reserves found in the floodplain – and thus played a very important function in sustaining remaining wildlife populations.



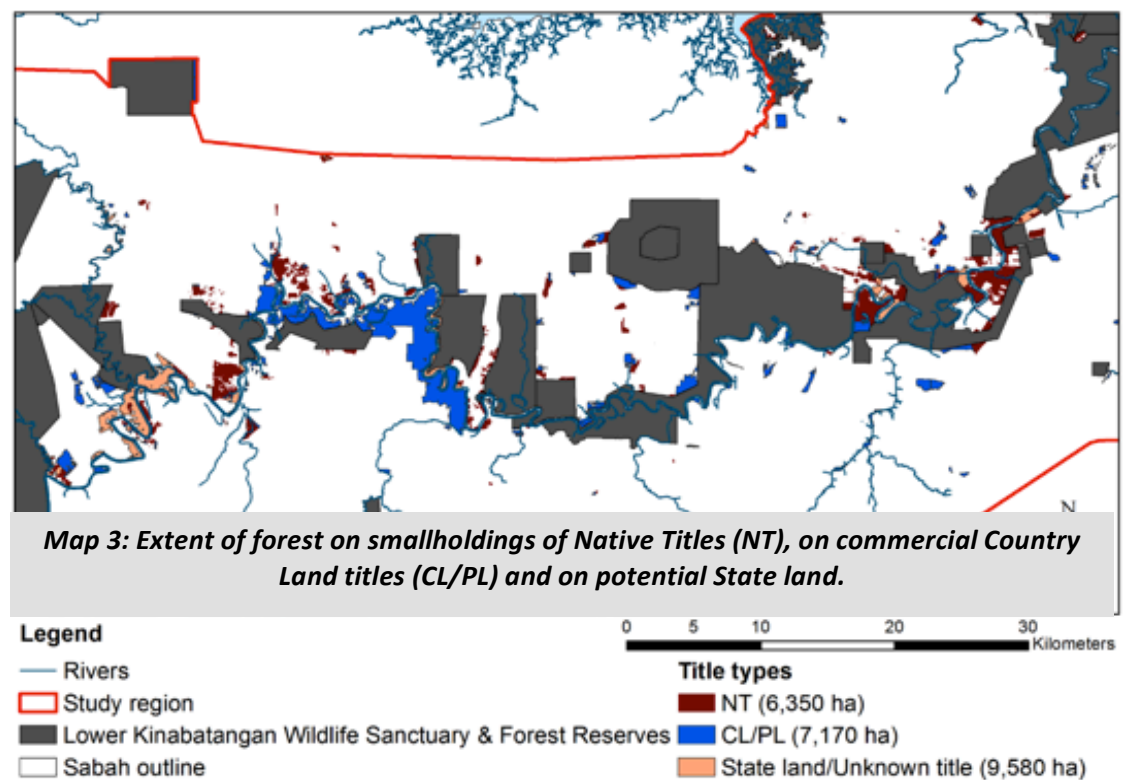


Map 2 showing the 2005 protected area network (cross hatch) with: the extent of the forest in 1996 (using Landsat TM images); 2005 forest extent (Landsat TM); and 2014 forest extent (Landsat EM).

In the mid-1990s, forest cover in the Lower Kinabatangan was far more extensive than it is today, with good connectivity both north and south of the river: Map 2.

Our estimates show that there were still more than 30,000 ha of forest located outside of the protected areas in the Lower Kinabatangan in the early 2010s⁴. Around two-thirds of these forests were located on alienated land allocated for oil palm: Map 3.

