



HUTAN

Kinabatangan Orang-utan Conservation Programme

2019 Yearly Activity Report





HUTAN

*Kinabatangan Orang-utan
Conservation Programme*



Dame Judy Dench enjoying the forest and the orangutans at the HUTAN Study site

*Abdul Rajak Bin Saharon - Ahmad Sapie Bin Kapar – Ahmad Shukryien Bin Abdul Rauf - Amalina Binti Adenan - Azli Bin Etin -
Azman Bin Abdullah - Bahrani Bin Elahan - Berjaya Bin Elahan - Darwis Bin Abdul Mohd - Datu Md.Ahbm Bin Abulani -
Dayang Rainah Bte Rahim - Eddie Bin Ahmad – Fasland Uda - Hamisah Bte Elahan - Hamsiah Bte Marhaban – Harjinder Kler
- Hartiman Bin Abd. Rahman - Hasbollah Bin Sinyor - Haslan Bin Saidal - Herman Bin Suali – Iqbal Alif Bin Jefrie - Jamal @
Jamalludin Sinyor - Johari Bin Jamal - Johari Bin Junaidi - Labari Bin Abidin - Mahala Bte Maharan - Mahathir Bin Ratag -
Mariana Bte Singgong – Maslinda Binti Sawang - Masni Bte Mansor – Masrita Binti Takasi - Misliha Bte Osop – Mohd
Arnizam Bin Arbani - Mohd Azizi Suhaiman Bin Bahrani – Mohammad Hafizuddin Bin Bibong - Mohd Izzat Bin Burhan - Mohd
Suhaimi Bin Bahrani - Mohd. Daisah @ Hussein Bin Kapar - Mohd. Faisal Bin Asmara - Mohd Sufrieyan Bin Jamil - Noorzeelah
Bte Mursalin - Noratika Bte Husir - Norinah Bte Braim - Nurfatihah Bte Jumlin - Rusiman Bin Rukimin – Salmeh Binti Hassan -
Selamat Bin Suali – Sharmila Aida Binti Datu Md Ahbm - Shia Kang Ping Amanda Sudirman Bin Sawang - Shernytta Poloi -
Tiawa@Sukmawati Bte Pilit - Waslee Bin Maharan – Zulkarnain Bin Jamal - Zulkifli Bin Talua –
And all the interns who are working with HUTAN....*



TABLE OF CONTENTS

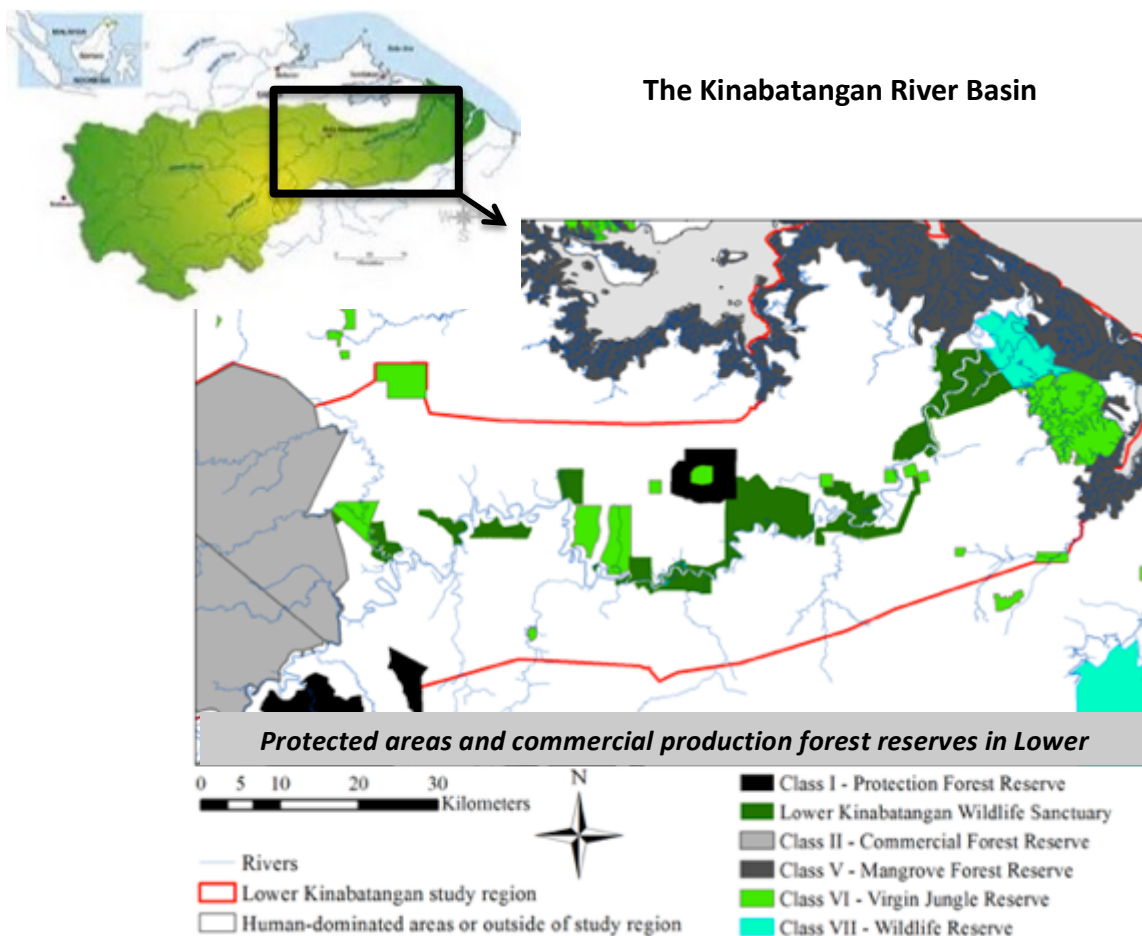
HUTAN Orang-utan Research Unit: <i>new strategies for orangutan conservation in agricultural landscapes</i>	p. 6
Elephant Conservation efforts: <i>toward peaceful coexistence?</i>	p. 13
Hornbill conservation efforts: <i>supporting viable breeding populations in Kinabatangan</i>	p. 16
The Pangi Unit <i>conserving colonies of swiftlets</i>	p. 20
HUTAN Reforestation Unit <i>restoring natural habitat in the most degraded parts of the landscape</i>	p. 22
Wildlife Survey and Protection <i>Control illegal activities. Monitor and survey wildlife populations</i>	p. 26
Creating Wildlife Corridors <i>a way to alleviate population fragmentation</i>	p. 31
Capacity Building <i>increasing skills and knowledge to locally manage biodiversity</i>	p. 34
HUTAN Environmental Awareness Program <i>spreading conservation messages at all society levels</i>	p. 37
Improving Policy Framework	p. 40





HUTAN, a French NGO created in 1996 by Drs Isabelle Lackman and Marc Ancrenaz, is thriving to identify ways for people and wildlife to share the same habitat in a peaceful way. Since 1998, we have been operating in Sabah, a Malaysian state located in the northern part of Borneo island.

Our primary area of intervention is the lower Kinabatangan floodplain. This area is roughly covered with about 100,000 ha of forests (half being protected) and more than half a million ha of extensive oil palm plantations and man-made landscapes. Following intense human exploitation of natural resources, the forest ecosystems are highly degraded and fragmented. However Kinabatangan remains a “Biodiversity Hotspot”, harboring a remarkable diversity and abundance of wildlife, including iconic species, such as the orang-utan, proboscis monkey, Bornean gibbon, Bornean elephant, clouded leopard, sun bear, as well as a wide array of birdlife. Kinabatangan is therefore one of the major tourism hotspots for Borneo.



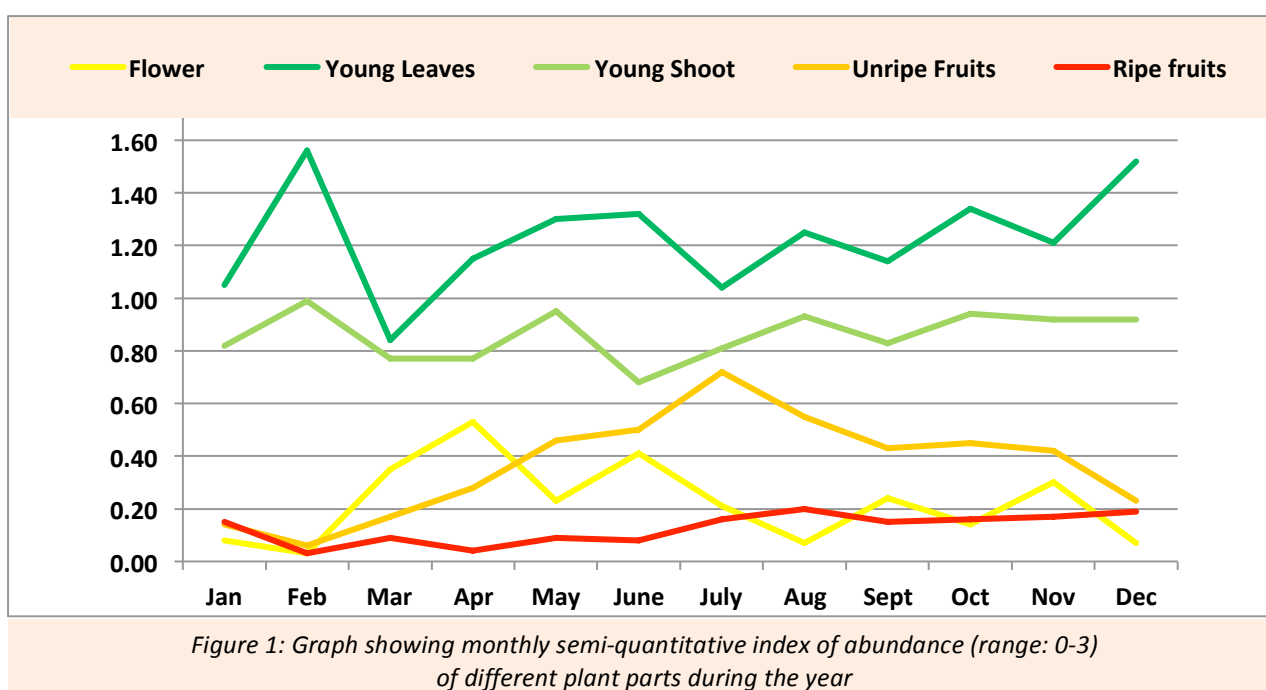


HUTAN Orangutan Research Unit
New strategies for orangutan conservation in
agricultural landscapes

In 2019, the HUTAN Orangutan team followed more than 30 wild orangutans at our intensive study site and secured a total of 157 full-day of observations (or more than 1,951 hours of direct observations).



The very dry weather conditions encountered in 2019 triggered a mass-fruiting event across most forests in the State, during which many climax tree species produced fruits simultaneously. Since the forest of Kinabatangan are still at an early stage of regeneration, pioneer species are largely dominating the tree community. Pioneer trees are responding differently than climax species to dry weather conditions, and the mass fruiting event at our site was not as pronounced as in other forests. However, the results of the monthly phenological monitoring conducted at our site still revealed a more regular and abundant production of flowers and fruits last year than during non-masting years: Figure 1.



Ripe fruits of *Maranthes corymbosa*, the most consumed plant in 2019

In 2019, plants consumed by orangutans originated from 38 Families and 90 species: 58 species of trees, 31 species of climbers and 1 species of epiphytes. Compared to previous years, climax plant species were consumed more often, reflecting the unusual flowering and fruiting patterns recorded in 2019.

