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# INTERNSHIP REPORT

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Final report since March 20, 2021



Placide MASENGESHO

CLP intern at WCS Rwanda

Title: **BIODIVERSITY RESEARCH FOR PARK MANAGEMENT AND COMMUNITY DEVELOPMENT.**

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**March 28, 2022**

**WCS Rwanda**

**Nyamasheke, Rwanda**

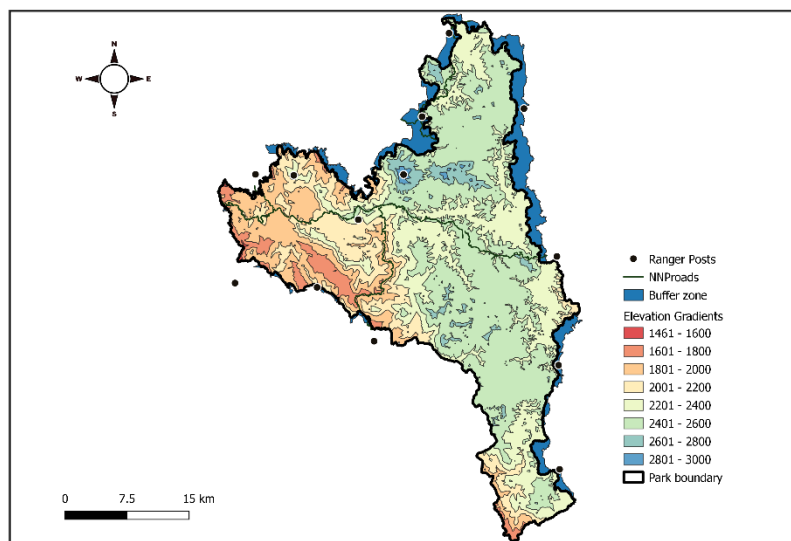
## **Executive summary**

This report summarizes the activities undertaken by Mr. Placide MASENGESHO during a one year (March 20, 2021 – February 20, 2022) professional internship at the Wildlife Conservation Society (WCS) Rwanda, in partnership with Conservation Leadership Program (CLP). The main objective was to integrate me to the practical activities of Wildlife Conservation Society (WCS) related to biodiversity research and the use of research information in park management and community development. This internship was also aimed at equipping me with not only mastery of biodiversity research methods but also the ecological data management skills of using the obtained research information in daily park management and community development and outreach activities. The internship was also intended to be an opportunity for me to build my connection with national, regional and international professionals / conservationists. This internship with WCS made me feel confident in methodologies used to survey animal population especially line transect, and camera trapping, team management, working under minimum supervision and leadership skills. All these skills will help me to become a future conservationist leader.

## **Introduction.**

The internship is a tool aimed at improving interns' confidence in the area of working environment, scientific reporting, and knowledge transfer across context and organizational participation (Yaakob et al., 2018). This report covers a summary of activities I carried out with WCS with financial funding from CLP in Nyungwe National Park (NNP). Nyungwe National Park is a Key Biodiversity Area (KBA) located in south west Rwanda (latitude 2° 15' and 2° 55'S, longitude 29° 00' and 29° 30'E) and is one of most biologically important Afromontane forests in Africa (Pintea et al., 2011). With an area of 1,019km<sup>2</sup>, and altitudinal range between 1600m and 2950m (see the map below), it is the largest and most floristic protected area in Rwanda (Plumptre et al., 2007). The Park is part of the Albertine Rift and is protected for its conservation importance and high levels of endemism. The NNP supports a diverse abundance of flora and fauna, including many endangered, rare and endemic species adapted to the montane forest landscape. "WCS has established a stronghold in conservation of wildlife and wild places in Rwanda and worldwide. WCS started working in Rwanda since 1950' while it is working in NNP in 1986 with the goal to preserve the biodiversity, functional integrity and resilience of Rwanda's important landscapes while addressing local livelihood needs and sustainability issues at the local and national level. WCS Rwanda focuses of 4 major Conservation

interventions: 1) Research and monitoring to identify and understand ecological requirements of landscape species and their main threats; 2) Transboundary collaboration to address conservation needs and management at the landscape level; 3) Addressing challenges surrounding natural resource use in a high population density and impoverished area through innovative projects and techniques; and 4) Education and outreach to foster the next generation of Rwanda's conservation leaders. In these 12 months of internship, I spent most of my time working in intervention 1 and 3. Working with WCS staff with long-term experience in conservation interventions, I was able to practice my theoretical skills from university in the field of wildlife conservation. I learned how to collect and manage ecological data, develop key conservation intervention affecting both community and habitat, and cost effective method to restore forest in anthropogenic degraded areas. To be a part of WCS helped me to learn from its experience in conservation as pathway to develop my career as a future conservation leader.



