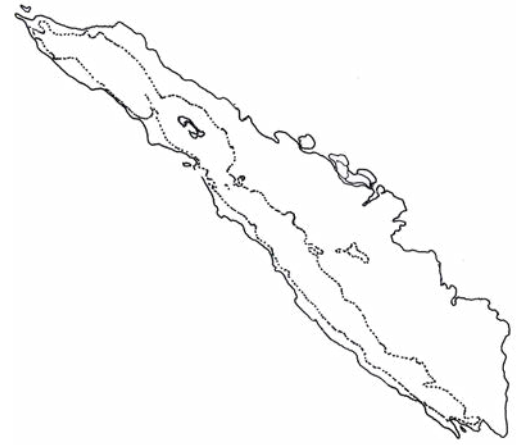


The
Sleeping
Tree





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Introduction

The Sleeping Tree is a long form, immersive, sound and light experience that will premiere at Brighton Festival in 2021.

The Sleeping Tree creates an evolving biome constructed from water, light and highly immersive sound. Through long-form capture processes the work asks you to be inside the forest and let it seep into you, become lost and drift inside one of the planet's most important ecosystems.

Mist gently falls around the audience, surrounding them in vibrant projected 3D digital images: millions of point clouds abstracted into washes of watercolour and unpredictable structures of light accompanied by captivating and intricate sounds of the jungle.

The Sleeping Tree traces a journey through the siamang habitat, using a month long sound capture to listen to their movements and calls across a vast section of forest in Sikundur, Sumatra.

Siamang sleep in specific sleeping trees each night, these trees are chosen for their height and safety and returned to by families for generations. Working with our colleagues from LEAP (Landscape, Ecology and Primatology) we have used research and location data gathered on "sleeping trees" and "calling trees" for a specific group of siamang as a map to record this section of forest over one month.

The sound capture comprises of two techniques; custom recording units we developed and called the OFR (open field recorder) that can be left in the jungle for long periods of time and record high quality stereo sound and secondly Invisible Flock spent just under a month working with local experts to track the siamang using directional and ambisonic microphones. During our stay in the forest we captured long, high density point clouds (LiDAR scans) which will make up a large part of the visual dimension of the installation. These scans are micro precise, and have a very digital quality.

We wanted to use an organic material to show back these imprints of the forest, and to bring them to life with an unpredictable element. Using fine layers of water mist as the final lens to view the work these highly digital scans become soft water colours, abstract and fragile. We wanted this visual impression of the forest to fire the imagination, to conjure a thousand versions of the forest lingering in a shadow or a gust of wind making you question whether an animal is watching you in the canopy, the sense that you are never alone.

The work is durational and mapped to the one month capture, so is never the same twice, you might arrive at night as the frogs start their night chorus, or early in the morning as the birds sing eclectically, if you are lucky you will hear the siamang dueting overhead, or a male orangutan warning you off. To really hear the forest, you have to spend time in the forest, nature doesn't perform for us, it has its own cycle, so many individual cycles at play in the chorus of the forest, what you hear or stumble across is always spontaneous even when tracking.

In the installation you will find the voices of elephants, pigs sneezing, hornbills calling, siamang over many miles dueting, orangutans kissing the air, gibbons chirping, frogs, cicadas and too many more to mention. It has been one of the biggest honours of our career to spend time in the Leuser Ecosystem working closely with the incredible people who fight to protect it and we hope that you can be entranced by it and get lost in it just as we have.

I will let my collaborators in this publication explain why this place is so magical and why we must, must ensure that this ecosystem thrives. We can't wait to bring this work to you all in the near future.

Victoria Pratt - Creative Director Invisible Flock



Ardian Syah and Ali Prestiono out on ranger patrol.



Young boy and his father travel by small boat across the river in Sikundur.



Forum Conservation Leuser (FKL) ranger in the forest near the Conservation Response Unit.

An Interview with Rudi Putra

The Leuser - living together with the forest

Tell us about the Leuser Ecosystem

The Leuser Ecosystem is the largest remaining forest in SouthEast Asia, 2.6 million hectares, and around 2.2 million hectares in Aceh. 1.8 million hectares in the Aceh province is still beautiful forest, two times the size of the Yellowstone National park in the US. The area is very important to our communities because 4 million people live here. The wildlife and biodiversity is the highest hotspot for biodiversity in the world. There is a lot of encroachment here from logging and poaching, but we can see that in the last few years the number of illegal activities is decreasing. Thanks to the Government and NGOs working together, 80% is still beautiful forest, our challenge now is how we keep and save this forest.

There are many ways we are attempting to do this, the first is restoration. Our patrol covers almost 75% of the Leuser in Aceh, In 2013 we started ranger patrol and opened monitoring units, we operate two research stations, two monitoring stations and one conservation response unit. In total across six of the restoration sites, we employ around 270 local people, mostly rangers working to protect the forest. We also work with the communities, and with other NGOs, working together to save the Leuser. We developed a system, where we can work together and

develop the community's livelihood. The next very important thing is how we can involve government in handling conservation in Aceh, this is a big challenge for us, but over the last year we can see a change in the government and how they care about the Leuser, the government published their commitment to giving no new commercial permits in the Leuser Ecosystem, and Aceh province, as well in regards to mining, logging and palm plantations.

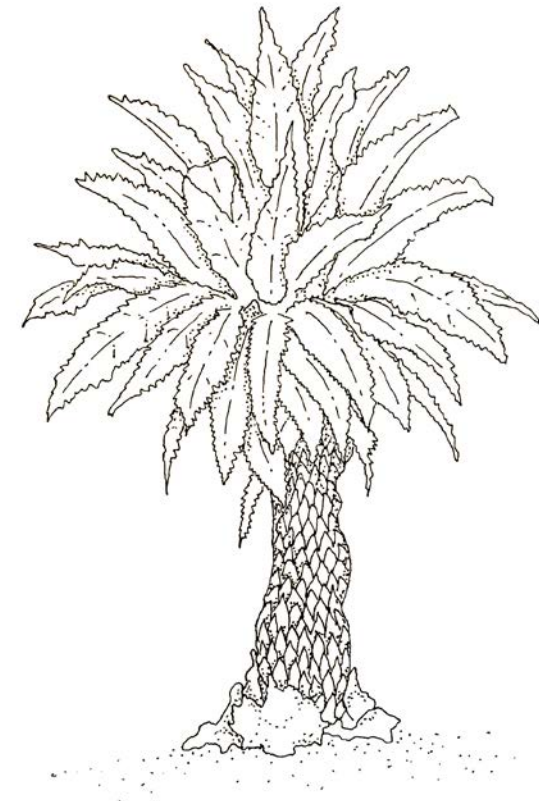
How is palm oil production affecting the forest?