Plant species that contributed more than 5% of the diet of followed orangutans combined a total of 55.5% of the entire diet (species with a * indicate climax species): *Maranthes corymbosa** (15.1% of the total diet), *Ficus* sp. (13.2%), *Parartocarpus brachteatus* (6.0%),

Dracontomelon sp. (5.5%), *Neolamarckia cadamba* (5.4%), *Diospyros* sp.* (or ebony wood: 5.3%) and *Lithocarpus* sp.* (or oak tree: 5.0%). Woody climbers and lianas represent more than a third of the orangutan diet at our site. Vines are important to sustain orangutans, especially in degraded habitat. Indeed, these plants are more uniformly widespread and common than most tree species, and they produce fruit in less synchronized patterns than many tree species. Woody climbers that are the most consumed in Kinabatangan include *Spatholobus* sp. or *Bauhinia borneensis* (Leguminosae), *Lophopyxis* sp. (Celastraceae), *Gnetum* sp. (Gnetaceae), *Bridelia stipularis* (Euphorbiaceae), *Uvaria* sp. (Annonaceae) and etc.

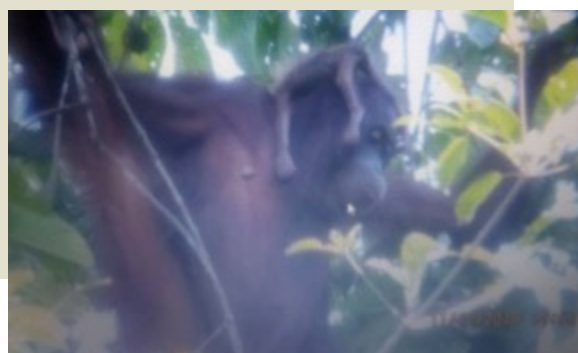
Our results show that orangutans require a highly diverse diet to be healthy: orangutans followed by the HUTAN teams consume a daily average of 3 to 15 different plant genera. In 2019, a total of 61.2% of the feeding time was spent on fruits (32.7% on ripe fruits and 28.5% on immature fruits), followed by flowers (very high in 2019: 18.8%), young leaves (15.5%), bark (3.9%).



In 2019, the average orangutan density at our site fluctuated between 1.7 and 8.4 ind./km², for a yearly average of 3.3. ind./km². This result remains in the range of abundance documented for the past twelve years at our site. Seasonal fluctuations of abundance are explained by the variation of food resources availability and by the presence of resident reproductive females that are momentarily attracting males from outside of our site when they are able to conceive.

In the morning of the 12th of November, Mallotus, Jenny's daughter and born in 2005, gave birth to her first baby. The team spotted the infant when Mallotus left her nest at around 9.00 am. However, very quickly, we realized that this baby was dead. Mallotus kept the baby with her for the next two days, carrying the body everywhere she would move. During this period, Mallotus was feeding less than usual, and would manipulate the dead body of the baby constantly. For us who have been following Mallotus since the day she was born in the forest, she looked extremely sad and depressed. Twice, the baby fell on the ground and twice Mallotus rushed from the treetop to retrieve it, even after the baby fell in the middle of a small river. The morning of the third day, Mallotus left the decomposing body of the infant in her night nest before leaving the area. She didn't come back to the nest thereafter.

According to the team, it took Mallotus about ten days to recover fully from this loss. This is the second time that we witness the mourning process of a mother orangutan after the death of a newborn baby. Each time, it is a traumatic period, both for the animals and for the human observers.





Adult female and her baby (seen attached on the back) crossing the Rasang tributary on a bridge

In order to address one of the causes of habitat fragmentation, we started to erect orangutan bridges in the early 2000s. Today venturing males and adolescents are regularly seen using these bridges, ensuring a proper gene flow between sub-populations. In August 2019, we obtained the first picture of an adult female carrying a baby on her back using a bridge to cross one tributary of the Kinabatangan River. This female was probably a resident animal whose territory is established on both sides of the river.

For over 20 years, our teams have followed wild orangutans in the lower Kinabatangan floodplain. Our research shows that these animals are thriving in the overlogged and highly disturbed forests of the region. They find sufficient food, they breed regularly and do not appear to be under much social stress. More recently we also realized that many animals were using oil palm plantations for dispersal, nesting or as food source. In these landscapes, orangutans can penetrate and venture several km away from nearby forest, walking on the ground. We are currently focusing some of our research efforts to better document and understand this new situation.

In 2019, the team conducted several surveys in oil palm dominated agricultural landscapes of Sabah in collaboration with PONGO Alliance. HUTAN is a founding member of the PONGO Alliance, an initiative that gathers NGOs, scientists and oil palm growers that aims at making resilient landscapes for both people and wildlife a reality.

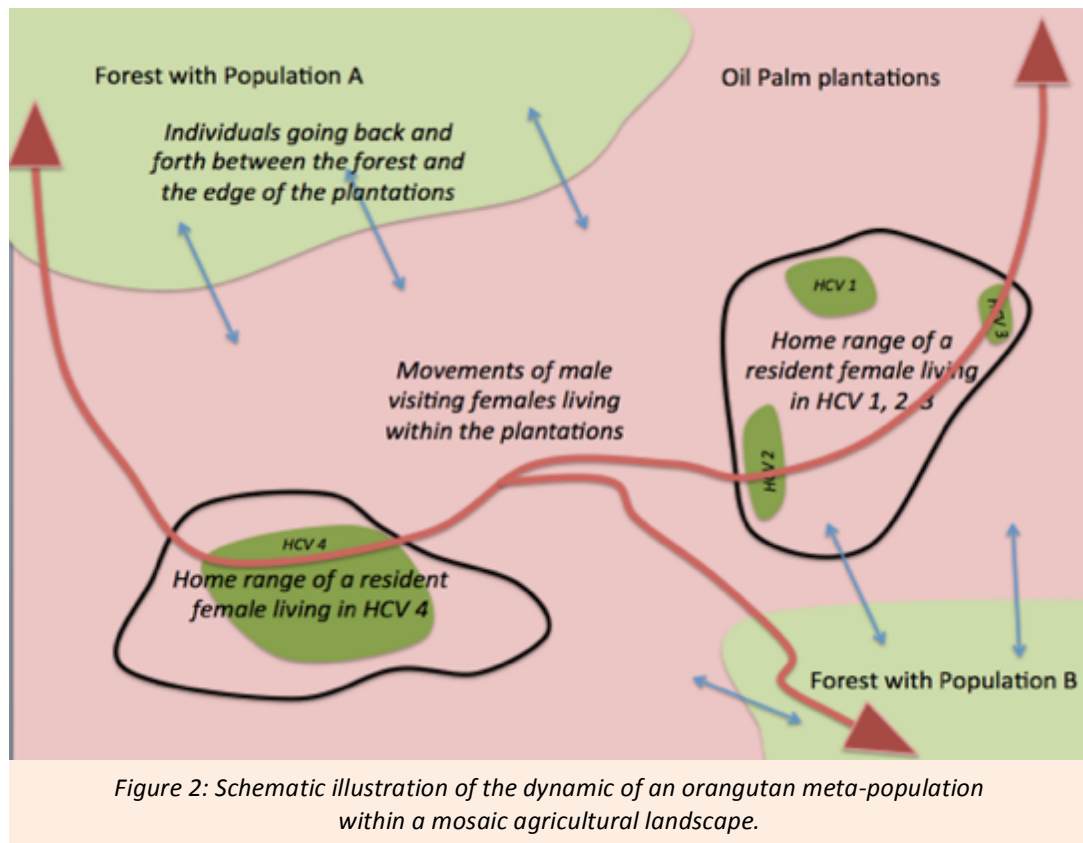


The team surveyed a total of 69,000 ha of plantations split in 25 estates belonging to eight different companies in Kinabatangan and in Sugud floodplains. In these two landscapes, we identified 20 patches of forest (High Conservation Value Forest) ranging from 1 to 236 ha. Seventeen of these forest patches (or 85%) showed signs of orangutan presence. We also confirmed the presence of six different resident



Young orangutan (and his mum) detected in a palm oil estate close to an isolated forest patch

adult females with a young in these patches. The size of the patches inhabited by the females ranged from 12 ha to 236 ha (average of 69.8 ha and median of 35 ha). A lot of these forests were located in steep slopes or ravines and covered with degraded forest. We are currently studying the female relative spatial dynamic in these fragmented landscapes and the movements and ranging patterns of associated males.



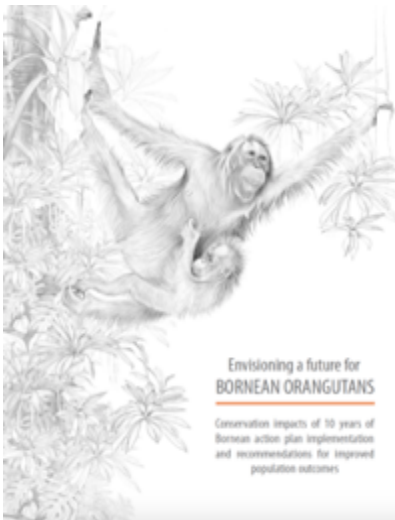
Our findings are crucial to understand the dynamic and viability of an orangutan meta-population that spans over protected and agricultural areas, and to manage populations and sub-populations in a landscape deeply transformed by man (Fig. 2).

For example, orangutans found in oil palm plantations or close to human settlements are often considered doomed by relevant authorities, NGOs, villagers and companies. Therefore, they are captured and translocated to nearby forests more often than not. This approach raises three major concerns:

- **Are translocated orangutans able to survive?** The survival rate of released orangutans after translocation has not been documented properly. We cannot simply assume that all animals will adjust and survive in places they don't know, especially where a resident wild population is already established. Indeed, although mostly a solitary foraging species, an intimate knowledge of the the diffuse fission fusion social network within sub-population is key to the survival of resident and related females.
- **What is the impact on the meta-population of removing individuals perceived as isolated and doomed?** Removing potential resident orangutans, especially females, from forest patches results in a net harvest within the meta-population occupying a landscape. Furthermore, routinely translocating dispersing males can likewise negatively impact local genetic fitness. Therefore, translocation in itself jeopardizes the long-term survival of the meta-population by further fragmenting the smaller populations that have adapted to survive drastic habitat transformation and conversion to agriculture.

- **What becomes of the forest patches after the removal of the orangutan?** Often, capture and translocation of orangutans means that the forest patches are cleared because they no longer contain “high conservation value” species. This destruction results in the loss of all species that were living in these patches and thereby intensifies fragmentation and habitat loss, hastening local extinction of all species, including totally protected species.

Allowing the industry to clear-cut forest patches makes the overall agricultural landscape less and less suitable for orangutans and other wildlife. HUTAN’s research shows that where hunting is not an issue, orangutans can use the remaining mixed forest/oil palm matrix, but to do so, they need forest corridors and patches of natural forests acting as stepping-stones in the landscape. If these patches are destroyed, the animals cannot use the landscape anymore, the population becomes catastrophically fragmented and not viable in the long-term. The only option is therefore to design orangutan conservation strategies at the landscape level that are encompassing production landscapes (incorporating existing oil palm plantations and other commodities) with the network of protected forests. These new findings are regularly published (see list of outputs) and were recently compiled in an internal report widely shared with our partners.



The long-term future of most orangutan meta-populations will primarily depend on three parameters:

- **A functional network of protected forests that will secure enough suitable habitat for orangutans;**
- **Securing a functional connectivity in non-protected areas and implementing agriculture practices compatible with the survival of the animals;**
- **Absence of hunting and ability for people to co-exist peacefully with the orangutans.**



In 2019, the team erected two new orangutan bridges above Sungai Sungai, a tributary of the Kinabatangan River, located in “Sawit Kinabalu” estate. This river was an impassable barrier for the animals living on both sides following the destruction of all trees that used to provide natural bridges to the animals.



