Gorilla Journal

Journal of Berggorilla & Regenwald Direkthilfe

No. 37, December 2008

Rapid Decline in the Largest Group of Mountain Gorillas

Important Forest Corridor for Gorillas under Threat

A New Approach to Gorilla Conservation: Gorilla Guardians

New Gorilla Population Estimates in Northern Republic of Congo

BERGGORILLA & REGENWALD DIREKTHILFE

CONTENTS

Organization Address:
Berggorilla & Regenwald Direkthilfe
c/o Rolf Brunner
Lerchenstr. 5
45473 Muelheim, Germany
Fax +49-208-7671605
E-mail brunner@berggorilla.org
Website:
http://www.berggorilla.org
Bank Account:
Account number 353 344 315
Stadtsparkasse Muelheim, Germany
Bank code number 362 500 00
IBAN DE06 3625 0000 0353 3443 15
SWIFT-BIC SPMHDE3E

Authors of this Issue

André Byamungu Ngurube studied science in Kisangani and worked at the CRSN in Lwiro. He is now Coordinator of the Walikale Project.

Don Cousins has had a lifetime interest in the great apes. He has worked in Twycross and Chessington zoos, and in 1957 visited Gabon to look for gorillas. He has researched and published widely on the subject.

Ofir Drori founded LAGA to save endangered animals in Cameroon by law enforcement. LAGA tries to catch and prosecute poachers that deal with endangered animal species.

Dr. James Higham is a post-doctoral researcher at the University of Chicago. His research has included projects on baboon ecology at Gashaka-Gumti National Park and drill endocrinology.

Inaoyom Imong has been working with WCS Nigeria as a research officer since 2004 and is planning a Ph.D. study of Cross River gorillas next year.

Mary MacKenzie is the Technical Manager at Roehampton University. Her responsibilities include operational management of the Life Sciences laboratories, GIS and cartography, and fieldwork support.

Richard Malonga is a conservation scientist with WCS. He is the Director of the TRIDOM – Odzala Project in northern Republic of Congo.

Denis Ndeloh Etiendem just graduated from the Vrije Universiteit Brussel and is currently preparing his Ph.D. research on Ecological Studies of Cross River gorillas in Cameroon.

Aaron Nicholas is the Director of the *Wildlife Conservation Society*'s Takamanda-Mone Landscape Project, with the core focus of conserving the Cross River gorilla in Cameroon.

Radar Birhashirwa Nishuli has been working in the Kahuzi-Biega National Park since 1985. He was the Head of the Environmental Education Unit and is now Provincial Director and responsible for Kahuzi-Biega.

Dr. Hugo Rainey is a conservation scientist with WCS. He was the Director of the Lac Télé Community Reserve Project in Congo. He is currently a technical advisor for WCS in Cambodia.

Dr. Emma Stokes is a conservation scientist with WCS. She spent 10 years in Africa working on great ape research and conservation, and coordinated the monitoring program in northern Congo. She is currently coordinating tiger monitoring activities for WCS in Asia.

Amelia Stott is an international volunteer at the WCS Takamanda-Mone Landscape Project.

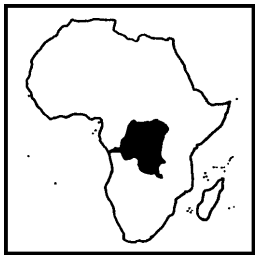
Veronica Vecellio has been working at Karisoke since 2005 and became Gorilla Program Coordinator in 2007. Before she went to Rwanda she worked in CAR, DRC and Gabon.

Dr. Ymke Warren is the Research Coordinator for WCS's Takamanda-Mone Landscape Project with responsibilities that include overseeing ongoing research in the Kagwene Sanctuary and field surveys in general.

Ruth Wiseman is interested in the research and conservation of endangered apes. She undertook GIS habitat mapping of the Kagwene Gorilla Sanctuary, Cameroon.

Dr. Kathy L. Wood conducted her Ph.D. research at the Drill Rehabilitation and Breeding Center in Nigeria and is currently working with *Pandrillus* on a planned reintroduction of drills to the Afi Mountain Wildlife Sanctuary.

Gorilla Journal 37, December 2008
Editor: Dr. Angela Meder
Augustenstr. 122, 70197 Stuttgart, Germany
Fax +49-711-6159919
E-mail meder@berggorilla.org
Translation and Proofreading: Ann DeVoy, Bettina and Andrew Grieser Johns, Colin Groves
Cover: Interaction between the Pablo group and Beetsme's group
Photo: Veronica Vecellio (DFGFI)



D. R. CONGO

A New Gorilla Group

The history of the "new gorilla group" in the Kahuzi-Biega National Park dates from 2004 when WCS conducted a survey of the area. During that year, the group was observed for the first time in the Mugaba tourism area. On a second occasion, it was observed by patrolling rangers in the areas of Madirhiri and Mugaba.

Group Composition

Due to the considerable size of the group, the then Conservateur Principal of the park, Bernard Iyomi, decided to monitor the group regularly, with responsibility for the supervision being given to the brave ranger Kaboyi Birhanenwa. He identified 17 group members, 1 silverback, 1 blackback, 12 adult females and 4 infants.

Why do we call this group "new"? Simply because it is the latest gorilla group to be discovered since the various wars devastated the region and killed and dispersed the long-standing gorilla groups. To date the group has not yet been given a name.

From 2005 to 2006, the group was under the supervision of the guide Munganga Mulengezi and its size did not change. From 2006 to date, the daily tracking of the group has been the charge of the guide, and head of team, Ntavuna Mishebere, who is a Pygmy and the son of the old tracker Mishebere who passed on the responsibility of team head to his son. Because his people believe in the value of nature, and in order to ensure that this new group remains protected, Ntayuna has promised that he will monitor it closely. And he has been doing just that, every day.

On April 22, 2008, we observed the group to split up into two groups. One male left with some other group members to form his own group.

Currently, there are 4 individuals in the old silverback's group, 2 adult females and 1 infant, in addition to the silverback himself. There are 13 individuals in the group of his son, which we are temporarily calling the "new group of the son". The son's group contains the silverback, 6 adult females, 3 juveniles and 3 infants.

Composition of the gorilla groups in Kahuzi-Biega (30 September 2008)

Group	silver-backs	black-backs	adult females	subadults m	subadults f	juveniles m	juveniles f	infants	**total**
Chimanuka	1	0	17	0	0	1	0	12	**31**
Mankoto	1	3	12	1	2	0	0	0	**19**
Mugaruka	1	0	0	0	0	0	0	0	**1**
Birindwa	1	0	6	1	2	0	0	1	**11**
Langa	1	0	8	0	0	0	0	5	**14**
Mpungwe	1	0	5	0	0	0	0	0	**6**
new group	1	0	6	0	0	0	0	1	**8**
Mufanzala	1	0	8	2	2	0	1	5	**19**
Ganywamulume	1	0	5	0	0	0	0	1	**7**

What Can Be Observed in the Field?

The old silverback continues to keep the rest of his group together, while his son has just lost 5 females to his rival Madirhiri. After his loss to Madirhiri, we have observed him join the Mankoto group which, unexpectedly, has accepted him without any problem. This increased the number of individuals in the Mankoto group to 19, including 1 silverback, 3 blackbacks, 3 subadults and 12 adult females.

The presence of the "new group of the son" within the Mankoto group has had the effect of making the group more sensitive to the presence of people. Apart from being followed regularly by our trackers, the son has not yet habituated to the presence of humans and therefore causes the females of the Mankoto group to flee.

Future Outlook for these Groups

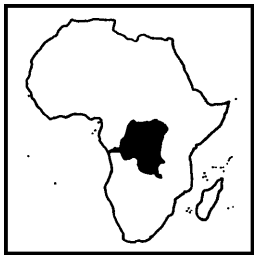
– Currently, we can offer tourists visits to two gorilla groups and the single male Mugaruka. We need to think about how to habituate the "new group of the father" in order to reduce pressure on these two groups.
– We need to approach well-meaning persons to find the funds for the organisation of a name-giving ceremony for the new group.
– We need to increase the number of trackers, which is very small at the moment.

Radar Nishuli

Another Mt. Tshiaberimu Gorilla Dies

Musangania, a 5-year-old gorilla from the Lusenge family, was found dead near the Burusi post on 30 August 2008. His belly was inflated, he had traces of blood in the mouth, lesions on the lips and foamy saliva coming from the mouth. He had been seen the previous day playing up in a tree, at a height of 9 m – probably he fell from the tree afterwards and died. The autopsy revealed that Musangania died from a brain hemorrhage and deformation to the front, right side of the head. His tragic death reduced the gorilla population on Mt. Tshiaberimu to 18 individuals.

Summary of Jean-Claude Kyungu's blog on WildlifeDirect

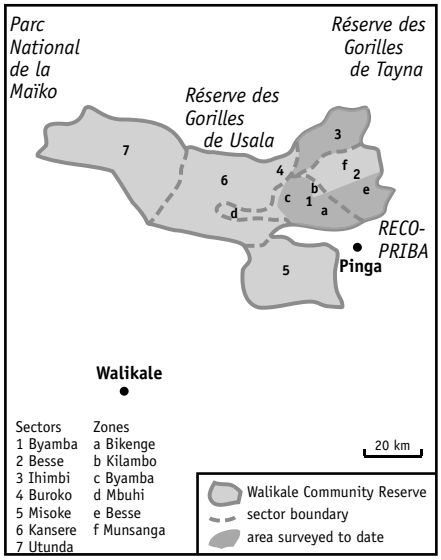


D. R. CONGO

Another Way to Protect Biodiversity – Community Conservation

For a number of years the Congolese government has been campaigning in support of endangered animal and plant species, and has created a new conservation policy, which aims to designate 15% of the country as protected areas. Biodiversity conservation is promoted both inside and outside these protected areas, but as there is no organised monitoring structure outside of them, the legally protected species remain liable to uncontrolled exploitation, which may in the end lead to their extinction. Walikale Reserve, one of the last remaining habitats for eastern lowland gorillas, is not designated as a protected area.

Given this situation, the Walikale population has quickly understood the danger threatening its gorillas and decided to help protect them by joining forces and creating conservation associations to protect areas where some gorillas are still living. This led to the creation of the Walikale Gorilla Community Reserve (RCGW), an association working in collaboration with the London-based NGO, *The Gorilla Organization*.



The main aim of the RCGW is to protect gorillas and their habitat and to promote the socio-economic development of the populations living around the reserve. This is made possible by the financial and scientific support of *The Gorilla Organization*. The funds allocated are being used for monitoring tasks and development projects.

The Walikale Gorilla Community Reserve is located approximately 92 km from the Virunga National Park and 150 km from the Kahuzi-Biega National Park; the Maïko National Park, the Tayna Gorilla Reserve, and the RECOPRIBA/RPKI reserve are very close.

The Walikale Gorilla Community Reserve has an equatorial, tropical climate. It extends between 0° 52.346' S, 28° 18.755' E and 0° 42.921' S, 28° 48.358' E, over an area of around 70,000 ha. Its forest is mixed, on clay soil, with hills, valleys and numerous rivers. The summits of the hills are occupied by the *Cyanometra alexandrii* (Caesalpiniaceae) and *Piptadeniastrum africanum* (Euphorbiaceae) group, and the valleys (periodically flooded) are dominated by species which grow in hydromorphic soils, such as *Uapaca guineensis* (Euphorbiaceae), *Funtumia africana* (Apocynaceae), *Alcornea cordifolia* (Euphorbiaceae), *Panda oleosa* (Pandaceae) etc. The forest comprises 3 separate strata:

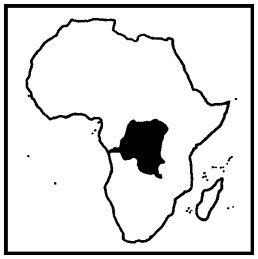
– the top stratum, of varying composition, with the species listed above;
– the middle stratum, constituted mainly by several species of bushes;
– the lower stratum with ferns including *Pteridium aquilinum* and other *Pteridium* species (Pteridae); species of Commelinaceae (*Palisota schweinfurthii*, *Palisota ambigua*); Zingiberaceae *(Aframomum sanguineum)* and Costaceae *(Costus lucanusianus)*; and others.

In addition to recording the vegetation, the monitoring work carried out in some parts of the reserve has allowed a gradual census of the gorillas. Each evening the gorillas make a nest of leaves in barely 5 minutes, in which they sleep. The nests are found either on the ground or in trees. Gorillas leave their dung in their large nests and then make a new nest the following night. Chimpanzees are also found in the Walikale Reserve and they build their smaller and highly elaborate nests (supported on forked branches, crisscrossed by bent twigs with a mattress of leaves) that are always in trees without dung.

To carry out monitoring work, camps are constructed in the reserve using tarpaulins and tents and material found on site (sticks, creepers etc.). We use these camps as rest places after monitoring and this is where we usually spend the night.

In the morning we form 2 teams of 5 people. Each team sets off in a different direction and returns to the camp in the afternoon around 4 p.m. Another group of 2 people stays in the camp to do the cooking. The stay in the forest often lasts at least a week, sometimes two, if we have to cover large distances. We leave the camp at 7 a.m. in two different directions following the topography of the reserve, either east-west or north-south, to avoid following the same families at the same time. It rains a lot in the region and there are many rivers so each person wears a pair of boots and a waterproof coat.

Once away from the camp we start looking for fresh gorilla tracks, which are then followed to the location of the recent nest sites; only one-day old sites are considered. The area of the site depends on the size of the family. This allows us to count the number of individuals capable of making nests (weaned individuals), i.e. the number per family, as it is not possible for 2 or 3 families at nest on the same site.



