



Gorilla Journal

Journal of Berggorilla & Regenwald Direkthilfe

No. 60, June 2020

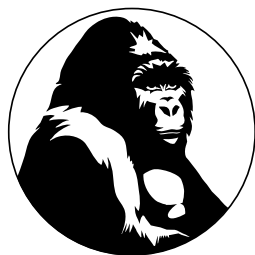


**COVID-19 and
Gorilla Doctors**

**Sarambwe after
the Demarcation
of the Internatio-
nal Border**

**Essential Com-
ponents of the
Mountain Gorilla
Success Story**

**Ebo Gorillas
Threatened by
Forest Manage-
ment Units**



BERGGORILLA & REGENWALD DIREKTHILFE

CONTENTS

COVID-19	3
COVID-19 and Gorilla Doctors	3
Rwanda Re-starts Gorilla Tourism	4
D. R. Congo	5
Severe Attack on Virunga Rangers	4
Sarambwe after the Demarcation of the International Border	5
Appeal for Donations	7
Mount Tshiaberimu	7
Itombwe Nature Reserve:	
Conservation Efforts 2017 to 2019	12
Gorillas	15
Mountain Gorilla Success Story	15
1,063 Mountain Gorillas – What Does this Number Mean?	17
A Tragedy in Bwindi	17
Ebo Gorillas Threatened by Forest Management Units	18
A Long-Term Monitoring Programme for Great Apes in Monte Alén	20
Reactions to Camera-trap Devices	22
Conservation Efforts and Monitoring Gorillas at Douguetsi Site, Gabon	24
Reading	27
Berggorilla & Regenwald Direkthilfe	28

Gorilla Journal 60, June 2020

Editor: Dr. Angela Meder
Augustenstr. 122, 70197 Stuttgart, Germany
E-mail: meder@berggorilla.org
Editing, translation and Proofreading: Ann DeVoy, Bettina and Andrew Grieser Johns, Laura Hagemann, Calum McCabe
Cover: Dr. Fred Nizeyimana, Field Veterinarian, Uganda, gets ready to administer medication to a gorilla from a distance via a dart projector. Photo: Skyler Bishop © Gorilla Doctors

Bank Account:

IBAN DE06 3625 0000 0353 3443 15
BIC SPMHDE3E
Switzerland:
IBAN CH90 0900 0000 4046 1685 7
BIC POFICHBEXX

Authors of this Issue

Anna Behm Masozera is the Director of the International Gorilla Conservation Programme, a coalition programme of Conservation International, Fauna & Flora International and WWF.

Dr. Ekwoke Enang Abwe is a post-doctoral research fellow with San Diego Zoo Global and manager of the Ebo Forest Research Project in Cameroon.

Dr. David Fernández is a Senior Lecturer in Conservation Science at the University of the West of England and has been involved in conservation in Equatorial Guinea since 2002.

Dr. Kirsten Gilardi is Executive Director and Chief Veterinary Officer of Gorilla Doctors as well as Associate Director at the UC Davis One Health Institute.

Anne-Céline Granjon graduated in evolutionary biology at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany and is now finishing her PhD there. Her thesis deals with the genetic analysis of the size and growth of African ape populations.

Nana Ismaila has been an intern at the PROGRAM as Technician Assistant of Gorilla Habituation Project since July 2019. He is responsible of GIS data managing.

Dr. Ammie Kalan is a Canadian primatologist currently working for the Pan African Programme based at the Max Planck Institute for Evolutionary Anthropology in Leipzig. She specializes in great ape culture, communication and conservation research, particularly using non-invasive devices.

Organization Address:

Berggorilla & Regenwald Direkthilfe
c/o Burkhard Broecker
Juedenweg 3
33161 Hoevelhof, Germany
E-mail: broecker@berggorilla.org

Website:

<http://www.berggorilla.org>

Dr. Dikenane Kombila joined PROGRAM in January 2004 and became General Secretary in 2018. He has experience in conservation, community-wildlife management, ecotourism and sustainable development in Gabon.

Jean Claude Kyungu Kasolene was Project Manager at Tshiaberimu for The Gorilla Organization. In 2008 he became conservator for the Mt. Tshiaberimu sector, from 2017 to 2019 he was the Director of the Itombwe Reserve and in 2020 became the Director of the Maiko National Park.

Ulrich Maloueki is a research volunteer assistant at the Kinshasa University. He has 7 years' experience in conservation of great apes. He has worked for the Protectrice des Grands Singes de la Moukalaba (PROGRAM) as Camp Manager of the Gorilla Habituation Project since March 2019.

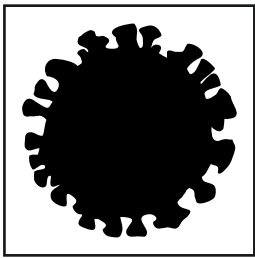
Dr. Gráinne McCabe is Head of Field Conservation and Science for the Bristol Zoological Society where she directs the global conservation portfolio and higher education provision.

Dr. Patrick McLaughlin is a post-doctoral research associate with the Bristol Zoological Society where he directs field operations and research for their western lowland gorilla project.

Dr. Bethan Morgan is Head of the Central African Program at San Diego Zoo Global, Principal Investigator of the Ebo Forest Research Project and Honorary Research Fellow at the University of Stirling, UK.

Claude Sikubwabo Kiyengo worked for the ICCN and for the IUCN. He was chief conservator of the Parc National des Virunga, central sector, coordinator of VONA, the PACEBCo expert for conservation and biodiversity in the Virunga region, and since 2008 he has been our assistant.

Obame Rina Zang has worked for PROGRAM since 2016. She is in charge of fundraising, writing the research projects, and environmental education.



COVID-19

COVID-19 and Gorilla Doctors

The World Health Organization (WHO) declared COVID-19 a pandemic on March 11, 2020. Never before have we understood the concept of One Health more than we do today, as we face the COVID-19 pandemic as a global community. While we don't yet have proof, it is likely that SARS CoV-2, the virus causing the COVID-19 disease, emerged from an animal host and spilled over to infect humans. We are living a One Health moment – seeing what can happen when humans and animals interact in a shared environment in unsustainable ways with devastating consequences.

The One Health Institute, Gorilla Doctors' administrative home at the UC Davis School of Veterinary Medicine, has been at the forefront of international surveillance and research on the very factors that have led to this moment in which we now find ourselves – facing the reality of the intersections among wildlife, people and the emerging pathogens that can lead



Ranger washing station, Kahuzi-Biega National Park, May 2020

Photo: Gorilla Doctors

to life-altering changes for people and the world. A new study published by the Institute's EpiCenter for Disease Dynamics found that habitat loss, human

exploitation of wildlife and species extinction are directly connected to the increased risk of disease emergence, and that emergence is occurring at a more rapid rate than ever before.

For the past 10 years (2009–2019), the One Health Institute led the USAID Emerging Pandemic Threats PREDICT project to identify and detect viruses carried by wildlife that could pose a risk to human health, and to recommend measures to reduce spillover. Gorilla Doctors was the implementing partner in Rwanda, Uganda and eastern Democratic Republic of the Congo. A team led by our Head Veterinarians (Julius Nziza, Eddy Kambale Syaluha and Benard Ssebide) collected and tested samples from more than 7,000 people and wild animals. With our laboratory partners, we detected more than 80 viruses (both novel and known) in the three countries, including several novel coronaviruses (SARS CoV-2 was not one of the coronaviruses detected in this region). PREDICT was launched

What Does It Mean?

SARS CoV-2: The name of the virus. When the SARS CoV-2 virus infects a human, the disease it causes is called COVID-19. A person tests positive for SARS CoV-2, not COVID-19.

SARS: **S** = Severe; **A** = Acute **R** = Respiratory; **S** = Syndrome. SARS CoV-2 is classified as SARS because it is genetically related to SARS CoV-1 from 2003.

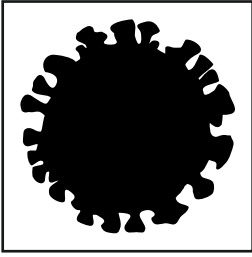
COVID-19: **CO** = corona; **VI** = virus; **D** = disease; **19** = 2019, the year the virus emerged.

Pathogen: A bacterium, virus or other microorganism (e.g. fungus) that can cause disease.

Zoonotic disease: Disease in humans caused by a pathogen that originated in animals.

Spillover: When a pathogen 'jumps' from animals to humans. While still not proven, SARS CoV-2 is a likely example of zoonotic spillover.

Emerging Infectious Disease: When a pathogen appears in humans or other animals for the first time and causes disease – it emerges from a new source, to infect humans or animals and cause disease.



COVID-19

to address the increasing threat of disease emergence from global hotspots – highly biodiverse regions where there is a significant risk of zoonotic spillover from wildlife. Equatorial Africa is one of these hotspots where human populations are dense and growing, there is significant species diversity and a high degree of human-animal interaction, all of which combine to increase the risk of viral spillover.

To date, we do not know if SARS CoV-2 infections have occurred in human-habituated eastern gorillas (mountain and Grauer's) or other great apes in the region. We do know that great apes, including gorillas, are susceptible to human respiratory pathogens and that respiratory illnesses regularly occur in mountain gorillas. When a gorilla is sick, our veterinarians collect diagnostic samples (fresh feces) to be screened for multiple pathogens, including the new SARS CoV-2 virus.

Rwanda, Uganda and DR Congo have all temporarily suspended gorilla tourism and severely restricted access to the parks. Park staff and Gorilla Doctors' veterinarians have implemented these additional protective measures:

- All park staff must wear masks during health checks (Gorilla Doctors' veterinarians have always worn masks when close to the gorillas).
- Daily temperature checks of people before entering the park.
- Maintaining a minimum distance of 10 m (the distance Gorilla Doctors always practiced during health checks and monitoring visits whenever possible).
- Hand-washing and the use of hand sanitizer.
- Boot disinfection.

In addition to helping enforce these safety measures, we are working with our government partners to keep the number of people coming into close daily proximity of the gorillas to the

Rwanda Re-starts Gorilla Tourism

On 17 June 2020 the Rwanda Development Board announced the reopening of tourism activities in the country as well as the resumption of international travel for charter flights. They wrote that they "have put robust health and safety guidelines in place" for the tourists. All visitors travelling by charter flights are expected to test negative for SARS CoV-2 within 72 hours prior to arrival. Tourists will take a second COVID-19 test prior to visiting any tourist attraction.

Gorilla permits are available again (at US\$ 200 for Rwandans & EAC nationals residing in Rwanda, US\$ 500 for foreign residents and US\$ 1,500 for international tourists coming with charter flights). Special all-inclusive packages are offered for groups, families and corporates on other products in Volcanoes and Nyungwe National Parks.

RDB press release: <https://rdb.rw/rwanda-re-opens-for-tourism>

essential minimum to ensure their safety and protection.

Gorilla Doctors' mission – conserving wild mountain and Grauer's gorillas using life-saving veterinary medicine, science and a One Health approach – is at the forefront of global wildlife conservation. Despite the current pan-

demic, I am hopeful and confident that Gorilla Doctors' One Health approach – understanding the intrinsic connectedness among wildlife, humans and the environments we all share – will ultimately provide the very solutions we need to prevent future outbreaks.

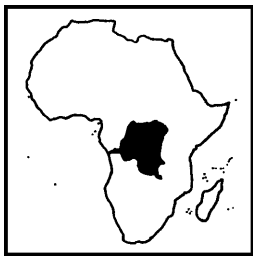
Kirsten Gilardi

Severe Attack on Virunga Rangers

On the morning of 24 April, three vehicles drove into an ambush on Route Nationale 2, near the headquarters of the Virunga National Park in Rumangabo. Half an hour of crossfire with about 60 militiamen later, 12 rangers, a driver and 4 civilians were dead. Three other rangers and two civilians were seriously injured. Cosma Wilungula, General Director of the national park authority ICCN, said this was the deadliest attack on Virunga park rangers in recent history. Almost 200 employees have died up to now during their work for the national park.

As the Virunga National Park wrote on their website, the rangers were on their way back to their headquarters when they encountered a civilian vehicle that had been attacked and subsequently came under a ferociously violent and sustained ambush by the armed group FDLR-FOCA.

Several militia groups use the Virunga National Park as a base and try to keep the rangers out of their areas. These groups include the ADF, the Mai-Mai Mazembe and the FDLR. Attacks happen again and again, and the rangers must fight back to protect the park and their own lives, often in cooperation with the Congolese army. The FDLR has been exploiting the park's natural resources, including minerals, ivory, fish, marijuana and is especially involved in the illicit charcoal trade.



D. R. CONGO

The Sarambwe Nature Reserve after the Demarcation of the International Border

In our last article (Gorilla Journal 58) we wrote about our hope that the encroachment of the Sarambwe Nature Reserve (SNR) by Ugandan farmers in search of new fields could be stopped. Today we can announce that this has been achieved. We will also make some recommendations for the future conservation of the Sarambwe Reserve.

The encroachment of Sarambwe Nature Reserve has always been severe. The situation was made worse by confusion over the delimitation of the border between the Democratic Republic of the Congo and Uganda, and by the encouragement or even protection of Ugandan citizens who exploited fields within the reserve that were actually located in the Congo. The reserve was entered for purposes of establishing new fields or cultivating existing ones, harvesting timber by pit-

Illegal activities in the Sarambwe Reserve in 2018 and 2019

Month	People seen		New fields (ha)		Poaching observed				Bush fires (ha)	
	2018	2019	2018	2019	Traps	Dogs		2018	2019	
Jan.	25	20	3	1	–	11	3	–	–	
Feb.	–*	4	–*	1	–*	–	–*	–	3*	
March	–*	–	1*	1	4*	–	1*	–	–*	
April	24	–	0.5	1.5	2	–	4	–	6	
May	30	14	4	6	–	4	–	–	–	
June	53	–	9	–	–	–	4	–	–	
July	12	–	2	–	–	1	–	–	–	
August	–	–	2	–	–	–	–	–	–	
Sept.	2	–	2	–	2	8	–	–	–	
Oct.	2	1	–	–	2	–	2	–	–	
Nov.	7	2	–	–	2	–	2	–	–	
Dec.	2	9	16	–	–	–	–	–	–	
Total	157	50	39.5	10.5	12	24	16	0	9	

* presence of Ugandan military

sawing, producing charcoal or hunting for bushmeat. Thanks to the very commendable efforts of senior officials of both countries and the mobilization of teams on the ground, the exact location of the international border has been clarified and demarcated, so that it has been possible to put an end to these violations and about 450 ha were re-integrated into the reserve.

