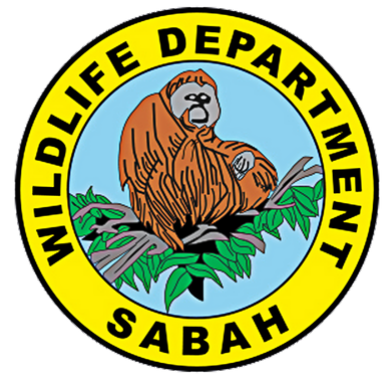


2019

YEARLY ACTIVITY REPORT



**Report prepared by Prof. Benoît Goossens
August 2019, Cardiff**

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INTRODUCTION

The Danau Girang Field Centre (DGFC) was established in 2008 through a formal partnership between Sabah Wildlife Department (SWD) and Cardiff University (UK). The Centre continually contributes and supports the long-term conservation strategies in Sabah through the undertaking of scientific research to develop a better understanding of how wildlife survives in a degraded, fragmented landscape also impacted by human pressures such as hunting, agriculture, and climate change.



This ground-based, targeted data inform conservation strategies such as species action plans and the establishment of new forest reserves, while continuing to engage with communities and other conservation and government organisations. DGFC also provides higher education opportunities (up to PhD level), and regularly hosts scientists (from Malaysia and around the world) and to date, has generated more than 125 peer-reviewed publications.

This report presents the different activities that were carried out at DGFC from January to December 2019.

VISITORS TO DGFC 2019

Field Courses

This year, DGFC welcomed almost 90 visitors from 14 different countries, hosting field courses, field staff/student training events, volunteers, and scientists, as well as attracting international media interest as the Centre's global reputation for its science-led conservation activities drew further.



Five young students from United World College South East Asia (UWCSEA, Singapore) visited DGFC for a mini field course as part of their grade 11 education. They took part in camera trapping, undergraduate professional training year projects, and riverbank cleaning.

DGFC welcomed 10 field courses from 5 different countries.

March: United World College South East Asia (group 1) (SNG), Freiburg University (DEU)

April: Cornwall College (UK)

May: Anglia Ruskin University (UK)

June: Miami University (group 1) (USA)

July: Miami University (group 2) (USA), Cardiff University (UK)

September: Aberystwyth University (UK)

October: United World College Southeast Asia (group 2) (SNG), Haut-Lac International School Eco Camp (CHE)



Haut-Lac International School Eco Camp. In partnership with our friends and colleagues from KOPEL (a community cooperative located at our nearest village Batu Puteh), DGFC welcomed a large group of college students for five days. They helped cut down the grasses to make space for the riparian buffer that is being restored and were taken for a forest walk to observe the fungi and insects and were even lucky enough to see an orangutan at the jetty.

Distinguished Visitors

Dame Judi Dench and David Mills, MBE



In April, DGFC were honoured to host the wonderful Dame Judi Dench and David Mills MBE while filming part of her ITV documentary 'Judi Dench's Wild Borneo Adventure'. The documentary was aired in the UK in July and showed Judi's journey from primary rainforest in Danum Valley down to Borneo's coral reefs just off Gaya Island, stopping off along the way to explore the wonderful wildlife.



Whilst at Danau Girang, Dame Judi and David got involved in a crocodile procedure, helped microchip a reticulated python and solved a "murder mystery" involving a hornbill nest and a sun bear. They also both took the time to get to know all the students and scientists at the Centre and showed a genuine interest in the conservation work and our ongoing research projects.



Mr Pascal Gregoire (Ambassador of Belgium to Malaysia & Brunei Darussalam)

The Belgium Ambassador to Malaysia visited our Director Benoit Goossens (a fellow Belgian) to learn more about the work of the Centre and discover the wealth of the surrounding biodiversity.

The Ambassador was taken on some boat trips and a forest trek and learned about the research work and collaborative projects undertaken by



the research staff and students at the Centre. His parting comment was that “this field centre is truly something to cherish, protect and develop”.

Steve Backshall (Wildlife TV Presenter)



Steve Backshall (centre), a British naturalist and broadcaster working for the BBC, Discovery and National Geographic channels, was at DGFC with his film crew to capture footage for a special ‘South East Asia Deadly 60’ episode for Children’s British Broadcasting Corporation (CBBC). He and the crew went searching in plantations for centipedes and worked alongside Rich Burger (DGFC

PhD student) to catch a python along the riverbank. Steve also spent a night high in a tree in a hammock, to catch footage of the sunrise, that Koko (DGFC field assistant and experienced rigger) had erected.

