

# Cross River Gorillas: back from the edge of extinction



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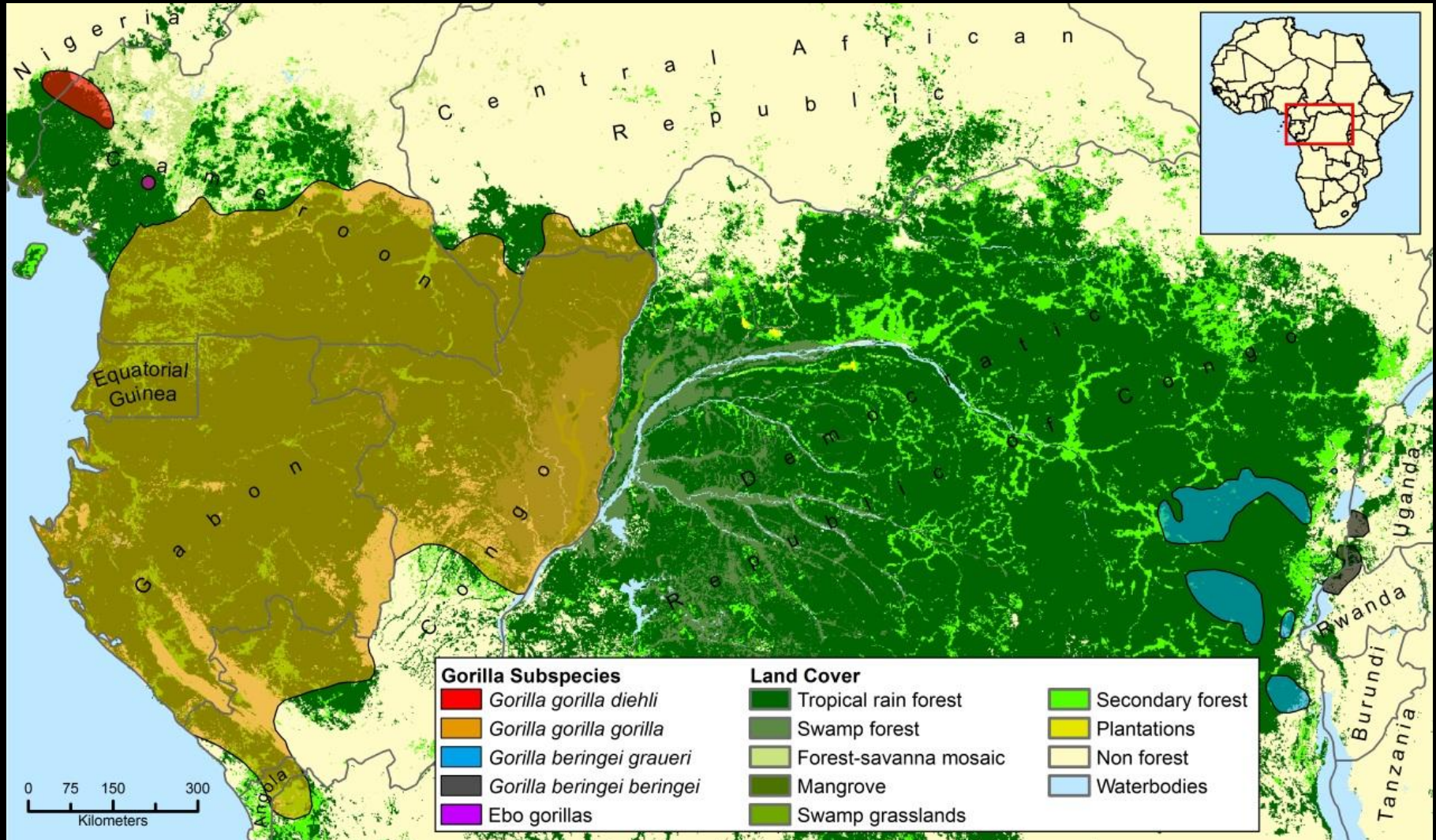
Andrew Fowler, Takamanda-Mone Landscape Project Director, WCS Cameroon Program