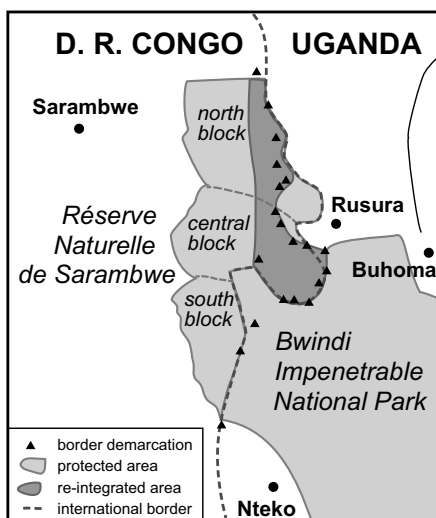
To prepare for the demarcation of the border on the ground, several meetings were held in the DRC and Uganda to determine the joint activities that needed to be carried out in order to sensitize the population and to force abandonment of the illegal fields (after a grace period that was granted for the harvesting of already planted crops). Since that time, we have seen a decline in encroachment and illegal activities to the point of almost complete cessation.

This table shows a positive trend for the conservation of the SNR. Indeed, before the international border was accurately demarcated, Ugandan farmers, hunters, pit-sawyers and loggers were spotted every month, sometimes under the protection of soldiers. The table indicates that there was lit-

tle or no Ugandan presence in the reserve in February and March 2018, but this is misleading in that the Ugandan army was present in the exploited area almost continuously during those two months, which meant that trackers and guards could not enter. Consequently, no observations were made. However, despite the two months without observations and the good month of August, 157 Ugandans engaged in various activities were recorded in the reserve in 2018.

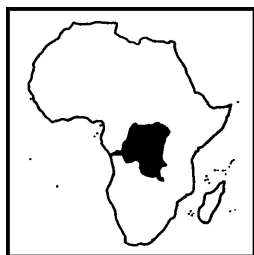
In 2019, the situation was much improved with only 50 people observed in the reserve. In terms of area, 39.5 ha were cleared for new fields in 2018 compared to only 10.5 ha in 2019. As far as hunting and poaching is concerned, more traps were found in 2019 than in 2018 (24 compared to 12). For dogs, the situation improved: 16 dogs were seen in 2018 compared to none in 2019.

We can also note a significant drop in illegal activities in the SNR: no new fields have been created since May 2019, i.e. in 7 months. We can conclude that encroachment has ceased. However, it will be necessary to monitor trends in illegal activities during



Map of the Sarambwe Reserve showing the re-integrated area

Map: Angela Meder, original drawing: ICCN



D. R. CONGO



A villager clearing a field in the Sarambwe Nature Reserve
Photo: Jean Paul Kambere

2020. So far, the situation is looking good in that there have been almost no illegal activities in the SNR this year.

Who Are the People Carrying out Illegal Activities in the Reserve?

Can we conclude that the destruction wreaked upon the SNR has been caused by Ugandans alone? The answer is no, although the observations made by rangers and trackers have indicated that much of the illegal activities can be attributed to the Ugandans. Congolese have also been involved in illegal activities in the reserve, albeit in smaller numbers. Rangers and trackers have sometimes encountered Congolese in illegally cleared fields. Having

said that, encroachment by Congolese has been minimal, as an information system had been set up to report any incursion into the reserve. In addition, people in the villages surrounding the reserve have been sensitized and motivated by several micro-projects launched by Berggorilla & Regewald Direkthilfe, the organisation that is taking charge of the trackers, acting alongside the ICCN, which manages the reserve. These community projects include

- an oil press project,
- a water project,
- community mills,
- pig, sheep and goat farming,

- a fish farm project,
- an afforestation project for the population with tree nurseries in schools and others managed by the wives of the trackers.

Conclusion and Recommendations

The Sarambwe Reserve is currently almost free of encroachment and illegal activities. However, the destruction resulting from several decades of encroachment remains evident. This consists of large areas of fallow land, which are degraded and require rehabilitation and increased monitoring to prevent further encroachment that would prevent natural regeneration, a process that will take several years. Continued monitoring and support for guards and trackers should therefore be encouraged and strengthened.

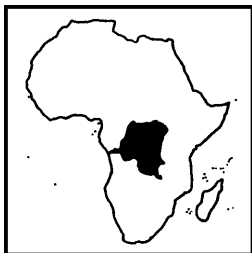
While there was confusion over the border issue, the Ugandans planted thorny hedges in order to protect their fields, blocking access to animals, particularly gorillas. These thorny species are a problem for effective monitoring; in addition, they are mostly exotic species that need to be cut and eradicated from the reserve.

The establishment of new trails in the reclaimed areas in line with the new border demarcation is imperative so that proper monitoring can be carried out. Ideally, in order to improve the monitoring in the entire reserve and because of the insecurity that still prevails, two new ranger posts should be constructed, one in the extreme south of the reserve, far away from the current Sarambwe post, and the other in the extreme north, on Mount Sarambwe.

A working group or CoCoSi (Site Coordination Committee) specific to the Sarambwe Nature Reserve would be desirable as part of an operational plan for the development of the SNR and the surrounding population, as was in place for the period between 1998 and 2001.

Illegal activities in the Sarambwe Reserve in 2020

Month	People seen	New fields	Poaching	Bush fire	Logging
January	0	0	0	0	1 (firewood)
February	1 incident	0	0	0	0
March	1 incident	0	0	0	0
April	0	0	0	0	0
Total	2 incidents	0	0	0	1



D. R. CONGO



Thorny bushes are removed from the fields in the reserve.

Photo: Claude Sikubwabo

Finally, we must not forget the inhabitants of the area around the reserve

who continue their support by reporting violations and raising the awareness of

the people committing the violations. It is intended to establish new micro-projects to enable them to provide for their own needs.

Claude Sikubwabo Kiyengo

Mount Tshiaberimu – the Science behind the Mountain of Spirits

The northern sector of Mount Tshiaberimu is an integral part of the Virunga National Park (VNP), the west is adjacent to Lake Edward in North Kivu Province, and the east is located in the Democratic Republic of the Congo. Its geographical coordinates are 0° 9'–0° 11' south and 29° 24'–29° 31' east. It reaches an altitude of 3117 m and covers an area of 60 km² of which 7 km² have already been deforested by the extension of cultivation. Gorillas exploit most of the habitat between 2650 and 2950 m.

Mount Tshiaberimu has an equatorial mountain climate type. Its climate reflects its location on the Equator and

Communities in Sarambwe

It is not easy to convince the local population of the benefits of nature conservation if the living conditions are as difficult as they are in the eastern Democratic Republic of the Congo. The best way to achieve this is for the people who live in the vicinity of protected areas to feel that they benefit from them. Claude Sikubwabo is in contact with the communities adjacent to the Sarambwe reserve and regularly monitors the success of the projects we support. He talks to the people and knows their needs.

We have received the following requests for support from communities close to Sarambwe Reserve:

- Kikundi cha Maendeleo: support for various agricultural activities and assistance for the purchase of household items
- Mamans de Nyarabugu: eight sewing machines
- Ajacar: setting up of a nursery, small animal breeding
- Rice cultivation
- Kishara: solar streetlamps

Bank Details:

IBAN: DE06 3625 0000 0353 3443 15
BIC SPMHDE3E
Switzerland: IBAN: CH90 0900 0000
4046 1685 7
BIC POFICHBEXXX

We would like to continue improving relations between the population and the Sarambwe Reserve. Please help us to carry out these small projects!

You are also welcome to donate via PayPal if you prefer this:
<http://www.berggorilla.org/en/help/donate>

Address:

*Berggorilla & Regenwald
Direkthilfe*
c/o Burkhard Broecker
Juedenweg 3
33161 Hoevelhof, Germany
www.berggorilla.org



D. R. CONGO

its high altitude. The vegetation is predominantly Afro-montane forest and changes composition according to altitude.

Mount Tshiaberimu in the Historic Context

According to the history of the migrations of the Bantu peoples, the Wandendes (Bayira) among them, Mount Tshiaberimu was discovered around about the sixteenth century, after the tribes had crossed the Semliki River, then called *Kalembe* (“snaking rope”). Stanley, among the first European explorers to arrive, wanted to know the name of the river and asked a fisherman who was carrying a closed bag. The fisherman, believing that he was being asked about the contents of his bag, answered “SIMULIKI” or “THERE IS NOTHING”. The explorer duly wrote down Semliki as the name of the river, and so it remains to this day. Stanley camped at a site dominated by tall trees; ‘Stanley’s tree’ still stands today on the west coast of Lake Edward between Vuholu and Kisaka.

The Yira people crossed the Kalembe River from Uganda on *Mughongo wa ndioka* (“the dragon’s back”), actually a large rock that breaks the surface of the water and separates Lake Edward from the Semliki River at Ishango in the Virunga National Park, where archaeologists discovered Ishango Man (Mashauri 1980).

After crossing the Semliki River, the Chief of the Baswagha clan temporarily settled his people on Mount Tshiaberimu, where they discovered a type of strong animal that they had never seen before. Whenever they encountered these animals, they would threaten the humans by hitting themselves on their chests. The Chief considered these animals to be spirits. Thus, the mountain was called *Kitwa ekyevirimu* in the local dialect (“mountain of the spirits”) which became Tshiabirimu (or Tshiaberimu), although the local spell-

ing remains *Ekyavirimu*. The spirit animals were, of course, the gorillas.

Mount Tshiaberimu: from the Traditional Spirits to an Understanding of Science

Mount Tshiaberimu was incorporated into the Virunga National Park in 1938 due to the presence of gorillas, which were discovered there by Sir Johnson in 1931, according to an ICCN report (ICCN pers. comm.).

George B. Schaller visited Mount Tshiaberimu for 2 weeks in 1959 and found 4 groups of gorillas. He estimated their number to be between 30 and 40 individuals. He studied the gorillas’ diet and how much time the gorillas spent in the various vegetation zones. Since then, work has focused on the parasitology of the gorillas including the determination of endoparasites (Masika et al. 2010), and on ape eco-ethology and some aspects of feeding behaviour (Chifundera et al. 2003). The information about gorilla numbers at this site comes from scientific missions conducted by Schaller in 1959 (Schaller 1963), Conrad Aveling in 1986 (Aveling & Aveling 1989) and Tom Butynski and Esteban Sarmiento in 1995 (Sarmiento et al. 1996). The number of gorillas was reported to be between 30 and 40 in 1959, 20 in 1986, 14 to 16 in 1995, and 11 in 2003, with no details given about group composition. According to Chifundera, the population rose to 21 (Chifundera et al. 2004) but this last number is disputed (Sikubwabo, unpubl.). The 2006 census (Kyungu & Kataomba 2007) estimated 13 individuals.

The reduction in numbers to 12 by mid-1997 (Sikubwabo, unpubl.) can be attributed to deforestation and hunting. Mount Tshiaberimu was invaded for mining and cultivation. According to Dajoz (1980), density-dependent factors modify the rate of population growth by acting on the birth rate or the death rate. Generally speaking, the

growth rate decreases as density increases. He also mentions that in some species, the reproductive rate decreases with decreasing number of fertile females, but also with the presence of disease. The former is certainly the case of the Tshiaberimu gorillas, as the number of females has currently reduced to two.

A New Project Comes to Life

The 1995 census shed more light on the situation of Mount Tshiaberimu’s fauna and flora. This census was funded by Zoo Atlanta, Berggorilla & Regenwald Direkthilfe (B&RD) and the Dian Fossey Gorilla Fund, London (now The Gorilla Organization). This census laid the foundation for a new gorilla conservation project. The equipment required for the project to start was provided by B&RD. The project was set up to safeguard the small, isolated population of gorillas under threat by human activities.

Project staff were recruited from villages around Mount Tshiaberimu. The rangers conduct patrols and monitoring. The workers set up transects. The Social Assistant is responsible for the sensitization of the population. The duties of the Assistant Conservator are administrative facilitation, sensitization and participation in patrols. The Project Director is the administrative and scientific manager, responsible for ensuring the smooth operation and management of the project according to the terms of reference defined by the project partners (The Gorilla Organization, B&RD, etc.).

Monitoring and Tracking of Gorillas

In 1997 and 1998, Claude Sikubwabo and the late Vital Katembo, with the support of B&RD, organised training for rangers in monitoring, anti-poaching and the identification of vegetation types. In early 2000, Claude Sikubwabo took part in the initiation of gorilla habituation, except for a brief period



D. R. CONGO

when he led the IUCN Parks for Peace Project (PPP).

Between 1997 and 2007, monitoring was carried out by 7 well-trained rangers working in two groups. Monitoring was supervised by the rangers Sindani and Mahamba Paluku. Two groups of gorillas were followed, Nzanzu-Lusenge and Tsongo. The two groups consisted of 11 and 4 individuals. According to Chifundera, there were also 3 solitary males and the group contained 3 infants, and the Lusenge group split in two subgroups in 2002 (Chifundera 2004). During monitoring, data were recorded on habitat (geographic coordinates, altitude, climate and vegetation) and on the behaviour of the group members, especially on interactions between the dominant males. Feeding behaviour and how much time the gorillas spent in different activities were studied in more detail. For purposes of habituation, the rangers tried to make contact with the gorillas on a daily basis.

Between 1998 and 2002, a Magellan 315 GPS was used to collect geographical coordinates; between 2002 and 2008, a Garmin 12XL was used; since 2008, a Garmin map 62 has been used. The coordinates are collected for each location where gorillas, their droppings or their nests are encountered. This information provides a set of data that indicate how gorillas occupy and use their habitat. They also show the movements of gorillas around the site. Altitude data can be used to identify vegetation zones. The gorillas of Mount Tshiaberimu travel at an altitude between 2650 and 2950 m.

The Nzanzu-Lusenge group spent the night in two sub-groups, one with 5 individuals and the other with 6. This might have been an indication that the group could split along these lines in the near future. The silverback spent the night with the sub-group of 5. The nests were arranged in an eastward direction. Some nests were built in trees.

Interactions (i.e. fights) between the two silverback males of the two groups were observed in December 2001 and January 2002. This family disappeared in 2012. Only two of its members, Mukokya and Mwengesyalu, were seen to move to another group.

The Development of Gorilla Monitoring Activities over Time

On 26 April 1998, the late Vital Katembo, then Project Manager, initiated gorilla monitoring. The team of trackers and rangers was installed in Kalibina, which is now the Gorilla Tracking Research Centre. The team members were Paluku Mahamba (park ranger and monitoring officer), Kakule Musavuli (tracker), Katsuva Kitsumbura (tracker), Kambasu Kasusu (tracker), Kavembere Kahumba (tracker) and Mumbere Katu (logistics officer). The trackers were assigned the task of tracking the Lusenge group, consisting of 11 individuals including ju-

veniles. There were also 2 known solitary gorillas. In order to locate the solitary gorillas, the number of trackers had to be increased, so Kakule Nyererere and Katsuva Kayisumba joined the team for this purpose. Monitoring was arduous and required endurance, but results were obtained. As habituation progressed, the gorillas turned out to be not as wild as had been believed.

Despite the constraints during the period of war, the monitoring team was regularly provided with rations.