12 Professional Training Year Students

12 Professional Training Year Students from Cardiff University (10) and Swansea University (2):

- 2018-2019: Ben Pridmore, Elizabeth Witcombe, Jamie Owen and Jessica Shuttleworth at the field centre; Charlotte Taylor and Megan Hooker at Gaya Island Resort.
- 2019-2020: Harriet Miles and Olivia Fitzpatrick at the field centre; Emma Remotti and Kathryn Webb (4 months at Gaya Island Resort (2019) and 3 months at the field centre (2020) from Cardiff University; Kirsty Leach and Tyler Cuddy from Swansea University, spent 7 months at the field centre.

21 Volunteers

ETH, Zurich (CHE), University of Greifswald (DEU), Cambridge University (UK), University Malaysia Sarawak (Malaysia), University of Kent (UK), Bangor University (UK), Princetown University (USA), Birmingham University (UK), Glasgow University (UK), Zurich University (CHE), Nottingham University (UK), Bristol University (UK).

12 Student Visitors

Universiti Malaysia Sabah, Miami University (USA), Cardiff University (UK), Glasgow University (UK), Edinburgh University (UK), Swansea University (UK).



Universiti Malaysia Sabah (UMS) came to visit DGFC to collect dung beetle data for their dissertation projects.

28 Other Visitors

(Including gap year students, academics and visiting medical practitioners):

Australia, UK, Norway, Canada, Singapore, United States of America, Malaysia, Spain and France.

6 Media:

BBC (UK), Scubazoo (Malaysia), Atlantic Productions (UK), Freelance Journalist (CHE), Educational Broadcasting System (EBS, Korea), Freelance Photographer (AUS).



From left to right: Chris Tan (Scubazoo), Pyeongsoon Choi (EBS) and Chang Yeol Lee (EBS)

EVENTS, CONFERENCES AND WORKSHOPS

World Pangolin Day



February 16th marked World Pangolin Day. Pangolins are currently the most trafficked mammal in the world, so raising awareness about their predicament is of utmost importance.

Elisa Panjang, DGFC's pangolin expert, is working hard to educate people about the pangolin plight. More of her work can be seen in the recent pangolin episode of Borneo Jungle Diaries season 2 (YouTube), where TV presenter Alexandra Alexander follows Elisa as she tracks Wira, a tagged pangolin in the Kinabatangan forest.



Special thanks to Maya Karin for giving a talk at the World Pangolin Day event in Kota Kinabalu, and to Yayasan Sime Darby for funding Borneo Jungle Diaries season 2, allowing us to raise awareness of our work and the wonderful animals that live in the Kinabatangan.

Away Day

In March, DGFC staff, including the Kota Kinabalu Office team and staff at the Sabah Wildlife Health, Genetic and Forensic Laboratory, met at the field centre to discuss research projects, planned changes, and future endeavours. Everyone engaged in the discussions and then enjoyed a series of team building exercises.



Sun Bear Symposium

From 23-26 September 2019, the Sabah Wildlife Department (SWD), Bornean Sun Bear Conservation Centre (BSBCC) and DGFC held the 2nd International Symposium on Sun Bear Conservation and Management. The 1st symposium resulted in the development of the Global Status Review & Conservation Action Plan for sun bears 2019-2028 (Crudge et al. 2019) and participating countries were invited to adopt this action plan as a template.



The 2nd International Symposium was attended by sun bear experts, stakeholders, NGOs and industry players to begin to develop the first 10-year 'Sun Bear Action Plan for Sabah'.

Mental Health and General Health Week

A two-day course was held for all Field Centre personnel at DGFC, to heighten the importance to practice both good mental and physical health. We would like to record our sincere thanks to our invited practitioners, Dr Sandi James (AUS) and Dr Timothy William (Malaysia) for their expert guidance.



Dr Timothy William (Gleneagles Hospital, Kota Kinabalu).

Launch of Regrow Borneo

Regrow Borneo is an ethical, transparent, and research-led reforestation and carbon mitigation project. Co-ordinated by Cardiff University (UK) researchers and DGFC, this joint project is the first of its kind to be undertaken by a UK university. The research will not only measure the impact of planting trees on carbon sequestration but also its effects on biodiversity, ecosystems and community health. Supported by its partner, KOPEL Bhd (a local community cooperative, based in the village of Batu Puteh), it is planned that when sufficient funds have been raised planting will begin in 2020. Regrow Borneo was launched on 17 October 2019 at Cardiff University by Professor Karen Holford, Deputy Vice-Chancellor.