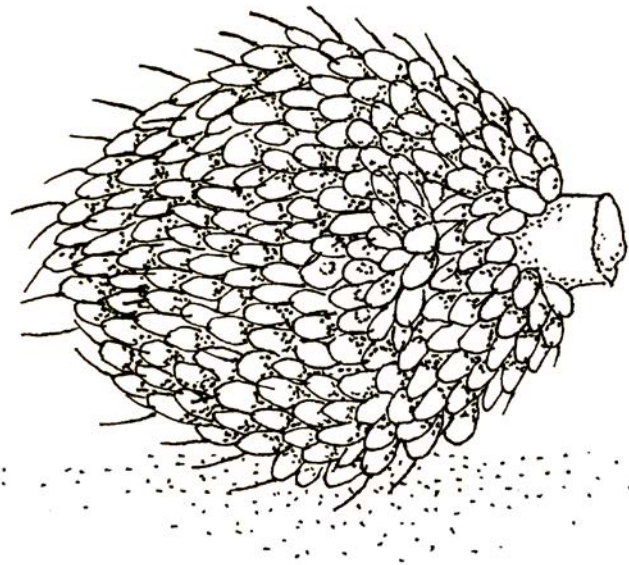
The growth of palm oil plantations is one of the enemies in Aceh but not all of the palm oil is bad, many companies manage production very well, there is no deforestation, those plantations were planted 100 years ago. They care about the community, they care about their labour, they care about their environmental impact, not all of the palm oil is bad. But some of them are from bad companies, they encroach the forest, and some of the small holders encroach on the forest. We work together to stop the deforestation, and work with the companies to care about the remaining forest in the Leuser Ecosystem, through this collaboration I believe we can save this forest, through demarcation, where it is good for the palm oil for the communities, where it is good economically and where they can plant palm oil.

Through spatial planning it must be clear where the plantations are and where the forest starts. What is essential is that we protect the remaining forest, all of the remaining forest, that there is no more available for palm oil, no more for mining, there is no more for logging, If Aceh right now has 600,000 hectares of palm oil this must be enough, what we have to do is increase the productivity of the palm oil, we don't need to expand the palm oil area just improve productivity like other countries like Malaysia where it is higher than Indonesia.

What is FLK's plan for restoring the forest?

We have started negotiations with local people about purchasing the land for a very important elephant migratory corridor. The plan is for us to restore the forest, the communities can manage this land but not for palm plantation. There are so many species and so many trees that we can plant on this land, this benefits us and the community as well, growing things like Durian for example, a very expensive fruit.





Elephants can live in Durian plantations, this is the solution to how the economy can grow, without destroying the forest. Our target is to secure the corridor for the entire Aceh province, right now the most important population of the elephants are in this district, around 250-300 individual elephants still in this area but the problem is there is no connecting land in the North and South area which is why we need to establish the corridor, to help the movement of the long term population of the elephant. If we lose the elephant we have lost so many things here.

What is peoples relationship to the forest?

In Aceh the communities are very very close to the forest, yes they are cutting the trees, but this is not commercial, this is for their houses and this has little impact. But when the commercial cutting happens and the communities cut down the trees and sell to the market then this is a big problem. Many years ago the Aceh communities were planting with many trees in their plantations, and they survived, because we don't need too much land for our survival, but the problem is the commercial economic drive. But many people in Aceh believe we can still live together with the forest, and protect the biodiversity of the forest, because they deeply understand that if there is no forest, there will be no water, if we don't have water, we cannot live. In many, many places, we can see

many of our staff are from the local community who are willing to work to protect the forest, even though what they earn is less than if they worked with the plantations. But this is about what they feel they can contribute to protect the environment, their ecosystem.

What are the success stories? How can we be optimistic

Until 2005, big logging companies were active in almost the whole of the Leuser Ecosystem. Hundreds of trucks, big trucks, bringing thousands of logs everyday in this area, but today we can see that it is difficult to find a logging truck here. This has made me very optimistic, that we can stop all destruction in this area. A couple of years ago, it felt like restoration was impossible in this area, but today we restore thousands of hectares, and we take over hectares working very closely with companies that are willing to support conservation. A few years ago there was no single company that cared about the environmental impacts of business, but today we can see they care about the elephant, they contact us if an elephant is injured or snared close to their plantation, or sighted by the communities. Another thing is government support, we are still struggling but we can see how the local government does care about the forest. Many heads of districts have declared they will stop illegal activities. I am optimistic.

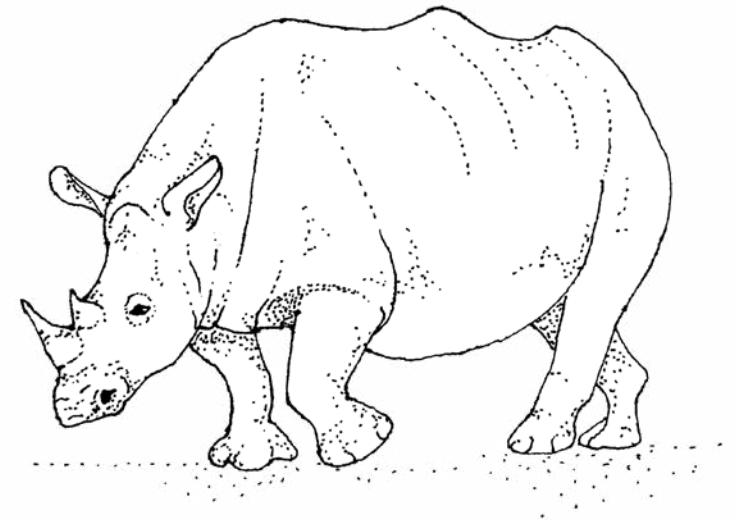
Durian fruit is distinctive for its large size and strong smell, a local delicacy for people and animals alike.

Why does the Leuser matter?

We all need oxygen to live, if we lose the forest the impact is not just on people here it impacts on everyone around the world. One tree everywhere is important. We are all responsible to protect even one single tree, this is not just the local people's work but all of our responsibilities. Further to this what we all eat right now is not just from local production, we have many foods using palm oil, we consume huge amounts of rice, many sugars, rubber, they are not local and they export to many many countries. We have to care about what we consume and how we use our resources, we have to protect them. We have to control our consumerism, we don't need to eat all things in the world, we don't need to buy all things in the world, what we eat is relevant to the environment, when we eat more it means the farmer needs more production which means they need more land, more fertiliser, we need to control how much we consume. We have enough to sustain our global population but we need to address what we think we need.

Rudi Putra is the Chair of Forum Conservation Leuser (FKL). The NGO patrols, restores and works with local communities and law enforcement to stop illegal wildlife poaching, palm oil plantation and destructive logging in the Leuser Ecosystem.

The Sumatran rhino is the smallest of the surviving rhinos, there are less than 80 remaining worldwide.





Towering trees of the rainforest in Sikundur.



Victoria LiDAR scanning two female elephants, Lia and Noni, at the Conservation Response Unit in Aceh

Ben interviews Rangers from Forum Conservation Leuser on the work they do to protect the forest



Sumatra, Jan-Feb 2020

A personal dispatch

I started writing this when I found out Salma was ill and continued once I heard she had died. I am coming to the end of my time here on the edge of the Leuser Ecosystem, a remarkable and fragile place, where elephants, tigers, rhinoceroses and orangutans still roam in the wild. It is one of the planet's remaining great forests.

Except we are not allowed in. We are here to record, watch and capture. This is what we find ourselves doing as artists who have moved to exist in a hybrid space where the large scale digital art we make co-exists with direct and important conservation work happening on the ground. Indonesia protects its remaining forests jealously. There has been a surge over the past years in top down led reinforcement of the already severe bureaucracy that hangs over these spaces. The academics and NGOs we work with on the ground, both Western and Indonesian are all finding operating here harder and harder with less and less room to manoeuvre and act. Taking this on face value makes the process feel incredibly self defeatist, by looking to protect and focus research onto local institutions and individuals the forest authorities are in effect reducing the power and potency of decades of experience and knowledge. It manifests as permits that never quite arrive, police checkpoints, being told to not visit a local village.