Andrew Dunn, WCS Nigeria Country Director

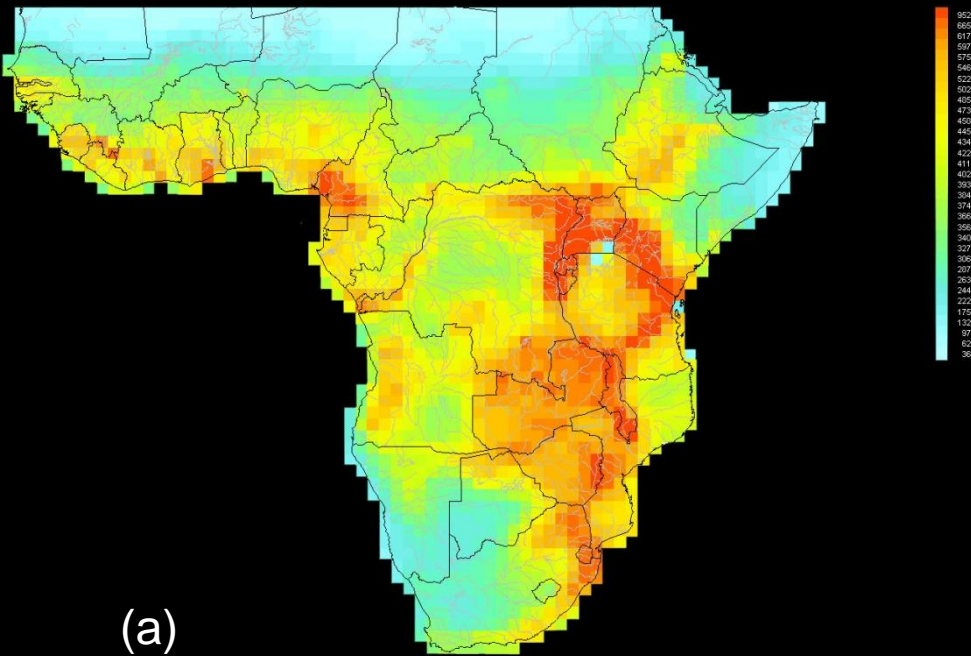
Dirck Byler, USFWS, Africa Program



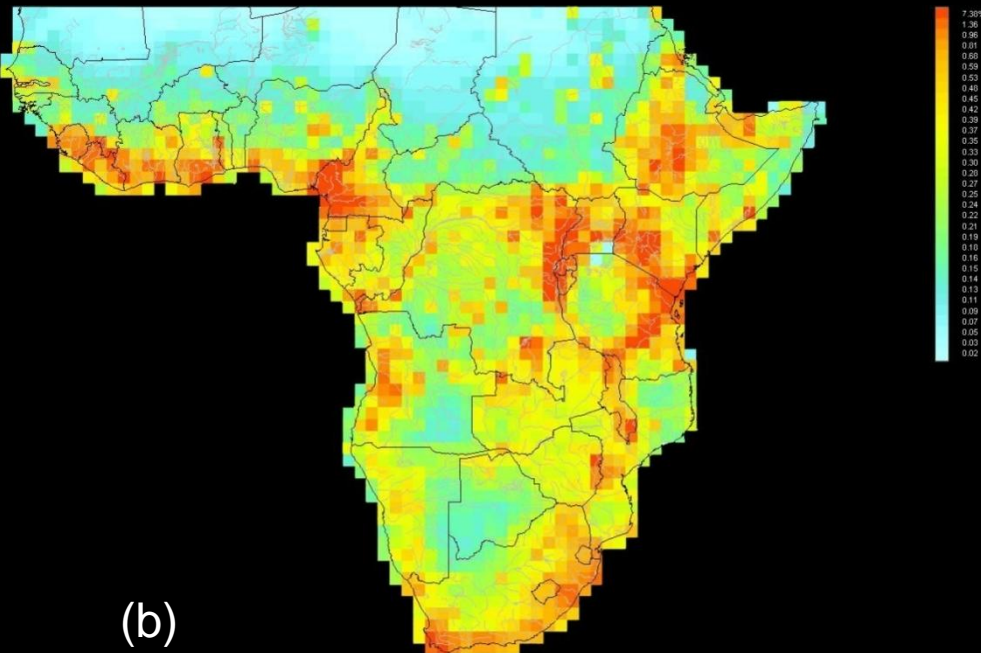
# The Cross River Gorilla (*Gorilla gorilla diehli*): endemic to the forests of Nigeria-Cameroon border.



The Cross River region is a center of species richness and endemism for many taxa in a continental perspective.