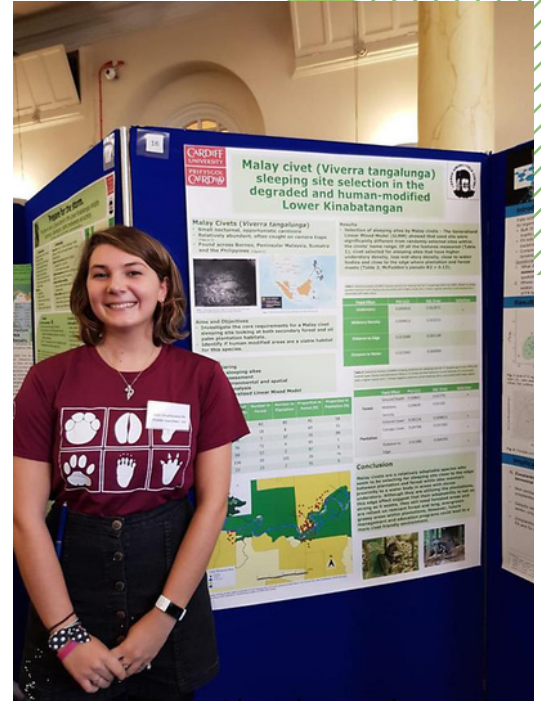
First Aid Training and Forest Survival



During October, Joe Wan from 'Fieldskills' visited the Field Centre to deliver a three-day first aid and wildlife survival course to DGFC staff and students.

Professional Training Year (PTY) (Viriamu Jones Gallery, Cardiff University) Student Presentation

As part of their degree assessment programme at Cardiff University, 2018-2019's Professional Training Year students: Megan Hooker (Gaya Island), Jamie Owen (DGFC), Ben Pridmore (DGFC), Jess Shuttleworth (DGFC, pictured), Charlotte Taylor (Gaya Island), Elizabeth Witcombe (DGFC) presented their posters summarising their DGFC research projects to lecturers and peers in the Viriamu Jones Gallery back at Cardiff University's prestigious main building.



Jess Shuttleworth

Leona Wai, PhD preparation

Leona spent time at DGFC in preparation for her PhD. She plans to study all four species of otter found in Sabah, using various techniques including camera trapping, paw prints and sleeping site analysis. During her visit, she learned how to sample eDNA with the help



of Eric Bairrao Ruivois (Beauval Zoo, France), Jean-Baptiste Decotte (Vigilife/SpyGen, France), Gabriel Michelin (SpyGen, France) and Nicolas Renault (Film maker, Beauval Nature, France). This technique will allow her to sample any otter DNA that could be present in the Kinabatangan and other rivers and will greatly help her survey of the population density of otters in Sabah.



Leona Wai conducted the eDNA sampling in the Kinbatangan river.



DGFC EDUCATION TEAM ACTIVITIES

Based at our DGFC Office in Kota Kinabalu, the Education Team had another busy and productive year promoting awareness of the threats that affect the survival of Sabah's endangered species through the delivery of educational activities to schools and at public events. Following agreement of its schedule and content of activities by Sabah Education Department and District Education Department (Penampang, Kudat, Kota Belud & Kota Marudu) this year's programme included the following.

February

- Launch of a series of DGFC storybooks "Animals of Kinabatangan" and "Kenali Hidupan Liar di Kinabatangan" at the Breeze Café, Suria Sabah.
- "Let's Talk about Pangolins", a chat with Maya Karin, Hotel Grandis in conjunction with World Pangolin Day.
- Attended the Sabah Environmental Education Network (SEEN) meeting, including a small workshop on "Environmental Education: Touch the Heart then Give the Science", a lecture given by Prof. Dr Piakong Tuah, organised by the Environment Protection Department (EPD).

March

- Exhibited at Universiti Malaysia Sabah in conjunction with World Wildlife Day 2019.

April

- Attended the Module and Boardgames for Marine Environmental Education Workshop organised by WWF (Kota Kinabalu) and EPD at The Palace Hotel.
- Delivered environmental awareness programme in three schools in Kudat, Sabah to: Sekolah Menengah Kebangsaan (SMK) Sikuati II Kudat, Sekolah Kebangsaan (SK) Sikuati Kudat, SK Matunggong Kudat.

May

- Delivered a 4-day education programme in Kota Marudu visiting: SK Mangaris, SMK Bandau and SK Talantang.
- Held an open exhibition booth for "Wildlife Conservation and Awareness nurture from young" at the Asia City Complex, Kota Kinabalu organized by Pusat Minda.

June

- Delivered Wildlife Awareness and Education Outreach Programme in Kota Belud to SK Bangkahak Baru and SMKA Tun Said Kota Belud.
- Opened an exhibition booth and took part in the Run Wild - Save Our Wildlife, organised by US Embassy, held at Likas Bay, Kota Kinabalu.