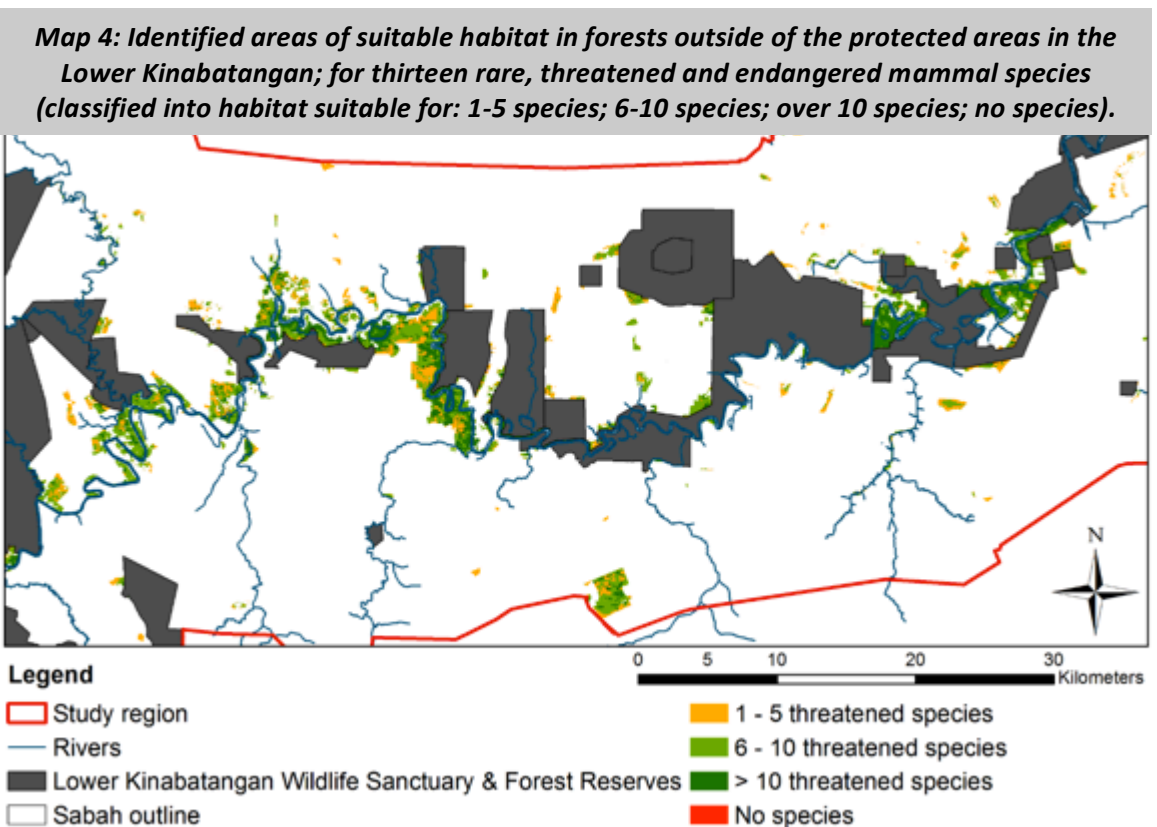
Alienated land in the Lower Kinabatangan region falls under Native Title or Country Land Title. Native Title (NT) includes titles for smallholdings for oil palm for perpetuity (999 years) and less than 40 ha in size (Section 70, Sabah Land Ordinance, 2010); and Country Land (CL) title are for commercial oil palm under a 99-year lease (Section 53, Sabah Land Ordinance, 2010). Under the Sabah Land Ordinance, NT titles are required to be fully cultivated within three years. For CL titles, one-fifth of the concession must be cultivated each year if the area is 40-250 ha; for titles of more than 250 ha, yearly equivalents are compulsory until the area is fully cultivated. Failure to cultivate can leave the land liable to be seized by the government (Section 70.4), though this rarely happens in practice. Although NT is aimed at 'native' people, this type of concession can be subleased for 30 years to individuals or companies (amended Section 17).



⁴ Abram, N. K., Panteleimon, X., Tzanopoulos, J., MacMillan, D. C., Ancrenaz, M., Chung, R., Peter, L., Ong, R., Lackman, I., Goossens, B., Ambu, L., and A. T. Knight. 2014. Synergies for Improving Forest Conservation in Oil Palm Dominated Floodplain Landscapes in Borneo. *Plos One*, 9(6): e95388.

Forest loss in Lower Kinabatangan has had a severe impact on the orang-utan population, driving a dramatic decline in numbers over the past 50 years (see above). In order to estimate what impact had deforestation on an array of other forest-dependent species, we developed habitat suitability models for 13 mammal species. These models integrated data on species presence in Lower Kinabatangan from 2007-2011 with environmental predictor variables – at one hectare resolution – using a Maximum Entropy Modelling approach and spatial predictors⁵.

