FINAL REPORT

Outreach and the development of primate tourism to protect the Critically Endangered white-thighed colobus (*Colobus vellerosus*) at Kikélé Sacred Forest, Benin

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EXECUTIVE SUMMARY

Kikélé Sacred Forest (KSF) in northwestern Benin is home to a small population of the critically endangered white-thighed colobus (*Colobus vellerosus*). KSF has been under anthropogenic pressures. Although the villagers do not hunt the monkeys in the forest, hunting in adjacent forests and other human activities have reduced the population size of this species to just two groups. Many villagers, especially women, have been disposing of garbage and trash, many of which are hazardous and non-biodegradable, into the forest. Also, some villagers have been using the forest as a toilet and small-scale tree cutting for firewood or other purposes occurs daily. A few people bring their cows into the forest. These practices threaten the monkeys' and public health. To mitigate these problems and prepare KSF for primate tourism, we embarked on hands-on activities in August - November 2019. The staff of the Conservation Association of Benin Flora and Fauna (CABFF) visited the local schools to engage in conservation education (e.g., storytelling the origin of the white-thighed colobus in KSF, proper hygiene). 219 students and faculty participated in this program. Some students also visited KSF to observe primate behavior. Furthermore, we conducted outreach in community meetings and met with stakeholders to discuss the current status of the species, the deplorable condition of the forest, and the prospect of developing KSF as a primate tourism site. We also mobilized 13-40 villagers per day over seven days to remove three tons of garbage and 300 kg of trash from KSF. The forest is now much cleaner. Some students now visit the forest during recess and after school. The women have created the Women's Environment Club that is now responsible for the maintenance of the forest. Outreach has helped reduce the number of gunshots that occur in adjacent forests. The occurrence of other illegal activities has also considerably decreased in KSF. 12 new toilets were created and stakeholders have promised to use their authority to improve the condition of KSF. There are still many hurdles that we need to overcome, but we are now in a much better position to develop primate tourism in KSF.

Introduction

Small populations of the white-thighed colobus (*Colobus vellerosus*) and the mona monkey (*Cercopithecus mona*) inhabit the Kikélé Sacred Forest (KSF) in northern Benin. The white-thighed colobus is a critically endangered species (Matsuda Goodwin et al. 2019a, b) while the mona monkey is a Near Threatened species (Matsuda Goodwin et al. in print). For centuries Kikélé village has protected their ancestors' totem, Donko (the white-thighed colobus in Yoruba); however, the village has been facing challenges.

The growing human population, exacerbated by the flow of migrants from Togo, has been putting enormous pressure on the limited land available in the village. Farms have expanded while forested areas were reduced and degraded. Hunting in adjacent areas – Kikélé monkeys sometimes range into the unprotected adjacent gallery forests – over the last many decades has reduced the number of *C. vellerosus* from about 300 in the 1950s to 100 by 2010 (L. Chabi Ota pers. comm. 2018). Now, only 23 white-thighed colobus monkeys live.

The first problem that KSF faces is tree cutting. Some recent migrants who lack respect towards the local traditional belief systems engage in illegal tree cutting (Orekan 2008; R. Chabi Ota pers. obs. 2017). Some of the trees that have been cut down are important primate food species. As long as hunting is controlled, both *C. vellerosus* and *C. mona* can survive in somewhat disturbed habitats (Wong & Sicotte 2006, Matsuda Goodwin 2007; Matsuda Goodwin et al. 2019a, 2019b), although this does not mean that disturbance has no negative effect on the behavioral ecology of the species. The small-scale disturbance that occurs every day could cumulatively inflate to a large-scale tree loss.

The second problem is that some villagers, especially women, have been disposing of garbage and trash (e.g., polyethylene garbage, broken bottles, broken ceramics) in the forest over the last many decades, forming three large heaps. Many of the trash are non-biodegradable, non-burnable, or hazardous when burned. The garbage and trash can cause negative effects on the forest ecosystem. R. Chabi Ota began removing the trash with some students from the secondary school, where he used to teach part-time, but the problem is too large to be solved by a few visits by several people.