July

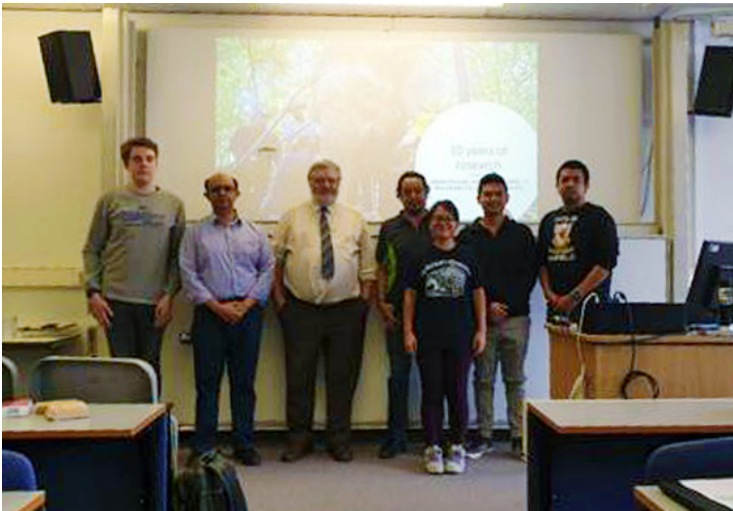
- Delivered the Wildlife Awareness and Education Outreach Programme to SK St Theresa and SK Buit Hill, Penampang, Sabah.

December

- Conducted environmental awareness programme with the resort's guests at the Shangri-La Rasa Ria Resort, Sabah.
- Organised "A Wild Weekend at the Library" (State Library, at Tg. Aru), a public event with exhibitions, talks and activities by conservation NGOs (HUTAN, BSBCC, MRF, Reef Check, One Stop Borneo and SWD).

Presentations and Professional Development

- Turtle Talk at Kinabalu International School, 13 June
- EHA training on sampling and cold chain management
- EMZIDS at Universiti Malaysia Sabah (UMS)
- 1st Sabah Wildlife Policy Workshop, The Palace Hotel
- Elephant IUCN Specialist Group Meeting
- PREDICT Symposium, Universiti Malaysia Sabah
- 2nd Sabah Wildlife Policy Workshop at The Palace Hotel
- Elephant IUCN Specialist Group Meeting
- Education activity (Kinabalu International School Global Goals Day)
- PERHILITAN's Dasar Hidupan Liar Kebangsaan workshop, Promenade Hotel
- Workshop "Sustainable Internet of Things Infrastructure Towards Efficient Wildlife Conservation", at School of Computer Sciences, Cardiff University, (UK).



Ms Panjang and participants at Cardiff University.

Pangolin Awareness Activities and Workshops

- Pangolin Education Camp was organized from 5th to 8th August 2019 at four rural schools located within palm oil plantations in Kinabatangan, Sabah. The schools involved were SK Kampung Suau Lamba, SK Sandau, SK Buang Sayang and SK Ladang Bode Kretam. The project's Primary Investigator led the program assisted by the DGFC Education Team. 106 primary students and 13 teachers attended the programme which was supported by Sabah Wildlife Department and funded by Kansas City Zoo, USA.



- A Pangolin Awareness Talk was given at the Shangri-La Rasa Ria Reserve, Kota Kinabalu. The program was initiated by the Rasa Ria Reserve management team and attended by hotel guests, university students as well as school pupils.
- Fundamentals in Conservation Conflict Transformation - Capacity Building Training, Tanzania. Ms. Panjang participated in a 5-day mediation and conservation conflict resolution training together with 24 other international participants.
- Ex-situ Assessment and Planning Workshop for Sunda pangolin, September 2019 at National Museum Bangkok, Thailand.

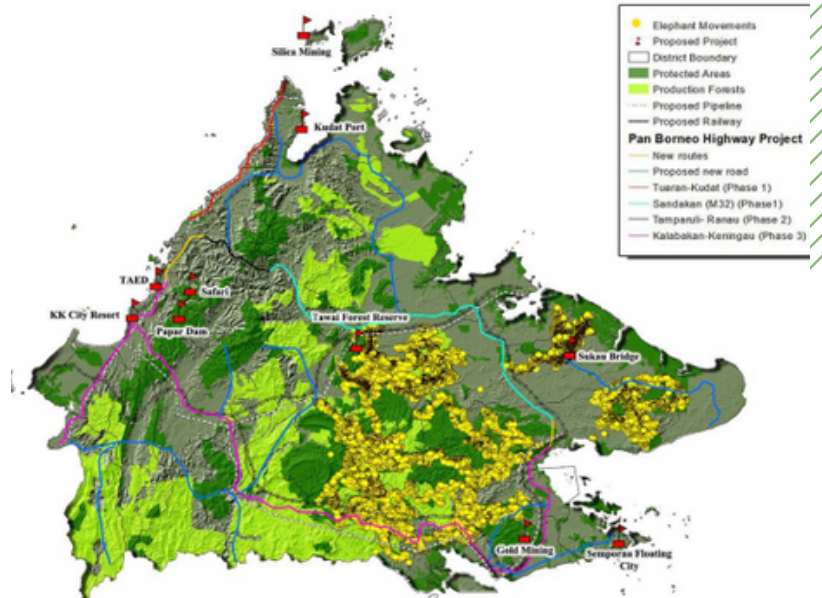
- Borneo Eco Film Festival Youth Forum “Careers in Conservation: Why We Do What We Do?” Sabah Museum, Kota Kinabalu. Ms. Panjang was invited as a panellist to discuss opportunities and challenges in conservation careers.
- Pangolin Awareness Talk at Kota Kinabalu International School
- Sabah Pangolin Sanctuary and Research Institute Workshop held at the WWF Sabah.
- “Basic Guidelines to Wildlife Tracking and Identifying Animal Tracks”, Rasa Ria Nature Reserve, Tuaran. Ms. Panjang and a member of DGFC ran a program to teach and demonstrate to the guests of Rasa Ria Reserve about how animal tracks are used in wildlife research.



