Cat Project of the Month – May 2009

The IUCN/SSC Cat Specialist Group's website (www.catsg.org) presents each month a different cat conservation project. Members of the Cat Specialist Group are encouraged to submit a short description of interesting projects

Consequences of different forest management strategies for felids in Sabah, Malaysia

Male clouded leopard photographed in Deramakot Forest Reserve (Photo A. Wilting and A. Mohamed)

Many carnivores are under severe threat from permanent loss of suitable habitat. To ensure their long-term protection, an ecologically and economically sustainable large scale habitat management is required. We evaluate the consequences of different forms of forest exploitation for the distribution of felids in Sabah. All results will be used to compile management and conservation plans for these threatened species in close collaboration with local counterparts.

Starting 2005, Andreas Wilting has worked on the Sundaland clouded leopard in Tabin Wildlife Reserve, Sabah. In 2007 he joined the Leibniz Institute for Zoo and Wildlife Research in Berlin, Germany. Azlan Mohamed has been conducting his master thesis in conservation biology at the Institute for Tropical Biology and Conservation (ITBC) at the University Malaysia Sabah (UMS) within this project since July 2008.

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Azlan Mohamed and Andreas Wilting in the field (Photo K. Povey)

Background

The continued depletion of tropical rainforests and the fragmentation of natural habitats have created substantial ecological changes which lead to a significant challenge for most carnivores. Due to their spatial requirements, carnivores are among the first to suffer when their pristine habitats are changed through human exploitation. On Borneo, in particular, the conversion of previously forested areas to primarily oil palm plantations puts substantial pressure on this biodiversity hotspot. Currently there is no information on the population status, or the effects of habitat fragmentation on any 5 Bornean cat species (Sundaland or Sunda clouded leopard *Neofelis diardi*, bay cat *Pardofelis badia*, marbled cat *Pardofelis marmorata*, flat-headed cat *Prionailurus planiceps* and leopard cat *Prionailurus bengalensis*) in Sabah, and basic information on their life histories and population ecology is still lacking. Almost all species have drawn very little attention in the recent past although 4 of the 5 investigated species are classified either as endangered (flat-headed cat and the Bornean endemic bay cat) or as vulnerable (Sundaland clouded leopard and marbled cat) in the IUCN red list 2008. Just one of the five cat species, the leopard cat, is classified as least concern on the red list and this species is also the only one which has been captured and radiocollared so far (Rajaratnam *et al.* 2007).

Camera-trapping photograph of a female clouded leopard from our second study site Tangkulap Forest Reserve. (Photo A. Wilting and A. Mohamed).

One of our focal species will be the Sundaland clouded leopard, the least known big cat species endemic to the islands of Borneo and Sumatra. Recently, the Sundaland populations were classified as a separate species, distinct from its continental relatives, *Neofelis nebulosa* (Buckley-Beason *et al.* 2006, Kitchener *et al.* 2006, Wilting *et. al.* 2007 a & b). Our previous research in Sabah demonstrated for the Sundaland clouded leopard that most potential habitat for carnivores is located in commercially used forest reserves with different forestry management strategies (Wilting *et al.* 2006). Therefore special interest of this project lies upon the assessment of the degree up to which the different cat species cope with anthropogenic changes of their habitats, as the survival of these species will largely depend on appropriate land management outside the totally protected forest reserves.

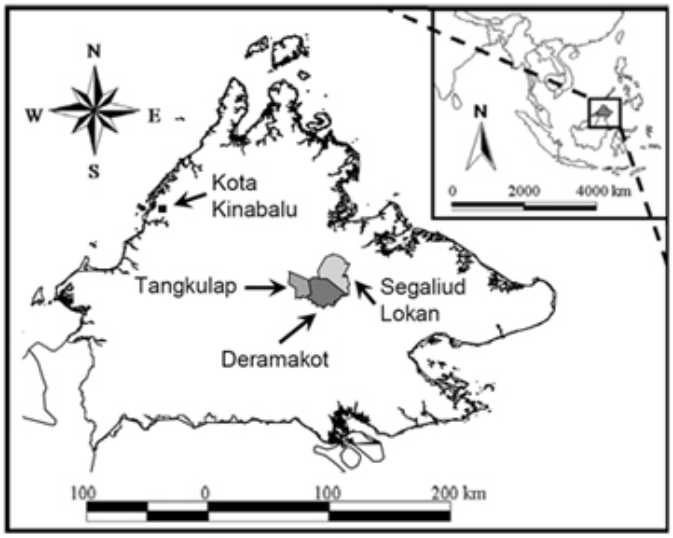
Specific aims

- Application of four non-invasive methods (camera-trapping, molecular scatology, track classification and night transect surveys) to study secretive carnivores in tropical rainforests. This will allow us to compare and possibly refine these methods and help us to develop a field manual for studying secretive carnivores in these rainforests suitable for local counterparts, wildlife and forestry agencies as well as university students.
- By the combination of different non-invasive methods we intent to calculate more precise abundance and density estimations for these endangered cat species.
- A comprehensive faecal analysis will help us to understand the feeding ecology and by this way the conservation needs of these species.
- We intend to contribute significantly to the understanding of the ecology of some of the least understood felid species. The inclusion of different habitats will provide a particularly balanced picture on the habitat requirements of each species.
- We will evaluate how commercially used areas may contribute to the conservation of felids and we will assess the impact of different forestry management procedures on these carnivores.