### **Aim and objectives**

As a scientist who strongly desires to become a conservation leader and put conservation science into practice to save wildlife and wild places worldwide, inspiring people to value nature, this internship was aimed at strengthening my conservation and leadership skills through assisting the Biodiversity Research and Monitoring Manager and Community Development Manager in their daily activities like designing and implementation of projects.

## Activities and Methodology

In this internship I have been involved in different activities from March 20, 2021 to February 20, 2022. The activities were chimpanzee and other mammal survey data collection, ecological data management, primate tourism product development and forest restoration of post-fire degraded area and provision of energy saving stoves.

### POST-FIRE ASSISTED NATURAL FOREST REGENERATION

Fires in tropical forests are an ecological disaster as they harm large surface area in short time due to the fact that logging residues and dead wood are left behind in the forest, providing fuel for future fires (Tacconi et al., 2007), this creates more space in the forest and colonization of mono-dominant species bracken *Pteridium aquilinum* which vegetation dries out more quickly and burns easily, creating a cycle that renders the forest ever more flammable. To mitigate this fire cycle, WCS initiated the project of Post-fire Assisted Natural Forest Regeneration which is aimed at cutting fern to reduce its cover and let the light rich the soil and let seeds germinate from seedbank. This methodology demonstrated to be cost effective to speed up forest recovery in terms of tree species diversity, abundance, tree growth, and tree density. We collected data (number of seedlings recruited, height and tree species) to monitor forest recovery. Data collected once in three months for three years. After this period of time, seedlings are already grown to sapling which has the ability to compete with ferns.





The pictures above illustrate in short how the activity of forest regeneration is done and the development of sapling of *Macaranga kilimandscharica* in regenerated plots. Though *Macaranga kilimandscharica* appears as a developed sapling, but 17 different plant species were identified to be grown in the regenerated plots.

#### **DEVELOPMENT OF CHIMPANZEE TOURISM PRODUCT**

Chimpanzees, the closest living relative to humans, are the one of the great apes found in Africa (Central African Republic, Sudan, DRC, Uganda, Rwanda, Burundi and Tanzania) and are the only great apes found in NNP which makes them to be regarded as a flagship species. They play a significant ecological role such as seed dispersal and attractive to tourists. The goal of development of chimpanzee tourism product was to support chimpanzee conservation in NNP through better planning and monitoring (habituation) of chimpanzee groups for tourism activities. During the course of implementation of this project, WCS focused on different aspects including mapping of important food trees (trees that provide food/diet to chimpanzees) and development of chimpanzee habituation trails, training of park staff in chimpanzee habituation techniques following IUCN guidelines, and identified areas in need for more trail facilities. Chimpanzees are habituated to allow tourists to approach them, to be habituated; trackers follow them every day to make them being familiar with human being faces.

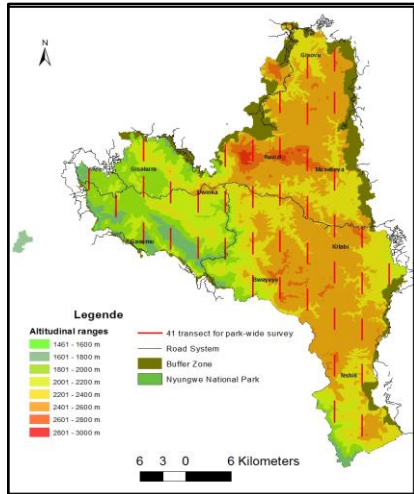
Since April 26 - May 12, 2021, I assisted data collection and mapping trees that provide food to chimpanzee in the newly and ongoing chimpanzee habituation for tourism at Gisovu. During this time, 25 ha were sampled in the region of Gisovu using grid (500 x 500m) sampling, circular plot sampling (20 m radius) to inventory and measure tree and shrub species as well as dominant

herbaceous species. And all tree species, seedling and sapling within a circular plot of 20m radius were counted and measured their relative abundance, density, basal area, and Diameter at Breast Height (DBH). A total of 58 tree species were counted in sampling site.