- Pangolin Awareness Talk. Ms. Panjang presented to 30 university tourism students from Universiti Teknologi Mara.

GEOGRAPHIC INFORMATION SYSTEMS (GIS)

Ms. Liew, DGFC's GIS officer has continued assisting the spatial research at DGFC, including weekly elephant monitoring, human-elephant conflict hotspot detection (figure below), and Bornean banteng distribution mapping in Sabah.



TESSA (Toolkit for Ecosystem Service Site based Assessment)

This project was initiated by the SE Asia Rainforest Research Partnership and Yayasan Hasanah in collaboration with the Tropical Biology Association to build existing capacity of conservation practitioners to measure and assess the ecosystem services in Malaysia. In conjunction with this, DGFC and HUTAN teamed up to be part of the project focusing on measuring and assessing the ecosystem services in Rasig Corridor, Sukau, Kinabatangan, Sabah. For the purpose of this assessment our team chose to focus only on carbon stock (above-ground biomass) and field surveys were conducted. These data were then analysed using the TESSA toolkit and the results presented at the Ecosystem Services Community of Practices forum held at Yayasan Hasanah, Subang, Kuala Lumpur.

MAIN RESEARCH PROJECTS

Bornean elephant (*Elephas maximus borneensis*)

This research project broadly focuses on Bornean elephant landscape utilization, using a combination of airborne Light Detection and Ranging (LiDAR) and Global Positioning System (GPS) collaring data to examine broad-scale habitat use, as well as identifying key areas of movement on a local scale. We examined adaptations of three spatially isolated populations by identifying both home-range estimations and specific behavioural movement traits. These traits enabled a fine-scale evaluation of movements between, and adjacent to, forest patches and the role that large-scale agriculture have in elephant movement.

The data helps outline the contemporary situation of the Bornean elephant in Sabah and focuses on the existing challenges that need to be addressed to enable people and elephants to coexist, particularly in man-made landscapes dominated by oil palm plantations.

This research has directly led to the drafting of the Elephant State Action Plan 2020-2029, which was finalised in November. Moving forward a Cabinet Paper will be prepared by the Sabah Wildlife Department and DGFC which will be tabled for consideration by the State Cabinet in early 2020.

Civet species (*Viverridae sp.*)

Data continues to be collected to evaluate the sleeping site selection parameters for male Malay civets in the forests and oil palm plantations in the Lower Kinabatangan region. Live trapping of civets commenced in June with the aim to fit males with a GPS collar. Eight box traps were deployed in the Lower Kinabatangan Wildlife Sanctuary and 16 civets were successfully caught. Of those, nine animals were sampled, and three males were collared providing valuable additional spatial ecology data.

Cats

1. Flat-headed cat (*Prionailurus planiceps*)

The flat-headed cat camera trap survey was expanded to cover all oxbow lakes and tributaries in the Lower Kinabatangan Wildlife Sanctuary using 30 camera traps, fixed 100 meters apart, and moved to each pre-determined site every 3 months. The survey undertaken at Tungog oxbow detected a flat-headed cat on three separate occasions producing seven images of this elusive cat. Subsequently, one image was captured at Danau Patong and oxbow lakes respectively. Camera trapping was postponed in November and will resume after the rainy season.



Flat-headed cat sighting near the Tungog oxbow.

2. Leopard cat (*Prionailurus bengalensis*)

After receiving appropriate permissions from the local oil palm plantations, trapping began in August. One female was captured, and the successful procedure was disseminated in a press release in three languages. Since release, we recorded 937 GPS fixes and maintained visuals through camera trapping.



Camera trap image of the collared female leopard cat.

