

## **Wildlife Conservation Society- Rwanda Program**

### **Program description**

**Title:** Biodiversity Research and Monitoring

**Funded by:** USAID, UNDP/REMA, MMBF

**Partner institutions:** Rwanda Development Board (RDB)

**Overall term:** 2009 to 2013

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**Context:** Nyungwe National Park (NNP), located in southwestern Rwanda along the Congo-Nile divide, covers an area of 1,019 km<sup>2</sup> and is the both the largest and most floristically rich forest in Rwanda. Elevation ranges from 1600 m to 2950 m at the highest point. The NNP supports a diverse abundance of flora and fauna, including many endangered, rare and endemic species adapted to the montane forest landscape. Nyungwe forest also provides vital watershed protection for the country, contributing to over 70% of the country's dry season river flow rainfall.

Given the importance of Nyungwe National Park as a conservation site within the Albertine Rift and the high number of range-restricted and globally threatened wildlife and plant species it protects, research and monitoring in NNP is critical to better understand the population densities, distributions and ecological requirements of these species. It also facilitates the measuring and tracking of threat incidences and impacts within the Park.

Current research in Nyungwe is primarily focused on the ecology of several of the park's primate species, as well as general biodiversity surveys and the continued long-term monitoring of NNP's mammals, birds and tree species that began with the establishment of Nyungwe Forest Conservation Project (PCFN) in 1980s.

### **Objective of the program:**

The overall objective of research and monitoring carried out by WCS in Nyungwe National Park is to provide protected area authorities with the quality scientific information necessary for long-term planning and management, and ultimately improve the effectiveness and sustainability of conservation efforts.

### **Approaches:**

#### **Tree Phenology Monitoring**

The purpose of the tree phenology research is to obtain information on both the timing and the potential reproductive output (quantity of flowers and fruit) of species of trees and shrubs. This work concentrates on tree species that constitute a significant food source for

vertebrate frugivores, such as primates and birds. Long-term tree phenology data also provides a wealth of information for understanding the regional impacts of climate change, particularly when combined with climate data.

**Achieved Results:** Tree phenology research and monitoring focuses on tree species producing fleshy fruits that have been identified as being attractive to frugivorous species. A total of 960 individual trees representing 70 different species are sampled along elevational gradients (1800 m – 2900 m). Each tree is visited monthly and data is recorded on the estimated quantity of leaves, fruits and flowers.

### **Ranger-Based Monitoring**

Forest fires from honey collection activities, illegal logging, mining, poaching, bamboo and tree cutting, coupled with large numbers of people entering the forest looking for firewood and medicinal plants all pose serious threats to the Nyungwe forest ecosystem. The purpose of ranger-based monitoring (RBM) is to monitor threats and key wildlife species within the park boundaries, as well as identify any trends and changes. Data is collected regularly by park rangers during protection patrols throughout the park. This system aims to provide timely and accurate information to park management authorities for adaptive management decision-making.

**Achieved Results:** WCS, in partnership with RDB, successfully established the ranger-based monitoring system and has trained park rangers in RBM data collection methods and analysis, assisted in developing data management tools, provided equipment, and improved infrastructure to carry out these activities. Data management tool development has led to the production of an RBM training manual and the use of MIST GIS software, with at least six RDB staff able to competently use MIST GIS software to analyze RBM data and produce useful information for patrol planning. Additionally, two ranger-posts have been constructed to facilitate RBM data collection and park protection. Dissemination and sharing of information with park management and district authorities through meetings and workshops is also a component of RBM efforts.

### **Biodiversity Surveys**

Biodiversity surveys are conducted to gather comprehensive data on the abundance and distribution of birds, mammals and plants across Nyungwe National Park. These surveys enable long-term monitoring of the flora and fauna in the park, as well as provide data used to assess the effectiveness of conservation actions. Biodiversity surveys have been carried out in Nyungwe in 1999 and 2009. As they continue to be replicated in the future, survey results will provide data useful for making comparisons and monitoring trends over time.

**Achieved Results:** In addition to a survey of birds, plants and medium-large bodied mammals, a small mammal survey was also carried out in 2009. Preliminary results from this survey identified at least 40 different species of small mammals and contributed 5 additional species of *Muridae* and 8 species of *Soricidae* to the existing Nyungwe mammal list. The Ruwenzori otter shrew (*Micropotamogale ruwenzori*) was also identified, which is the first record anywhere of this species in decades, and the first confirmation of its presence in

Rwanda. Additionally, population estimates resulted in counts of 7,285 blue monkeys, 365 chimpanzees, 758 bushpigs and 431 duiker species.

