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# *Successes in Community-Based Monitoring of Cross River Gorillas (Gorilla gorilla diehli) in Cameroon*

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**Abstract:** The Cross River gorilla (*Gorilla gorilla diehli*) is the most endangered sub-species of gorilla found in Africa with a minimum of only ~200 weaned individuals estimated to be surviving in the wild. Remaining individuals are found associated with 12 or so hilly refuge sites on either side of the Cameroon-Nigeria border, and today, roughly 2/3 of these sites are under some form of formal protection. The remaining unprotected Cross River gorilla sites are largely restricted to Cameroon and pose a challenge to the gorillas' long-term conservation. In 2008, the Gorilla Guardian community-based monitoring network was established in Cameroon as a means of improving the monitoring and conservation prospects for unprotected gorillas. The network involves traditional authorities and local hunters, working together with assigned Gorilla Guardians in selected villages to monitor their gorillas. This paper outlines what has been achieved through this system to date. Gorilla monitoring has proved to be more cost effective and efficient using this new approach, and over time, we hope that the Gorilla Guardian network will provide the foundation for a stronger community-based conservation program as an alternative to the more formal protected area approach.

**Key words:** Cross River gorilla, *Gorilla gorilla diehli,* Cameroon-Nigeria, Gorilla Guardian, hunting, gorilla monitoring, protected area.

***Résumé:*** *Le gorille de Cross River (*Gorilla gorilla diehli*) est la sous-espèces de gorilles la plus en danger trouvés en Afrique, avec un minimum estimé de seulement ~ 200 individus sevrés en survie dans la nature. Ses quelques individus se trouvent associés à une douzaine de sites refuge restreint de part et d'autre de la frontière du Niger et du Cameroun et aujourd'hui, environ 2 / 3 de ces sites sont sous une certaine forme de protection officielle. Les autres sites non protégés où se trouvent des gorilles de Cross River sont essentiellement limités au Cameroun et représentent un certain défi pour la conservation des gorilles à long terme. En 2008, le réseau de surveillance communautaire de Gorilla Guardian a été créé au Cameroun afin d'améliorer la surveillance et les perspectives de conservation des gorilles non protégés. Ce réseau implique les autorités traditionnelles et les chasseurs locaux, travaillant en collaboration avec des gardiens affectés par Gorilla Guardian dans des villages sélectionnés pour suivre les gorilles. Cet article détaille ce qui a été obtenu grâce à ce système à ce jour. La surveillance des gorilles s'est avérée être plus rentable et efficace en utilisant cette nouvelle approche et au fil du temps, nous espérons que le réseau de Gorilla Guardian fournira les bases durables d'un programme de conservation communautaire comme une alternative valide aux approches plus formelle des autres aires protégées.*

## Background

The Cross River gorilla *Gorilla gorilla diehli* is the northern- and western-most sub-species of gorilla, with a population fragmented across *ca.* 12 sites between SE Nigeria and SW Cameroon, and roughly 200 km from the nearest population of western lowland gorillas *G. g. gorilla*. With numbers estimated to be as low as 190-202 individuals (Nicholas *et al.*, in prep.), the Cross River gorilla is listed as Critically Endangered by the IUCN (Mittermeier *et al.*, 2009; Oates *et al.*, 2008).

Over the last decade, a growing commitment to conserving the Cross River gorilla has been made. Emphasis has shifted from surveys aimed at confirming status and distribution toward the implementation of a broad-based