The words for your own safety never clarifying who it is we are being protected from. This also leads me to be less generous with the assessment and to suspect a darker deeper motive which sadly would merely mean they are keeping pace with the retrenchment and fear of openness and scrutiny we are seeing playing out the world over.

There is an invisible barrier, which seems to remain largely porous for scooter riding fishermen and hunters, stops us from setting foot into the park under a real risk of a substantial fine maybe even prison and a nightmare of broken relationships for the NGO who had attempted to act as facilitators of the permits that never appeared. In the end our SIMAKSI allows us across the line but with no equipment, not even a camera. So instead we stalk the edges. The liminal space where plantation and village ends and primary forest begins.

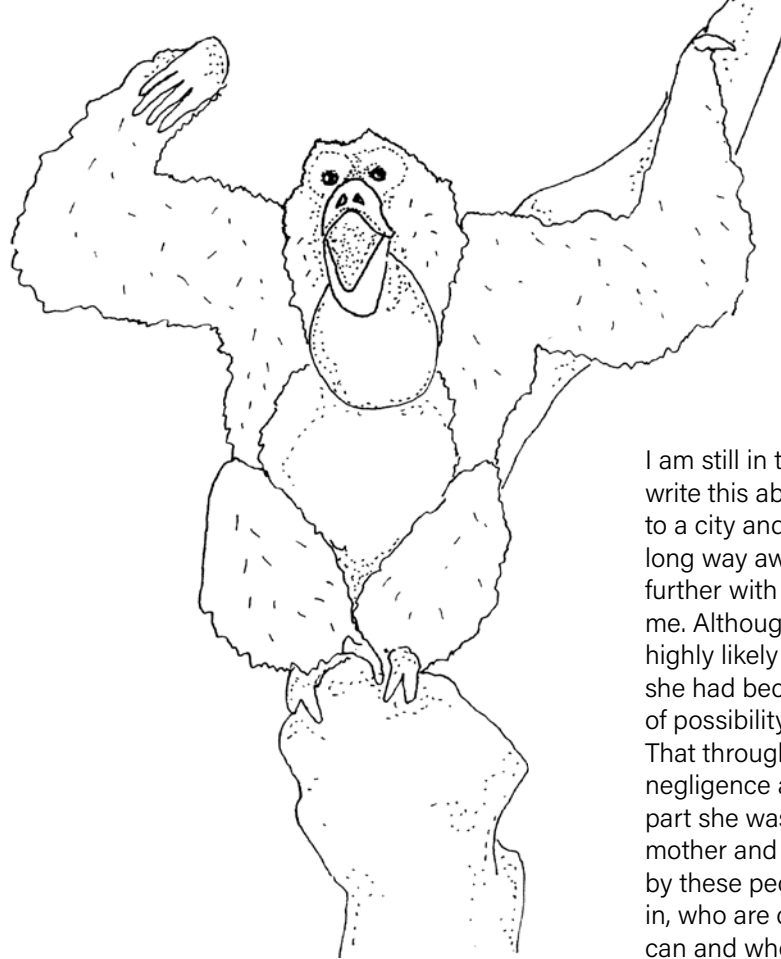
We are here for siamang, a particular species of gibbon. They live in the forest and have a couple of crucial features both of which are the focus of a new piece of work we are making. The first is that they only sleep in certain trees with a particular set of characteristics, and groups historically have a set number of these sleeping trees that they keep in rotation. so firstly we are here to scan these trees with a LIDAR to turn them into beautiful ghostly 3d images.



The second of their unique behaviours is their song. A unique unmistakable song that they sing some mornings from a whole different set of trees to mark territory. They roam around the forest, changing trees, changing areas, and some mornings they sing and some they don't.

It will take me 19 days of sitting largely silent in the forest, making myself small under canopy, using GPS and luck until on the last morning we eventually capture their sound in the trees directly above us, a group of three and a lone female sing back and forth at each other for 35 minutes. It had been a process of patience of local knowledge gained from the land shared to me by my guide Ucok, a technical challenge also. This writing was going to be about all of this, about how this process intersects and asks interesting questions about how we participate and visualise species and conservation, it was going to be about the piece we are making. And then we found out that Salma had died.

Salma is a baby elephant we have written about before. She was rescued by Leuser Conservation Forum (FKL) manned on the frontline by an amazing group of young men who literally risk their lives for the forest they were born in. They found Salma injured at the bottom of a cave where a wire snare had caught her. Her herd had moved on leaving her. The team extracted her back to their camp by jeep and boat and for the past 6+ months had been nursing her to health. Vic went to visit them leaving me in the forest, partly to do some more scanning of the other rescued elephants they have at the



CRU (Conservation Response Unit) but also to see Salma. She was ill when she saw her, thin. Baby elephants struggle away from their mothers, but she had overcome so much already, a major injury and infection, the sheer trauma of it all. She had been ill but was up on her feet, Vic played with her. She was getting better. She was supposed to make it. We wrote about her as a beacon of hope for us coming out of the shitshow that was 2019. The frustration comes in not knowing, not being able to understand exactly what happened, where it went wrong, what could have been done.

I am still in the jungle as I continue to write this about to face traveling back to a city and then onwards to home a long way away. Home somehow now further with Salma's death propelling me. Although it was always statistically highly likely that she would not make it she had become like a sort of beacon of possibility, like maybe she would. That through this horrible act of negligence and violence on someone's part she was separated from her mother and her herd but was found by these people who have taken her in, who are caring for her as best they can and who in the process have not only saved her, but have galvanised people around the world to care about this forest, its animals and also helped some of the healing process for two other female elephants who live at the Conservation Response Unit themselves broken in their own ways.

In all of this as ever it is the effect of man pushing up against these animals that leads us to where we are. Hunters looking to catch, let's be generous, deer or a pig end up snaring a baby elephant. I can't replay the scene in my head of the moment her mother left her as I find the whole thing just too heartbreaking to think about.

What is hope for an elephant, what is grief. We know they feel it. Her mother, still out there, wild, does she think of her sometimes?

I did not go to see her, Vic went. We can only chat through intermittent whatsapp messages out in the field. The story we had told ourselves was one where she was healthy, recovering, the visit was in part supposed to chart this recovery, and it took me a lot to shift myself to a mindscape to accept that she was ill. In the first draft of this, when she was just ill, I simply wrote that I was scared. Scared that she may in fact die. Animals die. People die. Last December a ranger for FKL died on patrol. I read his epitaph they posted online and the sentence 'He fell to save the earth' moved me to tears. I think I felt in my heart that Salma surviving would have been some sort of testimony to what we can still save. What care for a place and its creatures can do. But maybe that's too rose tinted and reality is more complex. Salma is an individual and to quote the books, we will never see her like again. She is a subtraction from an already small number that holds an entire species within its three digits. Perhaps emotionally we can't cling onto individuals, we need to cling onto species, but it's surprisingly easy to only see elephants as individuals when there are so few left. Dunbar's number which is a theoretical number of the amount of people our brains can keep track of emotionally is set at about 150, which means I could in theory know and care personally about nearly half of the individual remaining elephants in Aceh.

