

Gunung Palung Orangutan Conservation Program



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Code RED

An e-newsletter from your friends in West Kalimantan

Dear Friends and Supporters,

Happy New Year! December lets us wrap-up our successes, reflect on obstacles and challenges, and set new goals for the coming year.

In our first article this month, Victoria Gehrke and I put together some of our favorite milestones from the last decade. Our second article comes from PhD Candidate Amy Scott about her research on the family tree of the Cabang Panti orangutans! On our sidebar, we share some research on the role of NGO's in assisting the Forestry Department.

Some more exciting news is our article on *Reducing the Primate Pet Trade* has just come out in the

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Role of NGO's in Forestry Management

Role of NGO's in Forestry Management

In December, one of

American Journal of Primatology! Read and share the link [here](#). This has been a great year for scientific publications from our team - with 5 peer-reviewed articles published, all with different first authors.

We hope you enjoy catching up on what we've been doing and we wish you the very best in the new year! HAPPY NEW YEAR and HAPPY HOLIDAYS from all of us at GPOCP to all of you!

Sincerely,



Cheryl Knott, PhD
Executive Director
[Gunung Palung Orangutan Conservation Program \(GPOCP\)](#)

Highlights from the Decade

By Victoria Gehrke, Conservation Program Director & Cheryl Knott, Executive Director

As 2019 draws to a close we wanted to reflect on our last decade of achievements. Our successes are hard won, as change never comes easily and lasting solutions require a patient, adaptive and realistic approach. Our achievements are your achievements as we would never have been able to do our work without your support! Our amazing team, communities, volunteers, board and stakeholders all play an irreplaceable role in the process to make our successes possible in the Gunung Palung landscape. We can't possibly highlight all of our milestones, so here are some of our favorites!



our managers, Mariamah Achmad, attended a focused seminar hosted by the Provincial Government of West Kalimantan regarding "Review 2019 & Outlook 2020 of Forest Development in West Kalimantan". One of the speakers at the seminar, Professor Edi Suratman from Tanjungpura University, said that the regional income from the forestry sector is increasingly insignificant compared to the income from other sectors, due in part to over-exploitation of the forestry sector in the past. Professor Suratman also emphasized that forests cannot be valued solely based on economic benefits. Non-economic benefits such as ecosystem services in the form of carbon sinks, water retention areas, water filtration, global temperature stabilizers, biodiversity, ecotourism, and soil erosion prevention are other important reasons to safeguard forests. Professor Suratman further argued that the biggest issue faced by the forestry sector is not the lack of vast forested areas but rather adequate human and financial resources. As a result, the forestry sector

Winnie and Walimah wish you a Happy New Year!
Photo © Tim Laman.

On the Conservation side:

- * Our Environmental Education Center expanded with a new wing to become a vibrant hub for villagers to learn about sustainable farming and to network with other stakeholders.
- * We created two volunteer organizations of energetic young conservationists, one for each regency in our project area. Both groups are still very active and play a key role in our special events planning and are constantly adding new members!
- * GPOCP played a key role in the first successful prosecution of a wild orangutan trader, setting an important precedent for people working against the illegal wildlife trade across the archipelago.
- * We worked with the village of Riam Berasap Jaya to issue the first official proclamation of a village customary forest in Kayong Utara or Ketapang, paving the way for several other villages that are taking similar steps to bring local control and sustainable management over forests and related natural resources outside of the national park. This approach has led to the procurement of 5 different customary Forests, covering nearly 7,500 ha and we have two more in the process (adding another 1000 ha)!
- * One of our biggest accomplishments was the role we played in 2013 in helping to head-off a plan to de-gazette substantial areas of Gunung Palung National Park as well as large tracts of protected orangutan habitat. Tens of thousands of acres were proposed for conversion to oil palm concessions. We quickly worked to provide the essential arguments as to why these lands should not be converted, held meetings with members of the legislative council and spatial planners, and worked with other NGOs to develop a cohesive action plan.

needs additional outside support and expertise to better manage forest fires and natural resources. GPOCP addresses this need to advance forestry management in Kalimantan by working closely with the Forestry Department to achieve the national targets for sustainably managed forests. Working with governmental departments is one of the important steps we are taking towards achieving our conservation goals!



Field assistant Sahril measuring trees in Gunung Palung



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GPOCP Conservation Team, 2019.

* We are proud to announce we have 7 full university graduates from the Bornean Orangutan Caring Scholarships, and 30 undergraduate students currently enrolled.

* In 2015 we started including organic aquaculture in our Sustainable Livelihood program. This program has been embraced by the communities and local government agencies and we currently have 22 new aquaculture members and 13 organic farming members. Overall, we are working directly with 90 households. All 35 agriculture members are ex-loggers who are now working towards sustainable socio-economic development and are becoming conservation ambassadors.

* We have expanded into the very remote villages in and around Matan, on the north eastern borders of the National Park, thanks to support and funding from our donors and the hard work from our team.