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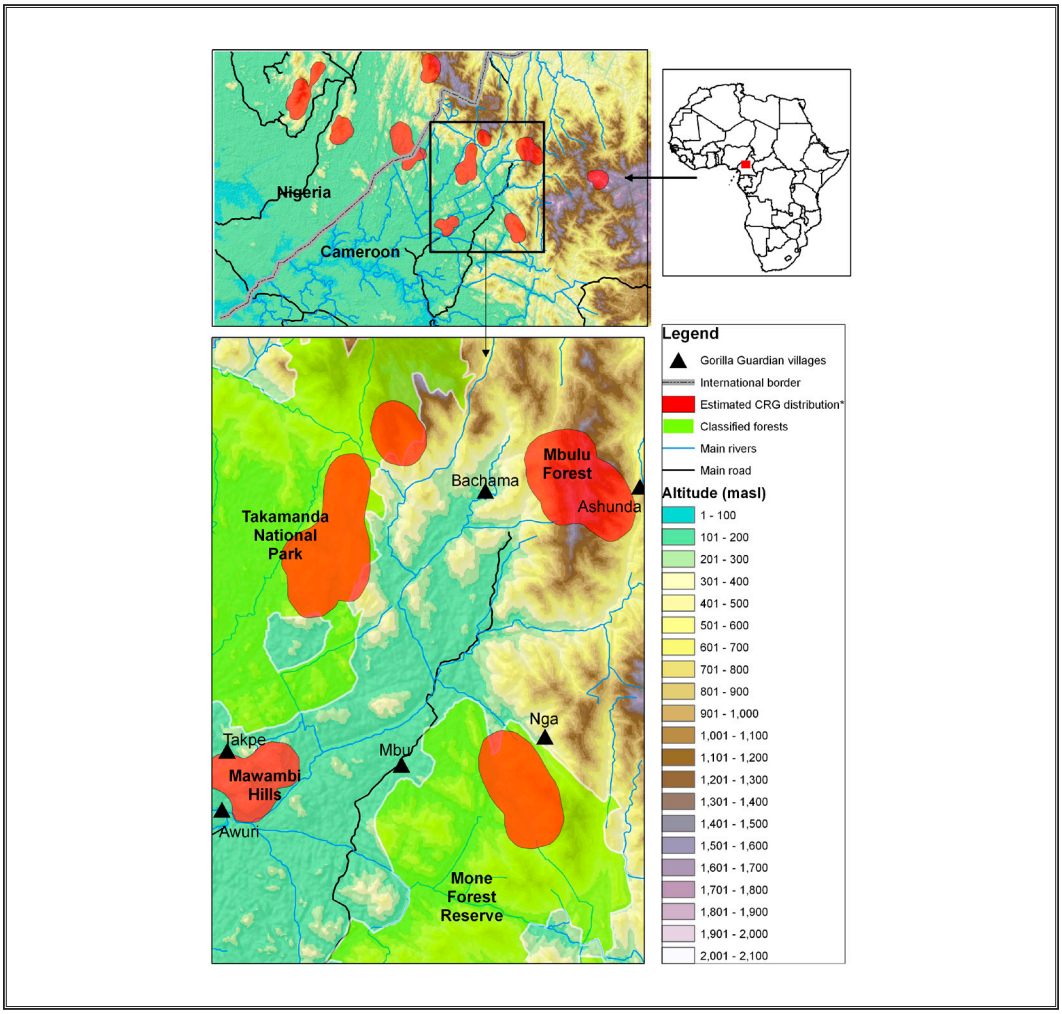


**Figure 1**. Cross River gorilla distribution in Nigeria and Cameroon, including the location of 'Gorilla Guardian' villages (* distribution estimate adapted from Bergl & Vigilant (2007); gorilla distribution has been expanded with more recent surveys (Nicholas *et al.,* in prep.).

trans-boundary conservation program, spear-headed by Wildlife Conservation Society (WCS) projects based in Nigeria and Cameroon which are working in collaboration with host governments and local communities. Some of the key actions aimed at improving the survival prospects for these gorillas have included the creation and improved management of protected areas, landscape-level connectivity planning, conservation education, and research and monitoring in support of these activities.

One of the biggest successes achieved to date is that roughly two-thirds of the Cross River gorilla population is now protected within some form of formally recognized, government managed protected area (including all of the sites in Nigeria: Afi Mountain Wildlife Sanctuary and the Cross River National Park; and three sites in Cameroon: Takamanda National Park, Mone Forest Reserve, and the Kagwene Gorilla Sanctuary; Figure 1). For the remaining one third of the taxon's population, some gorilla habitats are being managed by communities (e.g., in the Mbe Mountains in Nigeria), while the remainder constitutes Cross River gorillas that exist in unclassified (and un-managed) forest areas in Cameroon.

The Cross River gorillas found in unclassified forest areas in Cameroon are arguably the most vulnerable section of the remaining population. These sites are often remote and mountainous, such as the Mbulu forests (Figure 1). These forests provide a variety of essential services (e.g., bushmeat and other non-timber forest products, medicines, and watershed protection) to nearby villages. Apart from infrequent visits by researchers and the occasional government employee, normally there is limited interaction between local people and outsiders, and knowledge related to the exact status and distribution of gorillas has been frequently limited to only a few surveys carried out over the last decade (Sunderland-Groves, 2008; Warren & Bila, 2008; Warren & Ekinde, 2007).