Elephant conservation efforts
toward peaceful coexistence?



Dr Nurzhafarina Othman created a local NGO called “Seratu Aatai” (for “Peaceful Coexistence” in local language) at the end of 2018. Early 2019, she decided to join forces with HUTAN, and she is currently supervising her staff and three researchers from the HUTAN Wildlife and Survey Protection (WSP) team working full-time on elephant conservation. Additional HUTAN WSP team members are also regularly assisting the elephant unit when necessary.



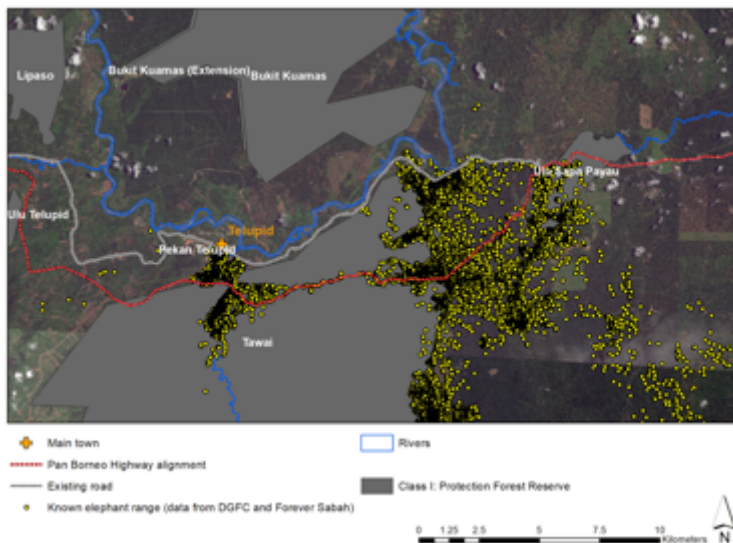
In 2019, the unit followed elephant groups that were roaming within oil palm plantations. In an oil palm plantation, a rotation cycle lasts about 25 years: at the end of this period, the old palms are replaced with new ones. Usually, the old palms are pushed down by tractors and their stems are sliced on site. Elephants are actively looking for these “chipping areas” to consume the freshly exposed shoots and the heart of the palms. During the first trimester of the year, the team secured a total of 131 hours of focal scan observations with all-males groups (n=34) and mixed groups (n=30). The average size of the focus groups was 4.2 individuals (range: 1-13).

Individual time budget revealed that elephants favored chipping areas for feeding activities, and oil palm blocks for resting. In a plantation, parts of the palm represent more than 95% of the elephant food. Most of the individuals who spend significant amount of time in the plantations appear to be in good to extremely good body condition, reflecting the easy access to food (palms): in this picture for example, the score would be 8 (out of 10).



The analysis of satellite data of elephants collared by Danau Girang Field Center and WWF Malaysia informs us about elephant movements and distribution in the Kinabatangan floodplain, and in the other two Major Elephant Ranges. In Kinabatangan, we have approached two estates where elephants roam extensively

and engaged with them to manage this new situation. Both estates have decided to create safe elephant passageways across their estate to ease the permeability of the agricultural landscape (page 33).



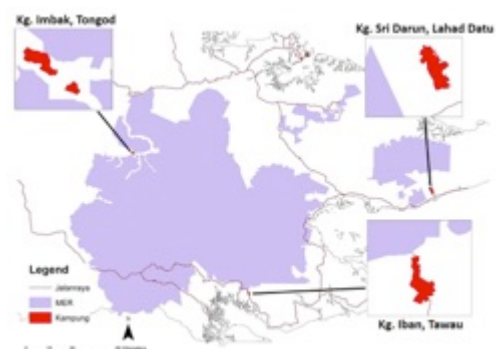
Satellite data also showed that the range and movement patterns of several elephant herds in Sabah will be significantly impacted by new development projects, such as the Pan Borneo Highway. This information is widely disseminated with land deciders and the public in order to influence final land use decisions and to mitigate negative consequences of these choices (page 42).

Over the past decade, the number of elephant deaths recorded by the state authorities has increased drastically in Sabah, with at least 131 records of elephants killed since 2010. Reported deaths are attributed to Human Elephant Conflicts and retaliation killing; poaching for ivory; poisoning (voluntary or not), accidental deaths or diseases.

Last year alone, more than 20 dead elephants were reported to the State authorities. Although the cause of death is obvious in the case of shooting or accident, between 40% and 60% of the cases remain unexplained when animals are found dead in oil palm plantations. Post mortem examinations usually reveal signs of acute poisoning but until now, no one has been able to identify if these deaths were intentional or not, or what was the causative agent. In Kinabatangan alone, a minimum of seven elephants died in 2019.

At the beginning of the year, the team, assisted by social scientists from the University Malaysia Sabah, selected three hotspot areas with high incidence of HEC outside of the Kinabatangan District to conduct preliminary interview surveys with affected communities.

Interviewed people (n=37) reported most damages on mature palms; many considered elephants as having no value and posing a threat because of crop depredation or risk to human safety. However most people recognized that they didn't really know much about elephant ecology and behavior. The majority of interviewees also agreed that they would accept to co-exist peacefully with the elephants. However for most of them, peaceful co-existence means a "land sparing" approach where people's belonging are

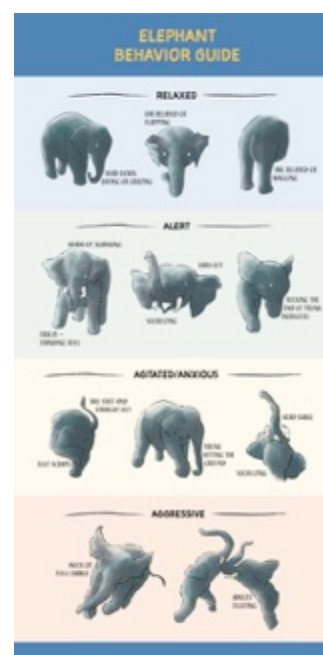


protected by electrical fences or other means, and where the animals are prevented from coming close to the villages. Most people think that elephant “belong” to the Sabah Wildlife Department and that the government should be more pro-active to address HECs. We plan to conduct more intensive interview surveys in 2020 to better understand the perception of local communities towards elephants, in order for us to design more efficient conservation actions with affected villages.



The HUTAN and Seratu Aatai teams are in regular liaison with the “Community Elephant Rangers Teams” (CERTs) that were established two years ago in Ulu Muanad and other villages affected by HEC. In 2019, more than 10 group discussions were organized in these villages. By working with CERTs, we assist the community to identify the underlying reasons of HECs, and what could be done to mitigate these conflicts. Our engagement also includes capacity building. For example, we developed and produced an

“Elephant Behavior Guide” for villagers and oil palm workers affected by elephants but who don’t know about elephant ecology. The guide was then translated in Malay and distributed during various awareness and training events. This example of brochure explains to people how to “read” an elephant and how to behave when they are close to one. Communities received very well these discussion sessions and we aim at expanding the scope of these awareness/training activities.



In December 2019, HUTAN and SA invited all CERT members in Sabah (n=20 people) to attend a five-days Seminar in Sukau. During these five days, the CERT members shared their experience and the issues they are facing in the field, and they brainstormed about how to best mitigate conflicts. In all villages with active CERTs, HECs have significantly decreased over the past two years. The last day of the “General Meeting Gajah” was spent in organizing an overall strategy for all CERT teams for 2020 and beyond.



Discussion by the CERT team members about HEC mitigation strategies



Training with villagers about electrical fencing to protect graveyards from HEC



Hornbill Conservation Efforts

Supporting viable breeding populations in
Kinabatangan

Two new field researchers from Sukau (Helson and Amidi) have now been incorporated permanently within the WSP Unit to undertake the HUTAN Hornbill Project on a full-time basis. Their efforts are supported by all WSP team members and supervised by Ravinder Kaur and her husband Sanjit, two Malaysian nationals who created GAIA, a social enterprise dedicated to hornbill conservation.

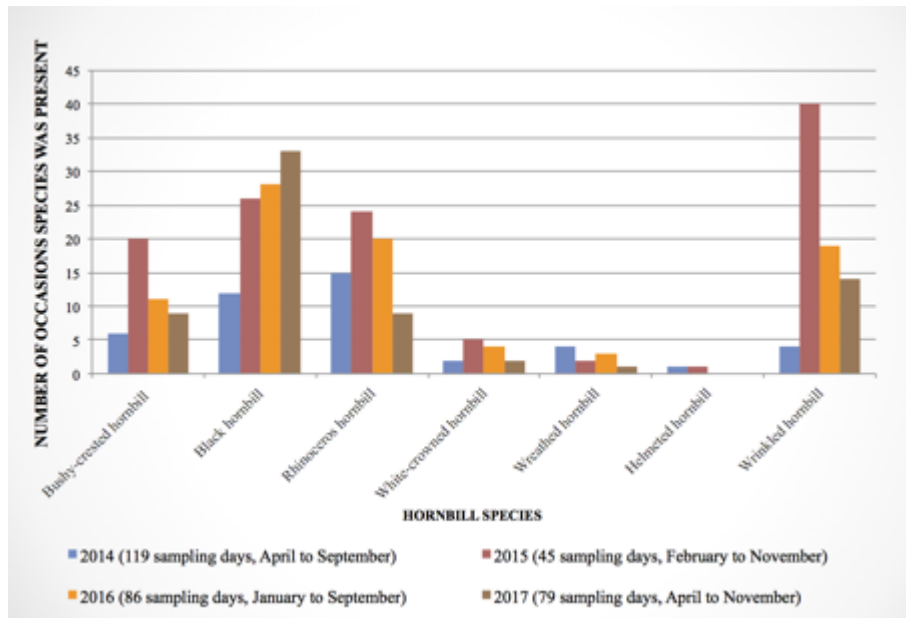


Figure 3: Bars showing the yearly number of species detection during monthly river surveys along two permanent river segments of 8 km.

Results of five years of on-going monitoring along two pre-established river segments show that all eight Bornean hornbill species are regularly spotted in Sukau area: Figure 3.

In Kinabatangan, the breeding season of hornbills occurs between May and November for all species, except for the pied oriental hornbill (December to April). From April to October 2019, the

team conducted *ad libitum* observations of 11 pairs of nesting birds to better understand the breeding ecology of hornbills: wreathed hornbills (1 Natural Nest or NN); wrinkled hornbills (1 NN but the tree fell in the river during this period and the nest was lost); helmeted hornbills (1 NN); rhinoceros hornbills (2 NN and 2 Artificial Nests or AN); bushy crested hornbills (1 NN and 1 AN); oriental pied hornbills (3 NN). To date, we have identified a minimum of 22 fruit species of plants being consumed by hornbills during the breeding season.

Our observations of the critically endangered helmeted hornbill revealed that the fledged chicks will remain in average at least six months with the parents after they have left the nest; that the chick is fed on average 11 times during the day while in the cavity; that it consumes between 900 and 1,900 g of figs every day, and that a significant proportion of the diet is provided by stick insects.

The team also surveyed 30 forest plots of 1 ha located in Lot 2 of the LKWS to assess (1) trees with cavities that could be potentially used by hornbills for breeding purposes; and (2) Ficus trees, a key resource for hornbill during their breeding season. The team identified a total of 14 trees with a natural cavity and a total of 33 Fig trees in these plots. However these cavities were located in small trees and their size was not suitable for large-bodied hornbills.