* In 2019, we were honored with the Whitley Fund for Nature Award, recognizing and supporting our strategy of orangutan conservation through sustainable handicrafts.

On the Research side:

* We welcomed the birth of 15 baby orangutans in our study population.

* We carried out over 3400 orangutan focal follows on 126 different orangutans.

"I think it is far more important to save one square mile of wilderness, anywhere, by any means, than to produce another book on the subject."

Edward Abbey

* In 2015 we celebrated 30+ years of research and conservation based out of the Cabang Panti Research Station. The celebration was a big hit, consisting of our entire staff working together to put on a two-day symposium and week-long trip to the research station for former researchers, Indonesian counterparts, board members, and local government officials!

* We collected over 877 urine samples, 1588 fecal samples, and weighed and measured 483 orangutan plants foods.

* Our team started using aerial drones to count orangutan nests as a more efficient way to estimate orangutan population size.

* We published 33 scientific articles and gave 83 scientific talks.

* We trained and supported 25 post-docs and graduate students, 24 managers and volunteers, 30 Boston University undergraduates and 31 Indonesian students.



GPOCP Field Research Team, August 2019.

There have been so many goals and achievements over the last decade - but most of all we are proud that we have made such a big impact on conserving and understanding wild orangutans and their rainforest home, while enriching people's lives, both in Indonesia and abroad. Our artisan's groups are becoming more independent, our customary forest groups more skilled in sustainable agroforestry, our education team is frequently requested for more events and from more villages, and there has been a significant decrease in illegal wildlife trade thanks to our investigation team's efforts. Our research results have been published and presented across the globe and over 100 students and post-graduates have been directly involved in our

orangutan research.

A heartfelt 'thank you' to all of those who contributed to these efforts and who support us - together you have made these accomplishment possible!

Using Genetics to Determine Orangutan Paternity

By Amy Scott, PhD Candidate, Department of Anthropology, Boston University

"One, two, three, four, five, six, seven, eight, one, two, three, four, five, six, seven, eight, satu, dua, tiga, empat, lima, enam, tujuh, delapan..." I count to myself as I fill tubes with chemicals, occasionally counting in Indonesia to keep my mind active. Since October, I have been conducting genetics research at the Eijkman Institute for Molecular Biology in Jakarta to determine the paternity of orangutans born in Gunung Palung National Park. We want to know if flanged or unflanged males sire more offspring. We also want to know if one flanged male is able to monopolize paternity. Because orangutans are primarily solitary and females mate with multiple males, genetic analysis is the only reliable method for determining paternity. This is part of my dissertation research at Boston University, examining reproductive strategies of orangutans. My excitement to learn the results motivates me throughout the monotonous task of carefully counting and filling multiple tubes with different chemicals all day long!



Flanged males (above) are approximately twice the size as unflanged males (below), have large cheek flanges, large throat sacs, and can produce long calls. Females show mating preference for flanged males. Photos by Amy Scott.



For this project, I am processing orangutan fecal samples that have been collected by dozens of field assistants, students, volunteers, and managers at Cabang Panti since 2008. Fecal samples are the best non-invasive source of DNA that we can collect from wild orangutans. It is important that our research is purely observational and does not harm any orangutans, so collecting a blood, hair, saliva or tissue sample from our wild orangutan study population is not an option. However, the only drawback to fecal samples is that they only contain small amounts of DNA compared to invasive samples, like blood. The fecal samples are stored in special chemicals or dried to protect the DNA from degradation, and then transported to freezers in Ketapang, and eventually brought to freezers at the Eijkman Institute in Jakarta.



GPOCP Research assistant Tori Bakley, collecting fecal samples in the field. Photo by Amy Scott

In order to determine paternity, a sample is needed from the offspring, the mother, and all possible male sires. I will genotype each of these animals.

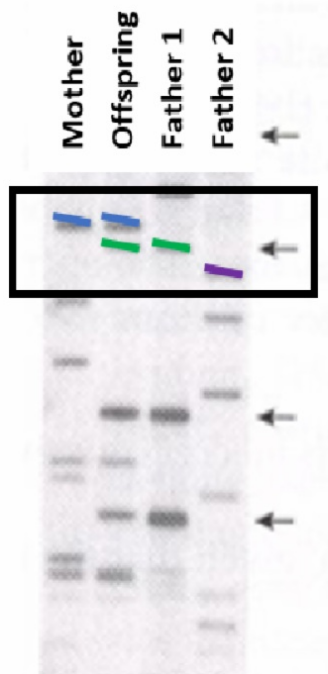
Genotyping is like fingerprinting, but with DNA. I am looking at 12 different locations in the orangutan DNA. Every individual has two markers (alleles) at each location, and there are 4-10 possible markers (alleles) at each of those locations. This many different combinations of markers means that each individual will have a unique combination of markers, i.e. each individual has a unique genetic fingerprint. Just like all other sexually reproducing animals, half of the offspring's DNA comes from the mother and half from the father.