In recognition of the fact that government lacks the resources to protect all Cross River gorillas, and in an effort

to learn more about gorillas found in unclassified forest areas, a community-based Cross River gorilla monitoring system was elaborated in 2008 for sites in Cameroon by the WCS. Three initial sites were chosen: the Mawambi Hills just south of Takamanda National Park, the Mbulu Forest, and the northern Mone Forest Reserve (Figure 1). The latter

**Figure 2.** Gorilla Guardians from Bachama and Ashunda villages with local hunter recording Cross River gorilla nest site information during a verification visit by TMLP staff (©WCS/ TMLP 2009).

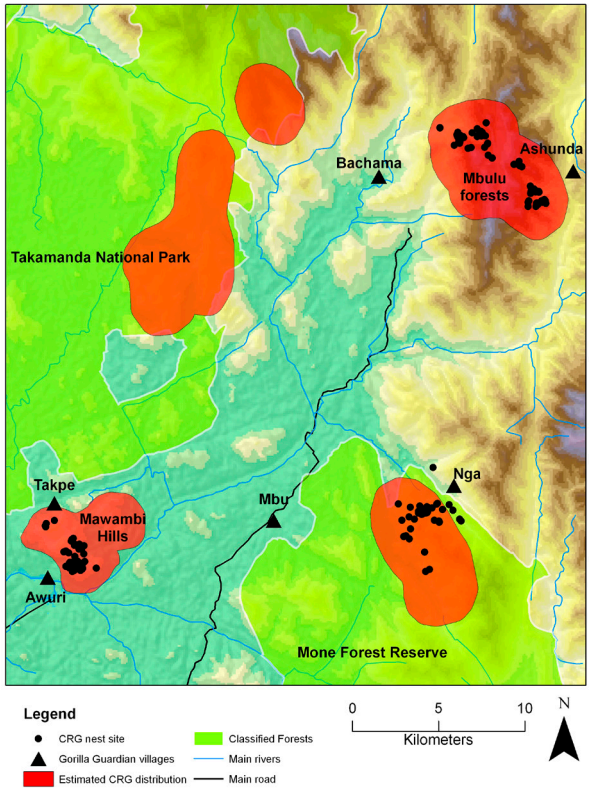


**Figure 3.** Location of Cross River gorilla nest sites in the three Gorilla Guardian forests visited during 2009.

site is, on paper, of lower official protective status than the other two; it was included because no conservation action was being implemented by government.

The monitoring system employs individuals referred to as Gorilla Guardians (GG's). It was envisaged that the selection of these participants would provide a number of benefits to Cross River gorilla conservation. First, the GG's would provide updated distribution information for gorillas in each site, working in collaboration with local hunters. Secondly, GG's would act as contact points between their communities and government, and function within a platform for sharing information and building awareness. All of the GG's selected to participate in the program were basically literate, young, fit and interested in gorilla conservation. Here, we report results from the first year of the initiative.

**Table 1 - Summary of results from Gorilla Guardian forest monitoring 2009.**

| Location | Species | # Sites | Total Nests | Maximum Nests | Minimum Nests | Average Nests | Total Ape Sites | Total Ape Nests |
|---|---|---|---|---|---|---|---|---|
| Takpe-Awuri (Mawambi Hills) | Gorilla | 77 | 512 | 16 | 1 | 8 | 119 | 704 |
| | Chimpanzee | 0 | 0 | 0 | 0 | 0 | | |
| | Tree | 42 | 192 | 9 | 1 | 6 | | |
| Mbu-Nga (northern Mone Forest Reserve) | Gorilla | 60 | 354 | 12 | 1 | 7 | 76 | 430 |
| | Chimpanzee | 0 | 0 | 0 | 0 | 0 | | |
| | Tree | 16 | 76 | 7 | 1 | 6 | | |
| Ashunda-Bachama (Mbulu forests) | Gorilla | 68 | 419 | 14 | 2 | 7 | 77 | 457 |
| | Chimpanzee | 0 | 0 | 0 | 0 | 0 | | |
| | Tree | 9 | 38 | 6 | 2 | 4 | | |
| | | | | | | **TOTAL** | **272** | **1591** |

## METHODS

Meetings with village councils surrounding the three target sites were used to confirm which villages held traditional forest rights over areas within which gorillas were thought to range. Six villages were identified, two adjacent to each of the three focal sites (Takpe and Awuri for the Mawambi Hills, Mbu and Nga for northern Mone Forest Reserve, and Bachama and Ashunda for the Mbulu forests; see Figure 1). In each village, traditional authorities assisted with the selection of a community representative to be assigned the title of "Community Gorilla Guardian."