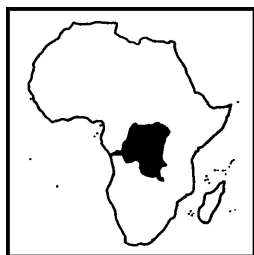
When the Project Manager left for study in 2002, a replacement director was appointed, Mr. Chifundera Kusamba. Activities continued throughout, mainly monitoring but many research activities. During this period, the following events took place:

- After several interactions, the Lusenge family was driven out and replaced by the Kipura group, led by the silverback Tsongo.



Jean Claude Kyungu introduces Mukokya to tourists in 2010

Photo: Jean Claude Kyungu



D. R. CONGO

- New babies were born, including Mwasananyinya, Kambula and Musanganya.
- The solitary males Kanindo and Katsavara were followed and habituated.

The number of trackers had to be increased once again and Kambale Towaluso and Kahindo Kivikwamo joined the monitoring team, followed by Kambasu Vihugho; Kihurania and Paluku Kakome joined in 2004.

In March 2005, Project Director Chifundera was assigned to other duties and replaced by Jean Claude Kyungu. The monitoring team was reinforced further in order to locate other solitary gorillas: Sinaminy Emmanuel, Paluku Kihunirwa, Vundama and Kambale Sivyaghendera joined the team at that point. During this period, a first scientific census of the Tshiaberimu gorillas was carried out by various researchers and trackers. A very important event was the birth of a baby in the Kipura group on 5 August 2006. It was named Musomboli to mark the election that was going on at the time. Another baby, Mwavita, was born in 2007; sadly, this one was found dead following an interaction. A third infant was born in 2009 and subsequently crushed to death by the mother Mwengesyalu.

The Development of Patrols

Prior to the start of the project: The forest of Mount Tshiaberimu was watched over by four ranger posts: the posts at Muramba and Kyavinyonge, which are located in the south and the north of the eastern part of Tshiaberimu on Lake Edward, and the posts of Camp Ngai and Museya located in the western and north-western part of the forest.

Each post had a well-defined area where they coordinated surveillance and anti-poaching patrols. The patrols had the same objectives as during the time of the project (see below), except that monitoring was not conducted.

During the project: There are two types of patrols: patrols during which the staff overnight in tents, and regular patrols. A 'tent patrol' is carried out once a month and lasts over three days. The rangers on patrol take food with them. The objective of the patrols is to dissuade the local population from entering the park. They combat poaching, gold panning, park encroachment and logging. Patrols help to maintain the integrity of the park's boundaries. Since December 2001, logging and the cutting of bamboo has reduced significantly, but the extension of fields for food crops continues and constitutes a serious problem for the conservation of gorillas and their habitat in the sectors of Vihyo and Mulango wa nyama. Poachers with dogs have been apprehended and taken to Mutsora Headquarters.

While the area of Kalibina was being monitored, rangers also patrolled inside the park. Before the war, the park rangers were equipped with weapons. These were later requisitioned by the local militia, and from then on, the rangers only had machetes or spears to take with them.

The invasion of the park by farmers has been going on for a long time, but with the great number of patrols it has been possible to reclaim some areas of the park, notably in 2002, with support from the regular army.

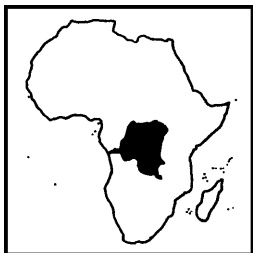
When the project started in 1996, The Gorilla Organization envisaged the construction of three patrol posts (PP). These were Burusi PP, Camp Ngai (this existed before, but had been destroyed during the war) and Kitolu PP, in addition to Kalibina Centre, where all houses were semi-permanent. This construction was required due to the increase in the number of patrol staff, which arose from the need to cover all sectors of the park. Both types of patrols were intensified. Equipment and food rations for the patrols were provided by the project. In 2007, to maintain

continuous monitoring and to reach even the most remote corners, The Gorilla Organisation considered building two houses made from wood planks at Kikyo PP. Mulango Wanyama PP was erected in an initiative by PEVi/KACHECHE (WWF), one of ICCN's partners.

Since Tshiaberimu is a sub-station, four Conservators succeeded one another in maintaining order and in collaborating with the project managers. These were: the late Kasereka Bayihota based in Kyavinyonge (1998–2000), the late Kamate Malikewa (2000–2001 and 2006–2009) and Beghene Katumbano Joseph (2002–2005); these were followed by Kyungu Kasolene (2005–2014). Jean Claude Kyungu was project manager from 2005 to 2009 and then appointed Conservator. He had the dual role of project manager and Conservator from 2010 to 2012 and continued as Conservator from 2012 to 2014. The project ended in 2012.

Relationship between Project and Authorities

We have met three times with the ministers and heads of divisions (RCD-KML Kisangani) responsible for nature conservation, the governor of North Kivu Province in Beni and the mayor of Butembo. After the reunification of the Province and the Republic, new strategies were developed for collaboration with Goma and Kinshasa (Provincial and National Deputies). In Kyondo, we are in regular contact with the group and community leaders. During all these meetings, we explained the objectives of the project and at the same time solicited the support of the communities for the implementation of conservation activities on Mount Tshiaberimu. During some of the visits, we are accompanied by Mushenzi Norbert, Director of the PNVi Northern Sector. The authorities have readily participated in the meetings and in workshops, which were organized jointly by The Gorilla



D. R. CONGO

Scientific Research

During the project period, several studies were conducted on Mount Tshiaberimu. There has been spontaneous work by KAUR (University of Virginia) on malaria in gorillas and by MIKE (Mountain Gorilla Veterinary Project) on gorilla haematology. Below is a list of other scientific work, most of which has already been published.

- Baluku, B. et al. (2010): Contribution à l'étude verticale des amphibiens du Mont Tshiaberimu, Parc National des Virunga, Nord-Kivu, RD Congo. [Contribution to the vertical study of the amphibians of Mount Tshiaberimu, Virunga National Park, North Kivu, DR Congo.] Thesis, unpublished, UOR
- Bapeamoni, A. et al. (2008): Inventaire ornithologique du Mont Tshiaberimu (R. D. Congo). [Ornithological inventory of Mount Tshiaberimu (D.R. Congo).] GO, report, unpublished
- Butynski, T. M. & Sarmiento, E. E. (1995): On the brink: Gorilla of Mount Tshiaberimu, Zaire. *Kenya Past and present* 27 (1), 17-20
- Chifundera, K. et al. (2003): The Mount Tshiaberimu in the Albertine Rift: biodiversity, habitats and conservation issues. Unpubl. report, Dian Fossey Gorilla Fund Europe
- Chifundera, K. et al. (2004): Inventaire des amphibiens au Mont Tshiaberimu: cas du marais d'altitude de Kalibina et de la vallée de Burusi et ses environs. [Inventory of amphibians on Mount Tshiaberimu: the case of the Kalibina high-altitude marsh and the Burusi valley and its surroundings.] TFC, unpublished, ISEC/KAYNA
- Kambale, S. (2018): Diet selection strategies of Grauer's gorillas (*Gorilla beringei graueri*) in relation to nutritional benefits and exposure to hepatotoxic phytochemical in Mount Tshiaberimu Forest, Virunga National Park, DRC. MS Dissertation, Makerere University, unpublished
- Kasika, L. et al. (2011): Etude de l'Influence de l'activité humaine sur les aires protégées en Territoire de Beni et Lubero : cas du Mont Tshiaberimu « secteur Nord du Parc National de Virunga » en République Démocratique du Congo. [Study of the Influence of Human Activity on Protected Areas in the Territories of Beni and Lubero: the case of Mount Tshiaberimu "Northern sector of Virunga National Park" in the Democratic Republic of Congo.] *Parcours et Initiatives* Vol. 9, 92-124
- Kigotsi, K. et al. (2009): problématique de la gestion des aires protégées face à l'émergence socio-économique des populations riveraines en province du Nord-Kivu. [The problem of protected area management in the face of the socio-economic emergence of neighbouring populations in North Kivu province.] Cas du Mont Tshiaberimu de 2002 à 2008. [The case of Mount Tshiaberimu from 2002 to 2008.] Unpublished memoir, UNIGOM
- Kyungu, K. & Kahambu, M. (2010): Etude du rythme d'activités journalières des Cercopithecidae au Mont Tshiaberimu. [Study of the rhythm of daily activities of Cercopithecidae on Mount Tshiaberimu.] TFC, unpublished, UOR
- Kyungu, K. & Kavugho, N. (2006): Les paysans face à la gestion des potentialités hydrauliques du Mont Tshiaberimu en territoire de Beni-Lubero [Farmers facing potential development of hydro-electric schemes on Mount Tshiaberimu in the Beni-Lubero territory]. TFC, unpublished, ISDR/GL
- Kyungu, K. et al. (2008): Dépistage des parasites gastro-intestinaux au mont Tshiaberimu et ses environs. [Screening for gastrointestinal parasites on Mount Tshiaberimu and its surroundings.] Unpublished report, ICCN-GO
- Kyungu, K. J.-C. et al. (2013): Contribution to the analysis of the viability of a small gorilla population, *Gorilla beringei graueri* (Hominidae, Primates), by modeling and simulations of the Mount Tshiaberimu ecosystem, Virunga National Park in the Democratic Republic of the Congo. <http://primatologyjournals.org/1453>
- Kyungu, K. J.-C. et al. (2019): Impacts of anthropogenic pressures on the habitat of the Grauer's gorilla population in the Virunga Great Landscape: understanding the origins of pressures on the habitat of the Tshiaberimu gorillas (Democratic Republic of Congo). *IOSR Journal of Humanities and Social Science (IOSR-JHSS)*
- Masika, L. et al. (2010): Prévalence des helminthes chez les gorilles du mont Tshiaberimu. [Prevalence of helminths in Mount Tshiaberimu gorillas.] Doctoral dissertation in Veterinary Medicine, unpublished, Graben Catholic University
- Ngbolua, K. et al. (2014): Phytochemical investigation and TLC screening for antioxidant activity of 24 plant species consumed by the Eastern Lowland Gorillas (*Gorilla beringei* ssp. *graueri*: Hominiidae, Primates) endemic to Democratic Republic of the Congo. *Journal of Advancement in Medical and Life Sciences* 1 (3), 1-6
- Roy, J. et al. (2014): Recent divergences and size decreases of eastern gorilla populations. *Biology Letters* 10, 11
- Sarmiento E. E. & Butynski, T. M. (1997): Population and Habitat Viability (PHV) for *Gorilla gorilla beringei*: Preliminary report on the Mt Tshiaberimu survey, June 28-July 17. Kampala, Uganda

Organisation, WWF/PEVi and ICCN. They have always promised to support the project. However, everybody we met has called for socio-economic development projects around Mount Tshiaberimu.

Relationship between Project and the Local Population

Contacts with the local population have been facilitated by various persons and organisations. The members of the Co-

ordinating Committee for the Revival of Population Migration and Spatial Planning (RMIP/AT) visited Burusi in December 2001 and January 2002. They held sensitization meetings, in which 180 villagers participated. However, some people and associations initially remained hostile to nature conservation activities in the PNVi Northern Sector, such as SYDIP (Union for the Defence of Farmers' Interests) and individuals such as Ngovi de Nguli, Kadembi,

Kasomya and Abel from Kabeka village, who continued to encourage people to enter the park and commit acts of vandalism. However, these relationships quickly improved and were maintained at a good level between 2006 and 2014.

Conservation awareness campaigns were carried out between 2002 and 2005 by the Social Assistant Ms Kave Aveline, between 2005 and 2009 by Paluku Vhosi and between 2010



D. R. CONGO

and 2014 by Kasereka Vatenaye. The Conservator visited the villages several times to explain to the population the merits and benefits of the project and of gorilla conservation. The association SAGOT (Friends of Gorillas) requested to collaborate with the project on environmental communication in school campaigns. The association Cultural Unity (ACU), led by Mr. Apollinaire, composed and recorded songs dedicated to the conservation of the gorillas of Mount Tshiaberimu.

These sensitization campaigns focused on:

- Educating the population through workshops, meetings, cultural and sports activities
- Radio broadcasts
- Various training courses on animal husbandry, agriculture, wildlife and human health
- Support for the project and the neighbouring communities. From 2008, B&RD provided funds to supplement the food rations and to purchase equipment for the trackers. A house made of wooden planks, 12x6m in size, was built in Burusi with B&RD funds. Part of this house was used as the Burusi project office; another part served as accommodation for non-local project staff. Office equipment was provided and mattresses and beds were purchased.
- B&RD support in Tshiaberimu: construction of the PP Burusi office in 2012, support for fruit cultivation by the communities, equipment for the trackers.

After the Project

The project ended abruptly without an exit strategy. Bonuses, salaries and all support were terminated abruptly. The well-trained personnel (trackers) were abandoned in the field. B&RD, which was already actively involved on the ground, found itself alone and had

to take charge of the Mount Tshiaberimu site. It was also a time of serious problems, including incursions by insurgents. Politicians greedy for power supported the termination of the project, reasoning that the European partners had found that the gorillas could no longer survive on the site. The number of gorillas had indeed dropped dramatically to six individuals with only two females, one of which was old and no longer able to reproduce. The politicians were campaigning for the redistribution of the Mount Tshiaberimu land to the people.

After B&RD was contacted, the organisation intensified its support for the site, which it continues to this day. It remains a relentless struggle to save the gorillas during a time in which rangers have been killed, trackers injured and forced to flee the area, and a gorilla has disappeared. Several development projects have been carried out around Mount Tshiaberimu and this has also helped to sensitize and bring development to the population. The ICCN, which withdrew from the site for a few months between 2016 and 2017, strengthened its team and consolidated its interventions. Currently, the situation is stabilizing and the birth of a baby gorilla at the end of 2019 is particularly good news.

*Jean Claude Kyungu Kasolene and
Claude Sikubwabo Kiyengo*

References

- Aveling, C. & Aveling, R. (1989): Gorilla conservation in Zaire. *Oryx* 23, 64–70
- Chifundera, K. et al. (2003): The Mount Tshiaberimu in the Albertine Rift: biodiversity, habitats and conservation issues. Unpublished report, Dian Fossey Gorilla Fund Europe, 231 p.
- Dajoz, R. (1980): *Précis d'écologie*, 5th edition. ed. Bordas, Paris, 505 p.
- Kyungu, K. & Kataomba, K. (2007): Inventory of Mount Tshiaberimu Mammals, Mount Tshiaberimu Gorilla Conservation Project. Mission report, unpublished, 32 p.
- Mashauri, M. (1980): Les migrations yira : rivalités d'occupation des terres à haute altitude. [Yira migrations: land occupation rivalries at high altitudes.] In: *Annals of the Faculty of Science, UNILU, PUL Vol. 2*. p.

Sarmiento, E. et al. (1996): Mission d'exploration scientifique au Mont Tshiaberimu [Scientific exploration mission to Mount Tshiaberimu]. ICCN, report, unpublished, 12 p.