The third problem is that several villagers, mostly children, have been using the forest as a toilet. Open defecation is a major risk factor for zoonotic diseases that threaten human health and non-human primates' health (Muehlenbein 2017). It increases the transmission of parasites through vectors such as flies and direct contact (Mphande 2016). The white-thighed colobus in Boabeng-Fiema Monkey Sanctuary (BFMS) in Ghana that frequent the village possesses gastrointestinal parasites that have been anthropo-zoonotically transmitted (Teichroeb et al. 2009).

The fourth problem is that a few villagers with cows bring their cattle into the forest. Cows devour tree seedlings. Because the forest is bordering the village, chickens and dogs also freely enter the forest.

Protecting the white-thighed colobus is important for the Kikélé village not only because we want to protect the monkeys for their own sake and potential socio-economic benefits that protection could bring to the village, but also because Donko has an important spiritual sacred place in the minds of the villagers. Therefore, we

implemented some activities in an attempt to cease these illegal activities to protect the primates and the forest.

Objectives

The objectives of this project were to mitigate the threats that KSF has been facing by conducting hands-on activities in the forest, schools, and communities. The ultimate goal of these activities is to develop KSF as a primate tourism site (Reynolds & Bettinger 2008). We define primate tourism as "Responsible viewing of flora and fauna in a natural setting that conserves the animals and their habitat with the income generated through the travel that improves the lives of people" (Strum & Nightingale 2014). When primate tourism is done with diligence and creativity, it can generate revenues for sustainable forest management (Hvenegaard 2014). Also, the presence of practitioners in the forest deters illegal activities (Campbell et al. 2011, Piel et al. 2015).

Methods

Project site and subjects

The project site was the community-owned 19.8-ha Kikélé Sacred Forest (KSF) (9.009° N, 1.729° E) at Kikélé Village in northwestern Benin (Fig. 1). KSF is a Sudanian dry semi-deciduous forest. The annual rainfall is about 1,300 mm with a long dry season from October to April and a wet season from April to September (Djègo-Djossou et al. 2015).The five common tree species are *Celtis integrifolia* (Cannabaceae), *Cola cordifolia* (Sterculiaceae), *Tectona grandis* (Lumiaceae), *Azadirachta indica* (Meliaceae), and *Holoptelea grandis* (Ulmaceae).