Capacity building for all selected GG's, including increased understanding of basic gorilla ecology and monitoring, wildlife laws, and participatory mapping, was conducted the Kagwene Gorilla Sanctuary in collaboration with officials from the Ministry of Forestry and Wildlife. Gorilla Guardians were then equipped and mobilized to collect data on their respective gorilla populations. Hunters who moved through the selected forests were asked to report any sightings of ape nests to the GG; details such as species (if known), freshness of site, and approximate location (recorded on a map) were noted by the GG. Approximately every three months, each of the forests in which the GG's worked was visited by an external team of expert WCS Takamanda-Mone Landscape Project (TMLP) field staff. These experts, in collaboration with the GG and hunters, physically examined and verified the reported nest sites (Figure 2). At this time, the field staff also collected additional information, including geographic coordinates and number of nests.

## RESULTS

During the initial year of the project, a total of 272 ape nesting sites were visited, and 1,591 individual nests were examined (Figure 3; Table 1). The majority of Cross River gorilla nest sites were confirmed by the presence of ground nests. A site where there were no ground nests was attributed to a particular ape species only if other evidence was indicative; for example, specific presence of gorilla or chimpanzee dung. If no evidence of particular ape species was obvious, sites were recorded as simply 'tree' or 'great ape' nest sites. By following this procedure, there were no confirmed records of chimpanzee nest sites, although it is likely that a certain percentage of 'tree' nest sites were built by the local chimpanzee sub-species (*Pan troglodytes ellioti*; Oates *et al.*, 2009). This possibility would be supported by the observations of Tutin *et al.* (1995), who found that 74% of tree nest sites belonged to chimpanzees in the Lopé Reserve, Gabon, where gorillas and chimpanzees also are sympatric. The largest nest count at each site indicated the possibility of 16 gorillas in the Mawambi Hills, 12 in northern Mone Forest Reserve, and 14 in the Mbulu Forest (Table 1).

The reports from hunters also revealed the possibility of gorillas moving outside of the estimated distribution previously described. A nest site attributed to 'great ape' was close to a farming area where reports of apes feeding on banana tree piths probably could be attributed to gorillas. On another occasion, a Gorilla Guardian reported that a gorilla had been killed just before this monitoring scheme was initiated, suggesting another recording for

**Table 2 - Comparison of Gorilla Guardian data with earlier surveys (equivalent areas are grouped under the GG forest area names).**

| Area | Year | Type of Survey | Source | # CRG Ground Nest Sites | # CRG Nest Sites[1] | # Tree Nest Sites |
|---|---|---|---|---|---|---|
| Mbu-Nga (northern Mone FR) | 2009 | Gorilla Guardian | TMLP long-term data | 60 | 0 | 16 |
| North Mone Forest Reserve | 2007 | 83 km guided recce | (Warren & Ekinde, 2007) | 6 | 1 | 12 |
| Mbu hills | 2000-1 | 4.5 km transect & baseline | (Sunderland-Groves, 2008) | 2[a] | | 2[b] |
| | | | | | | |
| Takpe-Awuri (Mawambi Hills) | 2009 | Gorilla Guardian | TMLP long-term data | 77 | 0 | 42 |
| Takamanda south | 2007 | 47 km recce walks | (Warren & Ekinde, 2007) | 25 | 0 | 11 |
| Takpe hills | 2000-1 | 7 km transect & baseline | Sunderland-Groves, 2008 | 4[a] | | 1[b] |
| | | | | | | |
| Ashunda-Bachama (Mbulu forests) | 2009 | Gorilla Guardian | TMLP long-term data | 68 | 0 | 9 |
| Mbulu study area | 2008 | 96 km guided recce | (Warren & Bila, 2008) | 3 | 1 | 1 |
| Bachama | 2007 | 20 km recce walks | (Warren & Ekinde, 2007) | 12 | 0 | 4 |
| Ashunda hills | 2000-1 | 4.5 km transect & baseline | (Sunderland-Groves, 2008) | 5[a] | | 1[b] |

[1]confirmed by presence of additional evidence such as fresh dung; [a] results not given as separate categories; [b] these results were categorized as chimpanzee nest sites.

the area. (Given the location of the reported incident, it is unlikely that this information would have been brought to our attention within a reasonable amount of time without the initiation of the program. The closeness in time of the report allowed follow up action to be taken, and a hunter was taken to Mamfe for questioning.)