- In this context we will develop recommendations how to minimize the impact of selective logging on commercially forest reserves for the Sabah Forestry Department and the owners of land concessions. The implementation of low-impact selective logging strategies might help the forest holdings to develop an ecologically as well as economically sustainable management in a long-term perspective.
- Identification of suitable habitats and regions by applying GIS models and remote-sensing data for each species to assess their potential large-scale distribution in Sabah.
- Development of species specific conservation action plans for Sabah together with other researchers and all local stakeholders.

The strong local involvement of counterparts and stakeholders will provide an excellent opportunity to develop recommendations that are practical, relevant and likely to be received positively by those who could implement them.

In Deramakot Forest Reserve Reduced Impact logging (RIL) methods like skyline logging are applied to reduce forest damages (Photo P. Lagan).



Map of the three study sites (Deramakot Forest Reserve, Tangkulap Forest Reserve and Segaliud Lokan Forest Reserve) in the Malaysian part of Borneo.

Study site

All field work will be conducted in the Malaysian state of Sabah in north-eastern Borneo. Four study sites of approximately 120 km² each will be sampled for at least 6 months consecutively. Two study sites will be in Deramakot Forest Reserve (FR), one in Tangkulap FR and one in Segaliud Lokan FR, all representing commercial forest reserves under different management strategies. Deramakot FR is the flagship of the Sabah Forestry Department for a sustainable forest management and received the FSC certificate as the first forest reserve in Asia (Lagan *et al.* 2007). Tangkulap FR was managed under a conventional strategy in the past, and thus logging is likely to have had a bigger impact on the ecosystem. Today Segaliud Lokan FR is privately managed by the Kuching Timber Store (KTS-Plantations) and contains poor forests with four previous felling cycles, small timber plantations, but also areas which are less affected by past logging activities. These three neighbouring forest reserves have comparable soil conditions and elevations and yet are under different management procedures, providing a unique opportunity to assess the impact of different management procedures on the carnivore assemblage in Sabah.

A special attention is paid to herbivores distribution and abundance during lion monitoring. Prey abundance and distribution will be assessed and linked to lion distribution.

Methods

We apply non-invasive methods to minimize disturbance by handling animals.

Camera-trapping

We set up a network of camera-traps to collect scientific data on presence/absence, proportion of area occupied, abundance, and density of cats, but also of other larger photo-trapped mammals. Each station consists of two digital cameras facing each other to ensure that photographs of both flanks of the animal are taken to facilitate identification of individuals. The camera-traps are placed along park roads, former logging roads, rivers, creeks and game trails. We chose a narrow one to two km interval between the camera-traps, because we experienced during a preliminary study that by this interval even the smaller carnivore species, with supposable smaller home ranges, can be regularly recaptured. Based on previous experiences we visit each camera every ten days to download pictures and check batteries. We designed a steel-housing with sharp nails on top to protect our cameras against damages by elephants.

Azlan Mohamed setting up a camera-trap in Deramakot Forest Reserve. The cameras are kept in steel housings with sharp nails on top to protect them from damages by elephants (Photo K. Povey).

Day-surveys

We establish a network of transects to survey for animal tracks, droppings and other signs of activity or presence. Transect surveys are conducted along trails and former or existing logging roads, because dense habitats and ground leaves make sampling inside the forest impractical. Each transect is sampled at least every four days. The recorded tracks give us presence/absence information about the larger mammal species. In addition we collect carnivore faeces along the transects. Based on my previous experience we expect to collect about 200 faecal samples along transects at each study site. Parts of the samples are preserved for further molecular and parasite analysis at the laboratories of the UMS. The short time frame between the surveys on the same transects increases the probability that high number of the collected faecal samples will be suitable for DNA analysis. For species identification we will sequence a short portion of the *cyt-b*, because this sequence has frequently been used in studies on carnivores allowing the alignment with GenBank stored sequences. The remaining larger part of the scats is used to analyse the diet of the different carnivores. We isolate indigestible materials like hair, bones and teeth of prey.

Night-surveys

We are conducting night surveys along the transects, because of a more nocturnal activity pattern of most investigated species. These will give us additional information on the presence and abundance of carnivores and other mammal species and provide us with further information on activity and behaviour of these secretive carnivores. Night surveys are performed using a bright spotlight from the back of a pick-up car. A video camera is used to document the behaviour of the observed animals.