(a)



(b)

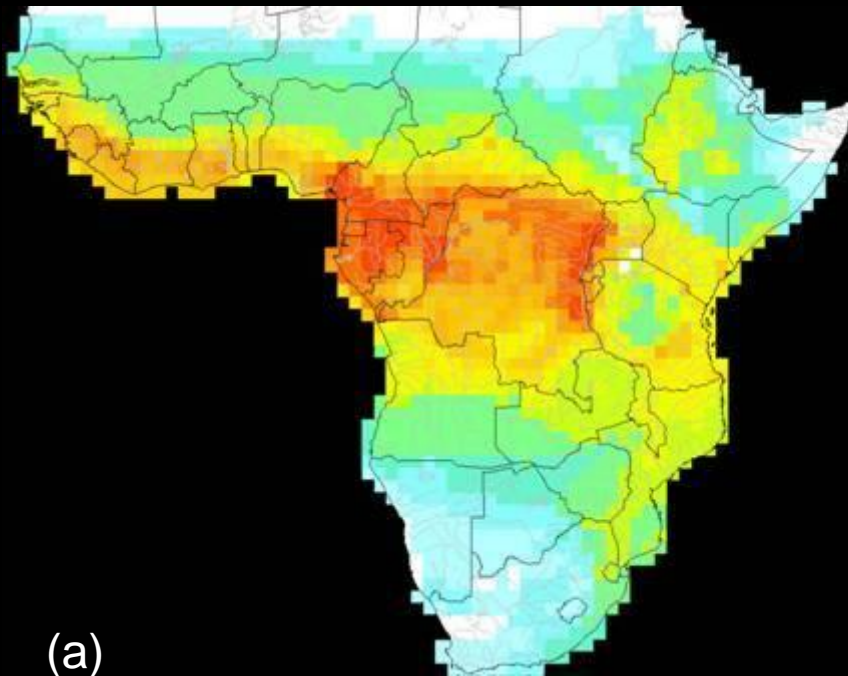
Mammal, amphibian, reptile, and bird species (a) richness and (b) inverse range size rarity (endemism) in sub-Saharan Africa. Species richness and level of endemism increase with increasing warmth of color.



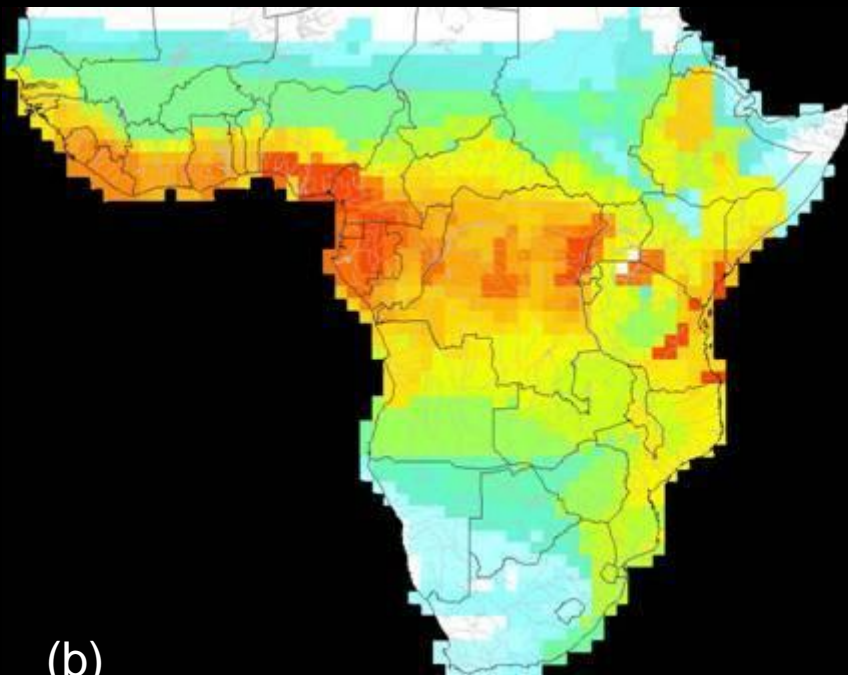
# Primate Biodiversity Hotspot

- Extremely high primate species richness
- Africa's largest number of endemic taxa.

Primate species (a) richness and (b) endemism in sub-Saharan Africa. Species richness and level of endemism increase with increasing warmth of color.