3. Sunda Clouded leopard (*Neofelis diardi*)

Trapping of Sunda clouded leopards commenced in June, with the aim of fitting GPS collars, and taking morphological and biological samples. Two, double door box traps were activated, and an audio lure was placed nearby. In July a clouded leopard entered and triggered the trap. A collar was fitted, body measurements taken, hair and blood samples taken, and a microchip was implanted. The collar transmitted GPS fixes (data transmission: 1 fix every 2 h, 4 fixes a message), allowing observation of the individual's movement patterns and home range.



Collection of morphometric measurements from the young adult male Sunda clouded leopard.

4. Sun bear (*Helarctos malayanus*)

The sun bear research programme is undertaken in close collaboration with the Bornean Sun Bear Conservation Centre (BSBCC). The camera trap project, which began in July 2018, aimed to recognise individual sun bears present in the study area (by encouraging scent-marking behaviour, exposing the chest marks for identification) and to identify suitable trap sites for the GPS collaring project to study their spatial ecology in a fragmented landscape.

Eleven camera traps were placed along the Kinabatangan wildlife corridor, spaced 1.5km apart. Initial observations may suggest that the bears do not claim territory in the wildlife corridor and that the corridor is merely used for traversing between other sections of habitat. This would explain why the bears do not engage in scent-marking behaviour as they are travelling through. In addition, the camera trap survey did successfully identify potential trapping sites.

To prepare for the trapping and collaring of sun bears, two sun bear barrel traps were deployed in May and July 2019 and the trap sites were selected with reference to the camera trap data previously collected, as well as any fresh signs of sun bear activity. We did not manage to capture any individual to date.

5. Sunda pangolin (*Manis javanica*)

Sign surveys were conducted again this year and interview surveys with respondents from three small villages and two oil palm plantations were also undertaken.

Radio telemetry data continued to be gathered from rescued pangolins which were tagged and released in the vicinity of the field centre. In March, a wild pangolin was caught and tagged, and initial data seems to suggest that pangolin sleeping sites are associated with large living trees (in the forest) or among branches on top of trees (in the oil palm plantations). Also, rescued pangolins were shown to roam much larger distances compared to wild pangolin.

6. Bearded pig (*Sus barbatus*)

As part of the “Conservation Ecology of the Bearded Pig” project, a collaboration between Berkeley University and DGFC, active live trapping began in November 2017.

The research team completed the analysis of 300 bearded pig hair samples at the Evolutionary Genetics Laboratory at UC Berkeley (USA). These samples, from 35 different locations, represent 200 km² of densely populated bearded pig habitat, and will be used in Next Generation sequencing to create a population genetic map of bearded pigs in a landscape fragmented by both natural and anthropogenic barriers. Mapping will provide the first evidence of fine-scale genetic population structure in bearded pigs, with important implications for human-induced gene flow shifts occurring in this threatened species.

Initial results suggest the influence of two potential genetic barriers: the Kinabatangan river (a large natural barrier inhabited by estuarine crocodiles, a major bearded pig predator) and the Pan-Borneo highway (a major anthropogenic barrier). These findings will have important implications for land-use planning and management for the bearded pig, a declining long-distance nomad with great ecological and conservation significance for Borneo.

7. Reticulated python (*Malayopython reticulatus*)

To date, a total of 117 wild individuals have been caught and sampled within the Lower Kinabatangan Wildlife Sanctuary with an additional 16 individuals sampled after being rescued by the Sabah Wildlife Rescue Unit. This takes the total number of sampled individuals to 133.

Further modifications to the tag design were trialed and the animals were placed in a newly constructed outdoor enclosure and closely monitored prior to release. In addition, smaller VHF implants will be tested, and plans are being put in place to have tracking data for up to a year for 10 individuals.

SABAH WILDLIFE HEALTH, GENETIC AND FORENSIC LABORATORY

Established in 2013 by SWD, EHA and DGFC, researchers use the laboratory facilities to provide valuable genetic information collected from a variety of DGFC projects as well as supporting the work of government departments and forensic agencies. The main species undergoing genetic investigation this year included: the green turtle (Marine Research Foundation); pangolin, Sunda clouded leopard; bearded pig and reticulated python.

This year also saw the beginning to obtain forensic laboratory certification with the support of Sabah's Defence Threat Reduction Agency, TRACE Analytical Laboratories (USA) and the United States Fish & Wildlife Service (USA).

SCHOLARLY ACHIEVEMENTS

PhD

1. GUERRERO-SANCHEZ S, 2019. Ecology and health of the Asian water monitor lizard (*Varanus salvator*) in the fragmented landscape of the Kinabatangan floodplain, Sabah, Malaysia. PhD thesis, Cardiff University, 142 pages.

Masters Degree

1. CHANG THC, 2019. Movement speed of Bornean elephants (*Elephas maximus borneensis*) travelling through the Lower Kinabatangan Floodplain of Sabah, Malaysia Borneo. Master of Research thesis, Cardiff University, 46 pages.