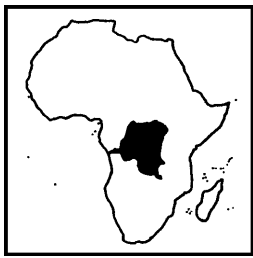
Schaller, G. B. (1963): *The Mountain Gorilla: ecology and behavior*. University of Chicago, 390 p.

Itombwe Nature Reserve: Conservation Efforts 2017 to 2019

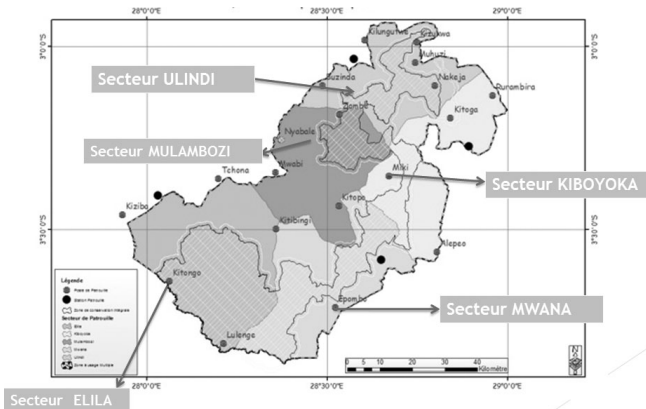
The East African Albertine Rift is known for its extremely high biodiversity and endemism, the highest in continental Africa, and has been the subject of numerous biological and ecological studies. As a result, significant conservation efforts have been made over the last few decades. The Rift extends over six countries, each with its own unique history, political system and capacity to engage in effective conservation.

The success of conservation efforts in parts of this region has recently increased due to effective transborder collaboration between Uganda, Rwanda and the Democratic Republic of the Congo (DRC), with a focus on the conservation of eastern gorillas. Regular cooperation, communication and planning between the natural resource management authorities of the three countries has maximized the conservation potential of the region's various parks with gorillas.

There has long been interest in the biodiversity of the Itombwe Massif in the Albertine Rift, going back to the expeditions of the 1950s by Prigogine, Curry Lindahl and George B. Schaller, as well as the work of Laurent in the early 1960s. These and other missions by Prigogine in the 1970s and 1980s have highlighted the great importance of the Itombwe Massif at the local, national and international level. Schaller demonstrated its significance for gorilla populations (17 important gorilla areas were identified at that time). In



D. R. CONGO



Sectors, stations and patrol posts of the Itombwe Reserve

Map: ICCN

1993, a conservation programme for the Itombwe Massif was prepared. The preparation of this programme, which would be financed by the World Bank and carried out by the IUCN Central Africa Office, started with an environmental and socio-economic survey led by IUCN with a view to planning future interventions. This project enabled the collection of additional and relevant information to be used for the conservation and sustainable use of the biological diversity of these places (Charles Doumenge and Christine Schilter 1997).

In 1996, a systematic great ape survey was conducted by ICCN and WCS. In 2004, WWF carried out an ornithological survey. The Itombwe Nature Reserve, INR, was created in 2006 by Ministerial Order 038/CAB/MIN/ECN-EF/2006 of 11 October 2006 with a surface area of 760,000 hectares. However, it could not be managed effectively as the Order did not clearly define its boundaries sufficiently. WWF supported ICCN with a series of activities to consolidate its status as a protected area by clarifying the boundaries where uncertainty remained. Resulting from these activities, the provincial authority of South Kivu published a provisional decree, no 16/026/GP/SK of 20 July

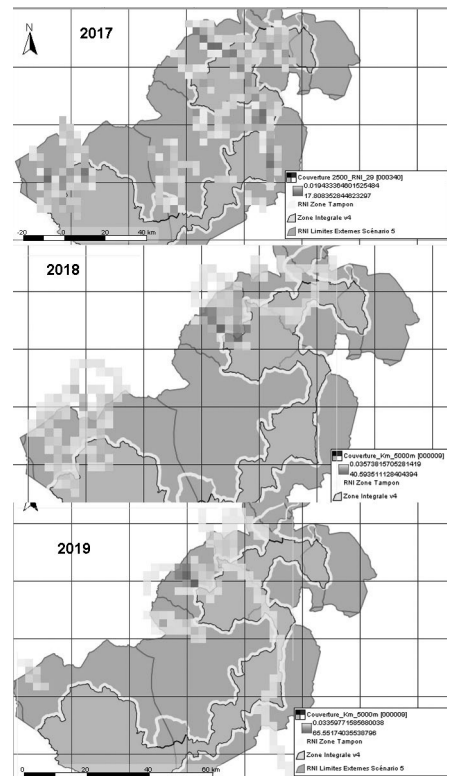
2016, for the updating of the boundaries through participatory demarcation of the Itombwe Nature Reserve, with a surface area of approximately 5,732 km² (i.e. 573,200 ha), pending a final decree from the Prime Minister.

Management of the Reserve

There are five sectors: the Elila sector, which will be based in Tchalela; the Mwana sector, which will be based in Tumungu; the Mulambozi sector, which will be based in Kalundu (Headquarters); the Kiboyoka sector, which will be based in Rubuga; and the Ulindi sector, which will be based in Kigogo. The activities for conservation and the integrity of the reserve had the following results:

Monitoring activities: The threats observed during different patrols were noted while keeping in mind that the INR may be classified as category VI by the IUCN. The definition of monitoring activities is based on what constitutes a threat to the objectives of conservation.

Extent of patrols: In 2018, patrols were carried out over a total of 266 quadrants, of which 111 quadrants were in Mulambozi, 110 were in Elila and 45 in Ulindi. This means that 28.2% of the total reserve area was patrolled. This is an increase from 2017, when 24% of the total reserve area was patrolled: there were a higher number of patrols in 2018. In 2019, the patrols were carried out for monitoring, community engagement and gorilla tracking. The vast majority of patrols were carried out in the Mulambozi sector with the support of The Gorilla Organization (GO) and Berggorilla & Regenwald Direkthilfe (B&RD). From

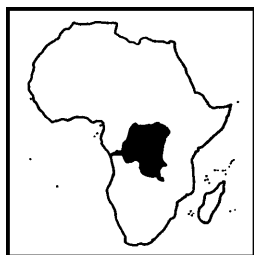


Extent of patrols in 2017 (with support from WWF), in 2018 (with support from B&RD and Africapacity) and in 2019 (with support from The Gorilla Organization and B&RD)

Maps: ICCN

January to September 2019, 14% of the area was patrolled.

Assessment of poaching: Illegal activities observed in all the patrolled sectors include trapping, digging for minerals, setting up poachers' camps, trafficking smoked meat, setting up diggers' camps and hunting (used cartridges). The data on poaching represents cases identified from the start of 2018 to August 2019. The rate of poaching was very high in 2018 (poachers were encountered in 0.9% of the patrols) and decreased with the support of GO and B&RD (0.2% of patrols). It should be noted that the setting of traps was reported more often than other illegal



D. R. CONGO

activities. Action taken included the destruction of poachers' camps in the core zone and the dismantling of traps.

Evaluation of gorilla monitoring (supported by BR&D in 2018 and by GO in 2019): The activities for the monitoring of gorillas were increased in 2019 compared to 2018.

INR boundary demarcation with support from WWF: Taking into account the first phase of documenting activities that was initiated in September 2017, and the implementation/demarcation that started in May 2018, we believe that the efforts made by each of the stakeholders are to be commended. It should be noted that this titanic work has re-established and strengthened the collaboration between ICCN/INR and the communities bordering the INR through the personal involvement of their Majesties the Chiefs of Chiefdoms, the political-administrative authorities and civil society. Also to be commended are the Mwenga Pilot Territorial Security Council, who have been willing to support this process such that, in a short period of time, considerable results have been achieved in documenting and implementing the external boundaries of the Itombwe Nature Reserve in the Mwenga territory. The demarcation was extended to the chiefdom of Basile, where 12 km were demarcated; the chiefdom of Wamuzimu, where we demarcated 28 km; and part of the chiefdom of Luindi in the two areas of Irangi and Ilowe, where 11 km were demarcated. Out of 164 km of land boundary to be demarcated, we marked 50 km in less than a year, i.e. 30.48 %.

Of the total 484.5 km of the INR's boundary, 164 km are on land and the remaining 320.5 km are covered by rivers.

Challenges

The data from the various patrols indicates a high level of poaching in the Elila sector in the Wamuzimu chiefdom.

To address this threat, the local staff members had the idea to work within a local custom, activating an existing calendar related to the closure of the hunt. Thus, a traditional community surveillance patrol was organized in the Wamuzimu chiefdom. Before the community patrol went into the forest for the first time, a sensitization meeting of the customary guardians was held to obtain their support for a ban on hunting and other human activities in the core zone, and to proceed with the closure of hunting and the implementation of regulations on resource use in the multiple-use zone. With the personal involvement of the chief, the hunt was officially closed by the customary guardians from November 2017 to April 2018. Repeat offenders will be judged directly by the community authorities as per the custom.

Key Interventions in the Management of the Reserve

Before B&RD became involved in the management of the INR and its surroundings, the eco-guards spent most of their time in Bukavu because they did not receive additional payment for fieldwork. They went to the field once a month to qualify for their government salaries and took the opportunity to stay and do odd jobs for up to a week. Apart from supporting tracking activities and community patrols by Berggorilla & Regenwald Direkthilfe and The Gorilla Organization, B&RD tops up the rangers' bonuses to allow them to stay permanently on site and to be able to work effectively. Without these bonuses, it would have been difficult to plan intensive activities to support communities (e.g. installation of public lighting) for community sensitization and mobilization. With these interventions and the involvement of customary chiefs in the planning process (CoCoSi), the population feels it has a part to play in this work of general interest.

It is also important to thank the other

organizations that also supported certain activities like various meetings and the training of community patrols: JGI, WWF, Strong Roots, Africapacity and RACOD.

However, this is not enough. A good preparation is needed, which requires a strong **sensitization** to awaken the population's awareness and to collect their opinions about (or reactions to) the conservation of the protected area, positive or negative. Secondly, **conservation development** activities need to be implemented that directly benefit the population. Taken together, these measures motivate the people to ensure that they participate and take positive action on site that favour the sustainable conservation of this nature reserve, which may become classified as a IUCN category VI protected area.

*Jean Claude Kyungu Kasolene and
Claude Sikubwabo Kiyengo*

References

- Curry-Lindahl, K. (1956): Ecological studies on mammals, birds, reptiles and amphibians in Eastern Belgian Congo. Part 1. Ann. Royal Museum of the Belgian Congo, Tervuren
- Doumenge, C. (1990): La conservation des écosystèmes forestiers du Zaïre. IUCN, Gland, Switzerland
- Doumenge, C. & Schilter, C. (eds.) (1997): Les Monts Itombwe: d'une enquête environnementale et socio-économique à la planification des interventions au Zaïre. IUCN, Gland, Switzerland
- Laurent, R. F. (1964): Adaptive modifications in frogs in an isolated highland fauna in Central Africa. *Evolution* 18, 458–467
- Prigogine, A. (1971): Les oiseaux de l'Itombwe et de son hinterland. Vol. 1. Ann. Royal Museum for Central Africa, Tervuren. Series 8, Sci. Zoo no. 185
- Prigogine, A. (1978): Les oiseaux de l'Itombwe et de son hinterland. Vol. 2. Ann. Royal Museum for Central Africa, Tervuren. Series 8, Sci. Zoo no. 223
- Prigogine, A. (1984): Les oiseaux de l'Itombwe et de son hinterland. Vol. 3. Ann. Royal Museum for Central Africa, Tervuren. Series 8, Sci. Zoo no. 243



GORILLAS

Essential Components of the Mountain Gorilla Success Story

Over the past five years the conservation community has successfully completed what, to date, have been the most intensive and comprehensive population surveys of mountain gorillas in their transboundary range in the DRC, Rwanda and Uganda.

Results of these surveys indicate the highest number of mountain gorillas recorded, and while the headlines focus on what are considered to be putative minimum counts (Virunga Massif: 604, Hickey et al. 2019a; Bwindi-Sarambwe: 459, Hickey et al. 2019b), robust population estimates that incorporate mark recapture analyses have also been recently published (Virunga Massif population, Granjon et al. 2020) or are in progress (Bwindi-Sarambwe population).

So, putting the evolution of survey methods and increased survey effort aside, how did growth in both populations happen? To what can this success at population and subspecies levels be attributed?

My position is that to focus on attribution does not adequately take into account the integrated approach to conservation of mountain gorillas which has been invested in over the long term by government agencies and bilateral donors, research institutions and non-governmental organizations, as well as the private sector and private donors.

Here, I offer my reflection as a practitioner, as the director of the coalition International Gorilla Conservation Programme (IGCP), on the essential components of the mountain gorilla success story – political will to support conservation, collaboration across borders, and community participation – and how we can build on these during the SARS CoV-2 (COVID-19) pandem-

ic, and as part of recovery and resiliency for mountain gorilla conservation.

Political Will to Support Conservation

Political will has been generated across the mountain gorilla range. While largely born from the promise and delivery of mountain gorilla tourism as a source of foreign income and driver of economic growth, political will has also been built through thoughtful leadership at all levels, and the sense of shared responsibility to the mountain gorilla as central to local, national and regional identity.

The full impact of the COVID-19 pandemic in terms of human and wildlife health is not yet known, nor the social and economic dimensions of the same, or how it might fundamentally change the tourism sector. Strategic decisions will need to be made to rebound economies and social sectors once the pandemic is over.

Strategic reform to the way mountain gorilla tourism is marketed, managed and monitored in each range State will be core to maintaining and

building upon the political will to support conservation. Alongside this, a re-commitment, at all levels, to the tourism best practices (Homsy 1999; Macfie & Williamson 2010) which safeguard the subspecies and the sustainability of tourism in the long run will be key, together with ensuring that they are consistently implemented at all sites across the landscape.

This commitment to best practices goes beyond the use of face masks for all park staff, tourists, researchers and others in proximity to mountain gorillas, which was recently introduced in Rwanda and Uganda in response to the COVID-19 pandemic, and already standard practice in DRC. It includes the serious attention to messaging, direction and supervision of how tourists are managed in proximity to mountain gorillas, to prevent what has become widely accepted as noncompliance to best practice in terms of tourist proximity to, and direct contact with mountain gorillas during visits (van Hamme et al. 2019).

While not the case at all sites nor in all circumstances, the mountain gorilla



Many people depend on gorilla tourism.

Photo: Neil Ever Osborne



GORILLAS

tourism product has slowly and notably strayed from the core principles of best practice due to a number of factors including complacency and the impact of a social media and selfie culture, as well as inappropriate marketing and personal and private interests. The pandemic should be a wake-up call for fundamental reforms to address this, and to eliminate the erosion of best practice which threatens both the gains of mountain gorilla conservation, and a growing tourism industry based on mountain gorilla viewing.