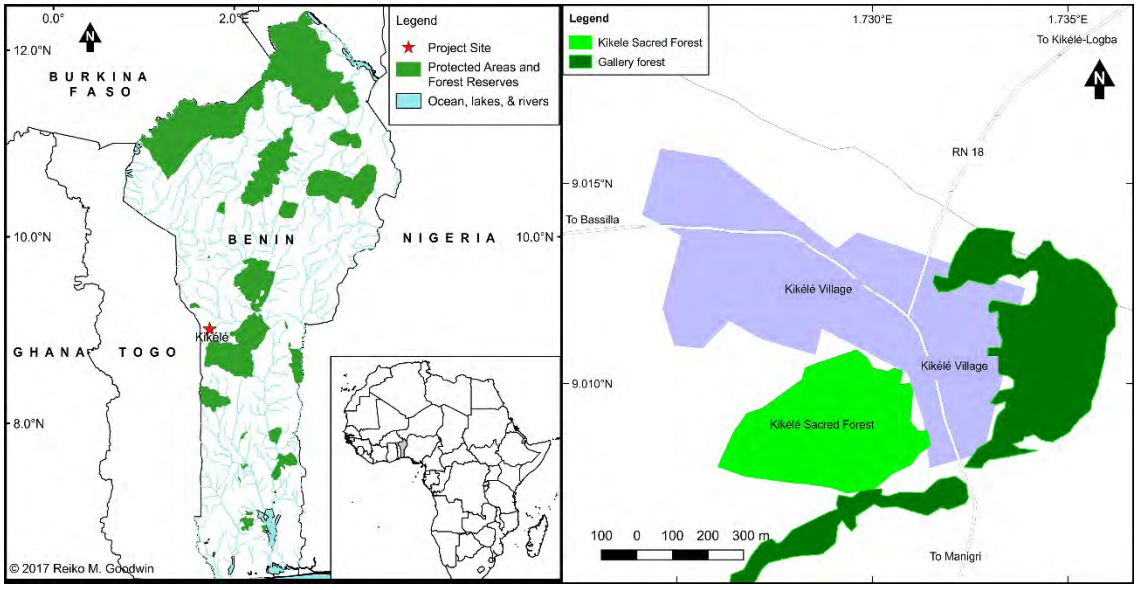

Fig. 1. Kikélé Sacred Forest (KSF) is located in northwestern Benin

Our conservation target subjects are the 24 member mixed-species group (NE group) that is composed of 21 *C. vellerosus* members (Fig. 2) and three *C. mona*. The NE group mainly ranges in the northeastern part of the forest. Most members, but not all, of the NE group members are habituated to humans. Even the behavior of feisty monas can be readily observed. In the southern part of the forest, there is an

unhabituated adult male-adult female pair of *C. vellerosus* (SE pair). The monkeys are not hunted in KSF, but if they venture out of KSF into the adjacent gallery forest, they can get shot.

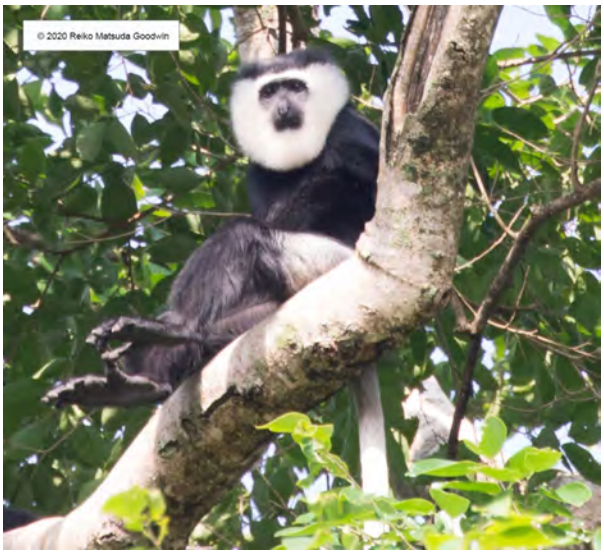

Fig. 2. Donko or the white-thighed colobus in Kikélé Sacred Forest

Educational program

Four CBFF staff (R. Chabi Ota, Y. Adiou, S. Affissou, A. Phillipe) visited the secondary school and middle school in Kikélé six times in October–November 2019. We visited the classroom by classroom accompanied by the headmaster and a biology teacher (Fig. 3.1 & 3.2). Each class consisted of 50-60 students. Learning about biodiversity conservation is not part of the school curricula at any primary or secondary school in Benin. For this reason, children in Benin grow up learning almost nothing about the connection between the wellbeing of the people and wildlife.

Fig. 3.1 (left) & 3.2 (right). RCO conducts an education program (left) with the principal (right) at the schools in Kikélé Village

In each classroom, we began by introducing the objectives, activities, and vision of the CABFF. Then, we assessed the students' knowledge of primate species in our communities. After this initial assessment, we gave a lecture as we presented the slides that show photographs of different primate species on our computer monitor (There is no electricity in the schools, therefore, the use of a projector was not possible). We talked about different primate species that occur in KSF and nearby community forests: the olive baboon or Ato (*Papio anubis*); tantalus monkey, Awiya (*Cercopithecus tantalus*); patas monkey, Amé (*Erythrocebus patas*); mona monkey, Lambè (*C. mona*); the white-thighed colobus, Donko (*C. vellerosus*); and Northern lesser galago, Ato oké (*Galago senegalensis*). We described the characteristic physical features and vocalization of each species and have students imitate their calls. We also talked about ecological functions that primates play in the forest ecosystem; how human activities threaten the survival of the KSF primates; the potential of pathogen transmission that can devastate the monkeys as well as human health (Wallis & Lee 1999, Muehlenbein 2017) as a consequence of open defecation; and the importance of proper household trash disposal.