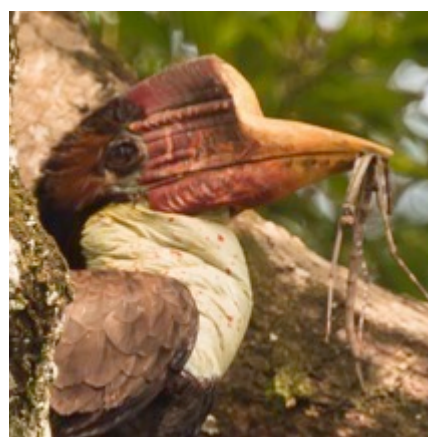


At HUTAN we are pursuing our efforts to improve breeding opportunities for hornbills by erecting artificial nest boxes. During the year, we built an additional six artificial nest boxes, achieving a total of 22 boxes erected in Kinabatangan since we started our initiative in 2014: Table 1.

No	Size	Location of Box	Tree height	Box height	Tree species
1	Big	Study site	25.8m	18.6m	Alstonia sp. (Apocynaceae)
2	Big	Back site	28.8m	19.4m	Dipterocarpus sp. (Dipterocarpaceae)
3	Big	Tenegang river	26.7m	18.6m	Dipterocarpus sp. (Dipterocarpaceae)
4	Big	Oxbow lake	27.8m	21.8m	Shorea laprosula (Dipterocarpaceae)
5	Big	Oxbow lake	16.0m	9.4m	Macaranga sp. (Euphorbiaceae)
6	Big	Danau Girang	46.6m	29.1m	Planchonia valida (Flecythidaceae)
7	Big	Danau Girang	50.8m	16.5m	
8	Big	Pangi (HHB nest)	46.2m	33.0m	Dryobalanops lanceolata (Dipterocarpaceae)
9	Small	Study site	23.5m	33.5m	Dipterocarpus sp. (Dipterocarpaceae)
10	Small	Viki (TPS)	13.3m	3.2m	Colona serratifolia (Tiliaceae)
11	Small	Malbumi(TPS)	11.2m	1.5m	Pterospermum elongatum (Sterculiaceae)
12	Small	Avecess(TPS)	11.0m	4.2m	Colona serratifolia (Tiliaceae)
13	Small	SFD	Unk.	10.0m	Alstonia sp. (Apocynaceae)
14	Small	Borneo Eco Tour	17.6m	8.0	Unknown
15	Big	Menanggol river	20.0m	7.0m	Xanthophyllum ellipticum (Polygalaceae)
16	Big	Menanggol river	25.0m	18.0m	Parinari oblongifolia (Chrysobalanaceae)
17	Barrel	Menanggol river	3.0m	15.0m	Gluta sp. (Anacardiaceae)
18	Barrel	Pangi near pangkalan	19.1m	5.0m	Pterospermum macropodom (Sterculiaceae)
19	Barrel	Danau Girang	44.8m	14.9m	Unknown
20	Barrel	Pangi Agob Sigpit	16.2m	6.0m	Aglaia sp. (Meliaceae)
21	Big	Borneo Eco tours	Unk.	17.8m	Carallia brachiata (Rhizophoraceae)
22	Big	Resig area	20.0m	12.3m	Vatica sp. (Dipterocarpaceae)

Table 1: List of all artificial nest boxes erected by HUTAN in the Lower Kinabatangan

To date, only the three nest boxes initially installed in 2014 have been used by large hornbill species. Oriental pied hornbills have used several boxes successfully, but this very common and adaptive species is not one of our target species for this program. A family of large flying squirrels is using Box 8, while several other boxes built with wood and/or plywood were colonized by colonies of stingless bees. Overall though, all artificial boxes are extensively visited by most species of hornbills on a regular basis, as shown by the pictures taken by our camera traps.



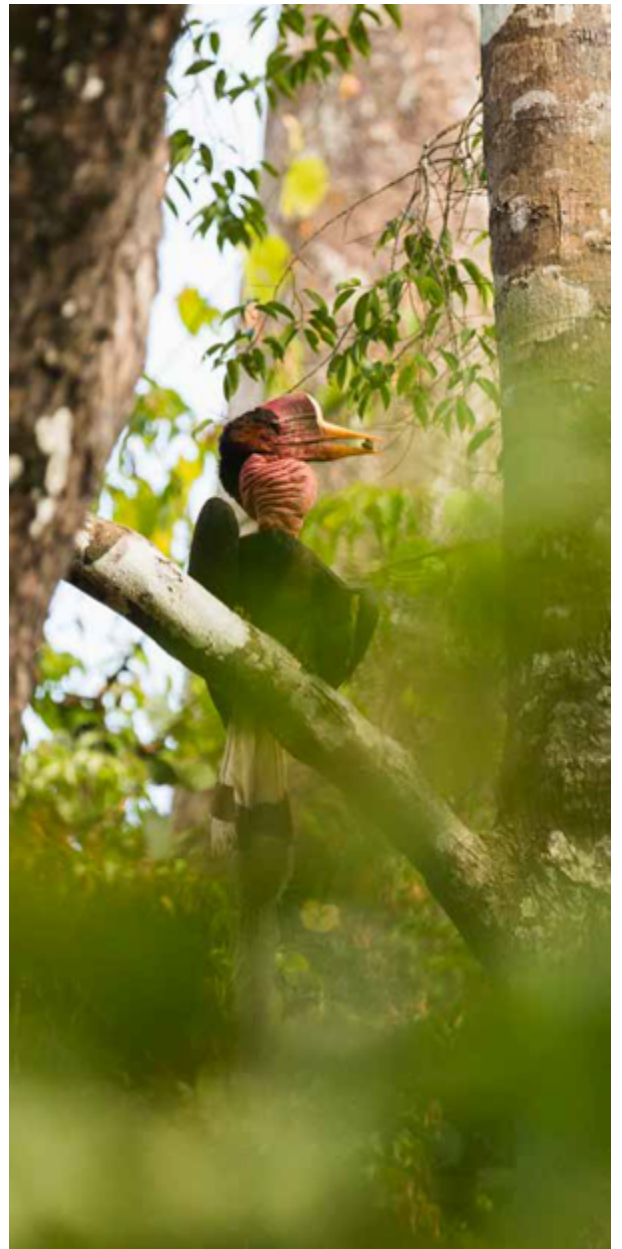
Female helmeted bringing a large stick insect to her chick



This pair of rhinoceros hornbills has used the same box three years in a row, and produced three chicks. The male is calling for the chick to exit the box.



In 2019, a family of bushy crested hornbills used one of the HUTAN nest boxes to raise their chicks for the first time.



The team: HUTAN – GAIA – Chester Zoo – Beauval Nature – Phoenix Zoo



The Pangsi Unit

Conserving colonies of swiflets

In 2009, HUTAN started the active protection of the limestone caves located in the Pangi Virgin Jungle Forest Reserve for preventing the complete destruction of the colonies of swiftlets breeding there, whose nests were overharvested by poachers.

The Unit I (13 full-time staff assisted by 12 interns) is guarding the Pangi caves 24 hours a day, 365 days a year to prevent poachers from stealing the nests and destroying the clutches of birds. Indeed, a kg of fresh wild white nests (about 70 to 80 nests) can fetch 1,000 USD, thus attracting a lot of attention from poachers. We do not harvest the nests, allowing for the birds to rise up to three clutches of one or two chicks in a year. Over the years, results of our efforts have shown a regular increase of the nests produced in the cave system of Pangi (Table 2).

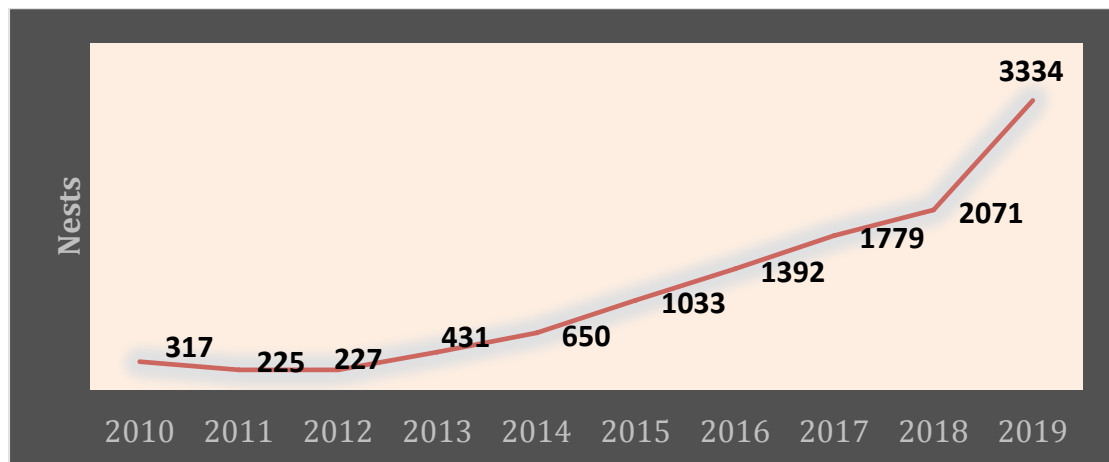
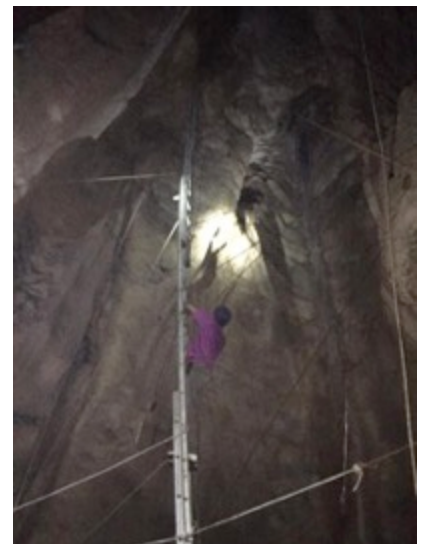


Table 2: Number of nests recorded every year in Pangi (13 caves) since the beginning of the project

Unfortunately, our success started to attract more and more poachers. In 2019, the caves were regularly raided by at least three different teams of poachers. Although we succeeded to dismantle one of these teams, and we seized illegal equipment used by these teams several times, two teams are still active despite the support of the military Tiger platoon in charge of fighting poaching in Sabah. The Pangi team assisted by the HUTAN HWWs is organizing regular patrols across Pangi but the cave system (more than 30 caves in total) is complex and offers endless opportunities for poachers to hide inside. About 1,700 nests were stolen last year.

Villagers in Sukau benefit directly from our efforts by the spill-over production of birds from Pangi caves. Indeed, some of the young adults produced by the Pangi colony are now emigrating and colonizing the farms built by local people who thus can start producing artificially farmed nests.





HUTAN Reforestation Unit
Restoring natural habitat in the most
degraded parts of the landscape

Since 2008, the HUTAN Reforestation team is recreating functional habitat for wildlife in Lower Kinabatangan by planting trees in areas with little or no natural restoration. Seedlings need a regular maintenance for at least three years to ensure maximum survival. In 2019, the 12 women of the team were still regularly attending seven plots planted between 2016 and 2018.

In early 2019, the team started to plant seedlings in the Keruak corridor (page 33). About ¼ of this corridor (or 110 acres) is covered with mature oil palms. In order to speed up the forest recovery process, the team planted 16 acres with 31,815 seedlings belonging to 29 different tree species and 18 tree families. The overall survival rate was 79.35% at the end of the year, a very encouraging result considering the exceptionally dry and hot season encountered in 2019, which is the main reason of mortality. Predators such as wild boars or deer are responsible for delayed growth or mortality, while some invertebrates can also kill seedlings (less than 10% of the total mortality rate).