### **CHIMPANZEES AND MAMMALS SURVEY**

This activity aimed to collect data necessary to evaluate status and trends of population of chimpanzee and other medium to large mammal species in NNP. The combination of line transects and camera trap methods were used to perform the survey Chimpanzees and mammal species in NNP. NNP was systematically sampled by WCS into 41 transects of 3 km and both oriented from south to north, with a systematic distance of 3 km from one transect to another (see the map below). From June 2021 to September 2021, using chimpanzee survey protocol developed by WCS, we opened up and collected data in 38 transects; each transect was visited 3 times with a scale from 18 to 21 day. We used direct and indirect observation of animal, nest counting approach of surveying chimpanzee, use of camera trap to survey shy, diurnal small and medium sized mammals and nocturnal mammal species. Data collection followed by data management including entry, data cleaning, and animal image annotation using Wildlife Insight platform. In January 2022, I got training in survey data analysis and reporting important animal population indices such as the estimate of animal species population, species richness, species occupancy and detection probability using R and Rstudio software. My activity was to assist Research and Biodiversity monitoring officer in planning and supervising all these activities. In the survey protocol, we have learned more about point count for bird sampling even though we didn't sample them in this survey, on the other hand, WCS staff members taught me basics for birds identification by morphology but not by their call (Bioacoustics).





The picture above illustrate NNP its elevation gradients and location of transects we sampled during this survey.



These pictures illustrate my supervision activity and measuring perpendicular distance of indirect signs observations.

## COMMUNITY DEVELOPMENT FOR PARK MANAGEMENT

Dependence of on firewood for cooking and warming the houses leads to major habitat degradation in NNP (Imanishimwe et al., 2018). The use of firewood as primary energy source for cooking has been exerting additional pressure on forest resources. In order to address this locally, WCS developed a conservation intervention of using energy saving stove CANARUMWE (burn one piece of wood) and raising conservation awareness through conservation education. During this internship I have assisted community development manager in the distribution, follow up and survey of cooking stoves in Sectors overlapping NNP of Nyamagabe District. The main aim of this project is to educate

people about the Park's protection and give them cooking stoves to reduce fuel wood consumption and thus reduce the dependence on the forest for firewood. Follow up made after the distribution to check if stoves are used properly and survey is made for understanding the stove users' perception.



The pictures above illustrate the process of cooking stoves distribution from education, distribution and its construction. There is a bonus picture showing the landscape where we distributed the stoves.

### **Outputs and results.**

During this internship, I have learnt a lot of new things with a lot of kills.

- Wildlife survey design and implementation activities: during the coordination in survey of the Eastern chimpanzee (*Pan troglodytes schweinfurthii*) and other mammals in Nyungwe National Park (NNP), I have been experiencing different survey methods used in tropical forest like line transect methods, reconnaissance (modified line-transect sampling), camera trapping method, distance sampling and wilderness navigation. By contributing in the implementation of Assisted Natural Forest Regeneration activities, I have learned the



methods used in post-fire assisted forest regeneration as well as ecological succession process. In addition, I have learned wildlife identification and their biological index used to evaluate and monitor animal population in protected areas.

- **Networking:** this internship linked me with different conservationists local, regional and international. I have attended different congress, meeting and workshop including 2021 International Congress for Conservation Biology from which I have met with different presenter worldwide and attendees. I have also attended workshop for data analysis and scientific writing prepared by WCS Rwanda. Furthermore, I have attended trainings prepared by Dian Fossey Gorilla Fund (Ellen Degeneres Campus of the Dian Fossey Gorilla Fund) about Geospatial data analytics.
- **Leadership and communication skills:** In mentorship by Research and Biodiversity monitoring officer in WCS Rwanda, this internship has built a new me in terms of leadership skills. Working in the environment of different peoples with different knowledge in conservation smoothly, increased my team working skills, I have also learned self-confidence, problem solving, and ability to mentor and communication to my co-workers and to my supervisors and outside my working institutions. This increased my lateral and vertical communication skills at different levels in WCS institution and partners.