D. R. CONGO

Most nests are made in trees that are 10–30 m tall, although it is not rare to find nests made on the ground, particularly for the silverback and females with babies. Photographs of the nest sites and other elements of the ecosystem are taken, and geographical data are collected thanks to the support of the TUSK TRUST, which constantly helps us to obtain equipment such as digital cameras and GPS units. The time of the recording is also noted using an ordinary watch. Overall we have already observed 78 families of gorillas with a total of 721 individuals, the average being 9 individuals per family. These gorillas are still wild; their habituation to the presence of humans is not yet envisaged for strategic reasons, as there are large numbers of weapons in the region due to the presence of armed groups. At this stage habituating gorillas to the presence of humans would merely contribute to their extermination.

Apart from the gorillas, other animal species in the Walikale Gorilla Community Reserve include: *Cercopithecus mitis*, *Cercopithecus ascanius*, *Pan troglodytes*, *Rhynchocyon cirnei*, *Potamogale velox*, *Manis gigantea*, *Funisciurus* sp., *Cricetomys emini*, *Atherurus africanus*, *Panthera pardus*, *Syncerus nanus*, *Hyemoschus aquaticus*, *Cephalophus* sp., *Dendrohyrax arboreus*, *Potamochoeurus porcus*, *Civettictis civetta* ...

The local population contributes significantly to protecting gorillas and their habitat; they have understood that if they do not get involved, the gorillas may disappear before their very eyes. This explains the strategy used, which consists in getting them to participate in the management and protection of the reserve. This is why we have allowed them to give the authorisations needed for outsiders to go into the forest, in accordance with their customs. The local people themselves decide which people to recruit as trackers, and they are all from within the communities.

Our vision is to respond to people's needs and to ensure the durability of the local resources, whilst at the same time conserving the biodiversity of the various types of ecosystems. It is in this context that we have helped with the rehabilitation of the Institut Technique Médical de Pinga, the construction of the Byamba primary school and that of Ihimbi (construction in progress), the rehabilitation of the RCGW liaison office in Pinga, and the distribution of footballs in some schools and football teams in the region, for leisure activities. Many more development projects are envisaged to support gorilla conservation such as livestock projects, agricultural projects, and improvement of the livelihoods and literacy of the local population.

For conservation, genetic studies are planned on the gorillas, their intestinal parasitaemia, the gorillas' diet, and the biological diversity system of the reserve.

Nevertheless, there are a few difficulties which do not make our task any easier:

– the presence of groups of armed foreigners within the zone in which the reserve is located: the Congolese executive power is only symbolic there, security being in the hands of these armed groups;
– the state of the road between Goma and Pinga: to gain access to Pinga two dangerous zones occupied by different armed groups need to be crossed, and due to the very poor state of the road between Mwesso and Pinga as well, we easily need 3 hours to cover 36 km;
– the absence of a communications network: once in the field there is no longer any contact with the outside world; this leaves us exposed to a number of risks with no hope of being able to call on anyone or anything.

André Byamungu

Return of Rangers

On 28 August 2008, Laurent Nkunda launched new attacks in North Kivu. Over the next months, he attacked many settlements and forced thousands of people to flee; his troops, as well as those of the other warring parties, committed atrocities among the population including mass executions.

The Virunga National Park has been involved in the fighting again. Nkunda had occupied most of the Mikeno Sector (where the mountain gorillas live) since September 2007; he now expanded his zone of influence and took over control of the whole Mikeno Sector as well as of the Sarambwe Reserve. At the beginning of October, the rangers in Rumangabo station, the headquarters of the national park, prepared to be evacuated. Although Nkunda attacked Rumangabo on 9 October, he did not take over the station, but when his troops returned on 26 October, they occupied the station and the rangers had to flee into the forest for their lives. They were eventually brought to a refugee camp with their families.

On 21 November, 70 rangers were finally able to return to Bukima station, which had been occupied by Nkunda's troops since September 2007, after long discussions between the park management, the ICCN headquarters and the rebels. On 25 November, the rangers started their patrols through the forest to find the habituated mountain gorilla groups. So far, they seem to be O. K.

Details in the blog of the Virunga Park (**www.gorilla.cd**).

RWANDA

Rapid Decline in the Largest Group of Mountain Gorillas

Pablo's group is the largest habituated group of mountain gorillas in the Volcanoes National Park, Rwanda, or anywhere in the world. The group was formed in 1993 and since then it has been regularly monitored. Its size far exceeds the usual range for the species, where the mean group size is normally 11.4 (Gray at al. 2005).

The group had gradually grown from 20 individuals in 1993 to its maximum size of 65 during 2006, but this exceptional size was maintained for only a few weeks before the group experienced a rapid decline over the following 8 months, after which it stabilized at 43.

This is the first time a group decline of this magnitude has ever been recorded in any population of gorillas. The initial decline commenced with an episode of infant mortality in the month immediately after the group reached its maximum size. Following this, an unusually high number of adult females transferred out of the group, including all of the females that had recently lost an infant. To a lesser extent, adult male dispersal and adult mortality also contributed to the decline.

Mountain gorillas live in social and cohesive groups led by one dominant male; other adult males, if present, are subordinates and play an important role in the group's protection and cohesiveness.

Pablo's group is a multi-male group including 5–7 silverbacks (adult males >12 years old) and 5–6 blackbacks (adult males from 8 to 12 years old). The number of adult females (females >8 year old) decreased from 20 to 10 when the group stabilized its size. The remaining proportion consists of immatures less than 8 years old.

When the group numbered 65 individuals (60 being independent travellers), unusual dynamics related to the large group size and consequent group spread were observed. As the size increased, the group as a whole became less controllable by the dominant male, and the formation of subgroups occurred at high frequency. The subgroups were always led by an adult male and were joined by varying numbers of females and immatures, and often followed by other adult males. Subgrouping is a rare behaviour in mountain gorillas and documented only in one case of male dominance change (Ndagijimana et al. in prep.), a fact that makes the observed events in Pablo's group a new opportunity in investigating social behaviour of this species. Such events can be explained by the changed role of subordinate males, in which they become extremely important to avoid an excessive group spread of vulnerable individuals, such as females and immatures. At the same time, the subordinate males began to initiate personal strategies for escalation in rank.

Most commonly, the main group was divided into two subunits ranging at short distances, with one led by the dominant silverback and one by the second-ranking silverback. On seven occasions the smaller group of 8–11 individuals, led by the beta-male, left the main group and moved as an independent subunit for several days (maximum 2 weeks) before rejoining the main group. The reunions were always peaceful, without conflicts between the two silverbacks. The same strategy was copied by the next-ranking silverbacks and once by a blackback as well. In all cases the subgroups rejoined the group after a few weeks.

The period of maximum instability that the group faced (associated with high frequency of infant mortality) was characterized by intra-group infanticide. Infanticide by a group member has been observed on only one other occasion in mountain gorillas, but in that case it was associated with the death of the dominant silverback (Watts 1989). In the present case, a young silverback, fourth-ranking in the male hierarchy, killed an 8-month-old infant and became very aggressive toward females. His ambition in forming his own group culminated after 7 months when he left the group followed by 4 females and one blackback.

Remarkable in Pablo's group has been the high frequency of female transfers, after which the group

The Pablo group with the dominant silverback Cantsbee in the center
Photo: Veronica Vecellio (DFGFI)

RWANDA

reached the stable size of 43 individuals. The resulting group composition seems to have found a new equilibrium, though this was recently altered by the disappearance of 34-year-old Pablo, the second-ranking silverback, in July 2008. His presence and experience were crucial in the group's social dynamic, and his disappearance resulted in female competition for male proximity and in ranking escalation of the young subordinate silverbacks.

Despite its decline in size, Pablo's group remains the largest group of mountain gorillas, and it provides a unique opportunity to compare aspects of behaviour at different group sizes and composition.

Veronica Vecellio

References

Gray, M. et al. (2005): Virunga Volcano Range mountain gorilla census, 2003. Joint organisers' report, UWA/ORTPN/ICCN

Ndagijimana, F., Vecellio, V. & Fawcett, K. (in prep.): Dominance change and related group dynamics in a mountain gorilla group, Parc National des Volcans, Rwanda.

Watts, D. P. (1989): Infanticide in mountain gorillas, new cases and a reconsideration of the evidence. Ethology 81, 1–18

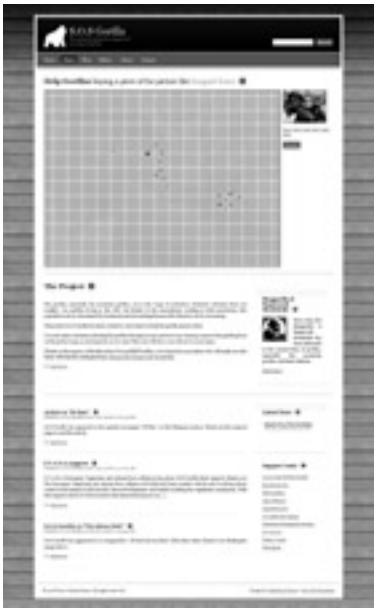
On 13 July 2008 Pablo disappeared, together with the 14-year old silverback Giraneza. It is assumed that these two males fought with the young silverback Inshuti and that Pablo did not survive the injuries sustained in the fight. At 34 years of age, he was the second-oldest known mountain gorilla male. Giraneza later rejoined the group but was driven out by another male.

Pablo was born in 1974 to a female in group 5. The observing scientists noted that he was particularly playful in nature. As a blackback he liked to try out his growing strength on people. When Ziz, the leading silverback of group 5, died in 1993, the group split up but the two silverbacks Pablo and Cantsbee stayed together. Although Cantsbee soon assumed the dominant position in the family, the group continued to be called "Pablo's Group".

Summarized from reports by the Dian Fossey Gorilla Fund International

The dominant silverback Cantsbee with females behind him

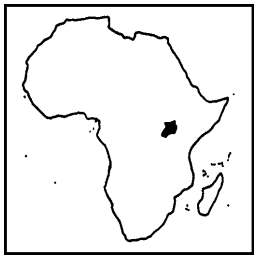
Photo: Veronica Vecellio (DFGFI)



S.O.S Gorilla

S.O.S Gorilla was created by Hector Prat of Barcelona, to raise funds for gorilla conservation. It is a website – **www.sosgorilla.com** – where donations can be made. Hector, supported by the Barcelona Zoo through Maria Teresa Abelló, decided to donate the funds to *Berggorilla & Regenwald Direkthilfe*.

People can donate money can do this by "buying" pixels of a gorilla picture; the picture will be gradually discovered as people buy the pixels (through PayPal) and, afterwards, the URL or names of the people who have paid for it will be shown, as a motivation to collaborate. The cost is 1 €/pixel, and the picture (600 x 800 pixels) is sold in 25 pixels squares, so a minimum of 25 € is required to collaborate. When the whole picture is finally "sold", it will have collected 480,000 €.



UGANDA

New Gorilla Groups Habituated in Bwindi

In July, the *Uganda Wildlife Authority* (UWA) started to take visitors to the two newly habituated gorilla groups in the Bwindi Impenetrable National Park. The habituation had begun in 2006: trackers followed them on a daily basis. At the same time they collected data on their feeding habits, personality traits, temperament, physical features, general health, grooming and mating habits, and how they react in different situations.

Before "real" tourists visit the gorillas, "mock tourism" is being carried out over a period of several months. This means that different people and objects are systematically introduced to the gorillas by the trackers for adaptation.

The two new groups are the Bitukura group in Ruhija and the Nsongi group in Rushaga. They were habituated because occasionally not enough gorilla tracking permits were available, especially from June to September and from November to February. With the two new groups, the number of available permits per day will increase to 48. Bookings to the Bitukura group started in September.

Summary of various articles published from July to October 2008

Another Set of Gorilla Twins Born

Kweitonda in the Nkuringo group, Bwindi Impenetrable National Park, gave birth to twins recently. They were observed for the first time on 2 November. This is the second case within the Nkuringo group; the first twins were born during the Christmas season of 2004.

Summary of an article by Gerald Tenywa in New Vision*, 30 November 2008*

Moving across the Border

The Rushegura group was the second gorilla group habituated to tourists in Bwindi – 14 years ago. In mid-2008, this group moved across the border to the Sarambwe Reserve in the Democratic Republic of the Congo; it has stayed there for most of the time during several months, and nobody knows if and when it will return to Uganda.

A female of the Rushegura group visiting a tourist lodge in Buhoma
Photo: Uwe Kribus

Meanwhile the Nyakagezi group in the Virunga Volcanoes returned to Uganda after having spent most of its time in Rwanda and Congo during the past few years. They now seem to have moved the center of their range back to the Mgahinga Gorilla National Park.

Ranger-based Monitoring in Uganda Must Continue

During "ranger-based monitoring" the rangers collect information on gorillas and their habitat while on their daily patrols. These data are added to a central database, ensuring that the rangers always know where the gorillas are ranging and enabling them to solve problems more easily.

Training for ranger-based monitoring started in 1996 in the Virunga Volcanoes; the collected data have been important for research on the ecology of the gorillas and help the national park management to improve the conservation of the gorillas and their forests.

We want to support the Ugandan rangers with equipment that they need to continue this important work for one year.