2. WAI L, 2019. Ecology of smooth-coated otter (*Lutrogale perspicillata*) in the Lower Kinabatangan Wildlife Sanctuary, Sabah, Malaysia. Master of Science thesis, Universiti Malaysia Sabah, 75 pages.

PUBLICATIONS

(**DGFC PERSONNEL APPEAR IN BOLD**)

1. **BRUNKE J**, RADESPIEL U, RUSSO IR, BRUFORD MW, **GOOSSENS B**, 2019. Messing about on the river: the role of geographic barriers in shaping the genetic structure of Bornean small mammals in a fragmented landscape. *Conservation Genetics* doi: 10.1007/s10592-019-01159-3.
2. FRIAS L, HASEGAWA H, **STARK DJ**, **SALGADO LYNN M**, NATHAN SKSS, CHUA TH, **GOOSSENS B**, OKAMOTO M, MACINTOSH AJJ, 2019. A pinworm's tale: the evolutionary history of *Lemuricola* (*Protenterobius*) *nycticebi*. *International Journal for Parasitology: Parasites and Wildlife* 8: 25-32.
3. FRIAS L, **STARK DJ**, **SALGADO LYNN M**, NATHAN SKSS, **GOOSSENS B**, OKAMOTO M, MACINTOSH AJJ, 2019. Molecular characterization of nodule worm in a community of Bornean primates. *Ecology and Evolution* doi: 10.1002/ece3.5022.
4. **GARDNER PC**, VAUGHAN IP, **LIEW LP**, **GOOSSENS B**, 2019. Using natural marks in a spatially explicit capture-recapture framework to estimate preliminary population density of cryptic endangered wild cattle in Borneo. *Global Ecology and Conservation* doi: 10.1016/j.gecco.2019.e00748.
5. **GARDNER PC**, **RIDGE S**, **WERN JGE**, **GOOSSENS B**, 2019. The influence of logging upon the foraging behaviour and diet of the endangered Bornean banteng. *Mammalia* doi: 10.1515/mammalia-2018-0075.
6. HEARN AJ, CUSHMAN SA, **GOOSSENS B**, ROSS J, MACDONALD EA, HUNTER LTB, MACDONALD DW, 2019. Predicting connectivity, population size and genetic diversity of Sunda clouded leopards across Sabah, Borneo. *Landscape Ecology* doi: 10.1007/s10980-018-0758-1.

7. KASZTA Z, CUSHMAN S, HEARN A, BURNHAM D, MACDONALD E, **GOOSSENS B**, NATHAN SKSS, MACDONALD D, 2019. Integrating Sunda clouded leopard (*Neofelis diardi*) conservation into development and restoration planning in Sabah (Borneo). *Biological Conservation* 235: 64-76.
8. **KUNDE MN**, MARTINS RF, PREMIER J, FICKEL J, FORSTER DW, 2019. Population and landscape genetic analysis of the Malayan sun bear *Helarctos malayanus*. *Conservation Genetics* doi: 10.1007/s10592-019-01233-w.
9. **OTHMAN N**, **GOOSSENS B**, CHEAH CPI, 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: 161-173.
10. ROBINS JG, HUSSON S, FAHRONI A, SINGLETON I, NOWAK MG, FLUCH G, SANCHEZ KL, 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.
11. **SALGADO LYNN M**, JALIL MFB, CHIKHI L, ANCRENAZ M, AMBU LN, BRUFORD MW, **GOOSSENS B**, 2019. Landscape genetics applied to the conservation of primates in flooded forests: a case study of orang-utans in the Lower Kinabatangan Wildlife Sanctuary. In: *Primates in flooded forests* (Matsuda I et al. eds). Cambridge University Press, Cambridge, UK.
12. **STARK DJ**, FORNACE KM, BROCK PM, ABIDIN TR, GILHOOLY L, **JALIUS C**, **GOOSSENS B**, DRAKELEY CJ, **SALGADO LYNN M**, 2019. Long-tailed macaque response to deforestation in a *Plasmodium knowlesi* endemic area. *EcoHealth* 16: 638-646.
14. THIRY V, BHASIN O, **STARK DJ**, BEUDELS-JAMAR R, VERCAUTEREN DRUBBEL R, NATHAN SKSS, **GOOSSENS B**, VERCAUTEREN M, 2019. Seed dispersal by proboscis monkeys: the case of *Nauclea* spp. *Primates* doi: 10.1007/s10329-019-00736-x.

