Combining Conservation and Community Empowerment:

Establishing Community Forests in Democratic Republic of Congo to Protect Critically Endangered Eastern Lowland Gorillas and Improve Wellbeing of Impoverished Communities

Photo credit: John Cannon

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Objectives

The goal of Strong Roots, a community-based grassroots organization, is to preserve and increase populations of the critically endangered Eastern Lowland Gorilla, also known as Grauer's gorilla (*Gorilla beringei graueri*), in Democratic Republic of Congo (DRC) by engaging local communities in their protection. Directly involving locals in conservation efforts empower them to participate in actively managing and governing their land. This project will help the client achieve their mission by:

1. Creating maps of Grauer's gorilla ranges to understand their current and future movements and nesting locations outside of two existing protected areas, the Kahuzi-Biega National Park and Itombwe Nature Reserve.
2. Creating a map of gorilla movements to delineate boundaries of habitat corridors (also known as community-forests) that connect the two protected areas. This will enable the safe movement of large mammals, particularly critically endangered Grauer's gorillas, outside of the protected reserves.
3. Providing management recommendations to help Strong Roots achieve their goal of drastically reducing deforestation from 0.25% to 0.12% within the identified corridors.

Significance

Gorillas are charismatic megafauna that draw attention and tourism to DRC from around the world. Gorillas are also an important component of their local environment; they disperse seeds and reduce vegetation density to allow new flora to grow[1]. Without them, bottom-up ecological effects can impact other species, including humans, who rely on that regrowth to sustain their environments. However, several threats such as habitat fragmentation, poaching, deforestation, and civil unrest[2] have drastically reduced endemic Grauer's gorilla (*Gorilla beringei graueri)* populations by 77% over the past 20 years[3] resulting in them being listed as critically endangered on the IUCN Red List[4] (Figure 1). Gorillas have a very slow reproductive rate due to their long gestation and very high infant mortality (only one surviving baby is reared every 4-8 years), thus it can take over a decade to replace a killed breeding-aged gorilla. Without concentrated efforts to conserve gorilla habitat connectivity they are likely to go extinct after three generations, by 2054[4].

Two large government protected areas, Kahuzi-Biega National Park or KBNP (6,000 km^2) and Itombwe Nature Reserve (5,700 km^2), were created in 1970 and 2006, respectively, to protect species and rainforest habitat. However, many of the Great Ape population ranges expand outside of these preserves[5]. Our client believes the best way to conserve the Grauer's gorilla is to create several corridors of community-managed forests between Kahuzi-Biega and Itombwe (Figure 2), which would reduce habitat fragmentation and create protected habitat outside of the preserves.

Strong Roots is working with local chiefdoms to establish this as a corridor comprised of 7 community forests between the two protected areas, which will be managed by the local chiefdoms. The goal is to legally designate this corridor with the provincial government, which will do three important things: 1) establish long-term protection of a large portion of gorilla habitat outside of the protected areas, 2) grant tenure to the land within the corridors which permanently protects them from exploitation, and 3) grant these chiefdoms legal access to the land, which they currently do not have.

Background

The Kahuzi-Biega National Park (6,000 km^2) and Itombwe Nature Reserves (5,700 km^2) are separated by 3,000 km^2 of unprotected land, which is the focus of our study (Figure 2). These forests are home to many IUCN endangered species such as Grauer's gorillas, chimpanzees, leopards and forest elephants[2], however the gorillas are the focus of our study as they have the most available field data. Creating current and future habitat maps of the Grauer's gorillas will serve as a case study whose methodology the client can mimic to create similar maps for other threatened and endangered mammals in the study area.

As of 2019, Strong Roots is the only organization working in this area to provide communities with secure access and the right to manage and govern their land. In 2014, the DRC government implemented the Community Forest Law which allows communities to apply for land tenure after establishing Conservation Committees and implementing a conservation plan. Strong Roots has been working with these communities to establish conservation plans. One of the last steps before submitting documentation to the government applying for land tenure, is to delineate the boundaries of the corridors. Strong Roots aims to submit the proper documentation by the end of 2020.