From behavioral observations we know that Tari is Tawni's mother. Since she was only a few months old, Tawni has always been seen clinging to, traveling with, and nursing from her mother Tari.

Since we know from behavioral observations who the mother of the offspring is, we can identify which one of the pair of markers at each location in the DNA comes from the mother. By process of elimination, the other marker must come from the father. This will tell us which markers the father must have at each of the 12 locations. Next, we can compare this genetic signature of the offspring's father with the genotypes of all the potential sires, and hopefully find the match. We will be using a computer program to make these comparisons.

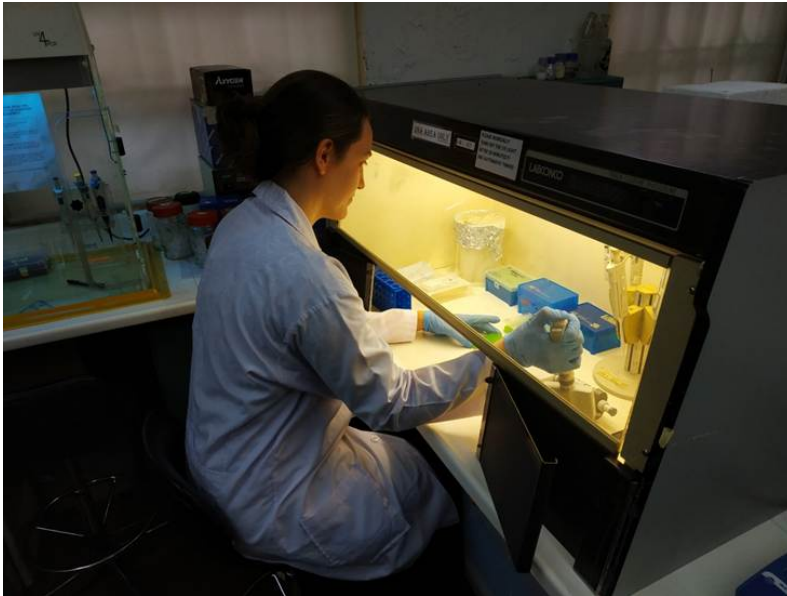
(A) PATERNITY TEST



The above example shows genotypes from 4 individuals. Individuals always have two markers at a given location in their DNA, so if they have two copies of the same marker (homozygous) it will show up as a single marker. If an individual has two different markers (heterozygous) it will show two different colored markers. At the location in the DNA that is signified with a box around it, we see that the mother has two copies of the blue marker (homozygous) and the offspring has a blue and a green marker (heterozygous). Because the mother will pass a blue marker on to all of her offspring, the offspring's blue marker must come from the mother. Therefore, the offspring's green marker must come from the father. Because only Father 1 has green markers at this location and Father 2 does not have green markers, Father 1 is a candidate father whereas Father 2 is not (color added for clarity, in reality these markers are differentiated based on length.)

Genotyping the orangutans requires four steps in the lab: extraction, quantification, amplification, and fragment analysis. First, we extract the DNA using a special kit with chemicals, beads, and heat to break up cells and pull out the DNA from inside the cells. Next, we quantify the amount of orangutan DNA that is in the sample. We need to know how much DNA is in each sample in order to know how many replicates are needed in the following steps, ensuring that the resulting genotype is correct. Due to the low amount of DNA in fecal samples, the next steps are prone to errors, but if you replicate them (up to 5 times), you

can ensure 99% accuracy of genotyping. The third step is PCR (Polymerase chain reaction) which amplifies the DNA. Machines called thermocyclers make many copies of the specific locations in the DNA that we are interested in. We repeat this step two times to increase accuracy. Then finally, we conduct fragment analysis to see what markers each orangutan has at the 12 locations. This final step requires special computer software to read how long the markers are for each location in each individual.



Amy fills a 96 well plate with chemicals and samples to run PCR to make many copies of the specific locations in the DNA that we are examining.

Each one of these steps of lab work is very intricate with many detailed steps that must be carefully followed. As with all lab work, there is trial and error to optimize the best conditions and combinations. Still, the most important thing is carrying out each step carefully. With genotyping, it is very important to keep track of each sample and not cross-contaminate, from one individual to another. I am working with a plate that has 96 wells (12 columns of 8 rows), so I have to be very careful that I am always using the correct sample and avoiding sample contamination. The repetitiveness of counting to 8 all day in an air-conditioned lab, is very different than the fieldwork portion of my dissertation research (see *Code Red* Volume 69, September 2018) observing orangutans from sunrise to sunset in the rainforest, never-knowing what the day might bring. Combining these two very different types of research with the long-term database will enable us to reveal the paternity of the Gunung Palung orangutans that have been born in our study area and to answer important questions about the reproductive benefits of developing flanges for male orangutans.

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