Of the forests found outside of the protected areas, 91 per cent were predicted to be suitable for orang-utan. For other species, the proportion of non-protected forests offering suitable habitats ranged from 14 per cent to 93 per cent, demonstrating the importance of these forests as High Conservation Value 1 areas: Map 4. These figures suggest that – despite considerable disturbances by humans – the forests of the Lower Kinabatangan continue to provide a suitable habitat for many species of large, threatened Bornean animals, supporting the well-established notion that human-altered forests can retain conservation value for wildlife.



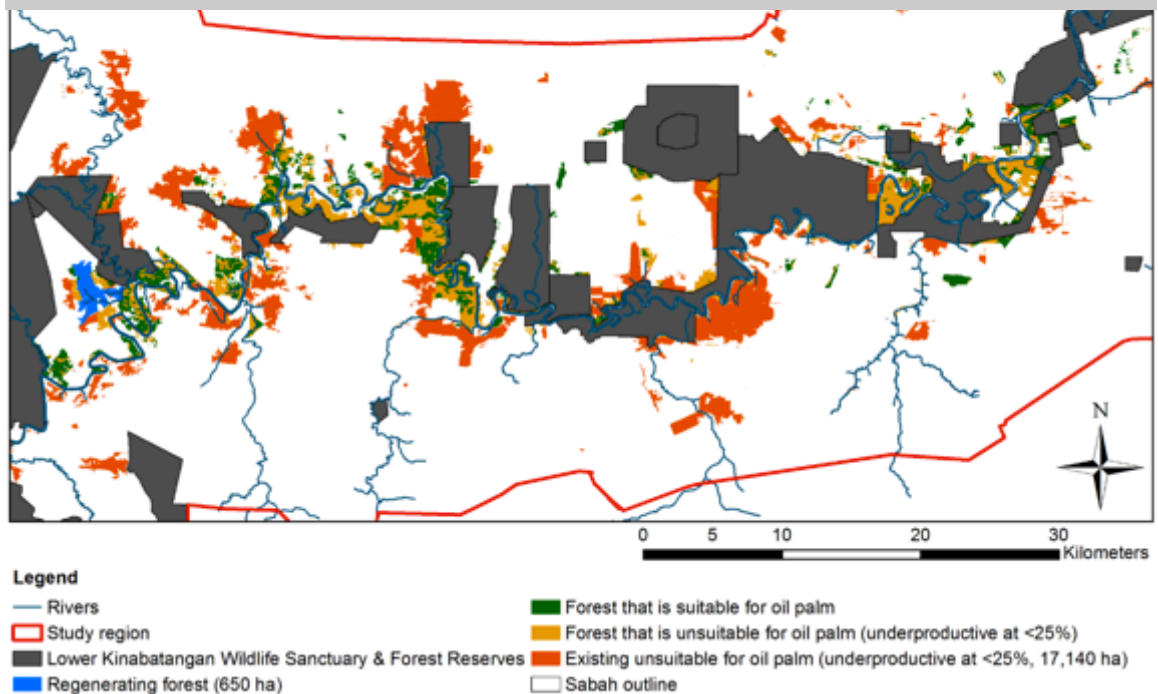
⁵ Abram N.K., MacMillan, D.C., Xofis, P., Ancrenaz, M., Tzanopoulos, J., Ong, R., Goossens, B., Koh, L.P., Valle, C., Peter, L., Morel, A.C., Lackman, I., Chung, R., Kler, H., Ambu, L., Baya, W., and A.T. Knight. 2016. Identifying Where REDD+ Financially Out-Competes Oil Palm in Floodplain Landscapes Using a Fine-Scale Approach. *PLoS ONE* 11(6): e0156481. doi:10.1371/journal.pone.0156481