Strong Roots has conducted socio-economic surveys of the poverty-stricken chiefdoms in the study area and monitored gorilla movements and nesting sites for 7 years. Our client has also established a community forest, the Burhinyi Community Forest (23.1 km^2), in 2010 with a local chiefdom which will serve as guideline as this project scales up to creating several community forests in the remaining unprotected area.

Equity

Around the world, impoverished communities, such as in Indonesia and Brazil, demolish their natural environment to provide livelihoods for themselves and their families[6,7]. The Batwa or Pygmy indigenous groups suffered the cost of conservation as they were displaced by the creation of the KBNP and now live in extreme poverty near the parks. These groups illegally hunt bush meat, cut down trees for firewood, and collect other forest resources since they have no employment or legal access to land.

Strong Roots is working directly with these chiefdoms to write conservation plans for their community forests. Involving local communities in the conservation of the gorillas and their habitat ensures they have a say in how to manage and govern their land. In addition, providing them access to land will alleviate pressure on Great Ape habitat as there will be less need for these groups to illegally take from the forests and instead use forest resources sustainably as outlined in the conservation plans. Ultimately, this allows these chiefdoms to co-exist with their environment while simultaneously providing for their communities. In addition, establishing community forests under the new law allows communities to be actively engaged in conservation instead of viewing it as a threat to their livelihoods.

Available Data

- **Socio-economic surveys:** Detailed community- and household-level data, as well as information regarding communities' usage of the forest and their ideas and attitudes concerning its conservation, were collected via group discussion and individual interviews. A multidimensional poverty index based on socioeconomic indicators in six areas (demography, education, housing, health, and food/economic security) was used to quantify household poverty. Surveys were conducted in 2012 with 93 households in the Burhinyi Community Forest. In 2014, additional

surveys were conducted with 831 housed on 4 chiefdoms (Burhinyi, Lwindi, Basile and Wamuzimu). We will be repeating this 2014 survey this year (2020).

- **Gorilla movement surveys:** We have data of gorilla surveys in the region (Kahuzi-Biega National Park and Itombwe Nature), including gorilla point location data as well as biodiversity and vegetation type transect data. Strong Roots has been monitoring 3 groups of gorillas in Burhinyi Community Forest for the last 3.5 years now. Information on the other groups were collected from forest expeditions, etc. The gorilla surveys will be conducted in our study area during April-August of 2020.
- **ArcGIS layers and maps:** For the maps we have remote sensing data in order to explore forest cover and type as well as community location, in addition to climate, elevation, road, urban area and population density data.

Possible Approaches

1. **Creating a map of the corridor.** This task will involve compiling data from socioeconomic surveys and urban area and population density data to determine community forest locations and using biological surveys to determine the location of wildlife in the area to help delineate the boundaries of the corridor. The Burhinyi Community Forests established by Strong Roots in 2010 between two different protected reserves to preserve gorilla populations and habitat will serve as a guideline for methodology for this project.
2. **Create connectivity models for Grauer's gorilla.** We will use GIS and modeling work to create connectivity methodology metrics using functional connectivity assessments.
3. **Creating a white-paper management recommendation to reduce deforestation.** This task will involve literature review to determine what practices in similar regions and similar impoverished groups have helped reduce deforestation.

Deliverables

- **Map** of corridors that will be legally designated as community forests
- **Map** of Grauer gorilla ranges and movements outside of the protected areas using data from field surveys
- **Recommendations** of management actions to reduce deforestation (in the protected areas and/or community forests and/or unprotected areas around the protected areas/community forests)

Internship

Strong Roots anticipates being able to support an internship for one student to travel to the DRC to work with the organization to conduct repeats of the already acquired socio-economic and gorilla surveys, or other tasks as determined by the project direction and student's interests. Due to the size and resource limitation of the organization, Bren School Summer Internship Funding will likely be necessary.