Further, political will to support conservation is nothing without good governance, and ensuring that conservation efforts reinforce and support good governance at all levels is a critical component going forward. This will mean more emphasis is given to championing transparency and accountability.

Collaboration across Borders

Hard-wired into the conservation of mountain gorillas over the last 30 years has been transboundary collaboration, among park staff and managers, among institutions and agencies, and even among community-based organizations. These efforts, and various achievements, have waxed and waned over the years, but remain the cornerstone of effective mountain gorilla conservation efforts from protection to gorilla population monitoring to sharing and scaling up successful approaches.

Established in 2015, the intergovernmental Greater Virunga Transboundary Collaboration is the framework for formal collaboration across borders, and greater human, social and political investments are needed to ensure it fulfills its intended purpose under the signed Treaty.

Collaboration is built on trust, which is achieved through dialog, information sharing and having clear shared objectives. It is now more than ever that stra-

tegic partnerships, including civil society and the private sector, are formed allowing for the framework to effectively deliver during this crisis period – in the coordination of the development and implementation of a contingency plan, and the mobilization of political and financial support as we emerge from this crisis.

We should be able to go beyond the basics of transboundary collaboration and start to push this even further through freely sharing information, pooling important data to look at trends in threats monitoring, and implementing strategies at the regional level – including better collaboration on tourism development. This is the only way we will be able to continue to sustain the mountain gorilla success story into the future.

Community Participation

In addition to small populations in restricted, protected transboundary habitat, a key element of the context of mountain gorilla conservation is that this habitat exists in a larger landscape with incredibly dense rural and peri-urban human populations. Due to fertile soils, and the promise of employment by the parks or in the tourism sector, some areas see in-migration as well as population growth.

The effect of insecurity and conflict which has afflicted the region, and can be especially volatile in transboundary zones, must also be recognized. In those tragic situations, as well as the pandemic crisis today resulting in the suspension of travel and tourism, the circumstances require downscaling of park and conservation partner activities to only essential functions, for safety as well as context sensitivity.

Through these acute periods of uncertainty, the commitment of individuals and the wider park edge communities toward the protection of mountain gorillas is notable, with community members providing important moni-

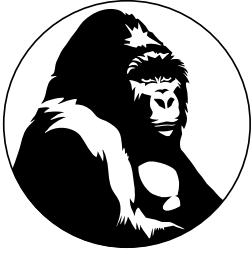
toring information to park authorities should the mountain gorillas stray out of the park, or if a specific threat to the mountain gorillas emerges. We have to work as a conservation community to build on this when and where we can so that we can continue to depend on this key constituency providing direct essential functions to gorilla protection and larger conservation efforts.

To learn from what works, and to optimize community participation in conservation we need to have greater focus on decision-making processes and inclusion, rather than a sole focus on development or livelihood initiatives, paying special attention to those who have been left out of these processes in the past.

Coming out of this crisis, IGCP plans to continue to support park authorities to use the Social Assessment of Protected and Conserved Areas (Franks et al. 2018) to inform community engagement and enhance participation within park edge communities. The process identifies areas of concern and areas of opportunity related to the relationships between parks and people, and between park authorities and local people. Through this identification and dialog, and with commitment from all parties, these issues can be constructively worked on to achieve more positive relationships and outcomes, including greater equity and transparency in the allocation of limited resources.

Consolidating Efforts

There are a number of incredibly exciting scientific questions regarding mountain gorilla population dynamics and disease yet to be investigated using the enormous datasets collaboratively generated through the recent population surveys. For example, understanding the presence of various pathogens (like viruses and parasites) not only in monitored individuals, but throughout the population, and how this may have changed over time, as



GORILLAS

A Tragedy in Bwindi

The silverback Rafiki was killed in Bwindi Impenetrable National Park, presumably by poachers. Rafiki was a member of the mountain gorilla group Nkuringo since 2003; he was found dead on 2 June 2020. His dead body was examined by the Gorilla Doctors and exhibited a large stab wound resulting of a spear, which was identified as the likely cause of death. The UWA (Uganda Wildlife Authority) announced that 4 poachers were arrested in connections with Rafiki's death. The Nkuringo group is one of the groups regularly visited by tourists. After Rafiki's death it consists of 16 animals – 3 blackbacks, 8 adult females, 2 juveniles and 3 infants. Following the death of the only silverback the fate of the group is uncertain. Substantial changes in the group's composition are likely and will be closely monitored by the Gorilla Doctors and the UWA. Especially the youngest members face a high risk of not surviving changes in group composition. This makes Rafiki's death a tragedy in many aspects.

well as demographic changes, such as group size and structure. Leveraging this knowledge to orient and assess conservation strategies will be a cornerstone of mountain gorilla conservation in both the near and long term.

Even prior to the current pandemic, there was recognition that the reclassification of the mountain gorilla's threat status to Endangered from Critically Endangered represented a fragile success. Right now, the focus is that we avoid and mitigate the direct risk to mountain gorillas, conservation personnel and park edge communities from the emergent coronavirus, and that moving forward we come together and further entrench the critical elements outlined above into not only an informed, but also fully integrated, conservation action plan.

Anna Behm Masozera

I thank Dr. Liz Williamson, Dr. Margaret Kinnaid, Dr. Michel Masozera, and Jessica Farish for their review and contributions to this article.

References

Franks, P. et al. (2018): Social Assessment for Protected and Conserved Areas (SAPA): Methodology manual for SAPA facilitators. IIED, London. 99 pp.

Granjon, A. C. et al. (2020): Estimating abundance and growth rates in a wild mountain gorilla population. *Anim. Conserv.* <https://doi.org/10.1111/acv.12559>

Hickey, J. R. et al. (2019a): Virunga 2015–2016 surveys: monitoring mountain gorillas, other select mammals, and illegal activities. GVTC, IGCP & partners, Kigali, Rwanda

Hickey, J. R. et al. (2019b): Bwindi-Sarambwe 2018 Surveys: monitoring mountain gorillas, other select mammals, and human activities. GVTC, IGCP & partners, Kampala, Uganda

Homsy, J. (1999): Ape tourism and human diseases: how close should we get? Critical review of the rules and regulations governing park management and tourism for the wild mountain gorilla, *Gorilla gorilla beringei*. Report of a Consultancy for the International Gorilla Conservation Programme

Macfie, E. J. & Williamson, E. A. (2010): Best Practice Guidelines for Great Ape Tourism. IUCN/SSC Primate Specialist Group, Gland, Switzerland

van Hamme, G. et al. (2019): Keep Your Distance: Using Social Media to Evaluate the Risk of Disease Transmission in Gorilla Ecotourism. 8th European Federation for Primatology Meeting. 2019 Primate Society of Great Britain Winter Meeting Oxford, UK, September 8–11, 2019

1,063 Mountain Gorillas – What Does this Number Mean?

My entire childhood was spent in the south of France, on a hill between an

evergreen oak forest and the garrigue. Our family had a lot of cats, who would always generously leave dead mice and spiders on our doorstep. Over time, our cats were joined by more and more cats from the wild. These feral cats would not allow us to come close to them, but they loved the food we used to leave on the windowsill. This obscure number of feral cats ended up eating the food that we had intended for “our” cats.

How many cats were there exactly? We could, of course, count our beloved pet cats: there were six of those. We were also able to distinguish a further seven cats. We knew that there were probably more of them, but they were never all there at the same time. As the feral cats were afraid of us, they mostly only ever came by at night. Eventually, we estimated there were probably about 20 cats in total: our six, the other seven we could readily identify, and the “others” that we only ever glimpsed.

That was my first experience with the difficulty of animal counting. If it is already so difficult with 20 cats – who all have a common source of feed – how difficult must it be with wild mountain gorillas? They live in dense forests, are shy creatures and an encounter with them can end up being life-threatening for both humans and gorillas.

Mountain gorillas (*Gorilla beringei beringei*) live only in two forest islands, the Bwindi-Sarambwe Forest in Uganda and the Democratic Republic of the Congo (DRC), and the Virunga area on the borders of Uganda, Rwanda and the DRC. On December 16, 2019, the IGCP announced that there were 1,063 mountain gorillas in the wild. But how did researchers come up with such an exact number? The short answer: they don't really know for certain how many mountain gorillas there are. However, just like with “20 cats”, this number is much easier to communicate than the statistics that lay behind it.

Since Dian Fossey began her work



GORILLAS

in Rwanda in the 1970s, mountain gorillas have been intensively researched and protected. About half of all gorilla groups are now “habituated” and the animals are no longer afraid of humans. This allows researchers (and tourists) to observe and name the gorillas and to register new births. Just like our cats back home, these gorillas are easy to count.

There are, of course, other groups of mountain gorillas, which are mainly found in Uganda and the DRC. These gorillas are mostly unknown to us. We don't actually want to encounter them, as this is the only way to ensure their protection. However, to be able to assess whether their areas are well protected, we need to have an idea of their number. Is it possible then to count animals without seeing them? Yes, indirectly. Like detectives looking for fingerprints at a crime scene, we can follow the tracks of the gorillas and collect their DNA. This is done by gathering the gorillas' faeces, which always contain a few cells with their DNA.

This DNA is extremely valuable, as we can use it to uniquely identify each individual – just like with humans. In autumn 2015 and spring 2016, we walked through the entire Virunga area and collected and analysed over 1,000 faecal samples. In addition to the 418 well-known habituated gorillas, we “found” (genetically identified) about 130 individuals who did not live in habituated groups. Thanks to DNA fingerprinting, we were able to identify which gorilla was found and where. We were, therefore, able to ascertain that we had missed at least 50 animals in the autumn and spring surveys.

Altogether we identified a total of 186 non-habituated gorillas. It became clear to us that if we searched the forest a third and a fourth time, we would certainly be able to find more gorillas. The total number of non-habituated gorillas must, therefore, be higher – but how high?

Various statistical methods are available to help us estimate this, however, they can end up giving differing results. According to one such model, there were 221 non-habituated gorillas in the Virunga area, but maybe only 204, or possibly as many as 243. The second model reported 251 gorillas, but also possibly up to 340. The actual number could, therefore, be anywhere between 200 and 340.

The published total of 1,063 mountain gorillas is a combination of multiple data sets: 186 non-habituated gorillas have been genetically identified in the Virunga area; in Bwindi there were 263 non-habituated individuals in 2018. In addition, we registered exactly 418 habituated gorillas in the Virunga area and 196 in Bwindi. 1,063 is, therefore, the bare minimum and excludes those gorillas that we have overlooked but are statistically highly likely to exist.

If we had recorded our cats this way, then we would have ended up with our six pet cats plus seven more, so 13 in total. This would have, however, ignored those cats that we could not exactly identify. It is similar with the number 1,063 – most likely it does not reflect the actual number of mountain gorillas, but rather the absolute minimum. Nevertheless, from a conservation standpoint it is important to remember that in contrast to the other great ape species, the number of individual mountain gorillas is increasing. And that is a huge success.

Anne-Céline Granjon

Original article

Granjon, A. C., Robbins, M. M., Arinaitwe, J., Cranfield, M. R., Eckardt, W., Mburanumwe, I., Musana, A., Robbins, A. M., Roy, J., Sollmann, R., Vigilant, L., Hickey, J. R. (2020): Estimating abundance and growth rates in a wild mountain gorilla population. Anim. Conserv. <https://doi.org/10.1111/acv.12559>

Gorillas of the Ebo Forest Threatened by Proposed Forest Management Units for Timber Exploitation

The Government of Cameroon has proposed two Forest Management Units (FMU) for timber exploitation which completely cover the proposed Ebo National Park in Littoral Region, Cameroon. The ministerial public notices for the FMUs were signed on 4 February 2020, yet only made public on the eve of a series of sensitization meetings in Yabassi and Yingui between 9 and 17 March 2020. The Ebo forest harbours an exceptional diversity of species including gorillas, chimpanzees, drills, Preuss's red colobus monkeys, Preuss's monkeys, forest elephants, goliath frogs and many newly described plants. The forest is a cultural and ancestral abode, and source of livelihood and health to more than 40 communities along its edge.

The biodiversity and cultural significance of the Ebo forest is of exceptional importance. Firstly, Ebo is the most important tract of intact forest in the Gulf of Guinea Biodiversity Hotspot (Oates et al. 2004). It is thus an important stock of carbon, estimated at 35 million tonnes (Global Forest Watch 2020). Secondly, the forest is a haven for animal and plant species that characterise this biodiversity hotspot yet have been extirpated in other parts of this ecological region (Morgan et al. 2013; Oates et al. 2004). For example, the forest is home to a population of geographically intermediate gorillas (*Gorilla gorilla*) that is potentially a third subspecies of gorillas in Cameroon. The forest is also home to one of the most important remaining populations of Nigeria-Cameroon chimpanzees (*Pan troglodytes ellioti*) (Morgan et al. 2011) that have a unique tool use repertoire (being the only chimpanzee



GORILLAS



A view of the Ebo Forest

Photo: San Diego Zoo Global

population to both crack nuts and fish for termites) (Abwe & Morgan 2008), and the most important remaining drill (*Mandillus leucophaeus*) population (Morgan et al. 2013). The forest also harbours forest elephants and a wide range of other large mammals, birds, amphibians and reptiles. Several new and threatened plant species unique to the Ebo forest, including *Ardisia ebo*, *Crateranthus cameroonensis*, *Gilbertiodendron ebo*, *Kupeantha ebo*, *Inversodicraea ebo*, *Palisota ebo*, and *Talbotiella ebo*, have been identified and published (Cheek et al. 2018).

Thirdly, the forest has been home to the Ndokbiakat clan of the Banen tribe for all of recorded history. It is still considered a cultural and customary heritage by this and other adjacent tribes. The forest is full of archaeological history, including colonial roads, stone-built missionary buildings and ancient village sites, the latter abandoned around the time of Cameroon's Independence in 1960. The burial sites of close relatives of patriarchs and matriarchs are situated in these village sites along with other cultural relics that symbolise the culture and tradition of the Banen tribe.

The significance of the Ebo forest has long been attested by the Government of Cameroon, which has supported and facilitated biodiversity conservation and research on a wide range of species in the forest including chimpanzees, gorillas, drills and plants. In

addition to granting numerous research permits for projects in Ebo, the Government of Cameroon has also legalised and authorised four grassroots associations: les Clubs des Amis des Gorilles (CAG) in three communities, and the Association des Chefs Traditionnels Riverains de La Forêt d'Ebo (ACTRIFE). The CAGs aim to conserve Ebo gorillas and their habitats through engaging in monitoring threats to gorillas, promoting alternative sustainable livelihood projects to mitigate pressure on the gorillas and other wildlife, and sensitising the general public on the importance of the Ebo forest's unique biodiversity. Under the dynamic leadership of Chief Dipita Gaston (Ndokbiakat clan chief), ACTRIFE has as its goal the conservation of the rich wildlife and cultural diversity of the Ebo forest, and the amelioration of livelihoods in communities along the edge of the forest.