We also used the traditional storytelling method to talk about the story of the origin of Donko (the white-thighed colobus). The method consists of telling stories with animistic characters with some implicit moral teaching. According to the legend that has been passed on from generation to generation, the ancestors of Kikélé came to settle at the current locality with a couple of Donko which they released in the forest next to their houses. These monkeys multiplied to several hundred individuals. During the dry season, they came to their houses to drink water. The monkeys were prophets of the future of the Kikélé inhabitants. If some bad thing would happen, Donko warns the villagers with their cries, which is called *adom kro* (*adom* = Donko's, *kro* = calls). The wise men of the village revered *Donko* and consulted them and have been making offerings to them to ward off evil spirits and malevolent events from happening. When there is a birth in a family, the newborn is embodied by Donko to whom the village makes an offering. When there is death in a family, an offering is made to Donko. We concluded with what the CABFF is doing to ameliorate the situation of KSF. After three visits at each school, we again assessed the students' knowledge.

Visiting KSF

The students visited KSF twice as after-school activities. As we quietly walked in the forest, the CABFF members showed them how to find the monkey group, identify different types of anthropogenic activities, and identify tree species.

After finding the NE group, we asked the students to record, in a notebook, what the monkeys were doing (moving, feeding, resting, grooming, sleeping) and if the monkeys were feeding on a plant, observe what they were feeding (list food tree or liana species monkeys were feeding on and food items (e.g., immature vs. mature leaves; ripe vs. unripe fruits). In other words, they had a specific learning goal during primate observation (Jacobson et al. 2015).

Fig. 4. Secondary students observes monkey behavior at KSF

We also discussed the mona monkeys' diet and how their behavior (e.g., spitting out the seeds, defecation) helps the natural regeneration of the trees in the forest. After the individual observation, we engaged in a group discussion in which we discussed methods of tree identification and forest regeneration. Students asked many questions regarding the natural history of *C. vellerosus*. The visits provided opportunities for the students to learn about the changes that occurred in the Donko population.

Community Outreach

In eight community meetings, CABFF staff, village chiefs, and villagers discussed the status of *C. vellerosus* in Kikélé and the nearby communities, the ecological services primates play in the forest ecosystem, the importance of monkeys and the forest to our communities, and the potential zoonotic risks that unhygienic behavior could bring to the primates and humans. We presented many images of primates killed by guns, wire traps, and the filth of the KSF. We explained that the monkeys are not the source of protein, but a heritage that needs to be preserved. We stressed the fact that we could not protect the monkeys if we destroy their habitat. To the women who throw the garbage and trash, we explained that the forest cannot be used as a dump.

We also discussed the pros and cons of primate tourism and forest management strategies. Primate tourism is neither an impact-free endeavor (Russon & Wallis 2014) nor a panacea for conservation (Leasor & Macgregor 2014). It could have some negative influences on the behavior and health of the primates (Cowlishaw & Dunbar 2000, Cunha 2010). It may be more beneficial only to some people (Hvenegaard 2014). This may create resentment among the community members. Therefore, all the advantages and disadvantages of the potential economic activity needed to be discussed.

We also conducted interviews on 12 villagers at their homes to find out where they throw the garbage and trash and asked them if they thought that KSF could bring some income once they stop throwing trash in the forest. These interviews helped us determine their availabilities on dates of forest cleanup.

After the forest cleanup (see below), we again convened community meetings to talk about the remaining problems and potential solutions.

Meeting with stakeholders

We met with the Bassila mayor, who has the jurisdiction over Kikélé village, to discuss the prospect of creating a more efficient sanitary condition, improving anti-

poaching law enforcement, and nighttime security of KSF. These issues need to be addressed before we bring in tourists. We also advocated sanctions against open defecation and campaign for strict enforcement of the rules against other illegal activities. We also made two visits to some hotels in Bassila to promote tourism.

We also met with the chief forester and discussed the current state of the forest, the activities we have carried out. We asked for their technical support.

Forest cleanup

We purchased the necessary tools and supplies (e.g., shovels, gloves, masks, aprons, garbage bags) and sought participants who could come to the forest to remove garbage and trash with a small daily wage. We determined the disposal location by consulting the governor and opened a large pit in an open area outside the forest. Each participant in this activity wore protective gear and rain boots for safety reasons. Over seven days, using shovels and long metal tongs, we picked up the trash (plastics bags; broken plastics and bottles, clothes, bags, broken batteries, broken bowls, etc.) of the heaps and placed it into large heavy-duty plastic bags. Then, we placed them in large bins, which we transported to the pit and buried. Both garbage and trash were buried outside the forest. While we were removing them, we avoided the area where the monkeys were engaging in some activities at the moment. When we encountered human fecal matter, we dug a deep hole to bury it. The tools were sterilized after use.