Budget

The budget for this project is not projected to exceed the $1,300 provided by the Bren School of Environmental Science & Management. Costs will include printing expenses and conference calls.

Citations

1. Rogers, M.E., Voysey, B. C., Mcdonald, K. E., Parnell, R. J., & Tutin, C. E. G. (1998). Lowland gorillas and seed dispersal: The importance of nest sites. *American Journal of Primatology, 45*(1), 45-68.
2. *Itombwe*. (2019). Retrieved from WWF: http://www.wwf-congobasin.org/where_we_work/democratic_republic_of_congo/itombwe.cfm
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5. *Programme International Gorilla Conservation*. (2015). Retrieved from Range States: http://igcp.org/gorillas/range-states/
6. Stoddard, R. H. (1992). The Disaster of Deforestation in the Brazilian Rainforest. *Natural and Technological Disasters: Causes, Effects and Preventive Measures.*, 18.
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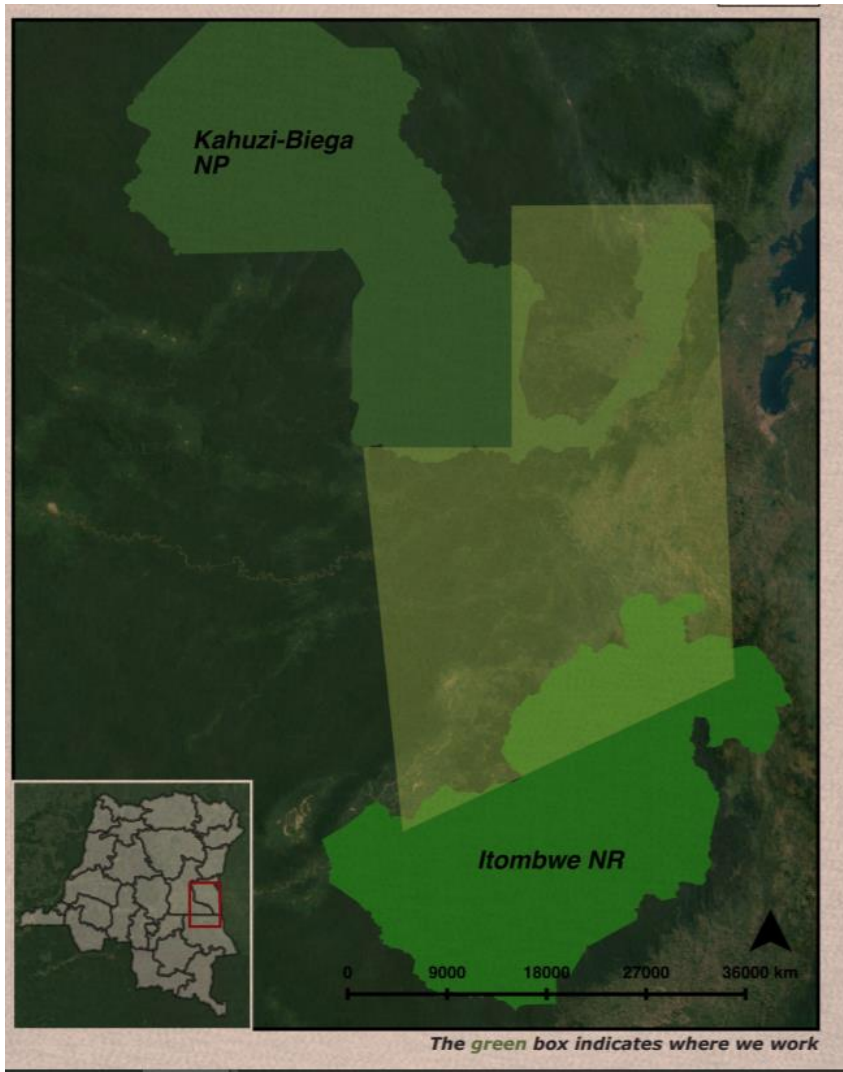
Figure 1A: Poverty and human pressure on the forest - artisanal gold mine

Figure 1B: Poverty and human pressure on the forest - land cleared for farming with evidence of erosion.