### **Bird and Mammal Inventories**

Large mammals and bird species tend to be good indicators of the overall integrity and conservation status of the Nyungwe ecoscape. The monitoring of birds and mammals aims to provide information on patterns of abundance, distribution and trends of key animal species to identify areas of conservation concern and evaluate the effectiveness of park management and protection.

**Achieved Results:** In addition to general biodiversity surveys, more regularly collected long-term data on birds and mammals is collected by PCFN to monitor changes in trends at five sites in Nyungwe National Park: Uwinka, Gisakura, Busoro, Uwasenkoko, and Cyamudongo. Data are collected along 17 standardized line transects. Data collection and analysis is ongoing.

### ***Sericostachys scandens* Monitoring**

*Sericostachys scandens* (*Umukipfu* in Kinyarwanda), of the plant family Amaranthaceae, is a slender semi-woody climber that has become widespread in Nyungwe National Park. This plant, growing up to 20-30 m in length, forms a dense herbaceous understory layer, grows predominantly in forest gaps, and quickly takes advantage of open areas. In areas where this vine takes hold it forms dense tangles of mono-specific stands that can smother trees and choke the understory, thereby impacting and altering the forest structure by out-competing other species and transforming the forest into an open, low-canopy system. Many people have hypothesized that *Sericostachys* is having a negative impact on the park and that the reintroduction of large mammals such as example elephants could limit the spread of this liana. Current research and monitoring of *Sericostachys scandens* aims to provide an understanding of its general ecology and impacts.

**Achieved Results:** There has been continued long-term monitoring to understand the ecology and functionality of this species. A major result of research conducted on *Sericostachys* was an international workshop held in Rwanda in 2009. There was a general consensus that any proliferation of *Sericostachys* is occurring in areas recently disturbed and this is likely to be the main critical factor. Furthermore, it was concluded that the reintroduction of elephants to Nyungwe would not suppress *Sericostachys scandens*. Evidence in Uganda suggests that elephants may even contribute to the spread of this liana by maintaining forest gaps and destroying tree saplings, further inhibiting forest regeneration.

### **Owl-faced Monkey Preliminary Survey**

A notoriously shy and elusive primate, owl-faced monkeys are classified as Vulnerable under IUCN criteria, and are near endemics to the Albertine Rift. Owl-faced monkeys (*Cercopithecus hamlyni*) are threatened by a number of human actions including habitat loss due to uncontrolled wildfires, illegal bamboo harvesting and encroachment, as well as hunting. These threats are exacerbated by limited park resources and the high human

population densities of communities adjacent to Nyungwe National Park. WCS works with the RDB to implement a suite of activities aimed at reducing threats faced by the Owl-faced monkey and sympatric species such as the Eastern chimpanzee (*Pan troglodytes schweinfurthii*) and range-restricted L'Hoest's monkey (*Cercopithecus L'hoesti*).

**Achieved Results:** In 2008, a population survey was carried-out in Nyungwe on the Owl-faced monkey to collect baseline data on the population status of this little-known primate species. The preliminary survey of the Owl-faced monkey will enable WCS to assess the status of the Owl-faced monkey and its habitat across the entire Nyungwe-Kibira trans-boundary landscape. Line-transect surveys and camera traps were used to survey of Nhili bamboo forest. A questionnaire survey was also carried out in surrounding communities. Based on results from the questionnaires and reconnaissance survey, Owl-faced monkeys were confirmed to inhabit Nyungwe and Kibira (in Burundi) National Parks.

### Forest Restoration

Rainforests are increasingly susceptible to forest fires today due to degradation from selective logging, fragmentation, and agricultural activities. Nyungwe National Park is not a fire-adapted ecosystem and therefore does not rapidly regenerate from wildfire disturbance. Approximately 12% of Nyungwe National Park has been affected by wildfires since 1997, largely resulting from people entering the forest to smoke bees from wild hives to obtain honey. During El-Niño years, when the climate is particularly dry, this has devastated large parts of the forest. An initial colonizer of burned areas is *Pteridium aquilinum*, a fern that grows rapidly and densely from existing rhizomes in the soil and air-borne spores, and has been shown to outcompete pioneer tree species. To combat the impacts of wildfire disturbance, WCS has undertaken an assisted natural forest regeneration program.

**Achieved Results:** WCS carries out periodic clearing of ferns in areas of past wildfires to enhance forest regeneration. It has been demonstrated that fern clearing every 3 months over a period of 3 years allows forest patches to recover by enabling native tree species to compete. More than 15 hectares of treated plots were cleared in which over 20 tree species regenerated, compared to less than 5 species in control plots.



Eastern Chimpanzee



*Symphonia globulifera* (phenology)



Owl-faced monkey