The monitoring carried out by the team intends to determine what tree species are the most suited for replanting exercises within an oil palm context. We consider tree species with a survival rate superior to 75% to be good candidates for recreating forest corridors in an oil palm estate. We are particularly interested in species that are producing edible fruits for wildlife, such as *Ficus sp.*, *Nauclea sp.*, *Dracontomelon sp.*, or in fast growing species that will quickly establish a forest corridor with a semi-close to close canopy, such as *Terminalia catappa*, *Octomeles terminalia*, *Pterospermum sp.*, or *Colona serratifolia*. We are currently using 29 different tree species for our replanting exercises: Table 1. Some of the seedlings planted in early 2019 were already 3 m tall at the end of the year. The development of a diverse, complex and multi-dimensional habitat below the crown of the palms will attract an increasing number of seed dispersers such as birds or small mammals. In turn this will result in the growth of new plant species that were not included in our first wave of replanting.

Many guests are assisting our replanting efforts. The Sukau Junior rangers and children from Primary and Secondary schools in Sukau have planted more than 1,000 trees for education purposes. Children from the village are now in charge of the regular maintenance and monitoring of their plots, of course supervised by the Reforestation team (page 39). We organized several planting events with plantations workers to raise awareness about forest conservation. Many international guests from Japan, USA, France, and UK also planted one tree (or more!).



Dame Judy Dench, planting a tree with the Reforestation team at the Keruak Corridor

Tree Family	Tree species	Local name
Anacardiaceae	<i>Dracontomelon sp.</i>	Sengkuang
Annonaceae	<i>Meiogyne sp.</i>	Karai
Apocynaceae	<i>Alstonia sp.</i>	Pulai
Combretaceae	<i>Terminalia catappa</i>	Ketapang Paya
Datisceaeae	<i>Octomeles sumatrana</i>	Binuang
Dilleniaceae	<i>Dillenia excelsa</i>	Simpoh Laki
	<i>Dillenia borneensis</i>	Simpoh Gajah
Dipterocarpaceae	<i>Dipterocarpus validus</i>	Keruing Kasugoi
Ebenaceae	<i>Diospyros sp.</i>	Kayu Malam
Euphorbiaceae	<i>Croton oblongus</i>	Lokon
	<i>Excoecaria indica</i>	Apid-apid
	<i>Glochidion borneensis</i>	Obah Nasi
	<i>Mallotus muticus</i>	Mallatus Paya
Lauraceae	<i>Litsea sp.</i>	Medang
Moraceae	<i>Ficus sp.</i>	Tangkol Hijau
Myrtaceae	<i>Eugenia cerassiformis</i>	Obah Merah
	<i>Eugenia sp.</i>	Obah Putih
	<i>Syzigium fastigiatum</i>	Obah Jangkang
	<i>Syzigium malaccense</i>	Makopa
Rhizophoraceae	<i>Carallia brachiata</i>	Meransi
Rubiaceae	<i>Nauclea orientalis</i>	Bangkal Daun Besar
	<i>Nauclea subdita</i>	Bangkal Aiskrim
	<i>Neonauclea bernaudoii</i>	Bangkal Merah
Sapindaceae	<i>Nephelium lappaceum</i>	Rambutan
Sterculiaceae	<i>Heritiera littoralis</i>	Dungun Laut
	<i>Pterospermum sp.</i>	Bayor
Tiliaceae	<i>Colona serratifolia</i>	Lamba
	<i>Microcos crassifolia</i>	Kerodong Damak-damak
Verbenaceae	<i>Vitex pinnata</i>	Kulimpapa
Table 1: List of tree species planted by the HUTAN Reforestation Unit		



HUTAN nursery (3 part-time staff) is supporting the efforts of the Reforestation Team by taking care of the seedlings that are then used in our reforestation efforts. More than 40,000 seedlings originated from the KOCP nursery last year. Overall, 24,000 seedlings were acquired from 15 different local villagers. Purchasing young seedlings from villagers is a strong economic incentive for local families who volunteered to be part of our scheme. Over the last six years, these families have received more than 25,000 USD. Nestle donated to the KOCP Nursery 11,000 additional seedlings to support the Corridor Project (page 33). In this case, the Nursery team is taking care of the seedlings until they are ready to be planted in the Corridor by the estate Planting Unit.



The Nursery Team initiated the “Hornbill Regeneration Study”. Hornbill fecal samples are brought back from the forest by the Hornbill Unit, and passed to the Nursery team who is in charge of producing and propagating seedlings from seeds originating from these feces. When the seedlings reach about two feet, they are planted in a specific experimental plot and monitored closely with the aims to study seed dissemination by hornbills and to produce tree species that are useful to sustain these birds.





Wildlife Survey and Protection

Control illegal activities
Monitor and survey wildlife populations

Hosei langur (*Presbytis sabana*) spotted by the team in the forest of Pangi, a scarce local endemic (pix by Sanjit – GAIA).

The Wildlife Survey and Protection Unit, led by Eddie Ahmad, is involved in several types of field activities:

- *Law enforcement*: all WSP team members are Honorary Wildlife Wardens (HWWs): the team of wardens is led by Berjaya Elahan;
- *Wildlife monitoring*: the team is conducting regular surveys and monitoring of various wildlife taxa in Kinabatangan and other areas;
- *Human Elephant Conflict mitigation*: two WSP team members are fully working on elephant issues, while other team members are assisting the elephant unit when necessary;
- *Hornbill conservation efforts*: WSP is supervising the small hornbill unit (2 staff) and is also fully involved in several hornbill activities when necessary.



In February 2019, Berjaya organized a two-days workshop with all wardens from HUTAN and nearby oil palm plantations in order to synergize patrolling activities in the area. Patrols are done by boat, motorbike, and by car, or on foot. The team is also using drones as a surveillance tool. One of the major hotspots of intervention during the year was the Pangi Forest Reserve (see above). Indeed, several gangs of poachers have been targeting the colonies of swiflets that are breeding in the Pangi caves to steal their nests, despite the efforts of the HUTAN Pangi teams to protect these colonies. The wardens organized a series of night patrols in the area and succeeded to stop one of these gangs. However, we had to request the support of the “Tiger Platoon” from the Ops Khazanah, a special military unit dedicated to fight poaching, to try to stop the other teams. To boost their confidence, the HUTAN wardens were trained by the police to be better equipped at arresting offenders during their enforcement activities. The

wardens conducted several patrols in the LKWS to check and halt illegal small-scale logging operations, and to deter poachers from setting snares in the forest or from hunting at night.

The team installed numerous signboards to show the boundaries of the Kinabatangan Sanctuary and to warn potential offenders of the risks associated with encroachments.

The wardens also regularly assisted the rangers of the Sabah Wildlife Department to conduct raids at the Sandakan market to seize turtle eggs that are still sold illegally or to carry out roadblocks to control poaching activities. In addition, the WSP wardens assisted the Sabah Wildlife Rescue Unit (WRU) in rescuing two elephants in March and October. One juvenile male had a broken leg and died during transportation, while a calf was brought to Sepilok by WRU following the death of his mother. The team also found a young calf roaming alone in a plantation. After locating the herd, the team successfully reunited the calf with his mother. During the year, four elephants were found dead in the estates surrounding our study area. Each time, the team assisted in the investigation of the death of these



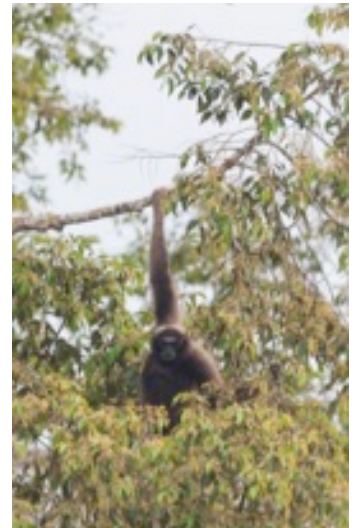
First examination by the wardens of a male orangutan found dead on the river

animals. However, the cause of death is still unknown. A dead orangutan floating on the Kinabatangan River was also found by the team. Necropsy results revealed that this animal had been shot. However the following investigation failed to identify the culprit. Last but not least, the team also assisted the “Borneo Sun Bear Conservation Center” to locate a bear released in Lower Kinabatangan. Although this individual was fitted with a radio collar, the team was unable to detect the location of the animal.

Results of primate monitoring

WSP has been conducting long-term primate monitoring in the Kinabatangan since 2005. Number of afternoon sightings of primate groups was slightly higher in 2019 compared to previous years, except for red leaf monkeys that are now extremely difficult to find in the Lower Kinabatangan. However, over a 15 years period, results of our long-term monitoring indicate a regular decline of group sightings along the river in late afternoon, especially for leaf monkeys.

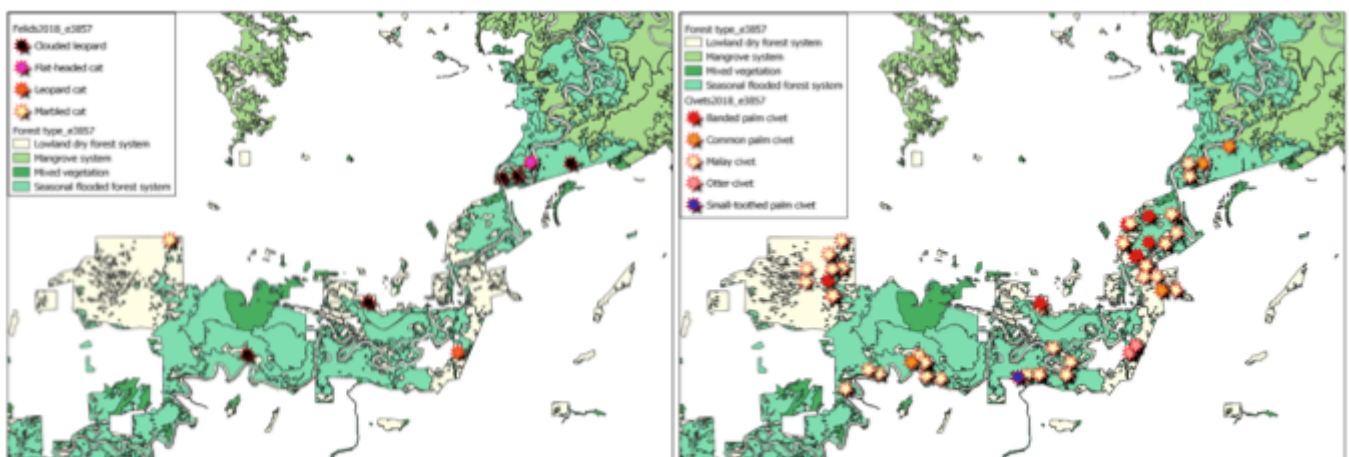
Gibbon density was estimated in Lot 2 of the LKWS in September and October by using early morning call survey. The estimated density of calling groups was 1.4 group/km², which is similar to our previous estimates recorded in 2016 (1.5 group/km²). Following the initial decline due to forest conversion to agriculture (gibbon density was estimated to range between 2 and 4 groups/km² in the 1980’s), gibbon density has stabilized at our site. However our results also show that gibbons are still declining in small and overdegraded patches of forest across Kinabatangan.