That's the kind of numbers we're talking about. Why was she ill? I don't know. Asian elephants in 'captivity', which for lack of a better term she was, have a mortality rate as high as 40%. Does this apply here? I don't know. Perhaps she needed the kind of nutrients and health that can only be found in a mother's milk, perhaps this was impossible from the start, perhaps there was something underlying it all, perhaps this would have happened no matter what, perhaps mistakes were made, perhaps the trauma was too much, perhaps she died of the broken heart like people say baby elephants do, perhaps if local state politics and pride hadn't prevented her being transferred to a sanctuary, perhaps it was just bad luck, perhaps those odds were too stacked against her. Just another animal caught up in the churn of a human world she could only ever glimpse. I take some comfort that she died surrounded by care and love rather than on her own in a pit. She slipped away watched over by Endang, her favourite keeper.

And perhaps dying surrounded by love is sometimes the best we can hope for. It makes me think about what we are doing here. I have spent 19 days tracking siamang in a forest. Trying to get a glimpse and record these animals in their natural habitat whilst we still can. Why? I was asked recently what is the direct impact of what we do, the legacy. A question full of traps and dead ends, as if we alone through a single piece of work could spark longitudinal behavior change throughout an entire community. I have been talking a lot about how our work is looking to exist at a place where the actions of conservation and

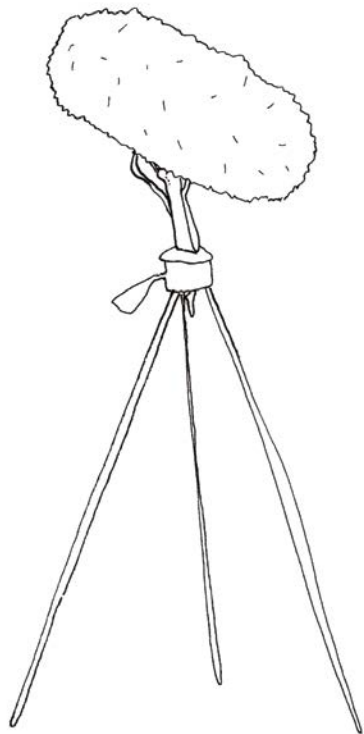
the making of art intersect to play an active role somehow in preserving and maybe even saving these habitats. How is what I am doing contributing to this? What did I actually do to help Salma. I met her, I played with her, I photographed and recorded her. I told people about her, I carried her in my heart back across oceans and continents. To quote another book I gave her all the blessings I could and she gave me all that she could in return, and I hoped desperately we would be telling a different story. And I hoped that story was one we could tell, and keep telling and that perhaps that would be a thing that mattered, to be in the orbit of an animal like her and all that she holds. I don't know how I thought this would end. Our project would finish and she would grow into a full elephant. Perhaps return to the wild, and maybe 10, 20 years from now I would have thought about her and this rainforest that would hopefully still exist in some capacity and know that she might be roaming it with calves of her own. This did not happen. It was not meant to be, the hunter's snare caught up with her eventually.

When I was a child one of the major sledgehammers to the wall of my childhood religious beliefs was a school catechism teacher (I went to a catholic school) telling us that a classmate's dog would not be waiting for her in heaven. I was furious. I still am. Well fuck her. I went to the forest and did what I could. I found a track that elephants cross by some water, lit some leaves (safely) to release the bits of her spirit that I held in me, and shouted her name three times into the trees, ending facing East which is where she lay relative to me. That

way the animals and elephants of the forest that stretches the hundred of kilometers from beneath my feet to where her body lay would hear it. I was watched over by an Orangutan who grumpily shuffled about and as I walked back to camp some siamang began to call in the distance (they'd hidden from me all week but now they decided to show up). To paraphrase our friend and fellow artist Leo Kay from a piece of his, did it do anything, I don't know. But it helped.

But outside of poetic gestures, looking forward, what realistically can I do about this, I don't know. Short term I don't know. Long term i'm not sure either. I want to look at how what we do directly helps protect these incredible creatures. We carried Salma close to us, but crucially we could always leave, and we did. The rangers are the ones left to do their best, once we and all the other westerners have left, they still live there, they have to bury her, and save the next Salma. I feel grief for her today, but I don't know how much of it is mine to take, how much is appropriate, how useful is it. What is useful? What is action? What saves the life of the next animal? What value does my distance add that is not already created on the ground by the people who lived and breathed her everyday. There are others working here like us, who come and visit and watch and report. We make art and experiences. Try and find a way to reify what is already precious, already rare. They take beautiful photographs, start fundraising campaigns and start trends on social media, they do talks at conferences, publish papers and effect policy.





We are all sending our dispatches from our own frontlines. For some of us they extend to the Leuser for others to the park or river at the bottom of your road. For some of us they feel more desperate and for some they are deadly, men being murdered for protecting butterflies in Mexico. We have to believe that the things we do, the mediums in which we work matter. That talking about elephants, or apes, or trees, showing them, conjuring them into being, that the way in which we file our individual dispatches moves something,

shifts people's perception, their understanding, that it moves enough air and gravity that layered on top of each other, these stories, these actions, these gestures will begin to hold back the slow motion tide that so far just seems to be washing us all away.

We need to understand our work as a small studio as not existing on its own, we are part of a complex ecosystem, one that incorporates rangers, activists, vets, academics, farmers, guides, photographers, social media influencers, NGOs, other artists and countless others. We are a network of effects whether we realise it or not, and the individual weight you give to any of these parts of the network depend on where you as an individual encounter any one of us. For many of you reading this the greatest proximity will be through our work, but that work is the frayed end of a thread that leads back through all these others, all the way to the very earth of that forest where Salma was born.

I need to believe this. I need to question this constantly, check and re-check, see that air move as we make our work and watch where it settles, make things that matter, and change when they no longer do.

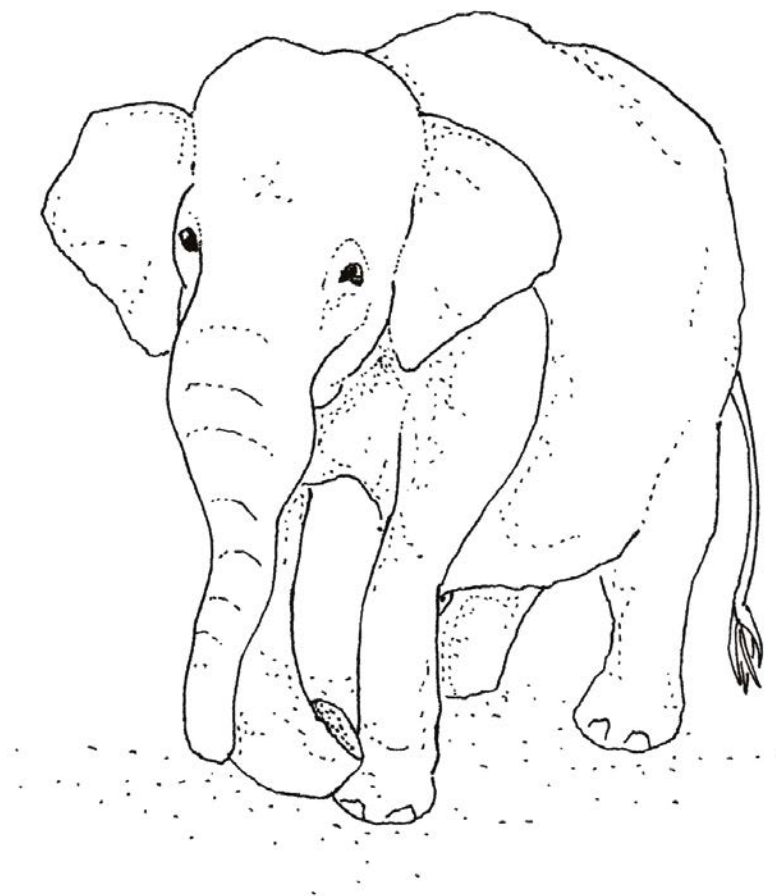
We carry Salma deep in us. When I was young I remember at the funeral of a friend's father that he talked about his dad in the present tense, did not accept that small but important linguistic shift from now to then. And so perhaps Salma can be the same. We carry her with us, she is the forest, the trees, the earth, the actions we take, the echoes in the trees.