The Carbon value of the Kinabatangan forests

Above-ground carbon data was developed from 110 hectares of carbon plot data that was integrated with remote sensing information using a step-wise Object-Based Image Analysis approach⁵. The carbon spatial data consisted of six classes using metric tons of carbon per hectare (tCh): <50 tC/ha; 50-100 tC/ha; 100-200 tC/ha; 200-300 tC/ha; 300-400 tC/ha; >400 tC/ha. We used a threshold of 75 tC/ha to define areas of low and high carbon stock, as above-ground carbon for mature oil palm is around 75 tC/ha. This is also in line with a 75 tC/ha threshold proposed to the RSPO. Forests outside of the Kinabatangan's protected areas hold a sizable above-ground carbon stock of 4.7 million metric tons⁵. Through the reclassification of above-ground carbon stock data, we showed that 17,140 ha (74 per cent) of forests found outside of the protected area network were having a high carbon stock (in other words, their carbon stock was greater than that of mature oil palm stands). Moreover, 50 per cent of forests outside of the protected areas were predicted to have from 100-200 tC/ha, and 22 per cent had more than 200 tC/ha of above-ground carbon. By securing these forests, Sabah could not only facilitate the long-term population viability of key wildlife species in this region, but also help make headway in Malaysia's commitment to cut its carbon emissions.

Last we estimated that around half of forests outside of the protected areas were not suitable for oil palm development due to seasonal or daily (tidal) flooding, despite it being allocated for this purpose: Map 5. According to previous economic analyses, converting unsuitable forested areas to oil palm production would yield a net financial loss and would likely result in the destruction of about 15,000 ha of land in the Lower Kinabatangan without any benefit for people or for biodiversity. If converted to oil palm, these forests would soon become commercially redundant areas: most palms would die and the overall net cost for converting forest to oil palm would significantly outweigh any revenue (estimated net present value over 25 years ranged from US \$-65 to US \$-300/ha per year)⁴. Investing in oil palm in unsuitable areas may therefore have disastrous financial consequences.

Map 5: Extent of failed oil palm areas due to seasonal flooding (dark orange), areas of non-protected forest that would be suitable for oil palm (green) and areas of non-protected forest that would be unsuitable for oil palm (light orange).



What solutions for Kinabatangan?

The Certified Palm oil Jurisdictional Approach

Sabah's commitment to undertaking jurisdictional certification for palm oil could be a much-needed game-changer and this initiative could provide a platform for landscape-level conservation of HCV and High Carbon Stock (HCS) areas in Kinabatangan. HUTAN is a permanent member of the Steering Committee driving this process. Over the past two years, we have attended a series of meetings and workshops to develop the road map that will allow for the entire palm oil production of the State to be certified by 2025.

A current issue is that Sabah's current land-use policies prohibit forest retention on private land (Sabah Land Ordinance, ver2010). Laws preventing such initiatives are currently major obstacles for private conservation ventures on alienated lands in Sabah as a whole, and not least to landholders who need to comply with RSPO standards. Amendments to the Land Ordinance are urgently needed to enable state-wide certification of sustainable palm oil and will need addressing by the states jurisdictional committee for sustainable certification (JCSC), and beyond that at the highest level of decision-making in Sabah – the State Cabinet.

Excising land.

Compulsory acquisition of land by the Sabah Government could provide highly effective means in preserving forests of less than 500 ha that fall outside the RSPO safety net. However, this approach would have to be handled delicately to avoid antagonising communities or companies whose goodwill towards biodiversity conservation is essential. It is highly unlikely that the State government will favor this type of approach.