North Bornean gibbon (*Hylobates funareus*) at the KOCP Study site

Results of carnivore monitoring with camera traps

Results of our intensive camera trap study conducted in 2018 became available in early 2019. In 16 of 117 sites (14%), both cameras failed, in 26 sites (22%) one camera failed and at 75 sites (64%) we collected data from both cameras. In average, cameras were operational for 42 days (range: 0 to 66 days). Thirteen species of carnivore were detected at 62 of the 117 sites, including four species of cats (clouded leopard, flat-headed cat, marbled cat and leopard cat).



Maps showing the location of carnivore species caught on camera traps (cats on the left; other on the right)

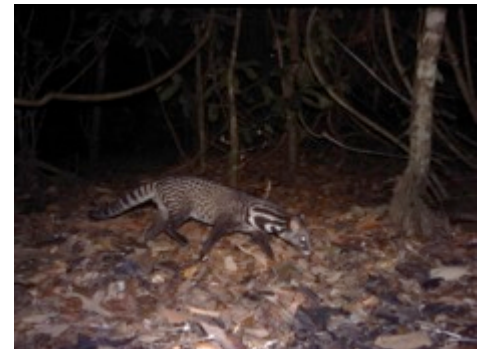
Daily detection probabilities for most small carnivores were exceedingly low. Three species only achieved daily detection probabilities > 0.025 , and could be confidently detected in deployments of 6 weeks (Malay civet, Common palm civet, Banded palm civet). Other species will need more effort. Ways to improve the detectability of rare species using camera traps include (1) increasing the number of cameras per site, and then (2) identifying and targeting preferred habitat. For carnivore species with adequate detections, occupancy models were run to assess habitat associations. The only species for which a significant habitat association was found was the Banded Palm Civet (picture on the right). For this species the probability of occupancy increased with greater distance from a river (beta coefficient = 0.532, SE = 0.26, $P = 0.041$).

Results of the Keruak (or Rasig) corridor monitoring

The long-term wildlife monitoring undertaken in the Rasig corridor aims at documenting whether forest corridors are an effective tool to sustain populations of wildlife in an oil palm context. In 2019, our aim was to establish baseline for future comparison. We also tested various techniques in terms of required resources, replicability and reliability. Detailed results of this monitoring are presented in a separate report, available upon request. As it was expected, our preliminary results for 2019 showed that species richness and abundance was higher in the forests bordering the Rasig corridor than in the corridor itself or the nearby active oil palm plantations. However many species were shown to increasingly use the Rasig corridor. This shows that even at its earlier stages, a corridor (forested or covered with palms) is an essential element to sustain the dynamic and functionality of animals' communities.

Camera traps deployed in the area allowed for identifying several orangutans regularly walking across the corridor to commute between Lot 2 of the LKWS and Keruak FR. We also captured many pictures of wild boars (low lying and flat areas), rusa deer (hilly areas) and mouse deer (everywhere).

Small mammal trapping resulted in 729 captures from 17 species. The proportion between nocturnal and diurnal species was roughly equivalent with 365 nocturnal and 356 diurnal individuals. Nocturnal species included seven rodents (Muridae: $n=360$ captures) and the moonrat ($n=5$ captures), while diurnal species were represented by 4 species of treeshrews ($n=275$) and three squirrels ($n=81$). The five most commonly captured species were the



Malay civet, a common sighting in Kinabatangan



Banded palm civet captured at night by one of our camera traps



Map showing the Keruak (Rasig) and the Pangli corridors



Wild boar, *Sus barbatus*, a common visitor of the Rasig corridor

Mueller's rat (n=196 captures), the large treeshrew (n=134), the tioman rat (n=133), the plain treeshrew (n=117), and the plantain squirrel (n=78), representing a total of 90.2% of all captures.

A total of 17 species of frogs belonging to 14 genera and five families were identified during frog surveys. More species were recorded in the forest sample areas (13 species), than active palm plantations (9 species) or Rasig corridor sampling areas (6 species). Two treatment areas were distinguished for bird surveys: 10 plots located in active oil palm plantations and 10 plots located in the forests of the Rasig corridor. The team surveyed these 20 plots twice. Overall, we recorded a total of 43 species belonging to 20 families: 43 species were recorded in the forested area, and only 18 species in the oil palm estate.

Other survey activities

The team organized rapid surveys in several oil palm estates to help locating orangutans and other Rare and Endangered Species inside the oil palm landscape. WSP is now collecting systematic road kill data along the 42 km long Sukau road with the aim of identifying hotspot areas and erecting sign boards. Monitor lizards are the commonest casualty, but mammals are also regularly found dead along the road: malay civet, common palm civet, malay badger and even leopard cat. One field expedition was organized in Tabin Wildlife Reserve to survey hornbills: one helmeted, one rhinoceros, one wreathed and one wrinkled hornbill nests were located during field activities. The team also took part in orangutan expeditions conducted in Beluran district and aerial nest survey organized in Ulu Segama FR.



Colugo or flying lemur, *Galeopterus borneanus*, spotted and photographed by the Reforestation team within the Rasig corridor

An aerial photograph showing a dense forest of palm trees and other green vegetation. A winding river or stream flows through the center of the forest, creating a natural corridor. The surrounding landscape is a mix of green and brown, suggesting a transition between different habitats. The text is overlaid on the upper left portion of the image.

Creating Wildlife Corridors

a way to alleviate population fragmentation

In 2019, HUTAN entered an official agreement with an oil palm estate located in lower Kinabatangan, covering about 8,800 ha fully planted with oil palm trees and operating a 60MT/hour processing mill within the plantation. This estate wants to explore innovative approaches for an oil palm plantation to significantly contribute to environment and biodiversity conservation.

In 2013, the estate had to undertake a new replanting phase (a rotation cycle for oil palms being about 20-25 years in average). At this time, the estate was using electrical fences, regular patrolling and use of noise cannon and other deterrent methods to mitigate elephant conflicts. However, damages were very high and costly for the company. From 2013 to 2016, out of 120,192 palms planted by the company, a total of 18,744 seedlings were destroyed by the elephants, representing about 15.6% of the newly planted seedlings (or several millions USD of net losses). In 2017, the estate changed their mitigation strategy, and experimented an inclusive (rather than exclusive) approach by opening up the fences and letting the elephants roaming freely in their estates. This change of approach resulted in a drastic decline of conflicts in the estates: Figure 4.

Year Of Planting	Planted Hectare	Palms Planted	Palms Replace / Damage	Percentage Damage
2013	84.5	9749	3256	33.40%
2014	603.6	67836	6355	9.37%
2015	143.1	17692	5886	33.27%
2016	212.3	24915	3247	13.03%
2017	205.8	26754	814	3.04%
2018	207.6	26988	469	1.74%
2019	139.7	18161	394	2.17%
Total	1596.6	192095	20421	10.63%
	Before conservation programme			After conservation programme

Figure 4: Number of palms damaged by elephants every year between 2013 and 2019

The approach favored by this estate is to try to establish a peaceful coexistence between their workers and the elephants. Several training sessions and awareness events were organized by HUTAN to achieve this goal. Following the drastic change of direction in the management of this issue, not only HEC has drastically decreased, but elephant behavior also changed remarkably. In this particular estate, elephants have become extremely quiet when they are in presence of people; they are not destroying human belongings or charging people anymore, although they still do that in other companies.

The current goals of this estate are to collaborate with various partners from government agencies, NGOs, research institutions and the private sector to achieve the following:

1. *Identify priority corridors to restore ecological landscape connectivity networks:*

About 400 ha of land covered with palms (primarily located along streams and rivers) have been set aside for conservation and excised from production area by the company.

2. *Enhance the extent, condition and connectivity of wildlife habitat:*

Corridors set aside for conservation are excised from the production area and restored by planting trees from 29 native species. Palms are maintained on site but not harvested. Seedlings required to restore the 400 ha will be purchased from local communities, which will bring an income of about 220,000 USD to the villagers. The company is in charge of planting and maintaining the reforestation area, but the HUTAN Reforestation Unit is supervising the work.

3. *Set up a long-term wildlife monitoring program to document project impact:*

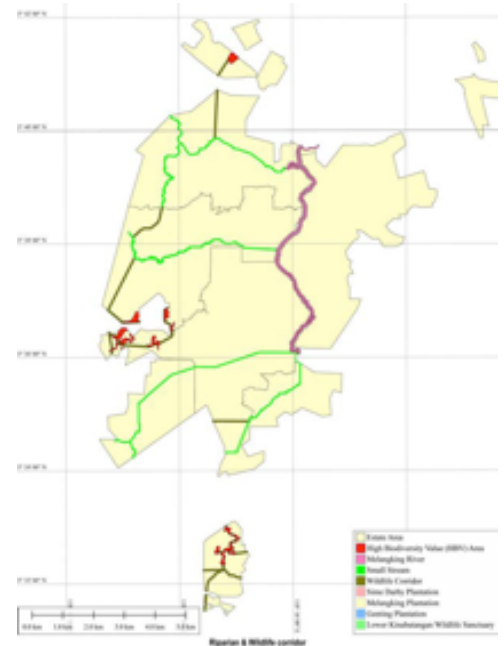
A Biodiversity Management Plan was developed during several workshops conducted between HUTAN and the estate managers. This document was approved by the owners of the company and is now guiding the long-term wildlife monitoring within the company.

4. *Enhance human resource capacity and commitment to manage and conserve biodiversity:*

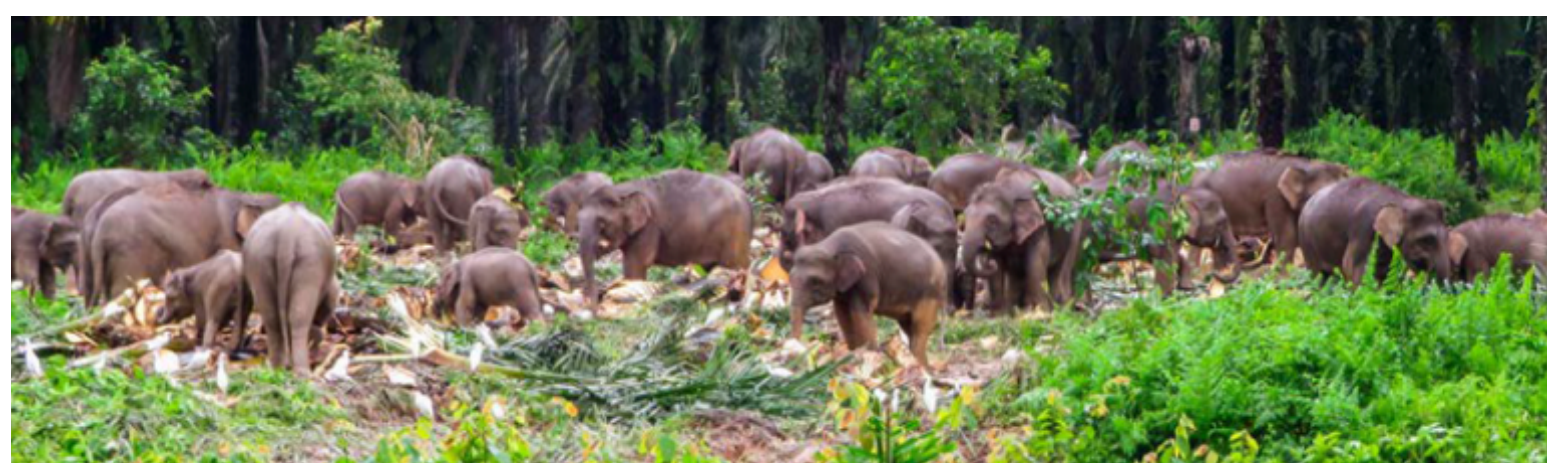
Several trainings were delivered at HUTAN HQ and on site to build local capacities. Information are collected by oil palm workers who are equipped with an ABS tool, an App that is used during their daily activities to control yield and harvesting operations.