We will keep filing our dispatches, keep filing yours.

With love and solidarity B

**Ben Eaton - Technical Director,
Invisible Flock**

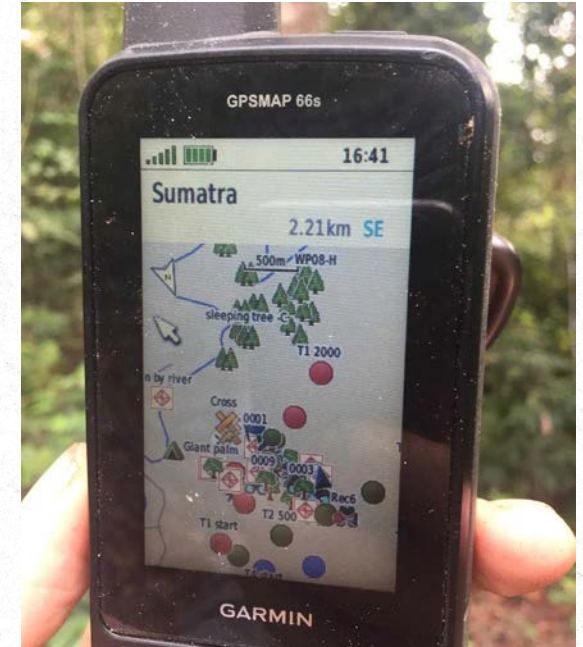
Elephants can hear storms as much as 150 miles away.





Recording Lilli at the Conservation Response Unit.

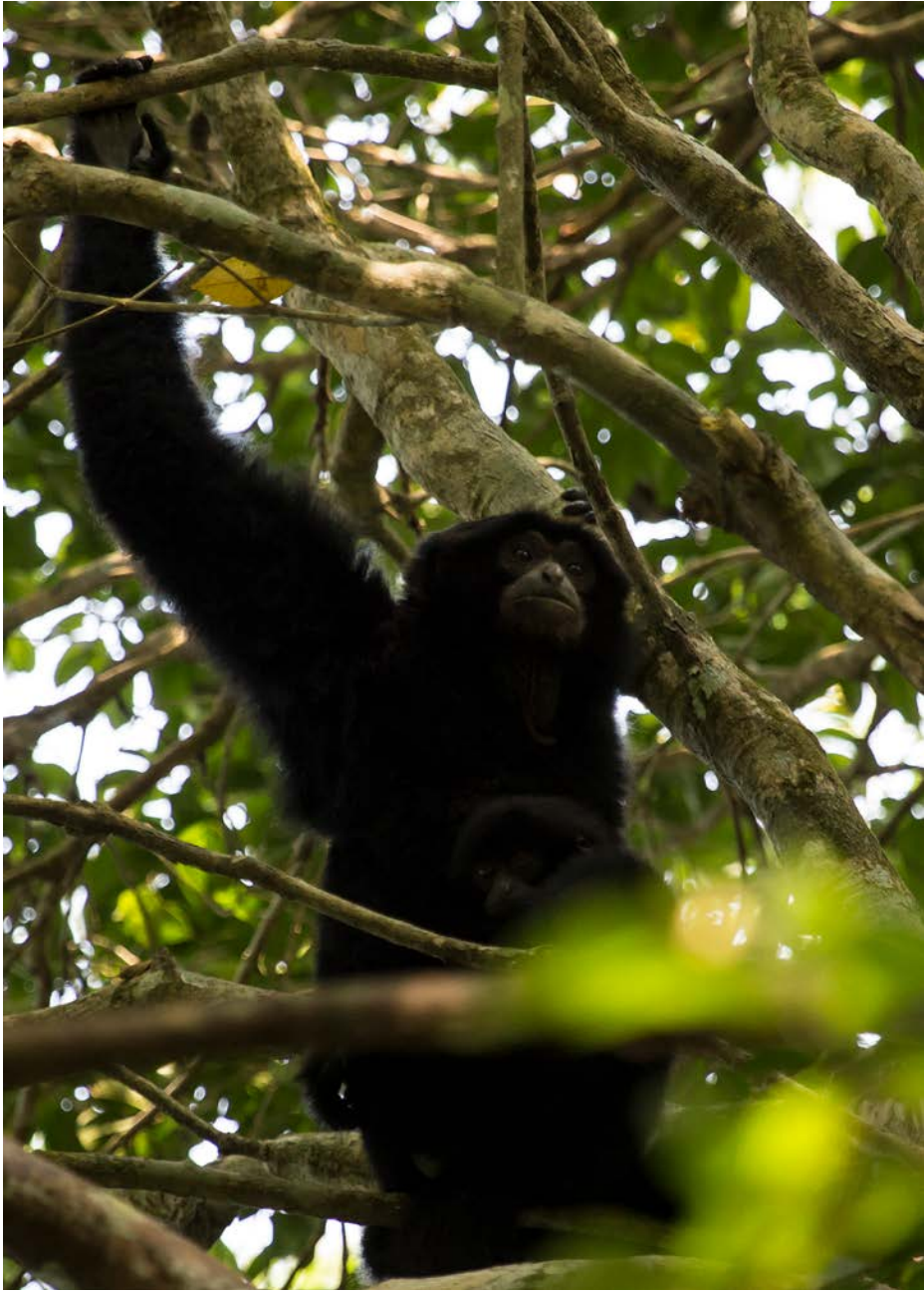
GPS logs of recording spots, sleeping trees and calling trees marked during our residence in the forest.



Ucok guides Ben through the forest in search of siamang.



Victoria with Lia.



An adult female siamang with her infant on her belly contemplates where to go next for food.



A view from the heights of the Leuser and the canopy the siamang occupy.