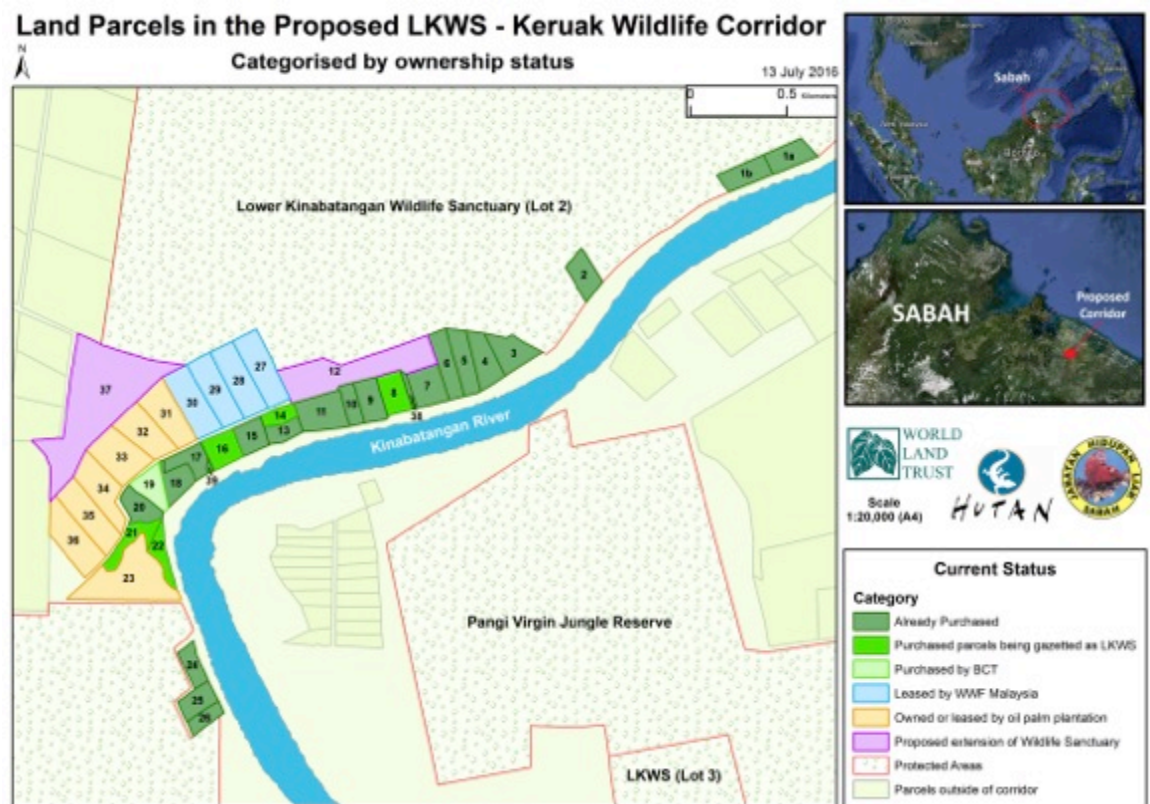
Acquiring land.

Acquiring private land before it is purchased by the palm oil industry is a possible way to secure more forested areas in Kinabatangan. Such an approach is currently pursued jointly by the Sabah Wildlife Department (SWD) and HUTAN, under the guidance of a Steering Committee chaired by the Permanent Secretary of the Sabah Ministry of Tourism, Culture and Environment (MTCE) and composed of 13 government agencies. The Keruak Corridor project aims to establish a wildlife corridor to reconnect two fragmented protected areas near the village of Sukau: Lot 2 of the Lower Kinabatangan Wildlife Sanctuary (LKWS) and the Keruak Virgin Jungle Reserve (VJR).

The proposed corridor, tentatively named the Keruak Wildlife Corridor, is still under

forest cover and has been identified as an essential segment of the elephant route near Sukau. The successful establishment of the Keruak Corridor signifies a small but vital step in securing the long-term viability of wildlife populations in the Lower Kinabatangan: Map 6.

The project's soft-approach has successfully gained the support of the individual land owners in the proposed corridor who have already contacted the project team expressing their desire to sell their lands. The project has also gained the support of the Sukau community as a whole, who are in favor of conserving these forested lands as a wildlife corridor instead of seeing the area converted to an oil palm plantation. To date, the project has already secured 28 out of the 40 parcels in the proposed corridor. An additional 10 parcels are currently being secured. All Land Applications secured in the Keruak Corridor project are to be surrendered to the Sabah Government for the purpose of gazettelement as a Wildlife Sanctuary. In 2016, Genting Plantation Berhad agreed to allocate its 7 parcels (110 acres) to the Keruak Wildlife Corridor for the purpose of wildlife conservation, at no cost.



Map 6: the “Keruak Corridor Project”

We are currently initiating a new project called the “Pangli Corridor” that will link Lot 1 of the LKWS with the Pangli Forest Reserve. However, the high price of land limits the scope for landscape-level purchase schemes.

REDD Plus project.