IN THE NEWS

28 January Lack of forest connectivity threatens Sunda Clouded Leopard

Daily Express, Sin Chew Daily & The Borneo Post

03 February Proboscis monkeys: Local loss in heart of Borneo adventure

Daily Express

10 February Tarsiers: 'Spirits' in the jungle night

Daily Express

17 February Pangolins: Scaling new depths of human greed

Daily Express

24 February Hornbills: life in the canopy

Daily Express

24 February Sunda Pangolins must be protected

The Borneo Post

03 March Clouded leopard-rare glimpse of Borneo's top predator

Daily Express

10 March Bornean elephants - marching on through adversity

Daily Express

25 March Coalition lauds CM over the environment in building highway

Asia Times, New Sabah Times, Overseas Chinese Daily News,

See Hua Daily News, Sin Chew Daily & The Borneo Post

01 July Reinforcement against wildlife poaching and trafficking

Asia Times, Daily Express, New Sabah Times, Overseas Chinese Daily News & Sin Chew Daily

29 August Reinforcement against wildlife poaching and trafficking
Asia Times, Daily Express, Harian Ekspres, New Sabah Times, Overseas Chinese Daily News, See Hua Daily News, Sin Chew Daily & The Borneo Post

05 September Banteng - most endangered mammal in Sabah
Asia Times, Daily Express, Harian Ekspres, New Sabah Times, Overseas Chinese Daily News, See Hua Daily News, Sin Chew Daily & The Borneo Post

12 September Leopard cat fitted with satellite collar
Asia Times, Daily Express, Harian Ekspres, New Sabah Times, Overseas Chinese Daily News, See Hua Daily News, Sin Chew Daily & The Borneo Post

25 September Sabah sun bear action plan in the works
Daily Express, New Sabah Times, See Hua Daily News & The Borneo Post

29 September Education can minimise wildlife conflicts
Daily Express

01 October The Vietnamese Government cooperated to close the bear farm
Harian Ekspres

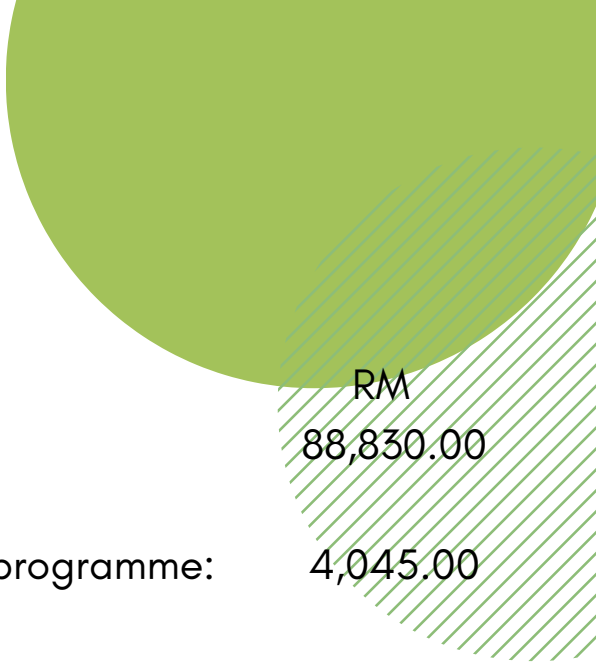
01 October Dept monitoring cyberspace for wildlife trade
Daily Express

30 October Crocodile population survey Launch
Daily Express, Harian Ekspres, New Sabah Times, Overseas Chinese Daily News, See Hua Daily News, Sin Chew Daily & The Borneo Post

23 November NGOs welcome increased sentence in sun bear case
The Borneo Post

24 November NGOs hail the harsher punishment
Daily Express

GRANT AWARDS



• US Embassy in KL: 1-year grant to support a Malaysian wildlife veterinarian:	RM 88,830.00
• Kansas City Zoo: Pangolin education outreach programme:	4,045.00
• Panthera Corporation (Health at the Edge project):	29,610.00
• Houston Zoo (Otter project):	123,632.00
• Yayasan Sime Darby: 2-year project, PROTECT:	4,000,000.00
• US Department of State: 2-year project, Boosting Enforcement and Forensic Capacity to Deter Wildlife Trafficking in Sabah:	3,951,051.00
• Cleveland Zoological Society (1-year project):	40,772.00
	Total 8,114,308.00 (Total = US\$ 1,944,573.00)

ACKNOWLEDGEMENT

In order to provide the opportunities and facilities to study and observe wildlife in this unique landscape, we are predominantly reliant on income generated from our visiting students and scientists as well as through grant awards and donations. We, therefore, wish to record our sincere thanks to everyone who has contributed this year. It really does make a difference.

Should you wish to learn more about the various ways you can help us, please email jrobertson@dgfc.life or visit www.dgfc.life and see how the work undertaken by DGFC continues to make such a valuable contribution to the future conservation of our wildlife and habitats in Sabah, Malaysia.