Bank Account:
Account number 353 344 315
Stadtsparkasse Muelheim/Ruhr
Germany
Bank code number 362 500 00
IBAN DE06 3625 0000 0353 3443 15
SWIFT-BIC SPMHDE3E

Address for cheques:
Berggorilla & Regenwald Direkthilfe, c/o Rolf Brunner
Lerchenstr. 5
45473 Muelheim, Germany

CROSS RIVER

Important Forest Corridor for Gorillas under Threat

The Afi River Forest Reserve is an area lying between two sites in Nigeria where the Cross River gorilla is known to occur – the Afi Mountain Wildlife Sanctuary (AMWS) and the Mbe Mountains. This reserve is one of the largest remaining forest blocks in Cross River State outside of the nearby Cross River National Park and covers approximately 380 km^2 at the head waters of the Afi River in the northern part of Cross River State. The AMWS, contiguous to the reserve, is known to be inhabited by a small sub-population of the Cross River gorilla *(Gorilla gorilla diehli)*. To the east of the reserve, Cross River gorillas can be found in the Mbe Mountains and in the Okwangwo Division of the Cross River National Park where two other gorilla groups are known to occur, but the Afi sub-population is in danger of becoming isolated from these.

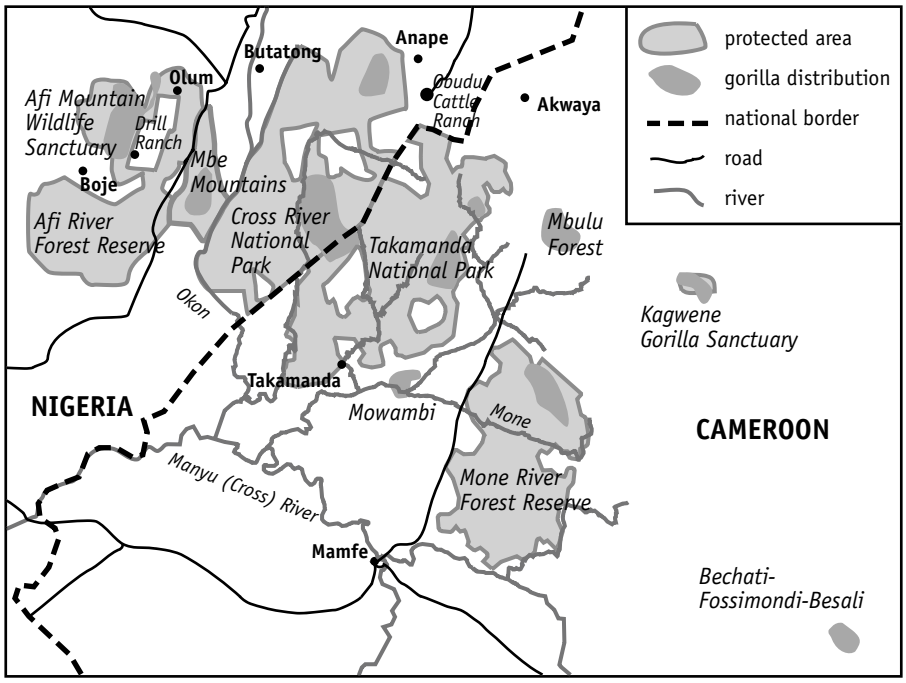
The large Afi River Forest Reserve is an area of lowland forest and ridge forest that is thought to be rarely used by gorillas. In comparison, the AMWS and the Mbe Mountains have received relatively more conservation attention. In fact, the AMWS was created from the northwestern corner of the reserve, and was gazetted as a wildlife sanctuary (the AMWS) in 2000 for the protection of the westernmost sub-population of Cross River gorilla. This sanctuary also protects other endangered primate species, including the Gulf of Guinea Chimpanzee, and the drill. The Mbe Mountains also enjoy an increased level of protection via a community-based conservation initiative supported by the *Wildlife Conservation Society* (WCS) in Nigeria (see *Gorilla Journal* 30, June 2005 and 36, June 2008).

The neglect of the Afi River Forest Reserve, despite its importance as a corridor between the AMWS and the Mbe Mountains, has resulted in an increase in human activities there (such as farming, logging and hunting), and these have altered a considerable portion of the forest and may have isolated the gorillas there. Adding to this isolation of the Afi sub-population of gorillas has been the creation of a paved highway that passes between the Afi and Mbe Mountains. The long-term survival of the Cross River Gorilla in this part of Nigeria will ultimately depend to a large extent on their ability to have regular genetic contact with other gorilla groups, and the Afi River Forest Reserve is an important forest corridor that allows for such inter-group migration; the increase in human activities occurring there has resulted in destruction of some of the remaining forest, and the forest reserve is now seriously threatened.

The Afi River Forest Reserve survey team

In recognition of this, four NGOs (WCS, *Pandrillus*, *Fauna and Flora International* and *Nigerian Conservation Foundation*, NCF), working in collaboration with the Cross River State Forestry Commission (CRSFC), decided to conduct the first systematic survey of the Afi River Forest Reserve. Up to that point, there had been no systematic data collection on wildlife abundance or human pressures within the reserve. This lack of reliable up-to-date information meant that objective and effective management within the larger region was difficult. The survey's objectives were:

– to assess the scale and distribution of human activities in the reserve,



CROSS RIVER

– to assess the feasibility of creating a corridor of forest connecting the AMWS to the Mbe Mountains for the long-term conservation of the Afi gorillas,
– to obtain baseline data for monitoring wildlife populations within the reserve,
– to assess the abundance and distribution of selected non-timber forest products and economically important tree species in the reserve.

Over a period of 3 months (February to April of 2008), a field team comprised of staff from the CRSFC, WCS, NCF and *Pandrillus* carried out the survey. Representatives of local communities accompanied the team across guided recce walks that covered a total of 27 transects and 82 km in the reserve.

Starting from the major Ikom–Obudu Highway to the east, and from the Olum–Boje Road to the west, the team travelled through the forest to the Afi River. All evidence of wildlife, farming, logging and hunting along transects was recorded. Additionally, at each 200 m along the recce path, the team made an assessment of the vegetation in 20 m radius plots, allowing for an overall picture of habitat quality throughout the reserve.

Results from the survey showed extremely high levels of farming, logging and hunting activities within the reserve. For example, encounter rates of approximately 3 farms and 3 signs of logging per km within a forest reserve are unquestionably high; such a high encounter rate is a clear indication that, unless concerted conservation action is taken to reverse the current trend, the entire reserve could soon become converted to farmland in the foreseeable future.

The northern part of the reserve appeared to be the most affected; over one third of the reserve, mostly in this northern area, has already been converted to farmland and more forest area is being opened for farming in some of the relatively less disturbed areas, leaving only small patches of forest.

Although human population density around the entire reserve is high and demand for agricultural land and forest products is likewise high, it appears that factors such as the traditional land tenure system, which ascribes ownership of an area of forest to the first community member to clear it, and very weak, almost nonexistent enforcement of forestry and wildlife laws in the reserve have contributed significantly to this extensive encroachment. Many farms located deep inside the reserve (far from human settlements) were reported by local farmers to have been cleared in order to lay claim of ownership on the land even though the land was not actually needed in the short term. In many cases such farms receive very little attention from their owners except few occasional inspection visits to prevent counter claims from other community members.

In contrast to the lack of good tracts of forest in the northern part of the reserve, a substantial tract of relatively good primary forest remains in the southern part. This area could serve as a wildlife corridor if adequately protected, although the prevalence of a relatively high level of logging, as well as hunting evidence, is a serious and immediate threat. In particular, logging activity is now focused where forest resources are relatively abundant, so that even the remaining tracts of relatively good forest in the reserve are under threat of destruction if urgent steps are not taken to discourage further exploitation.

Analyses which looked at the age of logging evidence showed that there has been an increase in logging activities in the last 5 years. Local efforts to stop logging have not been effective: for example, an anti-logging gate constructed on one of the main entrance routes into the reserve by the local law enforcement agency, CRFSC, appears to have had little effect in discouraging illegal logging. A number of large logging roads used by tractors were recorded during the survey.

Although the survey found relatively low levels of hunting in the reserve, wildlife evidence was extremely scarce. Most frequently encountered were three species of duiker (the blue duiker, *Philantomba monticola*, the bay duiker, *Cephalophus dorsalis*, and Ogilby's duiker, *C. ogilbyi*), the red river hog *(Potamochoerus porcus)*, and the African brush-tailed porcupine *(Atherurus africanus)*. Although large species such as the yellow-backed duiker *(C. silvicultor)* were also recorded during this survey, their continued survival would require urgent anti-poaching measures since their large body size makes them a target for hunters.

A pile of sawn logs and a logging trail in the reserve

A newly burned farm clearing within the forest

CROSS RIVER

The absence of ape and monkey species within the survey area (except for a single record of a distant mona monkey, *Cercopithecus mona*, vocalization) is a cause for concern. Signs of the larger primates present in this region of Nigeria are fairly easy to recognize and could not have been missed by the survey team made up of people with considerable field experience. Our conclusion is that current hunting pressure might be too high for primates to survive even within the remaining suitable habitat in the reserve.

The results of this survey have drawn attention to the level of habitat disturbance in the Afi River Forest Reserve and have highlighted some important issues regarding the long-term survival of the Cross River gorilla and other primate populations within the AMWS. If action is taken to slow the spread of farms and halt illegal logging, the Afi River Forest Reserve may still serve as a wildlife corridor between the AMWS and the Mbe Mountains. Our results also suggest that the southern part of the reserve offers the best option for a possible wildlife corridor, but continued survival of this forest is not yet assured. Unless the current rate of habitat destruction is reduced, this critical link will be lost. The obvious consequence will be further isolation of the small Cross River gorilla subpopulation within the AMWS.

The data from this initial survey have resulted in a number of recommendations for this important corridor area. First and foremost, local law enforcement agencies (in particular the CRSFC with support from relevant local and international NGOs) need to urgently review local enforcement strategies and gain better control over logging and farming activities in the reserve, and preferably to eradicate these activities completely. Next, any efforts to create a wildlife corridor in the reserve connecting the AMWS and the Mbe Mountains should focus on the southern part of the reserve, where most of the remaining relatively undisturbed forest occurs. Additional surveys of this area may be necessary to obtain a more complete picture of the best possible wildlife corridor. Also, a separate survey dedicated to mapping farms in the reserve may be necessary to obtain more detailed information on their nature and extent. Finally, follow-up surveys could be used to monitor any changes.

Inaoyom Imong and Kathy L. Wood

A New Approach to Gorilla Conservation: "Gorilla Guardians"

A new community-based approach to the conservation of some of the most remote (and hence least protected) groups of Cross River gorillas is currently underway in Cameroon. "Gorilla guardians" are in the process of being selected from the local population in villages close to target gorilla sites, with the overall goal being to strengthen monitoring, awareness, and protection of Cross River gorillas and other endangered species, through an approach that encourages greater community participation in conservation. In particular, the creation of these gorilla guardians provides another step towards the general sensitisation of the local people living in the Takamanda-Mone Landscape, as many of the villages earmarked to be involved in this initiative fall outside the range of current WCS-led conservation education activities.

Six villages have been selected initially to participate, two from each of the three remote gorilla sites – the Mowambi Hills, the Mbulu Forest and northern Mone – that we are targeting for improved conservation action. An estimated 60 or so gorillas are thought to be present in these sites, representing perhaps as many as 50% of all remaining Cross River gorillas in Cameroon (the total estimated number of Cross River gorillas in Nigeria and Cameroon is thought to be between 200 and 295 individuals; Oates et al. 2007). These gorillas are the most vulnerable, as they inhabit forests with little or no legal protection and where hunting pressure is particularly high. The gorilla guardian villages have traditional ownership over the forest areas where the gorillas occur, and their traditional councils have participated in the selection of the gorilla guardians, providing a strong sense of community involvement from the beginning. Due to the remote nature of these sites, survey work and ongoing gorilla monitoring in these forests has historically been limited, another good argument for involving local communities who live on the gorillas' doorstep.

The gorilla guardian approach aims to promote the conservation of these gorillas in three important ways. First, the appointed guardians will act as a direct link between conservation authorities and their sites, reporting any confirmed incidence of gorilla (and chimpanzee) hunting to government officials and WCS quickly. This will help strengthen the application of wildlife laws. Second, gorilla guardians will gather information concerning the location of gorilla nests from forest users within their community (particularly from hunters). This information will be recorded on a community-produced forest map. Research staff from WCS and the government will visit each village 2–3 times a year, to conduct surveys, visiting recorded nest sites in conjunction with the gorilla guardians. Given typical nest decay rates in the area, it should be possible for monitoring teams to visit most recorded nest sites on these regular visits. The use of this a priori knowledge should increase

CROSS RIVER

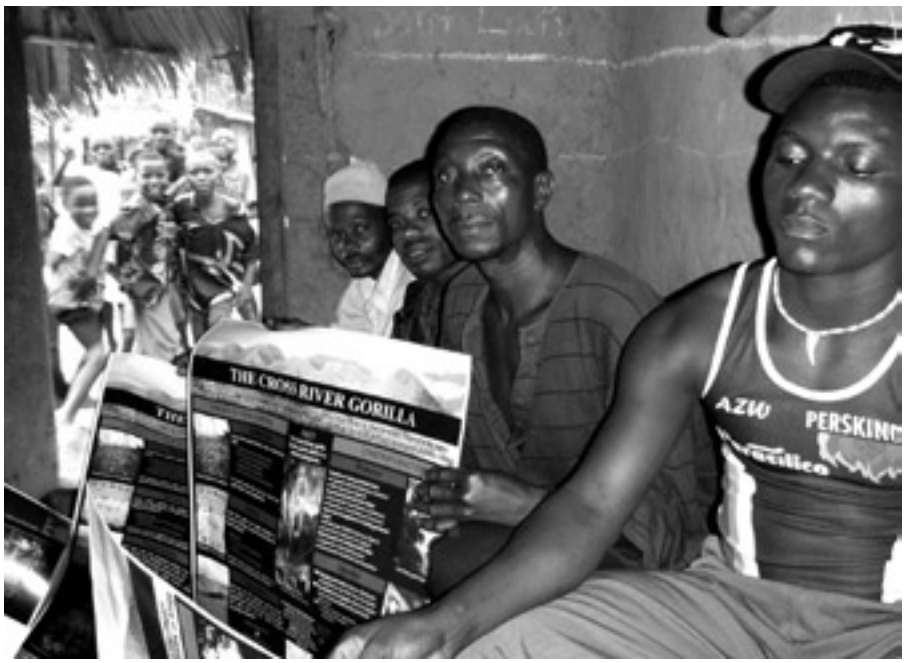
the effectiveness of such ongoing monitoring, as nest site searches will be directed rather than random, increasing the yield of baseline data and giving us a better idea of how gorillas disperse in various forest areas over time. Lastly, gorilla guardians will play an important role in building awareness amongst their communities of a range of topical conservation issues, as an extension of present conservation education programmes implemented by WCS across the Cross River gorilla landscape.