Fig. 5. We removed garbage and trash from the forest

Results

Education Program

The initial assessment was that most students were able to describe the physical characteristics (pelage color, size, tail size, facial pattern) of Amé (patas monkey) and the Donko (whit-thighed colobus), but most were unable to describe other species. Most students thought the baboon was the chimpanzee, which, has gone extinct from Benin more than 50 years ago. However, several students could not distinguish the vocalization of Ato (olive baboon) and Lambè (mona monkey), and Awiya (tantalus monkey). We helped them recognize the calls of these primates.

One of the secondary school students recited a myth - There was a baboon that planted seeds of some fruits by defecating. The tree eventually grew and bore a lot of fruits. Then other lazy animals came to enjoy the fruits. The angry baboon told them while bending the chest "*It is with my feces that I make my fruits nurture and mature.*

Thus, imitate what I do, instead of stealing my fruits. Defecate and plant the seeds". This story impressed the students. We explained how seeds germinate better if monkeys consume fruits and the seeds pass through the animal's stomach.

The second assessment we conducted at the end of the final school visits saw a dramatic improvement (50-75% increase) in students' knowledge among both primary and secondary schoolers, regarding the characteristics of primates and the fact that there would be negative consequences that anthropogenic activities could bring about on the primate populations and the forest ecosystem.

Visiting KSF

23 secondary school students and 19 primary school students visited KSF twice. The students lamented the filthy state of the forest. Students learned that Donko is a folivorous primate that feeds on trees such as *Celtis integrifolia* (Ulmaceae), *Holoptelea grandis* (Ulmaceae)*, Cola cordifolia* (Sterculiaceae), *Azadirachta indica* (Meliaceae), *Parkia biglobosa* (Leguminosae), and *Tamarindus indica* (Leguminosae), and the mona monkey is a frugivorous primate that feed on fruits of *Diospyros mespiliformis* (Ebenaceae), *Ficus congensis* (Moraceae), and other sugary fruits. For many students, this was the first exposure to forest ecology and primate behavioral ecology.

Outreach and forest cleanup

The outreach helped raise awareness regarding the importance of KSF and the primates among the villagers. We mobilized 13-40 villagers and their children per day and the forest committee members of Kikélé village to clean the forest over six and a half days. We mobilized more women because it was mostly women who were throwing the waste into the forest than men. Their behavior has been passed on from generation to generation. During the cleanup, we collected ≥ 3 tons of garbage and ≥ 300 kg of non-biodegradable trash. The forest is now much cleaner.

The women created the Women's Environment Club (Fig. 6.1 & 6.2), which is now responsible for monitoring illegal trash disposal, reporting it to the management committee, and manage the cleanup equipment.

Fig. 6.1 (left). Women's Environmental Club (WEC) cleans the forest

Fig. 6.2. The state of KSF after the clean-up

After the outreach sessions and the clean-up, the frequency of gunshots heard in adjacent areas has been reduced from 6-8 per week in 2017-2018 to 3-4 per week at the end of last year. The number of people who use the forest as a toilet and those who come to cut trees has decreased considerably. Before the project began, 5-10 people per day were using the forest as a toilet and dumping the waste. A survey we conducted on March 5-7, 2020 has revealed that there were only two cases of unhygienic behavior reported in the last two months. On January 19, 2020, a villager cut down a large tree to feed the young leaves to his herd of cows was arrested, imprisoned for one month, and fined 150,000 FCFA (about £208). This has sent a strong message to the villagers that no illegal activities would be tolerated in the forest. There have been no other cases of tree cutting so far.

Meeting with stakeholders

The stakeholders who attended the meeting with the CABFF agreed to support us and the Management Committee of the Kikélé village to work together towards sustainable management of KSF. 12 new toilets were constructed in Kikélé village and the mayor has promised to provide some funds for the protection of KSF this year. Also, the Bassila police have promised to imprison and fine those who commit illegal activities in the forest. The managers of Hotel Romance and Hotel Gabatchi in Bassila are eager to send tourists to KSF once the forest is ready to receive the tourists.