### **Achievements and impacts**

An internship is an official program that is offered by an employer to develop potential employees. In addition to the fact that I have learned different skills as mentioned above, I have played a role in biodiversity conservation in NNP. I have received certificates (including the use of generalized linear and mixed models in conservation biology as well as geospatial data analytics) as indicators of achievements during this internship. Mainly all the projects I have involved in, the main purpose is to conserve and restore biodiversity in NNP. Therefore, the achievements of my internship are measured in all the projects I did in WCS Rwanda and assess my knowledge before and after the project implementation.

- During the internship I have significantly contributed to chimpanzee population survey in NNP: Through this project, I have achieved more which will impact my career as future conservationist. Knowing biodiversity index and biodiversity threats in NNP is crucial for developing management plans for conservation of threaten species. Furthermore, I have

learned software used in ecological data management like Wild.Id and Wildlife insights for managing camera trap data, R studio for data analysis and Quantum GIS for geospatial data analysis. All these achievements will help me to build bridges to success in my career through practicing them in my own projects.

- Considerably contributed to the chimpanzee tourism product development – mapping trees that provide food for chimpanzee in their home range will help successfully chimpanzee habituation process, and chimpanzee tourism planning such as developing habituation and tourism trails with this community home range.
- Contributed to the recovery of natural forest in post-fires disturbed areas: Forest regeneration is a powerful process to recover the forest where there is disturbance due to fire. In the recent experiment done by WCS in NNP, they show excellent results. Now, 77 ha are regenerating and there are healthy seedlings which are growing so that in three years ahead, there will be sapling and trees in the regenerated areas.

Actively participated in community interventions to reduce pressure on the NNP - unsustainable firewood collection practices have impacted the health of the habitat of wildlife in NNP, which had already been strained by a strong reduction in the size. Although awareness and provision of energy saving stove is not absolute alternative to the firewood collection in NNP, it will certainly reduce frequency and quantity of firewood consumption, and add knowledge about importance of NNP to the community.

### **External influences and changes to internship.**

The internship was well planned and even though the challenges can rise like working on difficult terrain, but these were not hindrance of reaching my goal. For technical issue understanding of concept notes for the projects, my supervisors helped me as it was my first time to meet with practical knowledge as what I learned during this internship. COVID-19 was a major challenge but I coped with it by following prevention measures and guideline as developed by Ministry of Health to prevent the contamination and spread of this pandemic.

### **Conclusion**

In a nutshell, this internship has been an excellent and rewarding experience. I can conclude that there have been a lot I've learnt from my work at WCS Rwanda. Two main things that I've learned the importance of, are time-management skills and self-motivation. The specific skills regarding

wildlife survey methods including distance sampling, camera trap survey and wilderness navigation in tropical forest, ecological data management using different software as well as methods used by WCS for post-fire restore natural forest, species (animal and plants) identification, using plot sampling methodology to inventory plant species, and management of ecological data have acquired during this internship. In addition, I have learned the community conservation programs including community development and education. Furthermore, this internship brought me the opportunity to build local, regional and international network through different meetings, workshops and international events I attended.

### **Acknowledgements.**

I want to give hearty thanks to Conservation Leadership Program for providing grant to pursue this internship. Without your grant this internship would not possible. Your contribution in building future conservationists is highly invaluable.

I am highly appreciating WCS Rwanda for holding me smoothly the whole year. I didn't miss anything from WCS. Your strategy of being a hub for continuous skill transfer for future enthusiastic conservationists for Rwanda is highly appreciated. Simply great thanks are to WCS Rwanda staff member.

Great thanks are to my Supervisors, Felix MULINDAHABI, Protais NIYIGABA and Fidele TUGENDAHOYO. You are of a great important. It was my pleasure to work under your supervision. Your daily motivation, advice and skills transfer is highly appreciated.

I finally want to thanks WCS field staff for helping me to integrate in difficult terrain and wildlife identification of NNP.

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