Potential gorilla guardians, selected from an interview process held in their villages, were invited to the research station in the Kagwene Gorilla Sanctuary for a 2-week training course/final selection starting at the beginning of November. There they worked with permanent research staff and government representatives to learn first-hand gorilla monitoring techniques and other skills that they will need to perform their role back in their own communities effectively.

We are doing our best to minimise the expectations of local communities through this scheme, while at the same time encouraging them through their gorilla guardians to adopt a more community led approach to the conservation of Cross River gorillas and other endangered species. We very much hope that over time the gorilla guardian system might evolve into a realistic alternative to what local communities often perceive as a more top-down protected area approach typical of parks, wildlife sanctuaries and the like.

It will also be interesting to evaluate to what extent this scheme will be successful in the absence of some kind of additional community level benefits, especially as the goal for conservationists is not only to improve the survival prospects for Cross River gorillas in specific sites such as those targeted here, but also to maintain functional habitat connectivity across the landscape.

Aaron Nicholas and Amelia Stott



Potential gorilla guardians
Photo: Amelia Stott, WCS Takamanda-Mone Landscape Project

We would like to express our particular thanks to both the US Fish and Wildlife Service and the Margot Marsh Biodiversity Foundation for providing initial support to launch the gorilla guardian approach, and we look forward to keeping you informed of progress and lessons learned in due course.

Reference

Oates, J. et al. (2007): Regional Action Plan for the Conservation of the Cross River Gorilla *(Gorilla gorilla diehli)*. IUCN/SSC Primate Specialist Group and Conservation International, Arlington, VA, USA

A GIS Habitat Map for the Kagwene Gorilla Sanctuary, Cameroon

The Cross River gorilla is the most endangered of all great ape taxa, and its rare and increasingly fragmented populations continue to be threatened by habitat loss and, to a lesser degree, hunting for the bushmeat trade. The 11 or so sites in which the Cross River gorilla is still known are spread across approximately 12,000 km^2 of extremely rugged and forested terrain spanning the Nigeria–Cameroon border region, with remaining populations estimated at 70–90 individuals in Nigeria, and 150 individuals in Cameroon (Oates et al. 2003).

In the last decade a concerted effort has been mounted to learn more about the Cross River gorilla, and to implement conservation action in both Nigeria and Cameroon. As outlined in the *Regional Action Plan for the Cross River Gorilla* (Oates et al. 2007), this has been spearheaded by the *Wildlife Conservation Society* (WCS), working in collaboration with host governments and other partners. Considerable success has been achieved on a number of fronts, but efforts have been hindered by a lack of understanding of both the areas in which remaining populations are found, and the current and

CROSS RIVER

potential basic habitat requirements of the subspecies. Moreover, site-specific conservation plans are hampered by an absence of knowledge about habitats remaining in the area, as well as their current usage by gorilla populations.

With this in mind, we have recently undertaken a project to produce a habitat map for the newly formed (by Decree No. 2008/0634/PM issued 3 April, 2008) Kagwene Gorilla Sanctuary in Cameroon, in addition to an analysis of gorilla nesting preferences within the sanctuary. Such knowledge is essential to help guide practical field-based management activities linked to the protection, and possible expansion, of the current population.

The Kagwene Gorilla Sanctuary (KGS) covers an area of 19.44 km^2, and reaches altitudes of roughly 2,000 m, lying between 06° 05' 55" and 06° 08' 25" North and between 09° 43' 35" and 09° 46' 35" East. It is divided by a provincial boundary, and encompasses the northern part of South West Province, and the southern part of North West Province, of the Republic of Cameroon.

Nine villages surround the KGS, and villagers have historically utilized land within the sanctuary boundary for farming and hunting to varying degrees. Bororo settlements (settled grazers) are dotted within and surrounding the sanctuary, and these pastoralists graze their cattle on areas of open grassland adjacent to the Kagwene Mountain forests. Much of this land is burned each year to encourage the growth of new grasses, often resulting in the unplanned burning of forest. Currently, farmers also continue to cultivate crops within the boundaries of the sanctuary, especially in the southern sector of the reserve, with cocoyams the crop most commonly grown beneath the forest canopy. WCS operates a research camp from within the KGS, which has a permanent staff presence.

Kagwene botanical survey *Photo: Marion Rawson*

To produce a working GIS habitat map for the KGS, we undertook fieldwork from mid-March to the end of May 2008. We aimed to map areas of farmland and grassland within the sanctuary, and then to determine the variety and distribution of vegetation within the undisturbed forested sections. Using GPS units set to track-log, we walked around the edge of farms and grassland patches. Farm areas were so numerous within the reserve that we mapped a sample of them in this way, while the remaining farm distribution was determined through conversations with gorilla trackers familiar with the area, resulting in the creation of a second habitat category for our map of "presumed farm under canopy". To assess habitat types in the remaining forested zones of the sanctuary we undertook "recce walks" (White & Edwards 2000), which involved using GPS to record movements through the sanctuary, documenting vegetation changes as and when they occurred. We recorded both top storey and understorey vegetation, in addition to other information, such as understorey density, the slope of the ground, and canopy cover. Data collected during this fieldwork were downloaded into ArcGIS 9.1 and manipulated in order to generate habitat maps for the forested areas, overlaying GPS points measured around farms and grassland patches. To investigate nesting habitat preferences of gorillas at KGS, data were used from WCS records collected between January 2006 and March 2008, and we revisited these nest sites to reassess the top storey and understorey type and density. This assessment relies on the assumption that little change has occurred in the habitat between the time of construction and re-finding the nest, which seems likely. We also recorded a number of other aspects of the nest area, including measures of visibility, aspect, slope and canopy cover, using the same methods as were used during habitat mapping.

A preliminary analysis of the habitat map has shown that only a little over half of the sanctuary is forested (i.e. under tree cover and not farmland), and therefore potentially available to the gorillas. The other half of the sanctuary

CROSS RIVER

Kagwene monitoring
Photo: Ymke Warren

is roughly split between farmland under canopy and grassland patches. By overlaying nest site locations, we found that the gorillas at Kagwene do not nest in either farmed or grassland areas. As they are not known to crop-raid, farmland prevalent in the southern sector of the sanctuary is clearly avoided by the gorillas, while grasslands in the northern sector can be seen to fragment forest potentially suitable for the gorillas.

Further analysis and dissemination of gorilla nesting habitat preferences at the KGS are ongoing. This involves a full analysis of how the gorillas nest with respect to available top storey and understorey habitats in the sanctuary, and we hope to disseminate our results widely by publishing them in a scientific journal. These analyses will add valuable insight to our understanding of Cross River gorilla ecology. The habitat map will provide an extremely useful tool for the WCS, who are assisting the government with elaborating management strategies for the sanctuary, as well as for gorilla trackers working on a daily basis within the sanctuary. Thanks to the ongoing support of organizations such as the *US Fish & Wildlife Service*, WWF, *Gorilla Organization*, and *Margot Marsh Biodiversity Foundation*, the conservation of the Cross River gorillas of the Kagwene Gorilla Sanctuary is increasingly assured. However, further support is needed to implement site-based action in all 11 known Cross River gorilla sites (including parks, forest reserves, sanctuaries and unclassified areas of forest), as well as in habitat corridors that provide connectivity between these core areas.

Ruth Wiseman, Ymke Warren, Aaron Nicholas, Mary MacKenzie and James P. Higham

References

Oates, J. F. et al. (2003): The Cross River Gorilla: Natural History and Status of a Neglected and Critically Endangered Subspecies. Pp. 472–497 in: Taylor, A. B. & Goldsmith, M. L. (eds.) Gorilla Biology. Cambridge (Cambridge University Press)

Oates, J. F. et al. (2007): Regional Action Plan for the Conservation of the Cross River Gorilla *(Gorilla gorilla diehli)*. Arlington, VA, USA (IUCN/SSC Primate Specialist Group and Conservation International)

White, L. & Edwards A. (2000): Methods for assessing the status of animal populations. In: White, L. & Edwards A. (eds.): Conservation Research in the African Rain Forests: A Technical Handbook. New York (The Wildlife Conservation Society)

The Power of Local Stories in Lebialem, Cameroon

Cross River gorillas are found in isolated forest blocks including the Bechati-Fossimondi-Besali forest area in Lebialem Division, southwest Cameroon. Current threats to their existence in this area include hunting, forest conversion into farmland, and habitat fragmentation. The Bechati-Fossimondi-Besali forest (80–100 km^2) rises from about 500 m in Bechati through 1,700 m at Bamumbu to 1,900 m in Fossimondi (Oates et al. 2007). Topographically it consists of a series of hills and mountains with steep slopes and deep valleys. The change of vegetation from lowland to lower montane forest gives rise to a high level of plant and animal biodiversity. This challenging topography has limited the potential for commercial logging. However, a logging concession is located some 5 km from Bechati and currently under exploitation (Nkembi et al. 2006).

This study was conducted in five villages (Bechati, Besali, Fossimondi, Bamumbu and Folepi) to document stories told by local people about Cross River gorillas and assess the power and influence of these stories to people's values and perception towards gorillas both in rural communities where they are told, and in urban centers that have a greater outside influence. For centuries, stories of this nature have promoted cultural and behavioural norms of traditional African societies; such oral traditions are the only means through which knowledge and wisdom about the environment is passed-on and sustained from generation to generation (Jacobson et al. 2006). These stories, when retold in their origin-communities or to indigenes of these communities living in urban areas, could contribute significantly to influencing people's value systems and restore their kinship with nature's creatures (Rose et al. 2003). In addition, tales of myths about wildlife provide an excellent means of breaking tradi-cultural barriers and obtaining community recognition of conservation education programs.

CROSS RIVER

The Bechati-Fossimondi-Besali forest is not protected by government and hence is communal land (Nkembi et al. 2006). In such community-owned forest regions, informal institutions and traditional practices such as local tales and taboos, guided by cultural norms, can play an active role in nature conservation. In these areas it is social norms, rather than governmental juridical laws and rules, that determine human behaviour. People do not disregard taboos against hunting gorillas because, if they do, they may be punished by the ancestors or traditional institutions, unlike the wildlife law which is either poorly understood or hardly recognized. Taboos represent unwritten social rules that regulate human behaviour. Unfortunately, social institutions such as taboos, myths and wildlife tales are always neglected in conservation design (Colding & Folke 2001), although areas with high biodiversity in developing countries are always associated with regions of high traditional value systems.

The population of the five villages surveyed is estimated at 15,000 (2006). Farming, hunting and trapping are the major livelihood activities. Local oil production is a booming agricultural activity in the area and plays an important role in daily sustenance. Women, who are regarded as assets of men (some refer to their wives as having been "bought"), collect non-wood forest products and sell them in local markets in addition to crop farming, to support the income brought home by their husbands. Hunting is more severe in Bamumbu than other communities due to lack of alternative skills to engage in more profitable and off-forest enterprises. Birth rates are very high in this area.

Throughout the region social facilities such as pharmacies, health clinics, electricity, and piped water are absent. People rely heavily on traditional healers for their healthcare. Political authority is vested in a village chief, who is supported by a council of elders. Social behaviour within the village is further controlled through a series of extensive age-grade associations and secret societies, both of which fall under the auspices of the village chief. The government works through these village structures to govern the people and the decisions of the chief or traditional council are highly respected.

Methodology

During a 2-week stay in forest communities in Lebialem Division, South West Cameroon, we collected stories of myths, totemic kinship, physical encounters, hunting, rituals, and eating of gorillas. A total of about 15 stories were recorded. Only 7 of them are used in this paper. People who tell these stories do so with specific skills that make you feel the force of it in the glittering of their eyes.

To find out to what extent the stories told by local people will influence the conservation attitudes and behaviours of people living in urban areas, some of the stories collected from the field were recited to people living in Yaoundé, the capital city of Cameroon. Twelve people attended this session from assorted backgrounds (civil service, NGOs, teachers, churches etc.).

Stories Collected

Story 1: In my youth (1945–1952), people were not afraid of gorillas and gorillas were very gentle creatures. We usually observed gorillas feeding freely on plantains and bananas pith and fruits even in the presence of humans. At that time, gorillas even played with young children who accompanied their parents to the farm. All of this friendly relationship was reversed when some village people started hunting gorillas for meat. The gorilla since then has been very fearful of humans and vice versa.