Comparing the results from Gorilla Guardian monitoring to previous surveys in approximately equivalent areas suggests that a much greater number of nest sites can be located with information from hunters collaborating with Gorilla Guardians, rather than relying on strict survey protocols (Table 2). This is illustrated by the results for the Mbulu Forest, which previously had been surveyed three times (Sunderland-Groves, 2008; Warren & Billa, 2008; Warren & Ekinde, 2007). Twenty-one Cross River gorilla ground nest sites had been located by these previous surveys over a period of eight years. Within the course of one year of the monitoring program, Gorilla Guardians working with local hunters recorded the presence of 68 ground nest sites.

Although the data from the Gorilla Guardian program are not appropriate for strong statistical analysis (i.e., determination of density estimates), the program provides a cost-effective monitoring tool, and could be used for addressing additional ecological research questions. Taking the Mbulu area as an example, a 96 km guided reconnaissance survey conducted in 2008 cost $2,557 US to put a team of seven people into the field for 20 days. The team located four gorilla nest sites on their recce lines, representing a cost of $639 US per nest site. For the same area, the cost was $1,795 US to locate 68 gorilla nest sites over the course of a year utilizing the Gorilla Guardian approach. This represents a cost of $26.40 US per nest site, a very significant cost reduction on a comparative basis.

## DISCUSSION

The community-based Gorilla Guardian monitoring network is improving our understanding of both Cross River gorilla numbers and distribution in some of the sites where this Critically Endangered taxon is most vulnerable. In time, the approach may also do the same for other highly threatened apes, such as the Gulf of Guinea chimpanzee (*P. t. ellioti*). At present, however, the difficulty of accurately assigning nest sites to particular ape species in the field limits this type of monitoring. Where the method can be employed, further training of Gorilla Guardians also could be used to gain more detailed ecological data for the great apes species in those forests.

The shift towards a community-based monitoring approach may strengthen community support and 'buy-in' for gorilla conservation. Feedback from the Gorilla Guardians also contributed to gorilla conservation in revealing that gorilla hunting is still taking place at a low level in some sites, information that would not have easily reached the 'outside world' in the absence of the program. Where implemented, the monitoring network appears to provide a much needed platform to reach out to a number of remote, forest-dependent villages to build further awareness and support for conservation, in general.

From the beginning, we established the Gorilla Guardian network in a way that aimed to minimize the expectations of local communities, disassociating the scheme from other regional multi-donor funded conservation programs and encouraging the adoption of the gorillas as an enigmatic local 'flagship species' by participating communities. We hope that this approach can be maintained and further strengthened over time. There is certainly a need to develop long-term community-based forest/wildlife management mechanisms if the future survival of the Cross River gorilla populations found outside of protected areas in Cameroon is to be secured.

Based on the successes achieved to date, and requests to participate received from additional communities, it is envisioned that the Gorilla Guardian network will be extended to incorporate a further 2-3 villages adjacent to other unprotected Cross River gorilla sites in the next 12 months. Additional planning includes extension of conservation education activities to all Gorilla Guardian villages to improve general understanding related to wildlife laws and the importance of conservation.

In time, it is hoped that the Gorilla Guardian network might provide an entry point for developing long-term community-based conservation strategies focused on both forest and wildlife management. The strategy of maintaining connectivity between core protected Cross River gorilla sites is unlikely to be achieved without such an approach.

## CONCLUSION

The community-based Gorilla Guardian monitoring network is proving to be an effective and cost efficient way of monitoring some of the most vulnerable Cross River gorilla sites, certainly when compared to standard survey-based approaches. To varying extents, Gorilla Guardians are also acting as catalysts and conduits for conservation-related information to/from their communities, a positive outcome which should be further developed.

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collaboration with hunters from their respective villages. We must also thank the Wildlife Conservation Society staff who have also been assisting with the supervision of this program, and especially Pius Khumbah. We must also thank the Ministry of Forestry and Wildlife in Cameroon for their vision in supporting this non-formal conservation system which we believe provides the basis for a strengthened community-based gorilla conservation approach in Cameroon.

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***Gorilla gorilla diehli***

***Photograph courtesy of Nicky Lankester, Limbe Wildlife Centre***