Figure 1C: Poverty and human pressure on the forest - charcoal production

Figure 2: The light green polygon, which is approximately 3,000 km2, indicates the area where the protected community forests will be created to create protected corridors for endangered species in the area like Grauer gorillas.

Bukavu, le 06 Février 2020

N/Réf: 06/ED-SRC/276/20

To: Bren Group Project Coordinator

Bren School of Environmental Science and Management 2400 Bren Hall, University of California, Santa Barbara Isla Vista, CA 93106-5131

Dear Bren Group Project Committee,

Strong Roots Congo is happy to support the Bren School master's group project, Combining Conservation and Community Empowerment: Establishing community forests in the Democratic Republic of the Congo to protect critically endangered Eastern Lowland Gorillas and improve wellbeing of impoverished communities.

Strong Roots Congo is an organization that works at the grassroots level to apply local and adaptive solutions that work in the interests of conservation and sustainable development while working at global, national and local levels. To halt the decline of the Grauer's gorilla in the Eastern DRC, Strong Roots partners with local communities living near Kahuzi-Biega National Park and the Itombwe Nature Reserve in the eastern DRC. From providing training on monitoring gorilla populations in community managed forests, to reforestation projects and other alternative livelihood projects for local communities and indigenous peoples, Strong Roots believes that the best way to conserve the Grauer's gorilla is to combine scientific tools with traditional knowledge. Strong Roots empowers local communities and indigenous peoples by providing knowledge, tools and the opportunities to create for themselves a sustainable way of life while also supporting the long-term preservation of Kahuzi-Biega National Park and the Itombwe Nature Reserve.

Intended project objectives and outcomes include:

- Mapping Grauer's gorilla ranges and movements outside of the protected areas using data from the field surveys
- Modeling future gorilla movements

- Mapping of corridors that will be legally designated as community forests
- Recommending management actions to reduce deforestation

Strong Roots will extend an internship for one student to travel to the Congo to work with the organization to conduct biological and socioeconomic surveys in the corridor and create management plans as well as work with the organization to draft proposals for the area under community forestry law, reporting and communication through social media. Both student authors of the proposal are equipped to fund the internship with the $5000 of internship funding provided by their Forest Sustainability Fellowships. We do not expect the students to exceed the $1300 provided by the Bren School for the duration of the project.

- The data we have available for the project includes
  - **Socio-economic surveys:** Detailed community- and household-level data, as well as information regarding communities' usage of the forest and their ideas and attitudes concerning its conservation, were collected via group discussion and individual interviews. A multidimensional poverty index based on socioeconomic indicators in six areas (demography, education, housing, health, and food/economic security) was used to quantify household poverty. Surveys were conducted in 2012 with 93 households in the Burhinyi Community Forest. In 2014, additional surveys were conducted with 831 housed on 4 chiefdoms (Burhinyi, Lwindi, Basile and Wamuzimu). We will be repeating this 2014 survey this year (2020).

  - **Gorilla movement surveys:** We have data of gorilla surveys in the region (Kahuzi-Biega National Park and Itombwe Nature), including gorilla point location data as well as biodiversity and vegetation type transect data. Strong Roots has been monitoring 3 groups of gorillas in Burhinyi Community Forest for the last 3.5 years now. Information on the other groups were collected from forest expeditions, etc. The gorilla surveys will be conducted in our study during April-August of 2020.

  - **ArcGIS layers and maps:** For the maps we have remote sensing data in order to explore forest cover and type as well as community location, in addition to climate, elevation, road, urban area and population density data.

We are looking forwards and excited about the opportunity to partner with Bren students on this project and look forward to advancing our shared goal of conserving gorilla habitat and maintaining a sustainable way of life for the indigenous communities in this forest.

Dominique Bikaba

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Executive Director