Story 2: When a gorilla is killed, it is carried to the palace and the gong is played to summon everybody. Everyone gathers in the village singing songs of praises and bravery to the hunter and his father. This choral chanting is referred to as "nguh" (Fossimondi) or "sombo" (Bamumbu). The meat is distributed among the sub-chiefs and notables of the chief, with each of them receiving a pre-designated part of the animal. In some communities the hunter is rewarded with a traditional title "somgwei". In some communities he is rewarded with hunting cartridges. The heart is kept by the chief so that, in case the gorilla in question was the totem of someone in the village, the heart together with some other herbs will be used to disconnect him/her from the killed totem so that they can survive…

"Women of child bearing age will not eat gorilla meat because if they do so they will either be barren or give birth to gorilla-like babies".

Story 3: When I was young (referring to some 10–15 years ago) a hunter in a neighbouring village (Fossimondi) shot and killed a male gorilla while hunting. It happened that this gorilla was the totem of the most powerful herbalist in our village. Since he could not survive without his animal totem, he died. We have not – and will never have – such an effective and helpful herbalist in this village. Because of this, I want all gorillas to be saved. Two years ago a gorilla raided my farm and destroyed my plantains but I forgive them because that is their own way of finding food. Killing gorillas means taking away very important people from my village and I am totally against it.

Story 4: While walking on all fours, the gorilla hardly uses its left hand. The gorilla's left hand is the most powerful of its limbs. The gorilla itself treats this hand with a lot of respect. It is called the

CROSS RIVER

"chieftaincy" hand because herbalists who use gorilla totems to harvest herbs do so only with its left hand. Owners of gorilla totems must avoid using their left hand while fighting because if they do, the victim may go unconscious or even die from a slab with the left hand. This is why the left hand bone of a gorilla is used for medicine.

Story 5: I am a hunter; I want gorillas to be protected because they assist me in the forest. While foraging gorillas create forest tracks that facilitate movement of hunters at night. Also when I am hungry in the forest I eat anything that gorillas have fed on. So I believe gorillas like our ancestors direct me when I am out there in the forest.

Story 6: Two years ago I went hunting; it was 3:30 pm and I left my hunting hut to go look up for some monkeys I heard calling. I was accompanied by my favourite dog named "Whisky". Just a few minutes from camp, I arrived at a hill. Suddenly my dog ran to me with some frustration as if it was running away from something frightful. I looked up and saw a big gorilla sitting and feeding on some leaves on the hunter's trail I was moving on. I was frightened at first from the sight of the animal's size. But the gorilla was just sitting there undisturbed and where it was sitting was the only accessible path on that hill. So I mentioned these words in my dialect "pass go side whei you want go make I come pass my own. No bi you one get this forest." Meaning "you do not own this forest alone; go your own way so that I can also pass and continue my journey". Immediately the gorilla moved across the hill towards the left. I then continued my journey with my dog undisturbed.

Story 7: The gorilla said that it was the strongest and most powerful animal. Another animal told the gorilla that what he believes is not true. It advised the gorilla to go stand by the roadside if it intended to see the strongest of all animals. The gorilla feeling challenged agreed to go see this challenger. So it went and hid itself in the bush beside the roadside. Soon it saw a man moving along the road with something in his hand (a gun) which the gorilla thought was a stick. As the man was approaching, the gorilla leapt out of the bush without delay to confront the man. The man shot the gorilla and since this day, man (the hunter) is most powerful.

Interpretation of the Stories

The second story seems to suggest that that the villagers rarely killed gorillas in the past and when they did there was a reason. This shows the *respect* people had for these human-like creatures. When he says the hunters are rewarded, what comes to my mind is a man being rewarded after defeating a co-human at war. Hunting of gorillas was sacred and imbued with a lot of myths and superstitious beliefs, so much that the hunter needed not only physical braveness but spiritual and transformative powers. As the first story suggests, when outsiders came in with guns, the balance did change. Since gorillas could now be killed with a wave of the hand and sold for money, the kinship is lost, there are no more rewards for bravery and this tradition is finished.

We did hear countless stories about gorillas being used as totems and the use of totems by herbalists to collect medicinal herbs. In a society where western "modern" medicine does not exist, the significance of these beliefs should not be underestimated.

As the lady in the third story narrates, it is very clear that killing a gorilla that has a spiritual connection to traditional medicine men can bring grief to an entire community. Can this belief therefore serve as a motivation to protect gorillas? Another lesson from this story (3) is the expression of kinship with gorillas as used in the word "forgive". She realizes that, by cutting down forest for farmland, man has done harm to these apes and raiding of crops is not intentional but it is carried out in response to lack of alternatives. Her willingness to forgive gorillas that destroy crops, because she believes that if a gorilla is killed people will die, shows the extent to which totemic beliefs can influence people's behaviours in this area.

While stories 4 and 5 come back to the power and trust which have been mentioned above, story 6 brings in an-

other new theme, that of *mutual understanding*. Gorillas and humans (hunters) can communicate and act in mutual consent for each other's benefit. This story raised a lot of discussion when retold. Do gorillas understand human language or intentions? Story 7 demonstrates dominance of humans over gorillas. As the story suggests, this is because humans can use guns.

Urban Interventions: Yaoundé Comments and Discussions

When we recited stories told in the villages at the session in Yaoundé it provoked a lot of comments and heated debates, and also opened the way for more stories of the same nature to be shared. Below are some of the participants' reactions to numbers 3 and 6.

Story 3:

- According to my own thinking, if gorillas raid crops they should be treated as the worst enemies. In this regard, I do not understand why the woman in the story shows so much passion to this animal.
- I believe the woman values human beings more than crops and since she has that strong totemic belief that a man will die if a gorilla is killed, she will rather have her farm raided than have a fellow human killed.
- What is interesting to me is the fact that this woman kind of connects gorillas with the population of the village.
- One other reason someone pointed out was that this woman could tolerate gorillas raiding her farm because of the belief that if a gorilla defaecates on your farm you will have a good harvest that year and in the years to come.
- Someone remarked that less tolerant or more tolerant as in the story might just have been human nature.
- Someone asked the participant from the religious organisation if he believed in the story or totemic beliefs and he answered: "It is not easy to be an African and a Christian at the same time because the power of the totemic beliefs is too strong to be ignored. Although I believe that gorillas are used as totems, as a Christian I do not care about it."
- Inspired by this story one other participant narrated a story he knew from his own village which goes as follows: "A man pleaded to a chimpanzee/gorilla hunter that when he sees a group of gorillas in the forest, he should not kill the one with the bald head. Unfortunately this hunter shot dead the bald headed gorilla. A bigger one sprang out of the bush and tortured the hunter severely. The totem owner died. But the hunter survived." Two other participants confirmed that they had heard the same story.

Story 6:

- The first reaction was a question that was asked by one of the participants as to whether gorillas understand local languages.
- Someone else was concerned about the gentleness of the gorilla. He said that the gorilla as the story portrays can tell if you want to be friendly or if you want to kill it. He said this is contrary to the view he had about the gorilla which is that it is a dangerous animal and should be feared. He now has the opinion that the gorilla is like humans, the only difference being that it lives in the forest.
- A lady said that she was advised not to buy ape meat in a market in Yaoundé when she was pregnant in the belief that, if she does, her baby would look like an ape. She changed her intention and went for an alternative. Much time was spent on this story because it had a lot of meaning and implications for traditional tales of this nature.

Conclusions

Stories about gorillas when recorded or when recited can generate a lot of interest. They provide a wonderful opportunity to initiate conservation education and have a lot of value when people perceive them as coming from their communities. These stories are filled with life and one does not need to believe in them to feel their power. Yet they are full of mysteries and contradictions. Either you kill gorillas because they raid crops or you adore them because your grandfather uses them as totems. Either you kill a gorilla to be given an elevated title (chieftaincy titles are given to brave hunters who kill gorillas in some stories) in the community or you save them it because they are used by a herbalist to harvest medicinal plants. Different culture systems give rise to different levels of tolerance, acceptance or rejection. Whatever it is, I believe – and strongly – that it is within these contradictions that the conservationist must work to find solutions to the problems facing our close relatives. If we allow these rich cultural restraints against hunting and eating gorillas to continue to wane, the levels of intolerance and persecution will become more frequent in the near future.

Denis Ndeloh Etiendem

References

Colding, J. & Folke, C. (2001): Social Taboos: 'Invisible' Systems of Local Resource Management and Biological Conservation. Ecological Applications 11 (Part 2): 584–600

Jacobson, S. K. et al. (2006): Conservation Education and Outreach Techniques. Oxford (Oxford University Press)

Nkembi, L. et al. (2006): Lebialem Highlands Great Apes Conservation Programme: Mid term Progress Report to Forestry Bureau, CoaTaiwan. Menji, Environment and Rural Development Foundation (ERuDeF), 32

Oates, J. et al. (2007): Regional Action Plan for the Conservation of the Cross River Gorilla *(Gorilla gorilla diehli)*. Calabar, Cross River State, Nigeria, 40

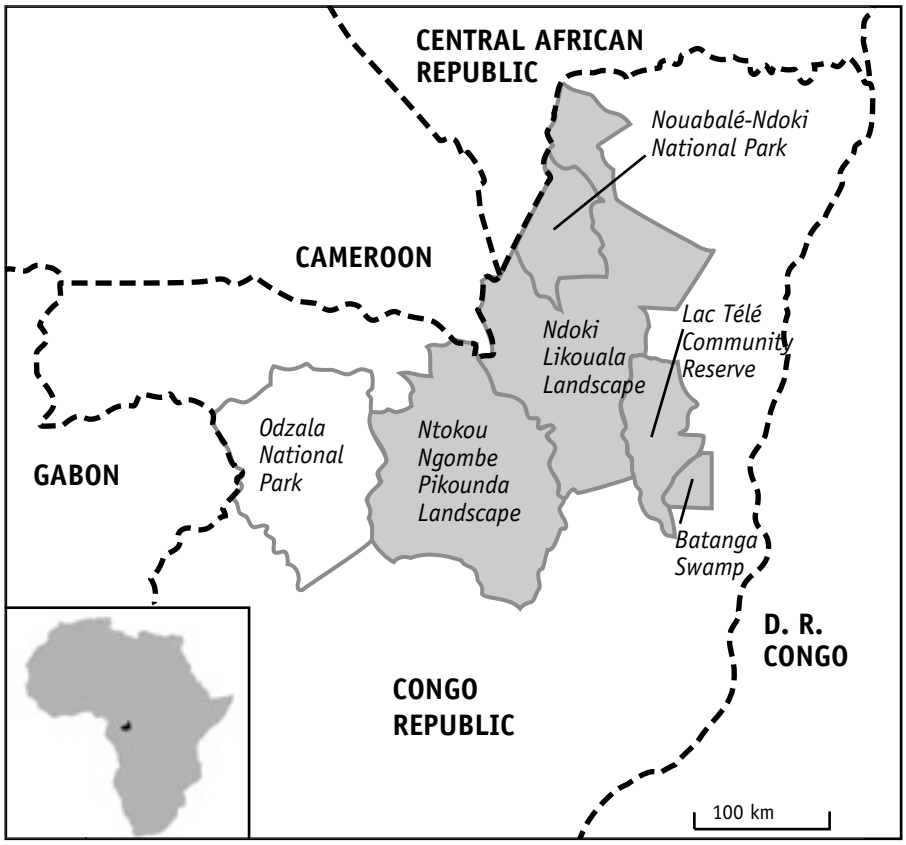
Rose, L. A. et al. (2003): Consuming Nature: A photo Essay on African Rain Forest Exploitation. California (Altisima Press)

GORILLAS

New Gorilla Population Estimates in Northern Republic of Congo

On 5 August, 2008, at the XXII International Primatological Society Congress in Edinburgh, the *Wildlife Conservation Society* (WCS) announced the results of a ground-breaking series of western lowland gorilla surveys conducted in the northern Republic of Congo, one of the last remaining strongholds for this species. The results estimate a total population of 125,953 individuals (90,325–161,545) living in 47,444 km^2 of contiguous lowland and swamp forest. This estimate exceeds the previous global estimate for the species and confirms the Republic of Congo as harbouring arguably the largest remaining populations of western gorillas in Africa.

Surveys in the 1980s indicated that healthy populations of western gorillas existed in many areas remote from human settlements (Harcourt 1996). In spite of legal protection across their geographic range, recent evidence has indicated that western lowland gorillas are declining rapidly, through a combination of commercial hunting, the spread of logging, which alters forest structure and opens up remote forest blocks to facilitate poaching, and Ebola hemorrhagic fever (Tutin et al. 2005). Commercial hunting and Ebola alone are thought to have reduced the western gorilla population by over 50% in the last three decades (Walsh et al. 2003), to the extent where the species was recently upgraded to "Critically Endangered" in the *IUCN Red List of Threatened Species* (Walsh et al. 2007). Most of the world's remaining western lowland gorillas are found in the Republic of Congo and Gabon (Harcourt 1996). Low human population densities (< 1/km^2) combined with relatively poorly developed infrastructure and access has, until recently, largely protected these forests and their wildlife from human disturbance and depletion.



The survey area *Adapted from an original map by WCS*

In the 1980s and 1990s, surveys in the northern Republic of Congo indicated that the region was of great importance for western lowland gorillas *(Gorilla gorilla gorilla)* and other endangered large mammals. Since 1991, WCS has worked together with the government of Congo and other partners to establish an effective conservation program in the region. In 2006 and 2007 WCS implemented a series of great ape surveys across northern Republic of Congo (see map). The surveyed area represents one of the most important remaining blocks of habitat for western lowland gorillas, covering 47,444 km^2 of contiguous lowland forest. The surveys were conducted in three phases, corresponding to three adjacent survey zones.