Discussion and Conclusion

We engaged in important activities that were the prerequisites for the development of the KSF as a primate tourism site. Through the educational activities, we have instilled the importance of the primates for forest regeneration in the minds of young people. Some of them may become conservationists in the future. The outreach sessions provided opportunities to the villagers to have a fresh perspective of KSF, which was previously considered by many a dumpsite of household waste. They also enabled the villagers, especially women, to begin to consider that the primates are a valuable resource that could improve the standard of living of the local population.

After the collection of the heap of waste, another layer of trash mixed with sand surfaced. It is the compost mixed with plastics bags, broken plastic containers, broken bottles that are spread over half a hectare of the area. We estimate that about 10 tons of trash still remains.

We have engaged in the first phase of the sustainable development of KSF. Challenges still remain, but we know that nothing would be like the past. The commitment that the Environmental Club, the forest management committee, the chiefs of Kikélé and the neighboring villages, and the foresters have made will lead to better management of the forest and protection of the monkeys. There are still hurdles that we must overcome before developing KSF for primate tourism. First, the lack of electricity is a major hurdle; it is not clear when electric lines would be pulled into the general population of the village. Therefore, purchasing and installing large-scale solar panels and batteries in the village is necessary. There is still a lot of trash in the forest. We still hear sporadic gunshots in nearby forests. We also hope to fence off the forest so that the domesticated animals like the cattle do not enter the forest. We also would like to prepare pamphlets that describe the flora and fauna of KSF for students and visitors. We

are committed that we will seek out funds to continue with our activities by overcoming many of the remaining hurdles.

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R. Chabi Ota, Financial Statement for Born Free

Date	Location	Payment type	Description	Local Travel	Supplies	Per Diem	Others	Total	Note
08/22/19	New York	Cash	Bank transfer fee	0	0	0	45	45	Transfer fee from RMG to RCO
08/22/19	Bassila	Cash	Payback debt (Vehicle insurance maintenance)	434	0	0	0	434	RCO had to pay for car insurance, but he had to borrow the money and now parttially paid back.
09/09/19	Cotonou	Cash	Shovel 15 x £ 4.62	0	69	0	0	69	forest clean-up
09/09/19	Cotonou	Cash	Garbage bins 12 x £14.62	0	175	0	0	175	forest clean-up
09/09/19	Cotonou	Cash	Rake x 20 X £3.85	0	77	0	0	77	forest clean-up
09/09/19	Cotonou	Cash	Garbage bags X 30 X £ 3.85	0	116	0	0	116	forest clean-up
09/09/19	Cotonou	Cash	Aprons 20 X £ 3.85 & design £ 19.31	0	58	0	0	58	forest clean-up
09/09/19	Cotonou	Cash	Wheelbarrow 4 X £38.86	0	155	0	0	155	forest clean-up
09/09/19	Cotonou	Cash	Rubber gloves 50 X £ 3.85	0	192	0	0	192	forest clean-up
09/09/19	Cotonou	Cash	Masks x 2 packages	0	65	0	0	65	forest clean-up
09/14/19	Kikélé	Cash	Per Diem 15 X £ 2.31	0	0	23	0	23	forest clean-up
10/10/19	Bassila	Cash	Petrol 2 L x £ 1.23	2	0	0	0	2	School visit
10/10/19	Bassila	Cash	Petrol 20 L X £1.08	21.6	0	0	0	0	forest clean-up & meeting with stakeholders
11/10/19	Bassila	Cash	Petrol 14 L X £ 1.08	13	0	0	0	13	forest clean-up & meeting with stakeholders
10/17/19	Kikélé	Cash	Per Diem 15 X £ 2.31	0	0	23	0	23	forest clean-up & meeting with stakeholders
11/11/19	Bassila	Cash	Petrol x 16 L X £ 1.23	17	0	0	0	17	School visit
11/11/19	Bassila	Cash	Motor oil 6 X £ 3.85	23	0	0	0	23	Vehicle maintenance
11/11/19	Bassila	Cash	Vehicle repair	3	0	0	0	3	Vehicle maintenance
11/11/19	Bassila	Cash	Filter	8	0	0	0	8	Vehicle maintenance
		Expenditure		501	907	46	45	1500	
		Budget (£ 1,500)		550	845	105	0	1500	
							Balance	0	