The Ecosystem Engineers; Siamang and other primates - By Amanda Korstjens

Siamang

Siamangs (*Symphalangus syndactylus*) are truly swinging apes that live in the dense tall forests of Indonesia and Malaysia. In Sumatra's Northern region, the siamangs share the forest with Sumatran orang-utans (*Pongo abelii*), white-handed gibbons (*Hylobatis lar*), Sumatran tigers (*Panthera tigris sondaica*), Sumatran elephants (*Elephas maximus sumatranus*), clouded leopards (*Neofelis nebulosi*), Sumatran rhinoceros (*Dicerorhinus sumatrensis*) and many other animals. The orangutans, elephants, rhinoceroses, and tigers of Sumatra are considered Critically Endangered on the IUCN Species Red List, while the siamangs, gibbons and clouded leopards are Endangered. This means that continued destruction of their habitat and persecution by people is bringing these species to the brink of extinction. The three ape species (orang-utans, siamangs, and gibbons) share their forest with four other primates: the venomous nocturnal Sunda slow loris (*Nycticebus coucang*), the stylish Thomas's langur (*Presbytis thomasi*), the tightrope walking long-tailed macaques (*Macaca fascicularis*), and the fearless pig-tailed macaques (*Macaca nemestrina*).

Siamangs are jet black with extraordinarily long and powerful arms. They weigh between 10.5-12.0 kg

(23-24 lb) and males are only barely larger than females. Both adult males and females have a large throat sac that they inflate when producing their extraordinary calls. Siamangs live in small family groups, most often consisting of a mother, father and their offspring to a group size of about 2-5 individuals. The bond between the adult male and female is very strong and they celebrate their relationship regularly (between every 2-6 days) with elaborate displays in which they sway through the tallest trees and sing a duet. Sometimes, adult males or females have not yet found their life partner and sing alone in the hope that there is a partner out there looking for them. Every night, the group returns to a sleeping tree, one of a few that they have used for generations. These trees are always very tall, and they typically stick out well above the rest of the canopy with only just enough connection to neighbouring trees to allow the siamangs to reach the crown. The group typically enters the tree just before it gets dark, they do this very quietly so as to not attract attention to their whereabouts. This forest harbours tigers, clouded leopards, snakes and large eagles that can prey on careless monkeys and apes. Sleeping at a height of over 30 meters in a tree that has no branches below 20 meters they stay safe from tigers and even the tree-climbing clouded leopards.



A jumping male siamang with scrotal tuft. Siamangs use a special way of travelling through the trees called brachiation, interspersed with massive leaps.



A white-handed gibbon about to jump the next tree and singing.



A male orangutan watches over us as we pass him.



Siamang mother and infant settle in a tree.

Very early in the mornings they leave the tree, often just before it gets truly light. Their secretive behaviour and the height of the tree reduce the risk of predators finding them at night. The female will usually sleep holding their youngest offspring while the male sleeps on a different branch hugging the older offspring. After breakfast, if it is not raining and the siamangs feel up to it, they will perform their song and the forest comes to life in a booming echoing experience. Usually they call between 9 and 11, just after the gibbons have sung their duet songs. Most often, many groups will respond and as they sing together a truly magical explosion of sound surrounds the observer.

Did you know that the male siamang can be recognised by their little tuft of hair, like a bunny tail, between their legs that is not a tail, because none of the apes have tails.

The duet starts with a boom-bark chatter by the male and the female with intermittent resonating booms. If the pair goes all out, this introductory sequence is followed by the louder and more energetic middle sequence, during which the female produces her Great Call, which sounds like long melodic ululating call mixed with boom-barks that get repeated every few minutes, and the male produces bitonal gobble-screams (whoo-hoo-et) with boom-barks. The anatomy of their throat sac allows each individual to make two seemingly separate sounds simultaneously. The duet climaxes with harsh barks given steadily by the female and rapidly by both the male and the female. The call can be heard up to a distance of around 2km(>1.2

miles) far (that is equivalent to a 20 minute fast-paced walking distance).

Our research shows that siamang in Sikundur like to sleep near the tree where they last fed (at about 126 meters distance on average) but travel farther to reach the tree where they have their breakfast (321 meters on average).

On average, siamang at our site travelled 1.57km per day and their territory consisted of an area of 0.7 km² (70 ha), with sleeping trees located in the core area away from the boundaries of their home range. There is some overlap between group home-ranges (about 17% between each neighbouring group).

Siamangs occur at a lower density than their close relatives the white-handed (or Lar) gibbons and siamangs prefer forest areas with more tall trees and a decent amount of connectivity between tree crowns.

The siamangs and gibbons move in a unique way, called brachiation. They are the true acrobats of the monkey bars (even if they are not actual monkeys). They can hang and travel using only their arms thanks to their long muscly arms, long fingers, and specially shaped shoulder blades.

Both male and female siamangs have long canines because they both want to fend off any suitors to their long-term partners or competitors trying to take over their territories.

Female siamangs are pregnant for just over 6 months (189 days on average) and typically have their first offspring at about 6-10 years of age if they are lucky enough to find a partner.

It is hard to say how long they can live in the wild but typically they live up to 25-30 years of age. Because, like all apes, they reproduce so slowly and produce so few offspring over a life-time, these apes are very sensitive to disturbance of their habitat and a population will struggle to recover if a disease or disaster drastically reduces their numbers.

Because humans are just another ape, we are very closely related to all other apes and we can infect our close relatives with our diseases and parasites, just like they can infect us with theirs. During the Covid-19 epidemic in 2020 the national park closed to all visitors and researchers to minimise the risk of people infecting the apes (siamangs, gibbons and especially orang-utans) with the corona virus.

All wild apes are extremely strong, have sharp canines, and can share our diseases with us so please never touch or feed wild or captive apes (or any other primates) but keep a safe distance and wear a mask if you are within breathing distance.

Indonesia's forests are rapidly disappearing, and this is a great worry for the entire world that depends on these high-carbon forests for reducing the severity of human-induced climate change and for the production of clouds to protect us from high temperatures and drought. The apes and other wildlife in these forests play a crucial role in managing these forests, they can be called ecosystem engineers, because they create pathways, spread seeds and pollinate trees. To help protect the forests and wildlife we all need to be less wasteful in our use of resources and be mindful to buy sustainable forest products whenever available.

Amanda Korstjens is a Professor of Behavioural Ecology at Bournemouth university. She has studied primates in their natural environments since 1993. She is interested in how the ecological and social environment drives animal behaviour and survival in a changing world. Her current research focuses on how climate change and forest degradation interact to change the lives of animals at micro- and macro- scales.



The smallest Sumatran primate, the slow loris, is the only venomous primate in the world.



Fletch prepares the open field recorders in Sikundur, to go out over a 2km x 4km stretch of the forest for 3 months.



Mandy, Victoria and Ben trek and scan trees through the rainforest in Sikundur.

Developing the OFR

What is OFR:

OFR is the Open Field Recorder created by Invisible Flock (and friends). With support and in collaboration with Bournemouth University and Professor Amanda H Korstjens from LEAP.

It is an open hardware and software platform for remote long form bio-acoustic recording.

It is created for sound artists, conservationists, scientists and anyone who wants or needs to record audio and environmental data for long periods of time in inhospitable environments.

It is modular, hackable, meshable and useful in a wide series of situations and applications.

Why does it exist:

The OFR was created by Invisible Flock to solve a specific need we had whilst recording large sections of a rainforest in Sumatra.

We needed recorders that would function in the difficult conditions of the forest for long periods of time in order to monitor the biodiversity of the area and that we could sync together to create large scale multichannel sound installations with audio quality as close to our main field recorders as possible.

The OFR for us was an attempt to bridge a gap that was not currently

being fulfilled by other products on the market allowing us to record stereo audio from high quality microphones that were synced via GPS.