Ndoki Likouala Landscape (27,970 km^2): The Ndoki-Likouala landscape includes two protected areas (the Nouabalé-Ndoki National Park and the Lac Télé Community Reserve), and several surrounding logging concessions. In collaboration with the government of Congo, WCS have been working in this landscape for the past 17 years. The primary objective of the surveys across this zone was to assess the population status of great apes in response to conservation interventions. This was the first systematic and standardized survey of the entire zone.

Batanga swamps (1,029 km^2): The Batanga swamps represent a largely unexplored area of *Raphia* swamp forest between the Ndoki-Likouala Land-

GORILLAS

scape to the west, and the Batanga River to the east. Reconnaissance missions conducted in the 1990s indicated these swamps support large populations of gorillas (Blake 1995; Fay & Agnagna 1992; Fay et al. 1989), but these forests have never previously been systematically surveyed. The primary objective of the surveys here was to assess the population status of gorillas and the potential for expansion of conservation activities into this area.

Ngombe-Ntokou-Pikounda Landscape (18,455 km^2): The Ntokou-Ngombe-Pikounda landscape includes the Ngombe timber concession, and the remote Ntokou-Pikounda forests to the south and east. The site is covered by very large tracts of Marantaceae forest to the west and north and by swamp forest to the east and south. To the west lies the Odzala-Koukoua National Park. It was the site of the last recorded Ebola outbreak in May 2005, which affected both human and gorilla populations (Caillaud et al. 2006; Devos et al. 2008). Prior recent outbreaks to the south and south west of the park were known to have devastated the previously high density gorilla populations (Bermejo et al. 2006). Reconnaissance missions conducted in the Ntokou-Pikounda forests in 1999 had suggested that it harboured large populations of great apes (Quammen 2001), but these forests have never before been systematically surveyed. The objectives of surveys in this zone were therefore to assess the population status of great apes in order to provide a baseline for effective protected area planning and management, and to identify evidence for Ebola impact on great ape populations in the landscape.

Line transect distance sampling was used to estimate gorilla density from nest counts (Buckland et al. 2001). Production and decay rates for nests were estimated and used to convert nest density into gorilla density (for details of survey design and analysis see Stokes et al. 2008). A total of 265 transects of 2 km in length were placed across the three survey zones.

The surveys were conducted between February 2006 and May 2007. A total of 3,815 great ape nests were counted along 526 km of transects. 2,550 nests were assigned to gorillas. The gorilla population across all three survey zones was estimated at 125,935 individuals (95% CI: 90,325 to 161,545).

The significance of this finding is two-fold. Firstly, it emphasizes the importance of scientifically rigorous survey methods in assessing and evaluating the conservation status of key species. Prior to these surveys the global estimate of wild western lowland gorillas was approximately 95,000 individuals (Butynski 2001). This estimate was based on range-wide extrapolation of data collected in the 1980s from a number of discrete survey locations in Gabon and the Republic of Congo (Harcourt 1996). However, in the light of both recent advances in survey techniques (Kühl et al. 2008) and, importantly, the recent documented declines in western lowland gorilla populations (Walsh et al. 2003; Devos et al. 2008; Bermejo et al. 2006; Huijgbregts et al. 2003), the validity of this figure is questionable (Walsh et al. 2007). Whilst we are unable to provide a revised global estimate of western lowland gorillas from our surveys, we are able to provide a revised baseline estimate for northern Congo, which represents a significant contribution to our knowledge of the current status of western gorilla populations and which provides a basis for monitoring the impact of future conservation efforts in what is undoubtedly one of the highest priority areas for the future survival of this species.

Secondly, the findings from these surveys highlight a number of key conservation issues and priorities for future conservation action. The majority of western gorilla habitat, and the majority of our surveyed gorilla population, lies outside of protected areas. In 2006, the government of Congo announced the proposed Ntokou-Pikounda Protected Area. We are keen to use our findings to work together with the government to catalyze the process of legally gazetting this protected area and promoting effective on-the-ground protection.

Many of the areas containing high densities of gorillas lie within sites managed in partnership between the government of Congo, WCS and other partners, including the private sector. The partnership with the timber concession holder CIB (Congolaise Industrielle de Bois) has yielded improved wildlife management and protection in over 13,000 km^2 of production forests surrounding the Nouabalé-Ndoki National Park. In June 2006, CIB's Kabo concession was the first timber concession to be awarded Forest Stewardship Council (FSC) certification in Central Africa. CIB's FSC-certified forests have now been expanded to 7,500 km^2 (Tropical Forest Trust 2007). These forests support some of the highest recorded densities of western lowland gorillas. Given the rate of expansion of commercial logging and mining operations across northern Republic of Congo, and indeed across much of Central Africa, we support the use of auditable timber certification schemes in production forests and the integration of best practices for reducing the impact of logging on great apes across their geographic range (Morgan & Sanz 2007) to ensure protection of gorilla populations in key habitats that lie outside of protected areas.

These findings are encouraging for the conservation of western lowland gorillas. The results indicate healthy populations in numbers higher than previously thought. The persistence of these populations can be largely attributed to the remote and inaccessible nature of

the Ntokou-Pikounda forests and the Batanga swamps, combined with successful conservation investment in the Ndoki-Likouala landscape.

At the same time, however, northern Congo is subjected to similar threats to those faced by western gorillas across their range. Remote and inaccessible forests are fast becoming opened up and commercially exploited for natural resources. The result is escalating hunting pressure to meet the growing demand for bushmeat. Our surveys did not indicate evidence of recent Ebola outbreaks in the gorilla population. Nevertheless, expert opinion and research findings to date all point to this zone for the next predicted epidemic. The recent upgrading of the western gorilla to Critically Endangered on the *IUCN Red List of Threatened Species* was primarily due to the rapid rate of decline of the subspecies over the past 20 years in response to increasing threats from poaching and disease. We do not advocate for western lowland gorillas to be down listed. Rather, we support a renewed focus on addressing and mitigating the threats that endanger these last remaining populations and on preventing further population decline of this species.

Emma Stokes, Richard Malonga and Hugo Rainey

The full scientific report (from which this article is taken) is available from estokes@wcs.org.

References

Bermejo, M. et al. (2006): Ebola Outbreak Killed 5000 Gorillas. Science 314, 1564
Blake, S. (1995): Swamp gorillas in northern Congo. African J. of Ecology 33, 285–290
Buckland, S. T. et al. (2001): Introduction to Distance Sampling. Oxford (Oxford University Press)
Butynski, T. M. (2001): Africa's Great Apes. Pp. 3–56 in: Beck, B. et al. (eds.): Great Apes and Humans. Washington (Smithsonian Inst. Pr.)
Caillaud, D. et al. (2006): Gorilla susceptibility to Ebola virus: The cost of sociality. Current Biology 16 (13), R489–R491
Devos, C. et al. (2008): Monitoring population decline: can transect surveys detect the impact of the Ebola virus on apes? Oryx 42, 367–374
Fay, J. & Agnagna, M. (1992): Census of gorillas in northern Republic of Congo. American Journal of Primatology 27, 275–284
Fay, J. M. et al. (1989): Gorillas *(Gorilla gorilla gorilla)* in the Likouala swamp forests of North Central Congo. International Journal of Primatology 10, 477–486
Harcourt, A. H. (1996): Is the gorilla a threatened species? How should we judge? Biological Conservation 75, 165–176
Huijbregts, B. et al. (2003): Ebola and the decline of gorilla *(Gorilla gorilla)* and chimpanzee *(Pan troglodytes)* populations in Minkebe Forest, north-eastern Gabon. Oryx 37, 437–443
Kühl, H. et al. (2008): Best Practice Guidelines for Surveys and Monitoring of Great Ape Populations. Gland (IUCN)
Morgan, D. & Sanz, C. (2007): Best Practice Guidelines for Reducing the Impact of Commercial Logging on Great Apes in Western Equatorial Africa. Gland (IUCN)
Quammen, D. (2001): Extreme Africa: Trekking Through the Green Abyss. National Geographic March 2001, 2–37
Stokes, E. et al. (2008): Western lowland gorilla surveys in northern Republic of Congo. New York (WCS)
Tropical Forest Trust (2007): World's Largest Contiguous Tropical Forest Certified in Congo Basin. www.tropicalforesttrust.com/media/londonmarch2007
Tutin, C. et al. (2005): Regional Action Plan for the Conservation of Chimpanzees and Gorillas in Western Equatorial Africa. Washington DC
Walsh, P. et al. (2003): Catastrophic ape decline in Western Equatorial Africa. Nature 422, 611–614
Walsh, P. D. et al. (2007): *Gorilla gorilla* ssp. *gorilla* IUCN 2007: IUCN Red List of Threatened Species. www.iucnredlist.org

Wildlife Crime in Cameroon and Operations' Impact

Illegal trade in apes is an issue that has suffered from great confusion and lack of knowledge for a very long time. While endless popular bushmeat studies keep on replicating themselves, the trade is an issue that has been largely ignored in research. One of the reasons for this is the lack of a credible database.

LAGA (the *Last Great Ape Organization*) is the first wildlife law enforcement NGO in Africa. It leads wildlife law enforcement investigations and follows cases right up to the point of prosecution, at a rate of one major wildlife dealer behind bars per week. It now possesses an extensive database of more than 200 court cases, which thus offers a unique reliability as it is validated by court procedures and prosecutions.

Beyond the number of operations and their effectiveness there is an even more important factor in evaluating LAGA's work – the strategic value of the operations in reducing the level of illegal wildlife trade. The operations which LAGA has been choosing to follow up are a diversified set of cases, including several in Cameroon which carry an additional value for exposing and mapping the different angles of wildlife crime in that country. Consequently, the work of LAGA and MINFOF *(Ministry of Forestry and Wildlife)* has shed light on the nature of illegal wildlife trade in the sub-region. Our strategic focus on apes and other threatened primates for 2007 and the first half of 2008 were as follows:

2007

The return of the "Taiping Four" gorillas marked another victory in a long fight against a different level of illegal trade in wildlife. It attracted huge public attention. One of the press releases called it "one of the most high-profile cases of animal trafficking in history". This affair exposes a different angle in combating illegal trade in apes: the political fight against the international players of the trade. The "Taiping Four" are four gorillas that were smuggled from Cameroon to Nigeria to the Taiping Zoo in Malaysia, which paid 1.6 million US$ in this illegal deal. Ever since the discovery of this affair by the *International Primate Protection League* (IPPL) in 2002, Cameroon has been demanding the return of the gorillas in accordance with CITES guidelines. Our work on this issue has been constant throughout this year as

GORILLAS

LAGA has been at the center of further negotiation between the governments, as well as within Cameroon itself, increasing cooperation between the different ministries involved and cooperation with the diplomatic mission of Cameroon in South Africa. LAGA also produced and promoted dozens of radio, TV, and written press pieces sensitizing the public. As a result, the gorillas finally arrived back in Cameroon.

In March 2007, a trader specializing in protected wildlife species was arrested in Bamenda with eight large bags of chimpanzee meat. The dealer had been observed regularly trading in protected wildlife species, including apes, between Bamenda and Kumbo in the North West Province.

An operation was carried out against an ape trafficker dealing in live chimpanzees in Nanga Eboko. This place has been an area of concern regarding the trade in great apes for some time, and officials there have been keeping pet apes in their houses as if they were above the law, while trade through the town intensified. *In Defense of Animals-Africa* had been leading an effort last year to apply pressure and diplomacy in an attempt to change things there. Recent LAGA missions indicated that little has changed. LAGA's operation was against one of the regular dealers who had been observed trading apes between Nanga Eboko and Yaounde.

An operation in Douala involved a hotel owner trying to sell a baby drill; he even produced a receipt for the sale. The drill is now in the Limbe Wildlife Center.

In November, an officer of the Cameroon Army was arrested trying to sell a live primate in Bamenda in the North West Province. He had arrived from the south, where he had been stationed in an area rife with corruption connected to illegal ivory trade. He was caught on record explaining how his position helped him in the past to avoid justice and fast-track illegal trade; prior to this offence, we had obtained recorded information showing how deeply he was involved in the traffic of wildlife and wildlife products while in his previous post in Djoum. The dealer has now been locked up in the National Gendarmerie Company in Bamenda.

January–June 2008

This period was marked by a special focus on trade in great apes in Nanga Eboko, Center Province. A manager in a logging company, Pangiotis Marelis, of Greek nationality, was arrested and put behind bars for illegally dealing with 2 chimps, 5 parrots and a DeBrazza's monkey. He was also caught with a hunting rifle without the corresponding permit. Investigations are now being carried out on his involvement with other chimps supplied in Douala. This comes at a time when the government and the international community are renewing pressure on logging companies to meet their legal responsibilities by controlling their facilities and their workers against illegal hunting and related trade.

A live chimpanzee was rescued from a high-ranking personality, the Senior Divisional Officer of Upper Sanaga Division/Nanga Eboko, one of the highly placed officials there who hold apes in their houses.

A retired military officer was arrested in Abong Mbang in the East Province for illegally trading in gorilla meat. The dealer was caught with a consignment of meat from an industrial refrigerator for sale including the legs and heads of gorillas. He attempted to bribe the arresting officers, and has connections to a member of parliament from the area, who also attempted to bribe the officers and the State Counsel without success. He was sentenced to 9 months imprisonment.