The forest has been a focus for studies by researchers and students from several government institutions. These include the National Herbarium, which has led botanical inventories in the area since 2005; the universities of Buea, Douala, Dschang, Yaounde I and the National Forestry School, Mbalmayo; as well as several researchers and students from universities across the world.

The main threats to the rich biodiversity of the Ebo forest to date include habitat loss, poaching and the bushmeat trade (Abwe & Morgan 2008; Mahmoud et al. 2019). Widespread and systematic timber exploitation across the forest would exacerbate these threats and potentially damage current conservation and research efforts. The Ebo Forest Research Project has been working with a range of stakeholders including grassroots communities and the local government administration to stem these threats (Mfossa et al. 2017).

In a letter to the Prime Minister of

Cameroon on 30 April 2020, more than 60 researchers and conservationists with experience working in Ebo argued for:

- Suspending the process of creating the two FMUs,
- Engaging in an inclusive and transparent local land use planning process following the methodology being developed by the Ministry of Economy, Planning and Regional Development (MINEPAT), with leadership, financial and technical support from Government and its multinational partners to explore and find a consensus on the best options for the sustainable use of land and natural resources in and around the Ebo forest,
- Considering sustainable alternatives to secure and enhance the management of the Ebo forest, including the creation of a protected area or an innovative conservation concession, co-managed by the State and local communities, financed by a combination of sustainable uses, international support for biodiversity conservation and potentially the sale of certifiable carbon credits on the carbon market. These options could bring in enough income to contribute to state revenues while ensuring the socio-economic well-being of neighbouring communities and the fight against climate change without damaging biodiversity.

Setting aside the Ebo forest as an eventual, creditable participatory protected area has several advantages and potential:

- The Ebo forest could be set aside as a showcase for biodiversity research and conservation in Cameroon. This 'natural laboratory', which contains a wide range of taxa, could then be explored by researchers and students from national universities and



GORILLAS

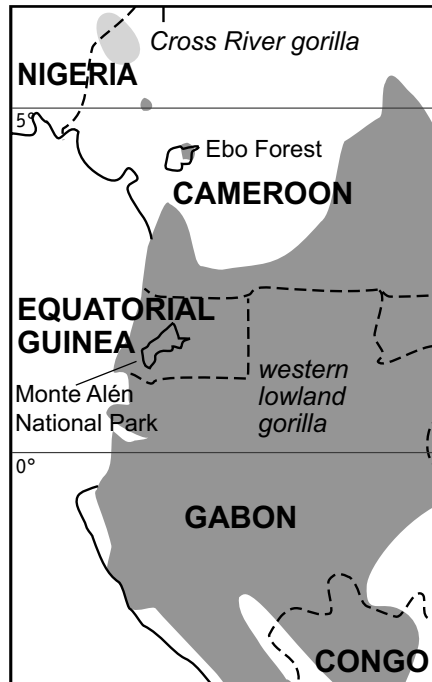
institutions, including the universities of Douala, Buea, Dschang and Yaounde I and the National Herbarium, as well as external universities and institutions to enhance scientific knowledge for the wellbeing of Cameroon and the world.

- The forest contains 35 million tonnes of carbon which if put on the carbon market would be a source of steady and sustainable funds for the benefit of local communities and the economy of Cameroon.
- The proximity of the forest to main populations and transport hubs in Cameroon, the rich biodiversity including charismatic species such as gorillas, chimpanzees, and elephants, along with the picturesque landscape with its archaeological sites and the cultural diversity of the Ebo forest are attributes that could be harnessed and developed for long-term ecotourism, again for the benefit of local communities and Cameroon as a whole.

*Ekwoke E. Abwe and
Bethan J. Morgan*

References

- Abwe, E. E. & Morgan, B. J. (2008): The Ebo forest: Four years of preliminary research and conservation of the Nigeria-Cameroon chimpanzees (*Pan troglodytes*). *PanAfrica News* 15, 26
- Cheek, M. et al. (2018): Notes on the endemic plant species of the Ebo Forest, Cameroon, and the new, Critically Endangered, *Palisota ebo* (Commelinaceae). *Plant Ecology and Evolution* 151 (3), 434–441
- Global Forest Watch (2020): <http://bit.ly/2Q1oTff>
- Government of Cameroon (1994): Law No 94-1 of 20 January 1994 to lay down forestry, wildlife and fisheries regulations. Government of Cameroon, Yaoundé, Cameroon
- Mahmoud, M. I. et al. (2019): Land-cover change threatens tropical forests and biodiversity in the Littoral Region, Cameroon. *Oryx*, published online
- Mfossa, D. M. et al. (2017): Conserving the Ebo gorillas through community collaboration. *Gorilla Journal* 55, 16–20
- Morgan, B. J. et al. (2011): Regional Action Plan for the Conservation of the Nigeria-Cameroon chimpanzee (*Pan troglodytes ellioti*). IUCN/SSC Primate Specialist Group and Zoo-



Positions of the Ebo Forest and the Monte Alén National Park

Map: Angela Meder

logical Society of San Diego
Morgan, B. J. et al. (2013): The distribution, status, and conservation outlook of the drill (*Mandrillus leucophaeus*) in Cameroon. *International Journal of Primatology* 34 (2), 281–302

Oates, J. F. et al. (2004): Africa's Gulf of Guinea forests: Biodiversity patterns and conservation priorities. *Advances in Applied Biodiversity Science* 6, 1–95

A Long-Term Monitoring Programme for Great Apes in Monte Alén National Park

Equatorial Guinea's forests maintain some of the highest levels of biodiversity in Central Africa (Sunderland 2005). Despite its small size, the country is particularly important for primate diversity, with more than 16 species reported, including the western lowland gorilla (*Gorilla gorilla gorilla*) and central chimpanzee (*Pan troglodytes*

troglodytes). This region is identified as a priority site by the Central Africa Regional Program for the Environment (CARPE 2005) and is highlighted as one of the most important areas for conservation in sub-Saharan Africa (Sunderland 2005; Murai et al. 2013; Strindberg et al. 2018). In 2014, the IUCN's Regional Action Plan for the Conservation of Western Lowland Gorillas and Central Chimpanzees identified the Monte Alén-Monts de Cristal-Abanga landscape between Equatorial Guinea and Gabon as a priority region, considered to be of 'exceptional' conservation importance for great apes (IUCN 2014).

Bristol Zoological Society (BZS) has been engaged in great ape conservation in Central Africa since 2003. Our efforts were initially focused in Cameroon, supporting a primate sanctuary and a community-based conservation project. In the UK, we are participating in the European Endangered Species Programme for the western lowland gorilla with our breeding group at Bristol Zoo Gardens. However, as underscored by the 2014 IUCN Action Plan, there is urgent need for additional *in-situ* conservation efforts in those priority regions that are currently receiving little attention. As such, in 2019, BZS initiated a research, monitoring and conservation programme in Equatorial Guinea's Monte Alén National Park (MANP).

Despite established environmental laws and policies, Equatorial Guinea has virtually no on-the-ground law enforcement in protected areas (Cronin et al. 2017). As such, current protected areas, including MANP, have been found to have no effect on the distribution of gorillas and other large mammals (Murai et al. 2013). Today, a large number of people are unemployed and rely on hunting as a source of income. As much of Equatorial Guinea's economy is based on oil revenue, the current coronavirus pandemic and subsequent



GORILLAS

depression of crude oil prices is likely to result in a further severe economic downturn for the country. Placed in the centre of this economic uncertainty, MANP could see an intensification of hunting within its borders. This, coupled with the estimate of only 2,000 gorillas remaining as of 2013 (Murai et al. 2013), is why we have chosen to focus our conservation efforts here.

Our initial goal was to establish a standardised, long-term monitoring programme that will produce accurate baseline information on population densities and distribution, and allow us to detect changes in those variables over time. This programme utilizes multiple techniques to enhance our detection rate for rare or cryptic species, including camera trapping, bioacoustics, transect and recce surveys, and invertebrate DNA. A central component of this effort is to build technical expertise

among our partners in the Equatoguinean Institute for Forestry Development and Protected Area Management (INDEFOR-AP). Once established, INDEFOR hopes to adopt our programme as their long-term monitoring protocol.

Our preliminary efforts focused on establishing a network of camera traps across MANP. The first cameras ($n=6$) were deployed in 2019 as a pilot study across a range of habitats covering approximately 30 km². Cameras were active for an average of 114 days and produced over 8,000 images, which included forest elephants (*Loxodonta cyclotis*), leopards (*Panthera pardus*), giant pangolin (*Smutsia gigantea*), mandrills (*Mandrillus sphinx*), black colobus (*Colobus satanas*), moustached guenon (*Cercopithecus cephus*), red river hog (*Potamochoerus porcus*), and various species of duiker (*Cephalophus* spp.). Chimpanzees

were detected on 4 cameras, including one less than 2 km from a central point of entry for hunters into the park. Two cameras confirmed the presence of western lowland gorillas, including a juvenile (approximately 4 years old), indicating the MANP population continues to reproduce. These cameras were among those positioned furthest into the interior of the park, suggesting gorillas may be isolated within regions that are less accessible for hunters. While their presence is a positive sign, we only recorded gorillas twice in 4 months, potentially suggesting a substantial retraction of their historic range within MANP. Our on-going programme will now be critical to better understand their current distribution.

Of greatest concern are the frequent signs of hunting within critical habitat for gorillas and chimpanzees. Hunting activity was detected 184 times during the pilot study, the majority of which occurred within 5 km of roads and villages. As expected, hunting was negatively related to species diversity, as cameras placed farthest from roads/villages captured the greatest number of species.

As of August 2019, we expanded our camera trap network ($n=20$) and captured a variety of additional biodiversity and threats. In addition to images showing prolific hunting activity, survey teams recorded a high density of snares and shotgun shells along most major trails. While snares and shotgun hunting can be devastating, their impact is typically limited to the areas adjacent to major trails where hunters have greatest access. A more urgent issue revealed by our camera traps is the use of dogs. Images reveal hunters with large packs of dogs, at times more than 5 dogs per hunter. Aside from the increased range and efficacy of hunting with dogs, there is also the potential for zoonotic disease transfer between dogs and wildlife (Ellwanger et al. 2019). This is of major concern as it



Camera trap images of hunting in Monte Alén National Park, Equatorial Guinea. Juvenile western lowland gorilla (*Gorilla gorilla gorilla*) (top left); Central chimpanzee (*Pan troglodytes troglodytes*) (top right); hunter with shotgun and hunting dogs (bottom left); hunter carrying dead primate (bottom right)

Photo: Bristol Zoological Society



GORILLAS

is a previously undocumented threat to these wildlife populations.

Despite an abbreviated field season in 2020 due to the pandemic, our monitoring programme has already revealed critical information about wildlife presence and hunting trends within MANP. Our plans are to expand the camera trap network across MANP, with 30+ cameras anticipated in 2020–2021. Once fully deployed, this monitoring programme will be complemented by a boots-on-the-ground approach, including surveys and enforcement patrols via our INDEFOR counterparts. The BZS western lowland gorilla conservation project remains the only significant effort to reduce the pressures on wildlife in this region of Equatorial Guinea. Thus, its continuance post-pandemic remains our top priority, particularly as our preliminary data underscores the urgent need for expanding monitoring to enable rapid, actionable information to inform targeted enforcement activities in the future.

Patrick McLaughlin, Grainne McCabe and David Fernández

References

- Central African Regional Program for the Environment (2005): The forests of the Congo Basin: a preliminary assessment. CARPE
- Cronin, D. T. et al. (2017): Conservation strategies for understanding and combating the primate bushmeat trade on Bioko Island, Equatorial Guinea. *American Journal of Primatology* 79 (11)
- Ellwanger, J. H. & Chies, J. A. B. (2019): The triad “dogs, conservation and zoonotic diseases” – An old and still neglected problem in Brazil. *Perspectives in Ecology and Conservation* 17, 157–161
- Maisels, F. et al. (2015): Regional Action Plan for the Conservation of Western Lowland Gorillas and Central Chimpanzees 2015–2025. International Union for Conservation of Nature
- Murai, M. et al. (2013): Priority areas for large mammal conservation in Equatorial Guinea. *PLoS ONE* 8 (9), e75024
- Strindberg, S. et al. (2018): Guns, germs, and trees determine density and distribution of gorillas and chimpanzees in Western Equatorial Africa. *Science Advances* 4, eaar2964
- Sunderland, T. C. H. (2005): A biodiversity assessment of the Monte Mitra forest, Monte Alen National Park, Equatorial Guinea. Smithsonian Institution

Reactions of Wild Great Apes to Camera-trap Devices

Camera trapping has become a predominant method for wildlife monitoring (Burton et al. 2015; Steenweg et al. 2017), including primates (Gerber et al. 2014), while little is known about how the animals themselves perceive and respond to these strange new items introduced into their natural habitats. Therefore, in a recent article we investigated the reactions of wild African great apes, namely bonobos, chimpanzees and gorillas, when faced with this novel object: the camera-trap device. Ultimately we were interested in describing and quantifying behavioural responses to camera traps to gauge variation across species, social groups and individuals in the wild; however, our results also have implications for conservation and monitoring efforts of great apes.

The original study included 43 great ape social groups which were all naïve to camera traps, meaning there was no record of, or known exposure to, these devices in the territories of these great apes. Of these 43 groups, 22 were western lowland gorilla groups and one was cross river gorillas. These data had been collected as part of the Pan African Programme (PanAf) where camera traps had been installed at 14 field sites including habitats where chimpanzees and gorillas are sympatric (live in the same area).

Black Bushnell Trophy camera traps were used at most sites while some of the field sites where data collection occurred early on (e.g. Loango, Gabon) used older models. Importantly, each field site was controlled in all analyses to account for any variation according to site-specific differences in camera-trap placement or type. Camera traps were installed on the ground by PanAf field teams along travel paths, near fruit



A silverback caught by a camera trap

Photo: Loango Ape Project, MPI-EVA

trees, natural log bridges, and water sources.

We first screened all camera-trap videos of great apes for a ‘looking impulse’, where at least one individual in the video orients face-forward to the device and looks at it (Berlyne 1966; Haude et al. 1976). The looking impulse was used to code great apes’ visual interest in the novel device. After this, we closely examined all reaction videos and used a detailed ethogram to code the neophobic and neophilic behaviours exhibited by the individual apes who looked at the camera. Neophobic, or fear-based behaviours included the production of alarm calls, displays, startle response and retreat from the device. Neophilic, or curiosity-based behaviours included approaching or touching the camera. We further recorded the duration in seconds that an individual spent looking at the camera trap. Due to the nature of camera-trap videos we could not identify all individuals observed in every video; therefore, we conducted analyses on two levels: the social group and the individual. We first calculated all camera-trap events (consecutive videos on the same device within 15 minutes of each other; McCarthy et al. 2018) per group where at least one individual displayed a looking impulse. Of those events, we calculated the proportion where at least one neophobic and at least one neo-



GORILLAS

philic response was observed. Overall, neophobic and neophilic reactions to the device were rare (see figure below).