Whilst there are other excellent products that already exist for bio-acoustic monitoring, most notably the audio-moth, the solo, and the swift none provided us with the specifics we wanted for this project but you may find they are good fit for you depending on your aims.

What's inside it:

Expanding ability and flexibility were important for us in this design and the ability for other users to build on it and hack the recorder into their own needs. Version 1.1 is built on the Spresense a multicore development board platform by Sony which is programmable via the Arduino IDE.

So what can I do with it:

You can record the sound of landscapes in near studio quality for long periods of time day and night in all weather conditions and use GPS and analogue sensors to sync multiple recorders and data readings over time and space.

Give me some specs:

Version 1.1 of the OFR:

- 2 to 4 channel audio
- 48khz to 198khz audio quality

- time and location sync via GPS to enable meshing of multiple recorders
- sensor logging to sync analogue sensor data points to audio files
- options for multiple budgets and microphone quality (ranging from cheap electrec mics to DPA 4060)
- phantom power
- theoretical running time of 7 days (dependent on specs used and batteries employed)
- custom shield for extra robustness and direct tangible access to key parameter
- design for inhospitable terrain able to withstand tropical rain storms and sub zero temps

What are you offering:

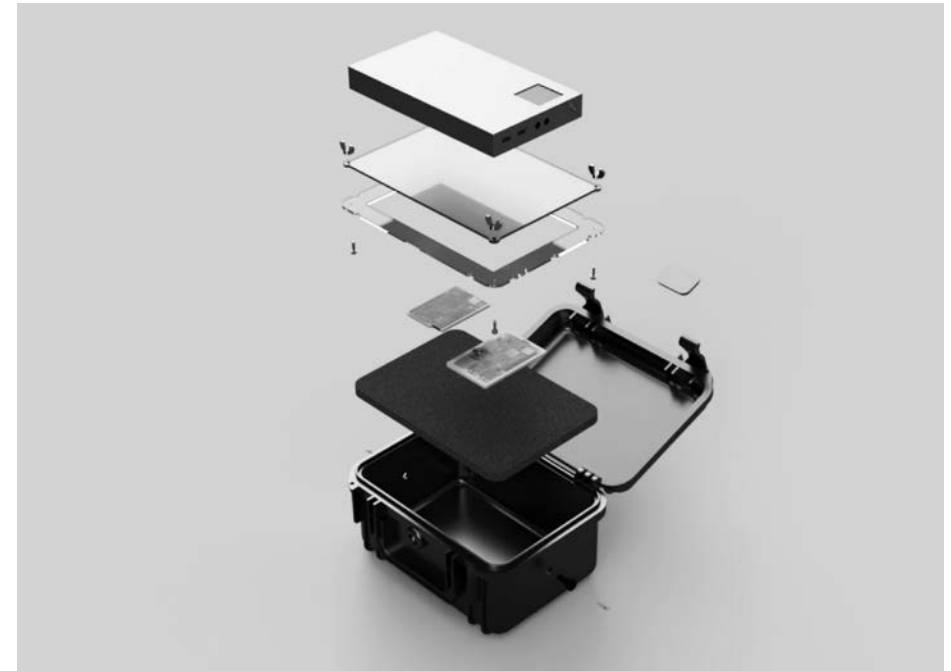
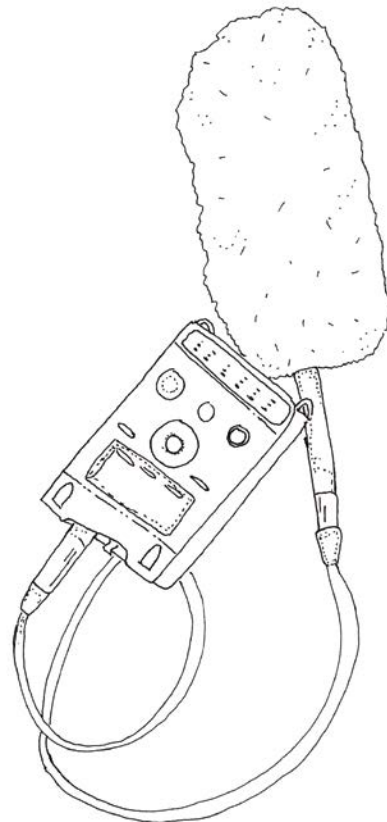
We do not currently sell the OFR as this would be neither cost effective for us or for you and neither would it be practical for us as we are a small studio whose main output is not product manufacture.

Instead we are working towards offering the full spec and design files for the OFR, including the CAD files for the box interior, the schematics for the shield, the codebase for creating and running your own version, a software interface for controlling and setting up your recorders and a willingness to engage and share knowledge with you in whatever project you embark on with the OFR.

This is all provided free (as in both beer and speech) but would appreciate a mention or shoutout as we are hoping to build a community around the creative use of the OFR.

How do I use it:

Right now getting a build of your own up and running would require a bit of work on your part but we are here to help with that. In the first instance you will need to head over to the hardware page which lists and explains the next steps. We are working to make the time and effort needed to get you up and running with the OFR system as easy as possible so you can get out in the field with it.



An exploded image of the OFR design.

The project and the code is available on the github although at the time of writing we cannot be certain that it is a working version - over thenext month we will get all of this documentation up to scratch and ready to flash onto your own OFR system.

What are the future plans:

Future versions of the OFR will hopefully offer other platforms to run the OFR on as well as provide longer recording time and more i/o options.

We are currently developing the shield which will increase the OFR's robustness in the field as well as providing physical tangible control over some key parameters of the recorder. We are developing this with

our friends at Digital Nativ based in Jakarta. We hope that we will be able to offer the shields to purchase in mid/late 2020.

We are also working closely with our friend and long time collaborator Romit Raj from design agency Quicksand who is working to develop a new ML based detection and bio-auditing system and we hope to be able to release a build of the OFR fine tuned to interface and provide the best possible results with his system.

Where is it being used at the moment:

The OFR has been deployed in Sumatra in 2019 and will return there in mid 2020 to help monitor and establish an elephant migration corridor.

It is being used in the state of Karnataka in India where it is similarly being used on farms where human elephant conflict is a recurring issue. Later in 2020 it will be deployed across the North of Finland to record the sound of the yearly freeze as part of an ongoing project with the Sub Zero collective of artists and scientists working on the edge of the Arctic. Hopefully we can keep this list updated and growing.

Can I hear what it sounds like:

Yes on our Github link: A loud monkey cackle, a storm, and an orangutan.

All of these were recorded in Sumatra in 2019.

Who else is part of this project:

The OFR was first designed and created as part of a collaboration between Invisible Flock and research undertaken by academics from LEAP specifically Amanda H Korstjens and Helen Slater and their ongoing research through Bournemouth University in the Leuser Ecosystem.