Abong Mbang, January 2008

Wildlife Smuggling on the Internet

LAGA, in collaboration with other bodies and individuals, has discovered that in addition to the lucrative illegal smuggling of wildlife, internet wildlife scamming is also on the rise. Studying the worrying growth of internet wildlife fraud in Cameroon in the last 2 years, we noticed the link between wildlife and other forms of fraud. This was even discussed with the Prime Minister in 2007.

One of the latest of the four successful arrest operations in 2008, carried out through the ministry authorities by the forces of law and order with the assistance of LAGA, is that of a well known scammer engaged in fraud and illegal wildlife trade over the internet. He was arrested trying to sell a chimpanzee over the internet to a client in Belgium for 2000 Euros using falsified government documents and CITES permits. His connection to other forms of fraud, including illegal immigration and adoption scams, is still being investigated.

Although a majority of the internet cases we have observed is fraud and does not involve actual animals, we do not rule out the possibility that actual animals are being used to build trust between the scammer and the victim. More than anything else, the limiting factor of the illegal trade in apes is the communication between national dealers and the widespread international demand. The internet therefore is potentially disastrous in the way it can connect supply with demand.

Ofir Drori

GORILLAS

Possible Goundou in Gorillas

It is generally recognised that naturally occurring treponematosis is found in some African nonhuman primates. In addition, bone lesions of treponematosis have been identified in wild chimpanzees and gorillas (Lovell et al. 2000), while yaws has been documented and photographed in gorillas in Republic of Congo (Levréro et al. 2007). It is not yet known which pathogenic agent is responsible in these cases, but it is thought to be the spirochaete *Treponema pertenue*, which causes the disease commonly known as yaws (or framboesia). This is a social disease that usually affects children and adolescents; it is endemic to hot, moist, humid areas in the tropics, and is particularly persistent in African Pygmies and some tropical Asian populations.

Spirochaetes are a form of bacteria, distinguished by their spiral shape. They include the types of bacteria which cause diseases such as relapsing fever and leptospirosis, and the treponemes, which cause yaws, syphilis and pinta (known as "treponematoses").

While there is a wealth of literature documenting endemic yaws amongst people in the former Belgian Congo (now the Democratic Republic of the Congo), it has never been recorded in wild great apes in that country. On the other side of the Congo River, in the Republic of Congo, however, there are areas where yaws has been reported to be rife in both humans and apes. It is worth noting in this respect that many African nonhuman primates, including gorillas, have tested serologically positive for treponematosis without showing any obvious sign of disease; in humans, latent yaws may occur when secondary lesions heal spontaneously and the disease enters the non-infectious, clinically-negative latent period that can last the sufferer's entire life.

Primary and Secondary Yaws

Yaws progresses in three distinct stages – primary, secondary and tertiary. It begins with the development of the primary skin lesion at the site of exposure to the pathogen, usually an abrasion or cut. Incubation period is 9–90 days (on av. 21 days) and the disease normally lasts 3–6 months, but it may heal spontaneously before the appearance of secondary papillomas (small outgrowths). If not, it appears as a red patch, called an erythemous macule, which enlarges and may ulcerate. About 3 weeks after the primary (mother yaw) lesion appears, the serology becomes positive and within weeks proceeds to the secondary stage.

Treponemes spread systematically via the circulation and, 6–16 weeks after the primary lesion, papules (dome-shaped swellings) break out around the mother yaw; these become generalised and spread over the body surface. These lesions are common around the nose and mouth, and they exude fluids rich in treponemes that are highly contagious, particularly during the rainy seasons, and are easily transmitted to unaffected individuals via direct skin contact; there is also some evidence to suggest that spirochaetes may be transported by insects feeding on open sores, and even by contact with treponemes occurring on non-living surfaces. During its early life the disease can be treated with antibiotics, and treponemes are in fact very sensitive to even mild antiseptic chemicals. If left untreated, however, the affliction may be characterised by periods of remission and relapse that can persist for decades. Nevertheless, recurring infection can create bone deformities, soft tissue sloughing, weakness and possible reproductive inefficiency.

Gangosa

Gangosa (Spanish for "muffled voice") is a destructive ulcerative rhinopharyngitis (inflammation of the nose and throat) that may occur during the second phase of a yaws infection. The condition normally starts in the nose, on the junction of the mucous membrane with the skin close to the septum, which ulcerates and spreads inwards, destroying the whole of the nose, palate and pharynx until a large funnel-shaped cavity appears in the centre of the face (Trenouth 1975). Saddle-shaped nasal deformity due to ulceration of the nasal septum may be present. In extreme cases the ulceration may spread through the nose to involve the eyelids, and lead to scarring and consequent ulceration of the cornea.

G. W. Harley (in Trenouth 1975) selected 284 patients with nose and throat lesions in from 5597 cases diagnosed as yaws. He observed 41 cases of goundou (see below), of which 19 were associated with lesions of active gangosa. He concluded that goundou was related to early gangosa.

Tertiary Yaws

Tertiary yaws develops in less than 10% of affected humans and is probably equally uncommon in nonhuman primates. It occurs several years after the primary infection, leading to severely deformed bones and joint lesions which consist of new bone formation, destruction of bone by soft tumours, and osteomyelitis (bony inflammation). This late stage of the disease is non-contagious. Tertiary lesions are mostly restricted to the postcranial skeleton, but when cranial lesions occur they most commonly appear on the face, in contrast to the cranial lesions of venereal syphilis *(Treponema pallidum)*, which are difficult to distinguish from those of yaws but are more likely to occur on the cranial vault. Gorillas appear to be more prone to progression to tertiary yaws than chimpanzees.

Periostitis

This is a reaction to inflammation of the periosteum, the thin layer of tissue

that adheres to the outer surfaces of the bones. Because the periosteum contains bone-producing cells, one way it responds to inflammation is to lay down new bone tissue, producing a layer that has the general appearance of a roughened plaque-like deposit, punctuated by small channels and small holes caused by blood vessels (Lovell et al. 2000). In time, if the infection does not persist, the bone will heal and remodel itself; but persistent infection may initiate vigorous bone replacement, leading to extreme overgrowth.

Periostitis is most commonly localised and is frequently indicative of inflammation due to injury, but it may also occur as a response to a number of infectious diseases, including yaws. In such cases, periostitis may be generalised throughout the skeleton. If the infection invades the bone marrow it produces osteomyelitis (bony inflammation), which results in the destruction of bone tissue.

Goundou

Goundou (also called "big nose") is a rare manifestation of tertiary yaws, produced by bilateral bony swelling of the maxilla or upper jaw bone (Trenouth 1975). The lesions are caused by deposition of new bone under the periosteum. Rarely, unilateral cases occur, and as the extosis (bony outgrowth) becomes larger, the nasal passages are obstructed and later on the line of vision is interfered with. Indeed, the expansion may displace the eye and destroy it. Although there were earlier reports of the disease, Maclaud (1895) was the first to document the term "goundou", the name used locally in the upper region of Niger. He described the malady as consisting of nasal tumours. Interestingly, he related that some species of monkey were susceptible to goundou, and he observed a captive young chimpanzee with double nasal tumours, although he did not examine it.

Specimen A *Photo: Colin Groves*

Goundou in Gorillas?

Cranial deformities have been observed in a number of gorilla specimens from museum collections and from photographs of animals killed in the wild. These skulls exhibit robust overgrowth of bone, principally in the malar (cheek) region, both bilaterally and unilaterally, presumably due to persistent periostitis. Encroachment of the orbital cavities is so common as to be almost obligatory. Some of the protuberances are so grotesque that it is difficult to visualise the appearance of the animals in life. These deformities are quite unlike those described for chimpanzees in which goundou is suspected, which are much closer in appearance to the human disease.

Specimen A: Incomplete skull of adult male (sagittal crest) in the collection of the Paris Natural History Museum. The cranium exhibits extreme periostitis manifested in globular bone formations that are well-calcified. Pettit (1909), who examined the specimen, gave a height of 13.5 cm for the right growth and 11 cm for the left. Bilateral bone overgrowth in the malar, and with involvement of the orbital cavity close to the cheek, compares favourably with the deformities of the present series of skulls for which goundou is suggested.

Specimen B (in Petit 1920): Complete skull of an adult male that formed part of the private collection of M, Rouppert, a Parisian osteologist, and is now in the Paris museum; it was obtained in the interior of the Republic of Congo. The specimen displays a large glob of bone on the right cheekbone, with a similar deformity beginning to form on the left side. It was described simply as "exostosis" (bony outgrowth).

Specimen C: Adult male, one of two, obtained from Bossango in the former French colony of Oubangui-Chari (now the Central African Republic) and presented to the Paris Natural History Museum; they were examined by A. Lévri. The cranium displays multiple bone overgrowth on the cheekbones bilaterally, two protuberances on the right and one on the left. The bone of the two huge masses on the right side were described as porous and spongy, which may be suggestive of osteomyelitis, while the protuberance in the left was likened to a "handlebar" and measured 6 cm. The double outgrowths were compared to "champagne corks", measuring 3.5 cm, with a diameter of 5 cm, and had deformed the right orbital cavity. The condition was diagnosed as "goundou" (Seques 1929).

The second cranium (Specimen D) is remarkable for its astonishingly high sagittal crest, a "fortress of bone", that Seques thought was probably the result of goundou, he said was prevalent in apes of that particular region. However, there are no obvious lesions or other abnormalities of the skull, and it may simply be a genetic anomaly.

Specimens E and F are of wild-killed gorillas photographed by Armand Denis in the area around Ewo in what is now the Republic of Congo in 1942, and reproduced in Schultz (1950). Specimen E shows a condition closely resembling that of gangosa in humans (which, as described above, is a disease believed to be allied to goundou), while specimen F exhibits unilateral swelling of the zygomatic or cheek bone, the site of infection apparently being the right eye.

Specimen G (pers. comm. Ulrich Roeder, many years ago): Perfect skull of adult male killed by Pygmies at Lolodorf, southwest Cameroon, in 1979. The animal was part of a group in which

GORILLAS

Specimen F

it was the dominant male. It illustrates the usual accumulation of reconstituted bone in the cheek region bilaterally, with the distinctive "handlebar" deformity. The right orbital cavity has suffered trauma on the rim of the cheek.

Discussion

If these specimens do indeed represent goundou in gorillas then it is problematic. Whereas soft tissue lesions are similar in both gorillas and humans suffering from yaws, manifestations of bone hypertrophy that typify goundou are very different in the two species. In humans the disease is expressed on the nose and the upper jaw (maxilla), and is manifested in symmetrical oval-shaped swellings in the maxilla on both sides, with the long axis pointed downwards and outwards; if the infection is durable these swellings can grow to the size of an orange, or even larger. In the gorilla, however, bone hypertrophy is related to the malar (cheekbone), bilaterally or unilaterally, often invading the orbits (eye sockets), and bone expansion can be extreme and invasive. Of the 5 skulls described only one is free of encroachment or deformity of the orbit, while in 3 of the remaining 4 specimens the right eye has been traumatised. This suggests that the original site of injury or infection may have occurred in the eye region.

The exaggerated and sometimes grotesque bone formations in gorillas may have several explanations: the greater volume and density of gorilla bone tissue, particularly in the male, with this tissue being more robust in the cheekbone (zygoma) than in the maxilla; a more aggressive periosteal response to infection or injury in an extremely sensitive area (i.e. the eyes), resulting in vigorous, defensive bone replacement; and the age and virulence of the infection. Another factor could be that the pathogens involved are actually slightly distinct in humans and gorillas. The most compelling argument relating the two is that reports of goundou in gorillas appear to originate from those regions of Africa where yaws is endemic in human populations. A convenient explanation might be that human goundou represents tertiary yaws in the maxilla, and gorilla goundou represents tertiary yaws in the malar.

Levréro et al. (2007) describe a female gorilla in Republic of Congo that was afflicted with a severe yaws infection. The unfortunate animal was so ravaged by the disease as to be reduced to a skeletal condition. She had lived with a breeding group for at least 18 months, and during 7 subsequent visits to a forest clearing before disappearing, solitary males or adolescent males from groups that she approached rejected her and behaved aggressively towards her. Both a solitary life for a female gorilla and the rejection of an adult female by males is practically unheard of.

Don Cousins

References

Levréro, F. et al. (2007): Yaws disease in a wild gorilla population and its impact on the reproductive status of males. Amer. J. Phys. Anthropol. 132, 568–575

Lovell, N. C. et al. (2000): Skeletal evidence of probable treponemal infection in free-ranging African apes. Primates, 41, 275–290

Maclaud, J. (1895): Notes sur une affection désignée la boucle du Niger et le pays de Kong sous les noms de goundou et anakhre. Arch. Med. Navale 63, 25–32

Petit, L. (1920): Notes sur le gorille. Bull. Soc. Zool, FR. (Paris) 45, 308–313

Pettit, A. (1909): Lesions osseuses chez deux singes (*Cebus Fatuellus* L. et *Gorilla* Wymann). Bull. Soc. Path. Exot. 2, 220–223

Schultz, A. H. (1950): Morphological observations on gorillas. In: Gregory. W. K. (ed.): The anatomy of the gorilla, pp. 227–251

Seques, F. (1929): Un cas diagnostique "goundou" chez le gorille. Rev. Méd. D'Hyg. Trop. 21, 50–53

Trenouth, M. J. (1975): Goundou-tertiary yaws in the maxilla. Brit. J. Oral. Surg. 13, 166–171

Information Needed: Skin Diseases

I am revising and updating my paper about skin diseases of gorillas. The updated version will include reference to a number of publications and reports that have either appeared over the past 10 years or that I missed in my earlier literature review. I am particularly keen to locate more published or unpublished material in languages other than English. Both *Gorilla gorilla* and *G. beringei* are covered in the paper – and animals in captivity as well as those in the wild.