Analyses at the group-level showed that bonobos had the strongest looking impulse of the great apes, followed by gorillas, with chimpanzees having the lowest proportion of reactions to the camera trap. However, bonobo and gorilla groups did not significantly differ from one another in their looking impulse tendency, suggesting that these species generally take notice of the novel device much more often than chimpanzees.

We proposed that these species-specific differences could reflect variation in leadership styles within the societies of bonobos, gorillas and chimpanzees. In particular, when there is a clear dominance hierarchy (e.g. chimpanzees) there is more likely to be clear attribution of leadership irrespective of sub-grouping patterns, whereas in more egalitarian species (e.g. bonobos) this may be more difficult to as-

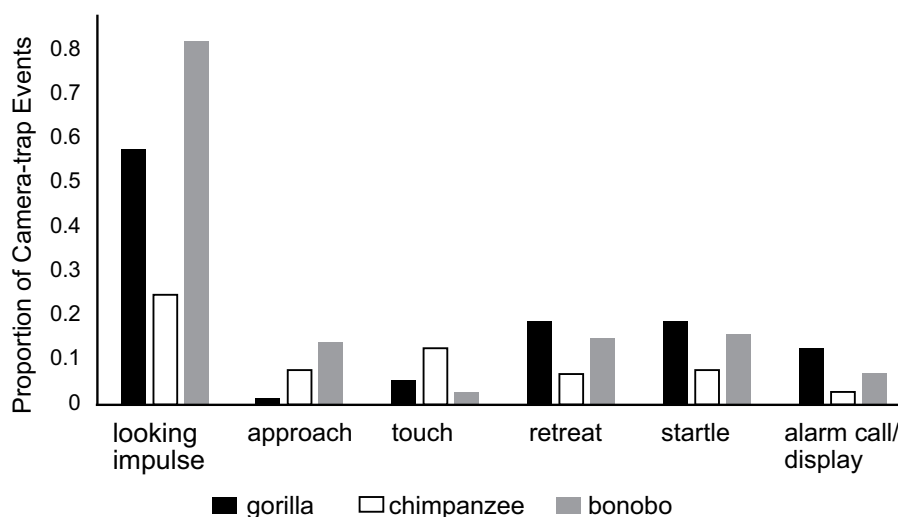
certain (Surbeck et al. 2017), leading individuals to be more cautious overall about their surroundings. Group decisions in gorillas are often thought to be controlled by the silverback (Watts 2000), and here we propose that variation in the personalities of silverbacks of each group may drive the large variation we observed in gorilla reactions. Moreover, bonobo groups also demonstrated neophobic behaviours more often than both chimpanzees and gorillas, while gorilla and chimpanzee groups did not differ in their tendency to give neophobic responses toward the camera trap.

It is important to note that our analyses controlled for repeated observations per group and field site. Our analyses simultaneously tested for additional effects, including the presence of conspecifics, the occurrence of a long-term research site within 5 km of the group's territory, and hunting pressure (encounter rate of hunting signs found during line transect surveys). We found that in areas with greater hunting pres-

sure there was a reduction in neophobic responses, which may be due to great apes becoming habituated to encountering human objects in these areas and/or perhaps because hunters do not target great apes due to protection provided by local hunting taboos. We did not know enough about the hunting activity at these sites, however, to gain any further insight into potential mechanisms.

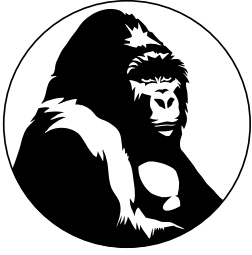
For the individual-level analyses, we tested variation in the time spent looking at the camera trap. Here we found no species-specific differences but did find support for young individuals looking significantly longer than mature individuals. This supports results in other animal behaviour studies where juveniles are often the most curious and exploratory since this phase of development is associated with learning about one's social and physical environment (Massen et al. 2013; Visalberghi et al. 2003). We further found support for the commonly known 'many eyes' hypothesis (Pulliam 1973) whereby individuals spent less time staring at the camera trap when they were together with more conspecifics. Individuals can essentially afford to be less vigilant when there are other group-members present. The presence of a long-term research site was also associated with a lower looking time, suggesting there may be a desensitization to novelty in general when individuals have had prior experience with humans.

In sum, camera traps are an excellent, cost-effective tool for monitoring wildlife, however, biologists and conservationists should demonstrate caution when installing these devices in wild habitats, especially those where animals are expected to be more naïve to human presence and human objects. As shown in our study, cryptic species like great apes can demonstrate overt behavioural reactions toward camera-trap devices and therefore can cause mild disruption to the



Proportions of all 2,078 camera-trap events for western gorillas ($n = 92$), chimpanzees ($n = 1,867$) and bonobos ($n = 119$) where a looking impulse and other behaviours were observed. Neophilic behaviours include approaching and touching the device; neophobic behaviours include retreat, startle and alarm calling or displaying toward the device.

Chart: Ammie K. Kalan



GORILLAS

natural activity of the animals. For example, apes might avoid visiting or using areas monitored by cameras (e.g. travel routes or fruit trees).

However, this study and decades of experience working with wild great apes also suggest that habituation and desensitization to camera traps may occur quickly.

Therefore, by considering the behavioural reaction, or lack thereof, toward the camera trap, biologists should be able to gauge the potential disruption to the natural behaviour of the apes and thereby make allowances in their study design and analyses to account for any complications that might arise as a result (e.g. installing a habituation phase where apes can get used to the new devices and data do not contribute to the overall goals of the study). Additional precautions biologists might want to consider depending on the species, population, environment and aims of the study, include positioning devices to avoid the eye line of individuals (i.e., this should reduce the chance that the apes notice the camera), and leaving enough space around important resources, such as water and fruit trees, for apes to access these without passing directly in front of the device should they be scared.

In general, new technologies like camera traps, drones and acoustic recording devices are incredible tools for monitoring wildlife at unprecedented scales, however, we must always consider and mitigate their potential effect on naïve animals.

Ammie K. Kalan

The PanAf methods used in the field to install, maintain and collect camera-trap observations can be found freely online in both English and French for others to use (http://panafrican.eva.mpg.de/english/approaches_and_methods.php).

Original article

Kalan, A. K., Hohmann, G., Arandjelovic, M., Boesch, C., McCarthy, M., Ag-

*bor, A., Angedakin, S., Bailey, E., Wilungula Balongelwa, C., Bessone, M., Bocksberger, G., Coxe, S. J., Deschner, T., Despres-Einspenner, M.-L., Dieguez, P., Fruth, B., Herbinger, I., Granjon, A.-C., Head, J. S., Kablan, Y. A., Langergraber, K. E., Lotana Lokasola, A., Maretti, G., Marrocoli, S., Mbende, M., Moustgaard, J., N'Goran, P. K., Robbins, M. M., van Schijndel, J., Sommer, V., Surbeck, M., Tagg, N., Willie, J., Wittig, R. M., Kühl, H. S. (2019): Novelty Response of Wild African Apes to Camera Traps. *Current Biology* 29 (7), 1211–1217*

References

- Berlyne, D. E. (1966): Curiosity and Exploration. *Science* 153 (3731), 25–33
- Burton, A. C. et al. (2015): Wildlife Camera Trapping: A Review and Recommendations for Linking Surveys to Ecological Processes. *Journal of Applied Ecology* 52 (3), 675–685
- Gerber, B. D. et al. (2014): Primates and Cameras. *International Journal of Primatology* 35 (5), 841–858
- Haude, R. H. et al. (1976): Visual Observing by Rhesus Monkeys: Some Relationships with Social Dominance Rank. *Animal Learning & Behavior* 4 (2), 163–166
- Massen, J. J. M. et al. (2013): A Behavioral View on Chimpanzee Personality: Exploration Tendency, Persistence, Boldness, and Tool-Orientation Measured with Group Experiments. *American Journal of Primatology* 75 (9), 947–958
- McCarthy, M. S. et al. (2018): An Assessment of the Efficacy of Camera Traps for Studying Demographic Composition and Variation in Chimpanzees (*Pan troglodytes*). *American Journal of Primatology*, e229049
- Pulliam, R. H. (1973): On the Advantages of Flocking. *J. Theor. Biol.* 38 (2), 419–422
- Steenweg, R. et al. (2017): Scaling-up Camera Traps: Monitoring the Planet's Biodiversity with Networks of Remote Sensors. *Frontiers in Ecology and the Environment* 15 (1), 26–34
- Surbeck, M. et al. (2017): Sex-Specific Association Patterns in Bonobos and Chimpanzees Reflect Species Differences in Cooperation. *Royal Society Open Science* 4 (5), 161081
- Visalberghi, E. et al. (2003): Response Toward Novel Foods and Novel Objects in Wild *Cebus apella*. *International Journal of Primatology* 24 (3), 653–675
- Watts, D. P. (2000): Mountain Gorilla Habitat Use Strategies and Group Movements. In: Boinski, S. & Garber, P. (eds.): *On the Move. How and Why Animals Travel in Groups*. pp. 351–374. Chicago, IL (University of Chicago Press)

Conservation Efforts and Costs for Monitoring Gorillas at Douguetsi Site, Gabon

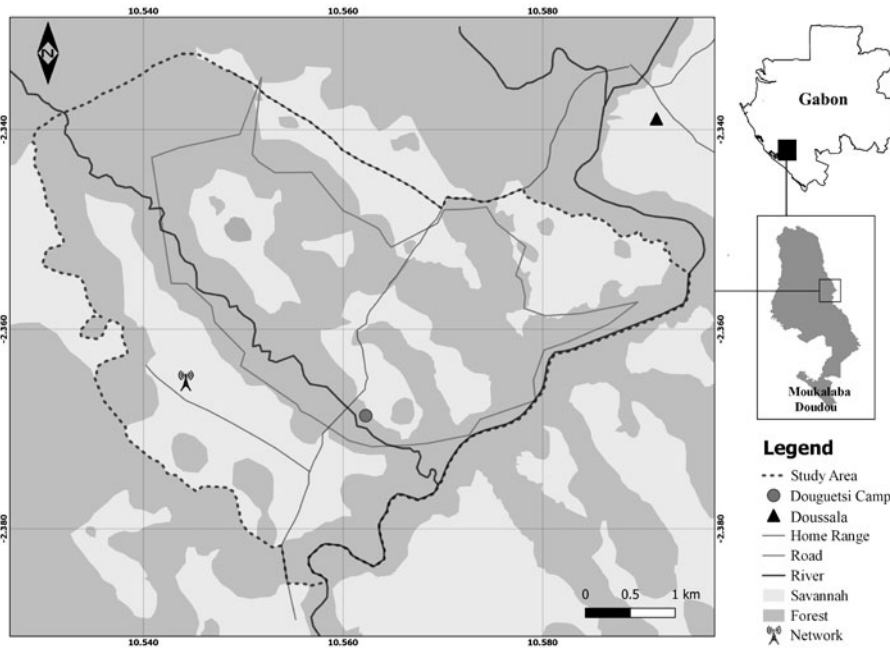
Despite the efforts of conservation NGOs and research teams, the expansion of anthropogenic activities such as bushmeat hunting, logging, and agricultural plantations – but also natural disasters caused by infectious diseases – have contributed to the population decline of great apes in rainforests (Walsh et al. 2003; Leendertz et al. 2006; Estrada et al. 2018). The amended version of the Red List of Threatened Species published in 2018 by IUCN classified the western gorilla (*Gorilla gorilla*) as a critically endangered species (Maisels et al. 2018).

PROGRAM (Protectrice des Grands Singes de la Moukalaba), a Gabonese conservation NGO established in 2004 that is working near the Moukalaba-Doudou National Park (MDNP), focused on the following activities: revenue generating projects (honey production), gorilla tracking, and ecotourism. It started a gorilla habituation program in 2014, the so-called pre-habituation period, and selected a study group (Mussiru group). This report discusses the inherent difficulties, challenges, and costs involved with successfully habituating western lowland gorillas in Gabon.

It is well known that the habituation of animals is a lengthy and expensive process during which observers are gradually accepted as a neutral element and therefore no longer affect the gorillas' behaviour in the wild (Williamson & Feistner 2003). Due to the extensive amount of time necessary for habituation the financial support can sometimes be insufficient. We believe that tourism would be a possibility to generate revenue in order to make the activity sustainable as soon as the



GORILLAS



Location of the Douguetsi study site and the home range of the Mussiru group, designed with the MCP method.

group is habituated. The costs are up to 200,000 US\$ per year for the maintenance of the camp and trackways, food rations, rotation of teams, salary, and equipment. When the tourism activity reaches its peak, almost 30 % of the annual costs can be recovered.

Study site

Bordered by the Douguetsi River, the Douguetsi research camp is located approximately 6 km from Doussala village along the right side of the Moukalaba River. It is located at the coordinates 02° 22' 11.42" S, 10° 33' 44.53" E, and covers ca. 23.01 km² to the northeast of the MDNP. For more details, see Ando et al. (2008) who described the study site.

During the tracking of the Mussiru group (MUG) under habituation near Douguetsi, the tracking team was made up of four to six people divided into two to three teams of two people each plus one researcher in order to increase the probability of encounter-

ing the study group. The group was visited from 7 h to 15 h and we tried to maintain the trace or contact (including direct and auditory contacts). Additionally, we visited the fruiting trees and nesting sites at various locations, as we knew that gorillas sometimes reuse nests and nest sites (Iwata & Ando 2007). The gorilla density is 3 gorillas/km² (Ando et al. 2008).

We followed fresh traces such as footprints, food remains, faeces, nest sites, chest beat direction, and other characteristic signs as long as possible until we encountered gorillas (Tutin & Fernandez 1984; Ando et al. 2008). As described by Ando et al. (2008) for the same study area, the traces could be lost quickly as a result of lack of vegetation in the undergrowth, insufficient feeding remains, and invisible footprints on the hard soil. To estimate the size of the home range, we used the minimal convex polygon (MCP) method with the QGIS version 2.18 software from a Global Positioning Sys-

tem (GPS). We took a measurement at each night's nest site sampled from MUG or at the first contact.

Observations

During our reconnaissance patrols in search of MUG, we occasionally encountered other untracked groups as well as solitary males sharing the same study area as the focus group. From these observations we identified at least 9 gorilla groups (including the study group) and 7 solitary males in the habituation area. Because of the replacement of the responsible primatologist in the habituation program, we distinguished 4 periods throughout this process (see table on page 26). 2015 (Period 1) marked the start of regular monitoring focusing on the Mussiru group. From 2016 to 2017 (Period 2), the process of habituation proceeded normally; the contact duration was 15 times more in 2017 than in 2016. This period marked the most successful phase of the process of habituation.

In 2018 (Period 3), the financial and technical support for the habituation program was interrupted. This certainly also contributed to a setback in the habituation of the group due to the lack of regular contact. Several trackers left the team during this crucial time because they received no salaries. During this period there was no primatologist in charge on the study site. We suspect that the trackers present on site did not look for the gorillas every day.