Habitat characterisation

Within each study site GPS coordinates will be taken and a digital map will be produced using GIS software such as ArcGIS 9.3 (ESRI Inc.). Around each camera-trapping station we describe the habitat characteristic along three 250 m (0°, 120°, 240°) line transects. Along these transects we measure different vegetation parameters: (1) the canopy height with a rangefinder, (2) the diameter breast height (DBH) of all trees above 10 cm of diameter in a distance of 2 m from the transect, (3) the canopy cover using a spherical densitometer, and (4) the understory vegetation density using a vegetation density board. Furthermore we record signs of disturbance like cutting signs or former logging roads, water resources as streams or water ponds, fruiting trees and pioneer as well as climax trees. As our camera-stations are evenly distributed we expect to get a very good overview about the habitat throughout our study sites.

View on Deramakot Forest Reserve (Photo K.Povey).

Research team in front of our house at the Deramakot district office. From left to right; Arthur (RA), John (RA WWF-Malaysia), Fabian (RA), Azlan and Andreas

Capacity building and education of local people

• In the course of this project research assistants from collaborating NGOs will be trained in the application of our methods. We hope that by the exchange of research assistance we will be able to standardize the applied methods, so that the results from different projects can be compared.

• Azlan Mohamed, a Malaysian student at the UMS and one of the principle researchers in this project, will complete his master degree in the project. After the field work Azlan will come to an oversea internship to the Institute of Zoo and Wildlife Research in Germany. There he will analyse his data to complete his thesis and he will gain further scientific experiences.

• We will offer internships for Malaysian biology students of the UMS to visit our field work project. These interns will stay at least four weeks to insure efficient training.

• At least three local research assistants will be employed. We train them in the applied methods to become para-ecologists after the duration of this study. Based on our experience these trained research assistants will be well equipped to get full time jobs as wildlife rangers or wardens for the government or NGOs after this project.

• We will assist researchers at the Institute for Tropical Biology and Conservation (ITBC) at the UMS to build up the capacities for their molecular laboratory. This includes joint applications for funding and a collaborative project on the phylogeography of cats and civets in Sabah. The collected faecal samples from our field work will also be analysed at the ITBC by Malaysian students and we will share our experience in carnivore genetics with these students.

• We will produce public awareness tools such as posters and brochures and give these to our partner agencies and to the villages and schools adjacent to the study sites.

Camera-trapping photograph of a leopard cat. This species is the most common cat species on Borneo and we regularly photograph this species with our cameras and observe it during night surveys (Photo A. Wilting and A. Mohamed).

Preliminary results

In the first seven months of this project we conducted all surveys in Deramakot FR. During our systematic camera-trapping effort we recorded four of the five Bornean cat species. Only the marbled cat was not recorded during that time, however during preliminary night surveys marbled cats were observed twice. One time the marbled cat was observed to climb headfirst down the tree trunk, an ability which was so far only described for the clouded leopard and the margay.

The photograph from the bay cat was a surprise for us, as this species have never been recorded for Deramakot before and to our knowledge this is the most northern record of a bay cat. Altogether Deramakot is one of the few areas on Borneo, where we can find all Bornean cat species. However all species except the leopard cat seem to occur in very low densities.

Camera-trapping photograph of a bay cat. This photo is the first confirmed record of this species in Deramakot FR (Photo A. Wilting and A. Mohamed).

Camera-trapping photograph of a flat-headed cat. Like the bay cat confirmed records if this species are very rare and since 2008 it is one of the few cat species classified as endangered on the IUCN red list
(Photo A. Wilting and A. Mohamed).

It is also remarkable that all our records of the flat-headed cat were from the north-western part of Deramakot which is flatter, with more water ponds, lakes and streams. The detailed analysis of the vegetation surveys together with the camera-trapping data will hopefully provide us with further information about the important habitat characteristics for this and the other cat species.

At the end of February 2009 we have started our surveys in Tangkulap FR, and before at the end of this year we will move to Segaliud Lokan FR.

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Project Information

Duration:	June 2008 – June 2011
Location (see map):	Deramakot Forest Reserve (FR), Tangkulap FR and Segaliud Lokan FR, Sabah
Sponsor(s):	Clouded Leopard Project & Point Defiance Zoo & Aquarium, WWF-Germany, WWF-Malaysia, Zoological Society for the Conservation of Species and Populations (ZGAP), Minnesota Zoo, Cleveland MetroParks, Nashville Zoo, Houston Zoo, Association for Wild Cat Conservation, Interessensgemeinschaft artgerechter Raubtierschutz e. V.
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	<u>Project team members</u> Azlan Mohamed, Master student ITBC, UMS & WWF-Malaysia John Japil, Assistant (seconded to the project ConCaSa from WWF-Malaysia)
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