If you know of any publications that I ought to include in my revised paper, please let me know. If you are the author of a particular article, would you please consider sending me a reprint, a PDF or a photocopy! Full acknowledgement to those who help will, of course, be given and I shall endeavour to let you have a copy of the final, published, paper.

John E. Cooper

Email: ngagi2@gmail.com
Fax: +1-868-645-7428
Address:
Prof. John E. Cooper
School of Veterinary Medicine
The University of the West Indies
St Augustine
Trinidad & Tobago, West Indies
or:
c/o School of Veterinary Medicine
University of Cambridge
Madingley Road
Cambridge CB3 OES, UK

READING

Colin Groves
Extended Family: Long Lost Cousins. A personal look at the history of primatology. Arlington (Conservation International) 2008. 225 pages. ISBN 978-1-934151-25-9

Those who are familiar with non-human primates know that feeling: no doubt we are part of the same family. Colin Groves' look at the history of primatology is so authentic because he himself is part of that history. His work has contributed substantially to our understanding of primates, in particular the great apes. As a taxonomist, he always had to be an investigator on the search for evidence in history. This aspect of his work has been especially exciting; not only the way of research, but also the results – this excitement characterizes his book and captivates the reader. Everybody who thinks that taxonomy is boring should enjoy the wealth of mythology and little stories. Colin Groves himself states "primatology is fun", and we definitely believe him after having read his book!

Angela Meder

Richard Wrangham and Elizabeth Ross (eds.)
Science and Conservation in African Forests. The benefits of long-term research. Cambridge (Cambridge University Press) 2008. 280 pages, 34 halftones, 8 tables. Paperback £ 27.99, ISBN 978-052172058-8. Hardcover £ 65.00, ISBN 978-052189601-6.

Our knowledge of the behaviour, ecology and demography of great apes could not have been obtained without long-term research. Long-term means, as we understand it nowadays, several decades of continuous observation of the same habituated individuals. The constant presence of researchers also affords an opportunity for conservation activities (and often this presence makes clear how urgently those conservation measures are needed). Different approaches to the connection between research and conservation have become established at different sites.

This book results from a workshop on the 20th anniversary of the Kibale chimpanzee project. After two introductory contributions on research and conservation in Uganda, several Ugandan and foreign researchers report their experiences in Kibale. Some articles summarize research methods and results, others discuss particular problems and how the Kibale researchers tried to solve them (habitat destruction, disease, introduction of tourism, community involvement). Various conservation strategies are also described.

Besides the articles from Kibale, contributions from other long-term research sites (Budongo, Gombe, Mahale, Taï, Bossou), as well as one from the Virungas on gorillas, provide additional experiences. This means that the book does not deal just with Kibale but covers the subject more widely, highlighting the problems and hazards such projects face, and showing how long-term research and conservation can profit from each other. The book thus describes success stories of the research and conservation of apes that can be of great value to other, similar research projects.

Angela Meder

Helen Suich and Brian Child with Anna Spenceley (eds.)
Evolution and Innovation in Wildlife Conservation. Parks and game ranches to transfrontier conservation areas. London (Earthscan) 2008. 432 pages. Hardcover, £ 49.95, ISBN 978-1-84407634-5.

Peter M. Burns and Marina Novelli (eds.)
Tourism Development: growth, myths and inequalities. Wallingford (CABI) 2008. 448 pages, hardcover, £ 75, US$ 150, Euro 120. ISBN 978-1-84593-425-5.

Anna Spenceley (ed.)
Responsible Tourism. Critical issues for conservation and development. London (Earthscan) 2008. 432 pages. Hardcover, £ 49.95, ISBN 978-1-84407639-0.

Gianna Moscardo (ed.)
Building Community Capacity for Tourism Development. Wallingford (CABI) 2008. 208 pages. Hardcover, £ 49.95, US$ 100, Euro 80. ISBN 978-1-84593-447-7.

Katja Liebal, Cornelia Müller and Simone Pika (eds.)
Gestural Communication in Non-human and Human Primates. Amsterdam (John Benjamins Publishing Company) 2007. XIV, 264 pages. Hardcover, Euro 95, US$ 143. ISBN 978-90-272-2240-4.

Sylvia Atsalis, Susan W. Margulis and Patrick R. Hof (eds.)
Primate Reproductive Aging. Cross-taxon perspectives. Basel (Karger) 2008. VIII, 200 pages, 53 figures. Hardcover, Euro 140, sFr 196, US$ 196. ISBN 978-3-8055-8522-4.

Carol J. Pierce Colfer (ed.)
Human Health and Forests: A global overview of issues, practice and policy. London (Earthscan) 2008. 392 pages. Hardcover, US$ 127. ISBN 978-1-84407532-4.

Pascal C. Sanginga, Ann Waters-Bayer, Susan Kaaria, Jemimah Njuki and Chesha Wettasinha
Innovation Africa. Enriching farmers' livelihoods. London (Earthscan) 2008. 384 pages. Hardcover £ 85.00, ISBN 978-184407671-0. Paperback £ 29.95, ISBN 978-184407672-7.

Alfred Nhema and Paul Tiyambe Zeleza (eds.)
The Roots of African Conflicts: the causes and costs. Oxford (James

READING

Currey) 2008. XI, 269 pages. Paperback £ 17.95, ISBN 978-1-847013002. Athens (Ohio University Press) 2008, US$ 24.95, ISBN 978-082141809-3.

Alfred Nhema and Paul Tiyambe Zeleza (eds.)
The Resolution of African Conflicts: the management of conflict resolution and post-conflict reconstruction. Oxford (James Currey) 2008. XI, 269 pages. Paperback £ 17.95, ISBN 978-1-84701302-6. Athens (Ohio University Press) 2008, US$ 24.95, ISBN 978-082141808-6.

Serge Desouter
Rwanda: Le procès du FPR: mise au point historique. Paris (L'Harmattan) 2007. 336 pages. Euro 28, ISBN 978-229602559-2.

Daniela Kroslak
The Role of France in the Rwandan Genocide. London (C. Hurst) 2007. XVI, 330 pages. Hardcover, £ 30, ISBN 978-1-85065852-8.

Daniela Kroslak
The French Betrayal of Rwanda. Bloomington (Indiana Univ. Press) 2007. XVI, 322 pages. Paperback US$ 24.95, ISBN 978-025321974-9. Hardcover US$ 65, ISBN 978-025335120-3.

David Renton, David Seddon and Leo Zeilig
The Congo: Plunder and resistance. London (Zed Books) 2007. 243 pages. Paperback £ 17.99, US$ 35.95. ISBN 978-1-842774854. Hardcover £ 55, US$ 104.95, ISBN 978-1-84277484-7.

African Statistical Yearbook 2006. UN Economic Commission for Africa 2008. 776 pages, US$ 50. ISBN 978-92-1-025162-4.

Economic Report on Africa 2007. Accelerating Africa's development through diversification. UN Economic Commission for Africa 2007. 179 pages, US$ 32. ISBN 978-92-1-125104-3.

Kevin Joseph Carey, Sanjeev Gupta and Ulrich Jacoby
Sub-Saharan Africa: Forging New Trade Links with Asia. IMF 2007. VIII, 56 pages. Paperback, US$ 18. ISBN 978-1-58906-667-0.

Asian Foreign Investment in Africa. Towards a new era of cooperation among developing countries. UN Conference on Trade and Development 2007. 211 pages, US$ 20. ISBN 978-92-1-112712-6.

The Governance of Nature and the Nature of Governance: policy that works for biodiversity and livelihoods. IIED 2008.184 pages. Paperback, US$ 30. ISBN 978-184369700-8.

The Last Stand of the Orangutan. UNEP 2007. 49 pages. Paperback, US$ 15. ISBN 978-827701043-5. (PDF available at www.unep.org/grasp/docs/2007Jan-LastStand-of-Orangutan-report.pdf)

New edition:
Thor Hanson
The Impenetrable Forest: My Gorilla Years in Uganda. 2nd edition. Warwick, NY (1500 Books) 2008. 284 pages, 16 tables with photos. Hardcover, US$ 24.95. ISBN: 978-193369819-9.

Now as paperback:
Andrea B. Taylor and Michele L. Goldsmith (eds.)
Gorilla Biology: A Multidisciplinary Perspective (Cambridge Studies in Biological and Evolutionary Anthropology). Cambridge (Cambridge University Press) 2008. 528 pages. Paperback, US$ 60. ISBN 978-052107891-7.

Ralf Buckley
Environmental Impacts of Ecotourism. Ecotourism series no 2. CABI 2008. 389 pages. Paperback, £ 35, US$ 70, Euro 55. ISBN 978-1-84593-456-9.

New on the Internet

The Center for International Forestry Research (CIFOR) published a report in September 2008 called **Conservation and Use of Wildlife-Based Resources. The Bushmeat Crisis**. The authors support the development of policies protecting endangered species, while allowing sustainable hunting of "common" game. The report can be downloaded at: www.cifor.cgiar.org/publications/pdf_files/media/cbd-ts-33-en.pdf

The third IUCN Best Practice Guideline for great apes is now available: **Best Practice Guidelines for Surveys & Monitoring of Great Ape Populations**. The PDF can be downloaded at http://data.iucn.org/dbtw-wpd/edocs/SSC-OP-036.pdf

These survey and monitoring guidelines are linked to the A.P.E.S. initiative. More information will be added on the A.P.E.S. website in the coming months: http://apes.eva.mpg.de/guidelines.html

Child soldiers are still being recruited to fight in the Democratic Republic of the Congo, and there is continuing abuse of women and children in the conflict. *Amnesty International* published the report **No End to War on Women and Children** in September 2008, which can be downloaded at: www.amnesty.org/en/news-and-updates/report/armed-groups-government-forces-abuse-women-and-children-in-north-kivu-20080929

The International Peace Information Service produced a map of eastern Congo that shows the groups involved in the conflicts there: www.ipisresearch.be/mapping_kivu.php

BERGGORILLA & REGENWALD DIREKTHILFE

2009 will be the Year of the Gorilla!

– and, because of this, in 2009 the gorilla will be the center of various campaigns. This is an initiative of the Convention of Migratory Species (CMS) secretariat together with UNEP's *Great Ape Survival Project* (GRASP) and the *World Association of Zoos and Aquariums* (WAZA). A special website for the Year of the Gorilla has been constructed: www.yog2009.org – it will feature all activities that are connected with this special year. As a GRASP partner, the *Berggorilla & Regenwald Direkthilfe* will be part of the campaign.

The Year of the Gorilla 2009 was launched on 29 November 2008 on the occasion of the CMS Conference of the Parties in Rome, Italy. Besides featuring scientific information and raising awareness, the campaign will provide the scope to raise funds for conservation projects to attract significant public and political support for great ape conservation. A major objective will be the implementation of the CMS Agreement on the Conservation of Gorillas and their Habitats.

Year of the GORILLA
Anneé du GORILLE
2009

Primatologists Meet in Edinburgh

Crickette Sanz and Emma Stokes

Miki Matsubara

Cross River team (from left): Bethan Morgan, Mary Gonder, John Oates, Jacqueline Sunderland-Groves, Andrew Dunn, Josh Linder, Richard Bergl

Our Donors

From May to October 2008 we received major donations by Elisabeth Engel, Marianne Famula, Jürgen Friedrich, Andrea Küpper, Angela Meder, Milwaukee County Zoo, Kurt Niemeyer, Birgit Reime, Dieter Schmitz, Elke Schmitz and Karin Vestner. We also received two used laptops by the company IBM and a digital video camera for conservationists in Africa.

Many thanks – to all the other donors as well! We wish you all happiness and success (and everything you wish for yourself) for 2009.

Subscription to the *Gorilla Journal*

If you become a member, you will receive the journal regularly. If you want to receive the printed journal without becoming a member, we would be grateful if you could make a donation to cover our costs. The costs to send the journal overseas are about US$ 20 per year.
If you do not need the printed version, we can include your email address in our mailing list and you will be informed as soon as the PDF files are available (contact: meder@berggorilla.org).

You can download this issue at:
www.berggorilla.de/fileadmin/gorilla-journal/gorilla-journal-37-english.pdf
as well as the German issue:
www.berggorilla.de/fileadmin/gorilla-journal/gorilla-journal-37-deutsch.pdf
and the French issue:
www.berggorilla.de/fileadmin/gorilla-journal/gorilla-journal-37-francais.pdf

Declaration of Membership

Starting with the following date __________ I declare my membership in *Berggorilla & Regenwald Direkthilfe*

Name ______________________ Affiliation ______________________

Address ____

____

Birth date ______________ male ☐ female ☐

☐ I want to receive a printed copy of the *Gorilla Journal*
☐ I want to be informed if the new issue can be downloaded from the internet. My e-mail: __________

Yearly subscription (please mark)

Date and signature ______________________

	Europe	Overseas
Student	☐ Euro 15	☐ US$ 25
General member	☐ Euro 40	☐ US$ 75
Family	☐ Euro 65	☐ US$ 120
Donor	☐ Euro 100	☐ US$ 180

Bank account:
Berggorilla & Regenwald Direkthilfe
Account number 353 344 315
Stadtsparkasse Muelheim, Germany
Bank code number 362 500 00
IBAN DE06 3625 0000 0353 3443 15
SWIFT-BIC SPMHDE3E

Bank account in Switzerland:
Postscheckkonto Postfinance
Account number 40-461685-7

Please send to:
Rolf Brunner
Berggorilla & Regenwald Direkthilfe
Lerchenstr. 5
45473 Muelheim, Germany
Fax +49-208-7671605