5. *Engage and support smallholders in adopting more sustainable agricultural practices.*

6. *Explore new mechanisms for oil palm plantations to translate biodiversity conservation gains into economic gains.*



Following the completion of the Keruak Corridor, HUTAN has initiated two additional corridors: the Meninggul and the Pangli Corridors. Several pieces of privately-owned lands were purchased in 2019 to improve connectivity in the Lower Kinabatangan floodplain.



New alliances are necessary to improve chances of wildlife survival in oil palm dominated landscapes

Saving large ranging species (orangutans, elephants and many others) requires not only the creation of protected areas but also better management practices outside of these protected areas where these species disperse and roam freely. **One of HUTAN's priorities is to create enabling conditions for people and wildlife to share the same environment.**

A shift of the conservation paradigm is necessary to recognize the role of agricultural landscape to sustain rare and endangered species, to embrace strategies over large landscapes and to create new alliances to implement the necessary changes.

For example, restoring highly degraded areas is a very expensive endeavor. We estimate that at least 1,000,000 USD will be necessary over a three-year period to rehabilitate both the 400 ha and the 120 ha respectively set aside for conservation by two estates. Although in both cases, the plantation owners agreed to excise these pieces of lands from their production land bank, they are not able to cover the rehabilitation costs.



The collaboration with GENTING resulted in the completion of the Keruak (Rasig) corridor. With support for HUTAN partners, HUTAN teams are now in a position to restore the area and to start a long-term wildlife monitoring there.

An exciting development with another estate was the opportunity to expand this initiative to additional partners, such as:

- Nestle-Rileaf with free donation of 700,000 seedlings for restoration purposes within oil palm estates;
- Houston Zoo signed a MoU with HUTAN and One of the estates on Sept 19th, 2019, and allocated a yearly financial support of 50,000 USD for reforestation activities;
- Chester Zoo agreed to enter a MoU with the same estate and HUTAN to support conservation activities;
- Bunge also decided to become a financial partner for this project.



Simultaneously, these corridor initiatives have attracted a lot of attention, with the visits of the several officials from Malaysia, the French Ambassador to the Environment, members of the Saraya Corporation (Japan), USFW Services (USA), and representatives from many zoos.

Capacity building

increasing skills and knowledge to locally
manage biodiversity



Building a trust-based collaboration with government agencies and empowering selected community members in the management of their natural resources appears to be the most promising approach to securing the future of Kinabatangan. KOCP's 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, and by developing proper mechanisms where their newly acquired skills can contribute to wildlife conservation and management.

Training of Malaysian students

Syasya binti Jee Rosly, a Malaysian student attached to HUTAN, Seratu Aatai and Danau Girang Field Center, conducted her fieldwork with the HUTAN/SA Elephant Unit in Kinabatangan. She successfully defended her thesis "Bornean Elephant feeding ecology in oil palm plantations: a case study in Kinabatangan, Sabah" at University Malaysia Sabah. Ravinder Kaur finalized her PhD thesis on hornbill ecology in Kinabatangan at University Malaya. She is expected to defend her thesis in early 2020. The WSP and hornbill unit assisted Ravinder during her fieldwork.

Every year, HUTAN welcomes three to six students from UPM (University Putra Malaysia) for a six-month placement during the course of their university degree. Four students were trained in 2019: Muhammad Haziq Irfan, Kharul Iman Zulkefly, Ong Xin Yi, Muhammas Haziq Hashim. In 2018, one of these interns, Mohd Fadil bin Ibrahim decided to work with HUTAN after the completion of his placement. He is now working full-time with the HEAP team.

Amanda Shia, originating from the nearby city of Sandakan has been working with HUTAN for the past three years, following a first placement with us to obtain her BSc from a local University. In 2019, Amanda supervised the wildlife monitoring in the Rasig corridor. In September, Amanda moved to the UK to undertake a MSc on "Zoo Conservation Biology" at Manchester Metropolitan University. During her MSc, Amanda will refine her skills to conduct and analyze wildlife surveys and monitoring. Chester Zoo, MMU and HUTAN are supporting Amanda while she is pursuing her degree.

Training delivered by HUTAN

Our partners increasingly recognize HUTAN skills and request for delivering various training sessions for their own staff. For example, in 2019, HUTAN was requested by UNDP-GEF to conduct a 2-days training about wildlife monitoring strategies for 30 senior officers from various State Departments. HUTAN also conducted several training sessions about wildlife management for palm oil estate managers from several companies. Many sessions were also organized by SA and WSP to train villagers about basic elephant behavior and HEC mitigation techniques (see elephant section), or to show interested villagers how to develop and organize a local tree nursery.



Discussion about wildlife management strategies with senior officers from SFD, Sabah Parks and Yayasan Sabah



Training organized about wildlife management in an oil palm context

Training of HUTAN staff

HUTAN staff is attending regular training sessions delivered on site by professional experts, or during outstation workshops and trainings. Topics are identified by the teams and by the two HUTAN directors. In 2019, some of the training sessions attended by HUTAN staff included 5 days of remote sensing organized by Google in Kuala Lumpur (2 staff); tree climbing (10 staff, 2 days); use of the GODK (type of SMART) technology (6 staff, 10 days), accounting and budgeting (5 staff, on-going), poster and designing (2 staff, 2 days), droning (7 staff, 2 days), video editing and film making (by the Borneo Eco Film Festival, 4 staff, 4 days), photography (on-going), NDVI methodology and picture analysis (8 staff, 1 day), research methodologies (1 staff, 2 weeks), botanic and tree identification and many others.

In October, Ahbam Abulani (KOCF General Manager) and Farina followed the one-week training organized in California by the Wildlife Conservation Network about creating and managing a conservation project. This week was an amazing opportunity for Ahbam and Farina to reinforce their own professional network, to share with other field conservationists the challenges for supervising a field conservation project or for fundraising.

In November 2019 a team of French scientists from Beauval Nature and Viglife spent a week at HUTAN to train WSP staff about eDNA sampling techniques. We collected a total of 20 water samples in the Kinabatangan River and its tributaries. These samples are being analysed to assess the presence and distribution of various vertebrate species in the area. Depending on the results, this new technology will be used as a tool to monitor wildlife in Kinabatangan.

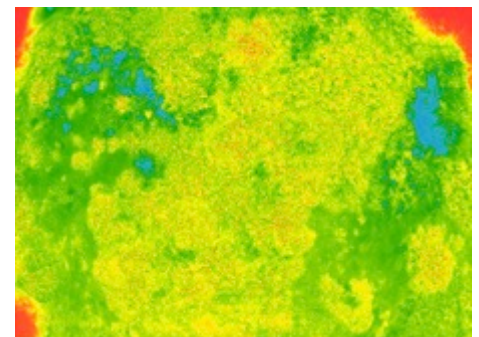
Over the course of two years, Mahadir Ratag, GIS officer working with WSP, followed the training on the Toolkit for Ecosystem Service Site-based Assessment (TESSA) delivered by “South East Asia Rainforest Research Partnership”. The course included three one week-sessions and covered the basics of ecosystem services and how to use the TESSA toolkit. For their field assignment Mahadir and Lucy Liew (from DGFC) compared the Above Ground Biomass (AGB) and biodiversity levels in the part of the Rasig corridor covered with palms and a nearby degraded forest. They established the baseline data (128 ABG kg/ha in the palm area vs 546 ABG kg/ha in the forest) and the monitoring strategy to monitor the AGB changes in the long-term.



Ahbam, delivering his presentation at the WCN Expo major event, California, October 2019



The eDNA team during field sampling



NDVI picture obtained with a drone showing areas of intense photosynthesis (red) indicating good quality plant growth.



The new Hutan Environmental Awareness Program (HEAP) Master Plan was revised under the direction of the Education Dpt of Chester Zoo. HEAP objectives are to develop a professional team of educators able to deliver first hand information about conservation, encourage the participation of the community in the management and protection of their environmental resources and to promote love, care and interest of their natural environment.



In 2019, HEAP reached out 34 schools in nine districts across Sabah, representing an audience of 10,759 students and 587 teachers. Each program is lasting from half a day to a day, and combines talks, videos, educational games and artifact display. These programmes are often co-organized with other partner organizations, including the Sabah Forestry and Wildlife Dpts, the Borneo Sun Bear Conservation Center, DGFC, WWF, Seratu Aatai and others. We take advantage of the different “Global Celebration Days” by focusing some of our events on specific messages: orangutan conservation for the “International Orangutan Day”, marine conservation for the “Turtle International day”; Pangolin Day, World Elephant day, World Environment day and so on.

All our programs are officially endorsed by the Sabah Education Department and the “Sabah Environmental Education Network”.



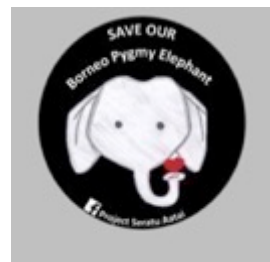
For the past three years, HEAP has also focused its efforts to spread environmental awareness in oil palm plantations. In 2019, we organized education events with ten different estates. Our messages mostly focus on peaceful coexistence between people and wildlife. We have developed specific curricula for the kids (2,132 pupils in 2019) attending the Humana schools located within the estate for palm oil workers’ children and workers (more than 1,000 people).



In 2019, HEAP developed a new concept called “Mega Konservasi” with the ultimate vision of enhancing human capital and interest to be actively involved in the conservation of local wildlife. This new curriculum was endorsed by the Ministry of Education and delivered to three schools (1550 students and 30 teachers). This program will be replicated every year in interested schools. This initiative, the first of its Kind in Sabah, generated a lot of interest and was covered in local newspapers and radio interviews. Evaluating the impacts generated by HEAP activities is part of the core values of the unit. The team is using a combination of interview surveys (before/after), behavioral scan sampling (short term evaluation during the school visits but also on the long-term with the

“Hutan Rangers”), and self-assessment to assess behavioral changes toward a more positive attitude for their environment.

HEAP, WSP and Seratu Aatai have developed specific activities about the need to protect elephant in Sabah. HUTAN and SA organized two special events for the international elephant day (19.09.19): one in an estate in Kinabatangan, and one in Kota Kinabalu (officiated by the State Permanent Secretary of the Sabah). A special logo was also designed with the motorbike community of Sabah to spread more awareness about this species. More events with this community are being organized in the State.



The Program Anak Angkat Pokok is a new program endorsed by the Kinabatangan District Education department and is aligned with the State Secondary school curriculum. We started this ten-year program in 2019 by enrolling 15 students from the primary and secondary schools of Sukau. Such a long time perspective will offer to the students the possibility to be deeply involved in theoretical and practical activities regarding sustainable management of the environment. Last year, the students searched wild seedlings in the forest, brought them back to the HUTAN nursery and cared for these seedlings for a few months before transplanting them to a specific planting area dedicated for this program. The group is now taking care of these seedlings and monitoring their growth.

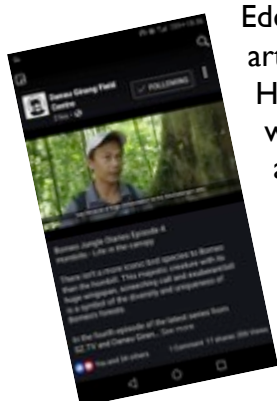


The Junior Rangers playing the Pak Lummun show before an audience of school children

The 17 HEAP Junior Rangers, aged between 8 and 17 years, focused their efforts in recycling and avoiding waste for the year 2019. They organized a Green Earth & Motivation Camp, developed their own poems songs and dances to create the story of Pak Lummun, an orangutan who is losing his forest because of the pace of human development. This show is played during festivals and major education events.