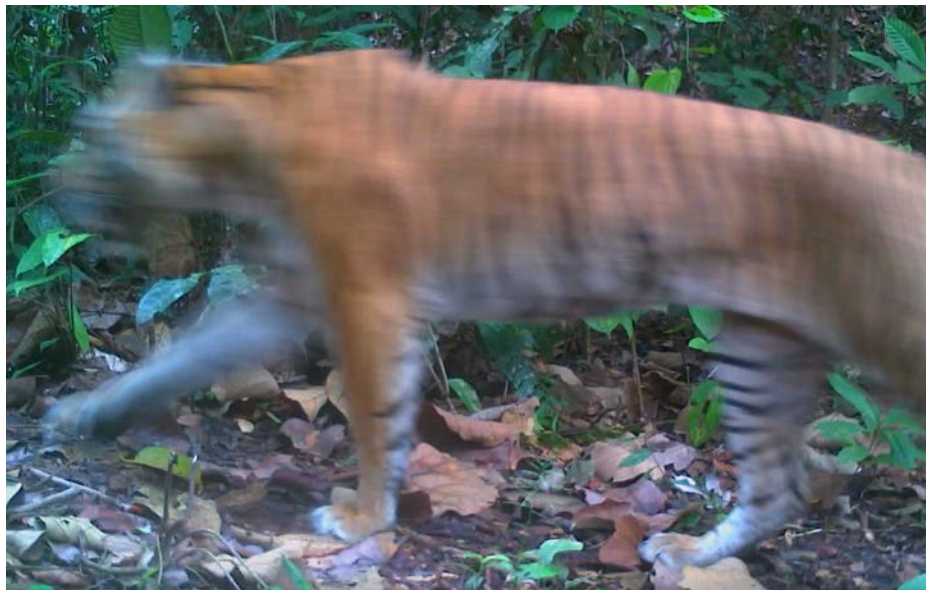
If you have any questions about the OFR, using it, deploying it or anything generally please do not hesitate to get in touch.

<https://github.com/invisibleFlock/Open-Field-Recorder>

flock@invisibleflock.com



Images captured by camera traps set out with our open field recorders



Sumatran tigers are the smallest subspecies of tiger yet boast the greatest concentration of stripes.



A curious macaque pulls at the sound recorder and takes a selfie with the camera trap.



An argus pheasant strolls by. The male is known for preparing a clear open spot in the forest as his dancing ground, his wings spread to reveal hundreds of eyes in his feathers.



A lone macaque takes a rest and watches the canopy.



A small herd moves its way through the forest heading to the river. Females are usually smaller than males, and have short or no tusks.



A banded linsang, nocturnal and usually solitary. It is a carnivore and has retractable claws and razor sharp teeth.

Acknowledgements

This work has been made possible by a collective of long term collaborators and friends.

Amanda Korstjens, Helen Slater and Nathan Harrison of LEAP (Landscape Ecology and Primatology) based at Bournemouth University

Rudi Putra and the team at Forum Conservation Leuser (FKL)

The Sumatran Orangutan Conservation Programme (SOCP) With Special thanks to Suprayudi Rimba and Ucok Sahrizal for their work in the field

Brighton Festival

Invisible Flock is Victoria Pratt, Ben Eaton, Catherine Baxendale, Klavs Kurpnieks, Simon Fletcher and Amy Balderston

Publication design by Kate Rutherford

Illustration by Amy Balderston

Photo credit

Invisible Flock

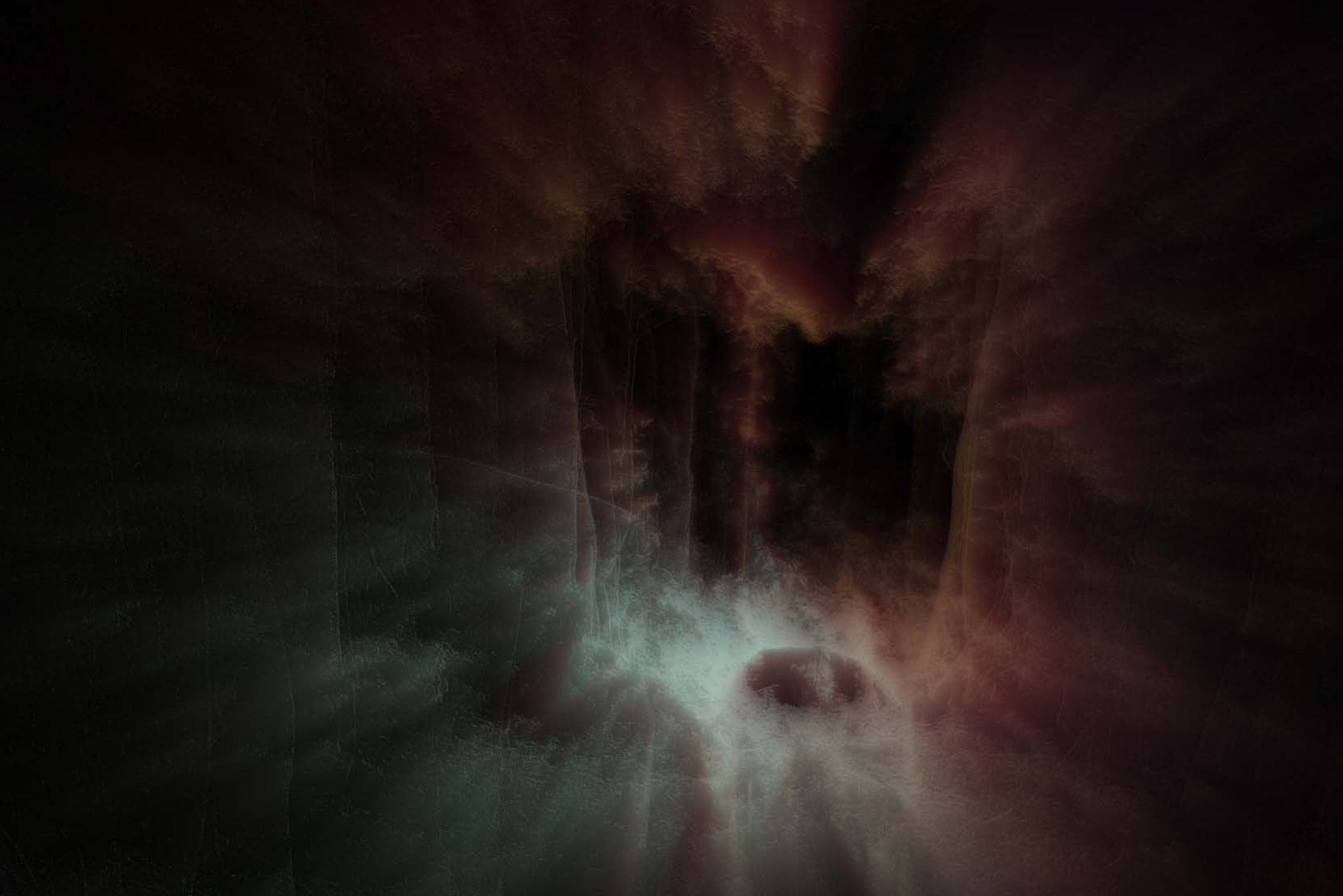
Amanda Korstjens (Pg. 31)

Helen Slater (Pg. 40, 41, 42, 43)

Emma Hankinson (Pg. 31, 32, 28)

The Sleeping Tree is made in collaboration with LEAP (Landscape Ecology and Primatology) based at Bournemouth University, SOCP (Sumatran Orangutan Conservation Programme) and FKL (Forum Conservation Leuser). Invisible Flock is supported by Arts Council England as a National Portfolio Organisation.







May 2020



Supported using public funding by
**ARTS COUNCIL
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