In 2019 (Period 4), the activities started up again at full speed, therefore, we had to employ several new trackers. This transition period slowed down the process of habituation as many of the new trackers were inexperienced or had never worked closely with great apes in the past. Although there are other sites in Gabon where gorillas are monitored, it was imperative for us to create job opportunities for



GORILLAS

Summary of the process of habituation of Mussiru Group, tracking efforts, contacts, and home ranges from 2015 to 2019

	Period 1	Period 2	Period 3	Period 4		
Parameters	2015	2016	2017	2018	2019	All
No. Tracking days	298	255	304	59	277	1,193
Tracking efforts* (%)	81.64	69.86	83.29	16.16	75.89	65.37
No. contact days	71	86	123	14	70	364
Gorilla encounter rate (%)	23.83	33.73	40.46	23.73	25.27	30.51
Yearly contact duration (min.)	486	871	13,412	435	1,295	16,499
Yearly home range (km ²), MCP	6.43	3.61	9.02	6.36	8.45	9.70

* no. of tracking days*100/no. of days in the year (365)

local people living in villages adjacent to the MDNP.

Until 2019, due to the lack of detailed observations, the composition and size of the Mussiru group remained unknown. The group's size obtained from nest counts ranged from 9.33 to 11.93 individuals. We assumed that there were also infants (≥ 3), seen during some rare direct observations, meaning that it is a breeding group. Most encounters occurred in the presence of the silverback male who was still very aggressive when we approached. Other individuals such as females and juveniles avoided us or showed signs of fear as soon as we established contact. The habituation of MUG at this stage remains fragile. However, the results obtained in 2019 are encouraging, and we are thinking of focusing on the silverback male in the future by increasing the contacts and the observation durations, in order to be accepted by him. It is expected that the other members of the group would then change their behaviour towards us.

In comparison to anywhere else in Central Africa, the habituation of western lowland gorillas in Gabon is a special case. This is because it can take a long time – up to 14 years in contrast to mountain gorillas in Bwindi, where

the habituation may take only 6 months (Goldsmith 2005). Ando et al. (2008), who worked in MDNP, mention that habituating a single gorilla group ranging from 20 to 22 individuals could take 6 years. It is crucial to secure funding for this process because it is risky leaving such a group exposed to poaching after they have become naïve to human presence.

While we are waiting for the MUG to be fully habituated to be able to open it up to tourism, it is essential for the success of the program to increase its revenue streams. All individuals, research institutions and donors who would like to help finance our activities and/or carry out studies in MDNP and its surroundings are welcome. The MDNP has a unique wildlife diversity in Gabon (see Appendix 1, species list of inventoried mammals from Nakashima 2015). For many species, the conservation status is unknown due to the lack of in-depth studies.

Ulrich Maloueki, Nana Ismaila, Obame Rina Zang and Dikenane Kombila

The authors would like to thank first of all the researchers and trackers who helped to collect these data as well as the staff of PROGRAM for their logistical and management support. In addition: the Agence Nationale des Parcs Nationaux (ANPN) of Gabon for the permission

to conduct our research in MDNP as well as the funders who have supported this program such as FFEM, USFWS and WWF-Gabon. We are grateful to villages in the vicinity of the MDNP for accepting this project.

Website: <http://www.association-program.com/>
Email: ong.program@gmail.com

References

- Ando, C. et al. (2008): Progress of habituation of western lowland gorillas and their reaction to observers in Moukalaba-Doudou National Park, Gabon. *African Study Monographs* 39, 55–69
- Estrada, A. et al. (2018): Primates in peril: the significance of Brazil, Madagascar, Indonesia and The Democratic Republic of the Congo for global primate conservation. *PeerJ* 6, e4869
- Goldsmith, M. L. (2005): Habituating primates for field study: ethical considerations for African great apes. In: Turner, T. R. (ed.): *Biological anthropology and ethics: from repatriation to genetic identity*. State University of New York Press, Albany, New York, pp. 49–64
- Iwata, Y. & Ando, C. (2007): Bed and bed site reuse by western lowland gorillas in Moukalaba-Doudou National Park, Gabon. *Primates* 48, 77–80
- Leendertz, F. H. et al. (2006): Anthrax in western and central African great apes. *American Journal of Primatology* 68, 928–933
- Maisels, F. et al. (2018): *Gorilla gorilla* (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2018, e.T9404A136250858
- Nakashima, Y. (2015): Inventorying medium- and large-sized mammals in the African lowland rainforest using camera trapping. *Tropics* 23, 151–164
- Tutin, C. E. G. & Fernandez, M. (1984): Nationwide census of gorilla (*Gorilla g. gorilla*) and chimpanzee (*Pan t. troglodytes*) populations in Gabon. *American Journal of Primatology* 6, 249–265
- Walsh, P. D. et al. (2003): Catastrophic ape decline in western equatorial Africa. *Nature* 422, 611–614
- Williamson, E. A. & Feistner, A. T. C. (2003): Habituating primates: processes, techniques, variables and ethics. In: Setchell, J. M. & Curtis, D. J. (eds.): *Field and laboratory methods in primatology: a practical guide*. Cambridge University Press. pp. 25–39



READING

Bila-Isia Inogwabini
Reconciling Human Needs and Conserving Biodiversity: Large Landscapes as a New Conservation Paradigm: The Lake Tumba, Democratic Republic of Congo. Environmental History Vol. 12. Cham (Springer) 2020. 397 pages. Hardcover € 189.95. ISBN 978-3030387273

Human Rights Watch
World Report 2020. Events of 2019. Human Rights Watch 2020. Paperback US\$ 34.00. 672 pages. ISBN 9781644210055

FAO and UNEP
The State of the World's Forests 2020. Rome (FAO) 2020. 214 pages. ISBN 978-92-5-132419-6, DOI: <https://doi.org/10.4060/ca8642en>. Download PDF (14.2 MB): <https://wedocs.unep.org/bitstream/handle/20.500.11822/32472/WF20EN.pdf?sequence=1&isAllowed=y>

New on the Internet

Congo Research Group
Congo, Forgotten. The Numbers Behind Africa's Longest Humanitarian Crisis. Congo Research Group August 2019. 18 pages. Download PDF (1.1 MB): <https://kivusecurity.nyc3.digitalocean.com/reports/28/KST%20bianual%20report%20August%2012%20%281%29.pdf>

The Sentry
Covert Capital. The Kabila Family's Secret Investment Bank. May 2019. 49 pages. Download PDF (4.1 MB): https://cdn.thesentry.org/wp-content/uploads/2019/05/CovertCapital_TheSentry_May2019.pdf

Ken Matthysen, Steven Spittaels and Peer Schouten
Mapping artisanal mining areas and mineral supply chains in Eastern DR

Congo. Impact of armed interference & responsible sourcing. Antwerp (IPIS) April 2019. 56 pages. Download PDF (1.1 MB): <https://ipisresearch.be/wp-content/uploads/2019/04/1904-IOM-mapping-eastern-DRC.pdf>

Congo Research Group
For the Army, With the Army, Like the Army? The Rise of Guidon Shimiray and the NDC-Rénové in Eastern Congo. New York (Congo Research Group) May 2020. 70 pages. Download PDF (66.1 MB): <https://bit.ly/2xVKksz>

The Alliance Against Industrial Plantations in West and Central Africa
Communities in Africa fight back against the land grab for palm oil. September 2019. 14 pages. Download PDF (794 kB): <https://www.grain.org/e/6324>

IIED
Communities as the first line of defence in combating illegal wildlife trade: Sharing lessons to influence policy and practice. Learning Exchange Event Workshop Report. 35 pages. Download PDF (1 MB): <https://pubs.iied.org/pdfs/G04445.pdf>

Duncan Macqueen and Jeffrey Campbell
Prosperity in place: meaningful work for mobile youth that enhances forest landscapes. Research report. 76 pages. Download PDF (3.5 MB): <https://pubs.iied.org/pdfs/13615IIED.pdf>

Amnesty International
Dismissed! Victims of 2015–2018 Brutal Crackdowns in the Democratic Republic of Congo Denied Justice. London (Amnesty International) June 2020. 63 pages. Download PDF (2.6 MB): <https://www.amnesty.org/download/Documents/AFR6221852020ENGLISH.PDF>

A Dirty Investment. European Development Banks' Link to Abuses in the Democratic Republic of Congo's Palm Oil Industry. Human Rights Watch November 2019. 125 pages. ISBN 978-1-6231-37823. Download PDF (10.5 MB): https://www.ecoi.net/en/file/local/2022163/drc1119_web_0.pdf

Rainforest Foundation UK
Ana Osuna Orozco and Maud Salber Palmed Off. An Investigation into Three Industrial Palm Oil and Rubber Projects in Cameroon and the Republic of Congo. London (Rainforest Foundation UK) May 2019. 68 pages. Download PDF (3.5 MB): <https://www.rainforestfoundationuk.org/media/ashx/palmedoffengfinal.pdf>

Rainforest Foundation UK
Mapping the Future: Towards Meaningful Participation of Forest Peoples in Land Use Planning in DRC and Cameroon. London (Rainforest Foundation UK) APRIL 2020. 52 pages. Download PDF (2.2 MB): <https://www.rainforestfoundationuk.org/media/9a32f99c-8a50-4515-bea7-647ac2d2d439>

Rainforest Foundation UK
Women's Participation in Community Forestry in the DRC. London (Rainforest Foundation UK) October 2019. 24 pages. Download PDF (1.3 MB): <https://www.rainforestfoundationuk.org/media/e2f37b75-08e4-4eb5-8dc1-448cb698d8c5>

Robert E. Moïse
Making Community Forestry Successful in DRC: Anthropological Perspectives on Community-based Forest Management. London (Rainforest Foundation UK) September 2019. 30 pages. Download PDF (1.1 MB): <https://www.rainforestfoundationuk.org/media/d5932bd6-81a5-467f-97de-effad454a140>



BERGGORILLA & REGENWALD DIREKTHILFE

Finances

Income in 2019

Subscriptions	23,893.20 euro
Donations	67,205.77 euro
Sales	162.90 euro
Total	91,261.87 euro

Expenses in 2019

Administration	1,921.46 euro
<i>Gorilla Journal</i>	2,176.63 euro
Website	890.40 euro
Refund meeting	335.16 euro
Currency differences	499.98 euro
Postage	1,472.79 euro
Pay/top-ups	8,450.00 euro

Sarambwe

Support of trackers	24,025.00 euro
Equipment	5,206.00 euro
Patrol post, road work	8,693.00 euro
Kitchen personnel	1,500.00 euro
Sewing machines	1,440.00 euro
Motorcycle	2,500.00 euro
Transport	200.00 euro
Restoration of fields	5,507.00 euro
Border demarcation	3,000.00 euro
Drinking water	8,637.00 euro
Animal keeping	5,825.00 euro

Mt. Tshiaberimu

Tracker top-ups	15,975.00 euro
Equipment	3,296.00 euro
Bee keeping	3,400.00 euro
Water supply well	5,340.00 euro
Potato growing	3,000.00 euro
Bamboo growing	6,170.00 euro

Itombwe

Ranger top-ups	36,000.00 euro
Tracker support	2,160.00 euro
Office, road building, street lighting	11,500.00 euro
Training gorilla monitoring	4,000.00 euro

Bwindi

Gorilla research	9,600.00 euro
ITFC employees	16,000.00 euro

Cross River area, Nigeria

Solar panels Mbe headquarters	7,000.00 euro
-------------------------------	---------------

Cross River area, Cameroon

School project	9,435.00 euro
Total	215,155.42 euro

Our Donors

From November 2019 to April 2020 we received major donations by Ravid Aloni, Alexander Bahr, Fredrik Bakels, Emilio Garcia Barea, Rainer Biermann, Anke Birr, Manuel Blatter, Andreas Bruck, Achim Christen and Rita Christen-Stuttgen, Colibri Umwelreisen, Contravis GmbH, Ulrich and Andrea Daniels, Angelika Dickmann, Herbert and Silvia Dieter, Sybille Eck, Daniel Edler, Michael Enders, Robert Epp, Andrea Fischer, Gaia Nature Fund, Sonja Geisendorf, Kerstin Gennilke, Susan Goetsch, Gorilla Gym Hamburg, Jens Hadler, Winfried Haid, Frank and Elisabeth Haspel, Hans Michael Henkst, Jeanette Herrmann, Daniel Hildebrandt, Birgit Höfer, Marieberthe Hoffmann-Falk, Indima, Helga Innerhofer, Sebastian Jutzi, Götz Kauschka, Hannes Kirsten, Benjamin Klöppel, Hartmann Knorr, Dennis Koenig, Sandra Kolberg, Nico Krebs, Christian Kühnle, Jasmin Kunchiwala, Elisabeth Labes, Doris Laubis and Frank Merkt, Wolfgang and Brigitte Leuper, Marco Makowski, Christian Lobert, Elisabeth Mann, Lore Marholdt, Kathleen Opitz, Lionel Palm, Anne Pfisterer, Pieternella Pols Fonds, Anke Poppeck, Ralf Preisendorfer, Birgit Reime, Geraldine Reischl, Niclas Remus, Rettet den Regenwald, Hans-Joachim Reuter, Wolfram Rietschel, Heidi Peter-Rocher, Alfred Roszyk, Erika Rüge, Jochen Saacke, Chris Schäfersküpfer, Günter Schaffhauser, Michael Schmidt, Gabriele Schmitt-Schleinkofer, Markus Schrempp, Gernot and Cornelia Schroer, Andreas Schröter (Kong Island), Schwabenpark, Eva-Maria Schweikart, Elke Seeger, Frank Seibicke, Roland and Waltraud Sickinger, Tabea Sieg, Michael Siems, Stephanie Skolik, Hartmut Stade, Jan Steinmüller, Heinz Stelter, Carsten Steves, Andreas Strohmail, Constanze Süßdorf-Schönstein, Ingo Teichmann,

Tiergarten Heidelberg, Heike Tischner, Bernd Treide, Jan Willem van der Lipp, Dirk Wahlscheidt and Bettina Urban Wahlscheidt, Hann-Jörg Walther, Antje Werner, WERO GmbH, Heidi and Jörg Werstat, Sebastian Weyrauch, Christof Wiedemair, Alex Witte, Ingo Wolfeneck, Brigitte Wullert, Heinz and Elisabeth Zaruba, Rebecca Zindler and die Zoos Krefeld, Rostock and Saarbrücken.

Again several institutions collected donations for us during public events: the Diakonische Hausgemeinschaften Heidelberg sold cookies, the DAV Boulderzentrum Tübingen organised a bazaar. Thomas Steidl asked the guests of a celebration to donate to us – with success.

We thank everybody who has been supporting us!



The company WERO not only donated money but also first aid kits that were sent to rangers in Congolese gorilla conservation areas (here Jean Claude Kyungu in Itombwe before distributing them).