Several newspaper articles were produced and released during the year in three languages (English, Malay and Chinese), covering many topics including poaching and wildlife trade, need to establish forest corridors, hornbills and artificial nest boxes, HUTAN environmental education, threats to Kinabatangan, impacts of the Pan Borneo highway, etc. HUTAN also contributed several documentaries and video interviews, starring Dame Judy Dench, or featuring

Eddie and his leading role in the hornbill artificial nest boxes project. In France, Marc, HUTAN co-director, gave several interviews with journalists and at the national radio about orangutan conservation in agriculture landscapes and sustainable palm oil. Several public articles were also produced for the French public.





Improved policy framework

The Sabah State Action Plan for elephants was finalized at the end of 2019, following the inclusion of the final inputs received from the IUCN SSC Asian Elephant Specialist Group (see below). The Plan was then presented to the State Cabinet in early 2020 and officially endorsed by the government on February 12th, 2020. The four priority actions identified for the Kinabatangan elephant population are:

- Action 1: Prevent any process that would further fragment the habitat of the elephant population
- Action 2: Instigate a moratorium on new oil palm development within 100 m on both sides of the Kinabatangan River
- Action 3: Develop an integrated electric fencing strategy for all stakeholders active in the area (smallholders and communities, large estates, state agencies, NGOs and other groups)
- Action 4: Enforce guidelines for wildlife watching along the river.

The Orangutan State Action Plan was also finalized at the end of 2019 and will be tabled before the State government in early 2020.

The 10-year Integrated Landscape Management Plan for the forests of the Gunung Rara complex produced under the UNDP-GEF “Biodiversity Conservation in Multiple-use Forest landscape” was also finalized and endorsed by the Sabah Forestry Dpt and its partners at the end of 2019.



The Pan Borneo Highway project intends to develop a network of highways across the island to improve communication in Sabah and in the other parts of the island. However, in Sabah, the current road alignment will cross through at least two major elephant ranges. All environmental NGOs and concerned groups in Sabah gathered in the “3H Coalition” in order to inform the government about the risks posed to the long-term survival of the species in the State if this Plan is pursued. We also propose ways to mitigate the possible impacts of this project on wildlife. Several meetings and discussions were held with various representatives from the road industry, the government and affected communities. A series of reports analyzing this situation was also developed and widely circulated.



With the results of our work, we are trying to influence the palm oil industry and its political framework toward better practices. We finalized several documents such as “Standard Operating Practices for Managing Elephant Corridors within Plantations”, or “Biodiversity Management within Plantations”. Several meetings and discussion were organized with the Federal ministry of Agriculture and palm oil certification bodies (RSPO and MSPO) to encourage better production practices.

The Sabah Elephant Task Force (including HUTAN, Seratu Aatai, DGFC, BORA and WWF for the NGOs; the Sabah Forestry and Wildlife Dpts for the government) met twice in 2019. The State Permanent Secretary chaired each meeting. This Task Force is in charge of issuing recommendations to the government for managing elephants in Sabah. One of the most urgent issues is to identify the cause of elephant mortality in oil palm plantations.



The 10th IUCN SSC Asian Elephant Specialist Group Meeting was organized in Kota Kinabalu on December 04th to 06th, 2019. During three days, more than 110 representatives from all Asian elephant range countries debated about elephant issues and threats, population trends and monitoring, policies and etc. Half a day was spent discussing the current elephant situation in Sabah, and some of the inputs of the discussion were inserted in the Elephant State Action Plan. The HUTAN Education team animated a booth that was visited by the Ministry of Tourism and Environment as well as by the public during the course of three days.



Other international events attended and contributed by HUTAN staff included the two-days workshop organized by the IUCN SSC Helmeted Hornbill Task Force following the ICPB Conference in Kuala Lumpur, the Conservation Committee Meeting of the European Association of Zoo and Aquarium (Hutan became a member of the Task Force on sustainable agriculture for EAZA), the Conference of the French Association of Zoo and Aquarium (during which a statement supporting certified palm oil was endorsed by all participants), the Third Country Training Program, the Consortium Study on Small Holder Palm Oil, PONGO Alliance meetings, RSPO Conference, and many more.

Disseminating the results of our conservation and research activities is an essential part of our efforts to influence policies and decisions taken in Malaysia and globally. In 2019, we published the following scientific articles in peer-reviewed journals (these articles are freely available from the net or upon request):

- Santika, T., Wilson, K.A., Meijaard, E., Ancrenaz, M. 2019. The power of mixed survey methodologies for detecting decline of the Bornean orangutan. *Ecological Modelling*, <https://doi.org/10.1101/775064>
- Morgans, C.L., Santika, T., Meijaard, E., Ancrenaz, M., Wilson, K. 2019. Cost-benefit based prioritisation of orangutan conservation actions in Indonesian Borneo. *Biological Conservation*, <https://doi.org/10.1016/j.biocon.2019.108236>
- Kaur, R., Singh, S., Ramli, R., Hassan, H., Mjinun, A., Ancrenaz, M., Ratag, M., Rauf, H.A., Jamal, J., Rauf, A.S.A., Yunus, M.D.M., Arbani, M.A., Asmar, K., Amir, M.A. 2019. Observations of a nest of Helmeted hornbill *Rhinoplax vigil* in Borneo, Malaysia. *Forktail*, 34: 68-73.
- Seaman, D.J.I., Bernard, H., Ancrenaz, M., Coomes, D., Swinfield, T., Milodowski, D.T., Humle, T., Struebig, M. 2019. Densities of Bornean orang-utans (*Pongo pygmaeus morio*) in heavily degraded forest and oil palm plantations in Sabah, Borneo. *American Journal of Primatology*, <https://doi.org/10.1002/ajp.23030>
- Simon, D., Davies, G., Ancrenaz, M. 2019. Changes to Sabah's orangutan population in recent times: 2002-2017. *Plos One*, 14(7): e0218819. <https://doi.org/10.1371/journal.pone.0218819>
- Santika, T., Wilson, K.A., Meijaard, E., Budiharta, S., Law, E.E., Sabri, M., Struebig, M., Ancrenaz, M., Poh, T.M. 2019. Changing landscapes, livelihoods and village welfare in the context of oil palm development. *Land Use Policy*: 87. <https://doi.org/10.1016/j.landusepol.2019.104073>
- Othman, N., Goossens, B., Cheah, C. P. I., Nathan, S., Bumpus, R., Ancrenaz, M. 2019. Shift of paradigm needed towards improving human–elephant coexistence in monoculture landscapes in Sabah. *International Zoo Yearbook* 53. DOI: 10.1111/izy.12226
- Burke, C., Rashman, M.F., Longmore, S.N., McAree, O., Glover-Kapfer, P., Ancrenaz, M., Wich, S. 2019. Successful observations of orangutans in the wild with thermal-equipped drones. *Journal of Unmanned Vehicle Systems*
- Padfield, R., Hansen, S., Davies, Z.G., Ehrensperger, A., Slade, E.M., Evers, S., Papargyropoulou, E., Bessou, C., Abdullah, N., Page, S., Ancrenaz, M.,...Struebig, M. 2019. Co-producing a research agenda for sustainable palm oil. *Frontiers in Forests and Global Change*. <https://doi.org/10.3389/ffgc.2019.00013>
- Robins, J.G., Husson, S., Singleton, I., Nowak, M.G., Fluch, G., Sanchez, K.L., Widya, A., Pratje, P., Ancrenaz, M., Hicks, N., Goossens, B., Petit, T., Saburi, R., Walzer, C. 2019. Implanted radio telemetry in orangutan reintroduction and post release monitoring and its application in other ape species. *Frontiers in Veterinary Science*, 6: 111. DOI: 10.3389/fvets.2019.00111
- Santika, T., Wilson, K.A., Budiharta, S., Law, E.A., Poh, T.M., Ancrenaz, M., Struebig, M.J., Meijaard, E. 2019. Does oil palm agriculture help alleviate poverty? A multidimensional counterfactual assessment of oil palm development in Indonesia. *World Development*, 120: 105-117. <https://doi.org/10.1016/j.worlddev.2019.04.012>
- Davies, A.B., Oram, F., Ancrenaz, M., Asner, G. 2019. Combining behavioural and LIDAR data to reveal relationships between canopy structure and orangutan nest selection in disturbed forests. *Biological Conservation*, 97-107. <https://doi.org/10.1016/j.biocon.2019.01.032>
- Runting, R.K., Ruslandi, Griscom, B.W., Struebig, M.J., Satar, M., Meijaard, E., Burivalova, Z., Cheyne, S.M., Deere, N.J., Game, E.T., Putz, F.E., Wells, J.A., Wilting, A., Ancrenaz, M., Ellis, P., Khan, F.A.A., Leavitt, S.M., Marshall, A.J., Possingham, H., Watson, J.E.M., Venter, O. 2019. Larger gains from improved management over sparing-sharing for tropical forests. *Nature Sustainability*, 2: 53-61. <https://doi.org/10.1038/s41893-018-0203-0>
- Salgado-Lynn, M., Jalil, M.F.B., Chikhi, L., Ancrenaz, M., Ambu, L., Bruford, M.W., Goossens, B. 2019. Landscape genetics applied to conservation of primates in flooded forests: a case study of orangutans in the Lower Kinabatangan Wildlife sanctuary: ecology and conservation. In *Primates in flooded habitats*: pp. 298-306. DOI: 10.1017/9781316466780.039

We also finalized and shared widely a report investigating how we could improve orangutan conservation strategies in Borneo. This report entitled “*Envisioning a future for Bornean orangutans – Conservation impacts of Bornean action Plan implementation and recommendations for improved population outcomes*”. With our partners from Borneo Futures and Wildlife Impact, we are currently preparing several peer-review scientific articles based on this report as well as a financial analysis of orangutan conservation strategies.



In 2019, donations received to support HUTAN conservation activities originated from:

More than 50,000 USD:

Arcus Foundation – Houston Zoo - North England Zoological Society (Chester Zoo) - World Land Trust - Zooparc de Beauval

25,000 - 50,000 USD:

Basel Zoo - Intrepid Travel foundation* - Synchronicity Earth –The Orang-utan Project - USFW Services - Utah Zoological Society (Hogle Zoo) - Woodland Park Zoo - Wildlife Conservation Network*

5,000 - 25,000 USD:

Arizona Conservation Center (Phoenix Zoo) – AZA Orang-utan TAG – Berit Durler - Cheyenne Zoo – CGMK Foundation - Cleveland Zoological Society – Columbus Zoo - Feralis (Univet Nature) – French Embassy - Mirai Foundation - Nashville Zoo – Oregon Metroparks Zoo – Saint Louis Zoo – Sudie Rakusin –W World Women Work - Wroclaw Zoo - Zoo la Palmyre

< 5,000 USD:

Apenheul Zoo – Campbell Foundation - Finley Foundation – Poppy merchandising - SECAS – Toronto Zoo

List of private donors who supported HUTAN via WCN and Intrepid Travel (>250 USD): Sean Caufield, Beverly Chan, Sandra Farkas, , Gilman Family Foundation, Jones Craig, Stephan Meyers—Ewald, Jeffrey Morris, , Terry Potts , Brigitta Schurmann, Anne Schukat, Edward Swart, Bob Worth. HUTAN wants to express a special thanks to Niklaus Gutjahr.



Pictures from KOCP, Sanjit, Jeremy, Gabriel, Nicolas, Ollie and KOCP friends