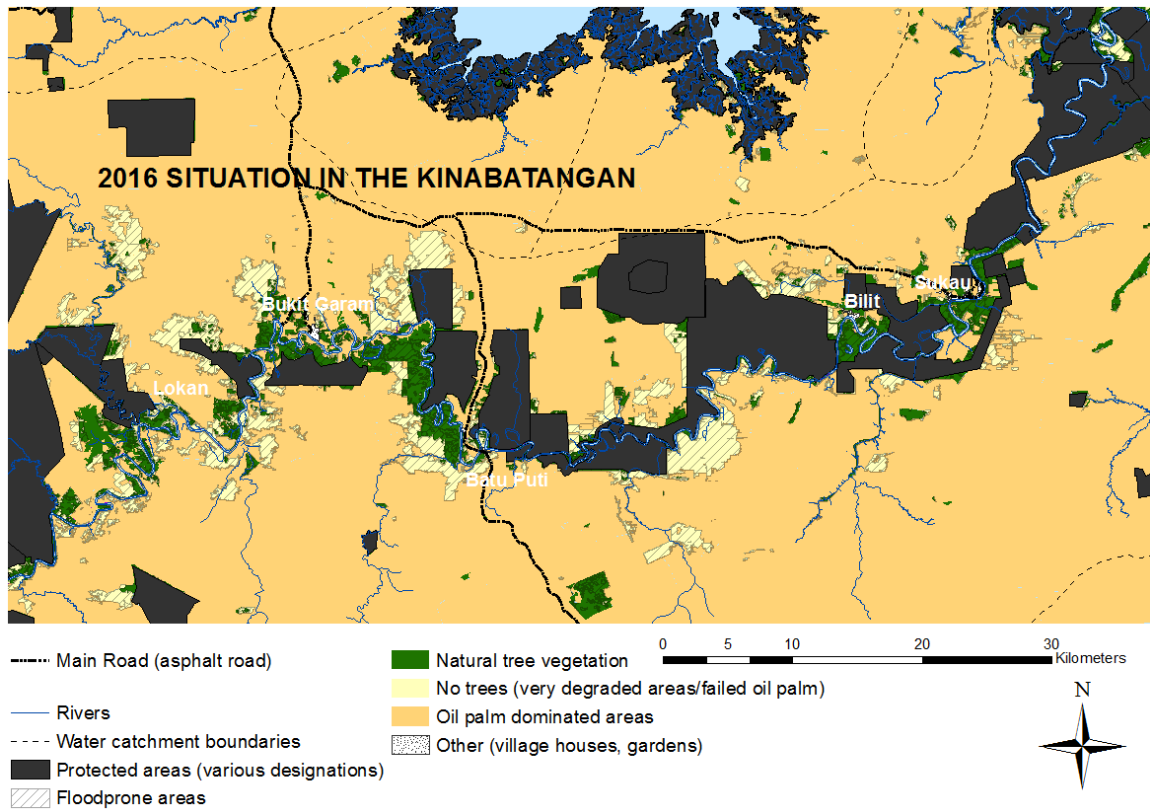
A REDD-Plus preparedness Roadmap was prepared for Sabah in 2011-2013 with financial support from the European Union. One of the pilot sites was the upper reaches of Kinabatangan. This project was organized by the “Borneo Conservation Trust” under the Sabah Wildlife Department but suffered huge setbacks and delays. In late 2017, the Sabah Forestry Dpt (implementer of the overall programme) reassigned this project to a new consortium of partners including the Forever Sabah/Leap group, the community-based Mascot-Kopel group and Hutan (represented by Norinah brain; Head of HUTAN Reforestation Logistics:). Norinah has attended a few working sessions to redefine the scope of this project in order to harness efforts of communities located in Upper Kinabatangan in reforestation efforts for the Lots 8 to 10 of the LKWS.

The “Save Kinabatangan Campaign”.



The big conservation success for Sabah in 2017 was the final decision by the State government to scrap off the project of a Bridge and Highway that was proposed to be built in Sukau (see above). This issue was the opportunity for all NGOs and environmental groups being active in Sabah to come up with a single voice about lower Kinabatangan. It was decided to initiate the “Save Kinabatangan Campaign”. Our vision is *“A floodplain with large tracts of forests, riparian vegetation, wildlife corridors, clean river, and viable wildlife populations, where local communities benefit through ecotourism and compatible land-uses”*.

The major targets to achieve this vision are to secure habitat for wildlife; to connect forests; to restore wildlife habitat; to manage and monitor wildlife; to restore the health of the natural involvement; to empower local communities; to promote responsible tourism and oil palm industry. We have proposed to the government to appoint a single Management Authority that would become responsible of the delivery of this Plan. We are also requesting no more land development in Lower Kinabatangan. This Vision was shared with the government and with a larger audience via newspaper articles.



Map 7: overall situation of the landscape in Lower Kinabatangan.