(a)



(b)





Drill (*Mandrillus leucophaeus*)





Nigeria-Cameroon chimpanzee (*Pan troglodytes ellioti*)





Preuss' guenon (*Cercopithecus preussi*)





Cross River gorilla (*Gorilla gorilla diehli*)



# Birds

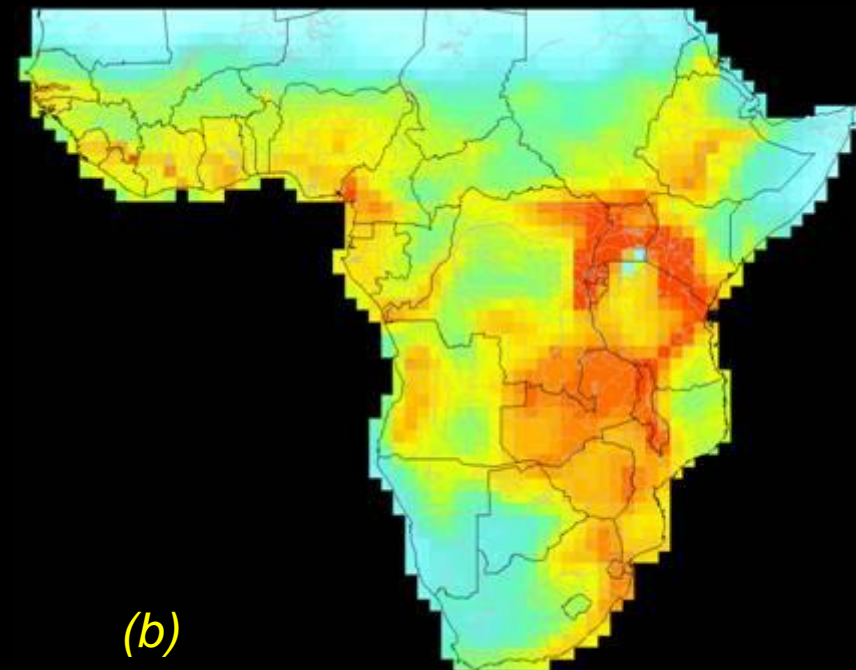
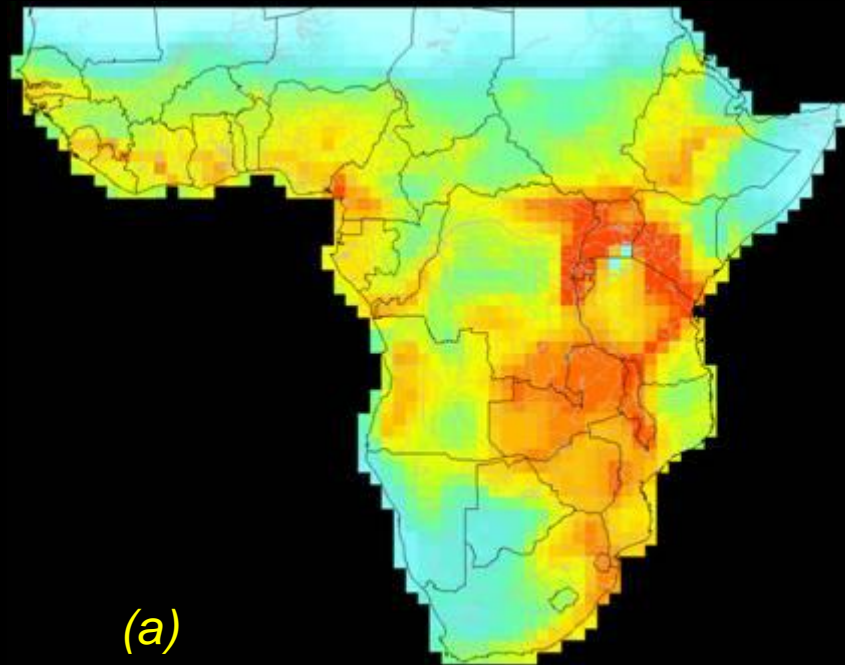
This region has the highest bird species richness and endemism of all Central and West Africa .

- 26 endemic species
- 2 monotypic endemic genera
- 3 species each known only from a single locality

Bird species (a) richness and (b) endemism in sub-Saharan Africa. Species richness and level of endemism increase with increasing warmth of color.

(a)

(b)







Bannerman's tauraco  
(*Tauraco bannermani*)





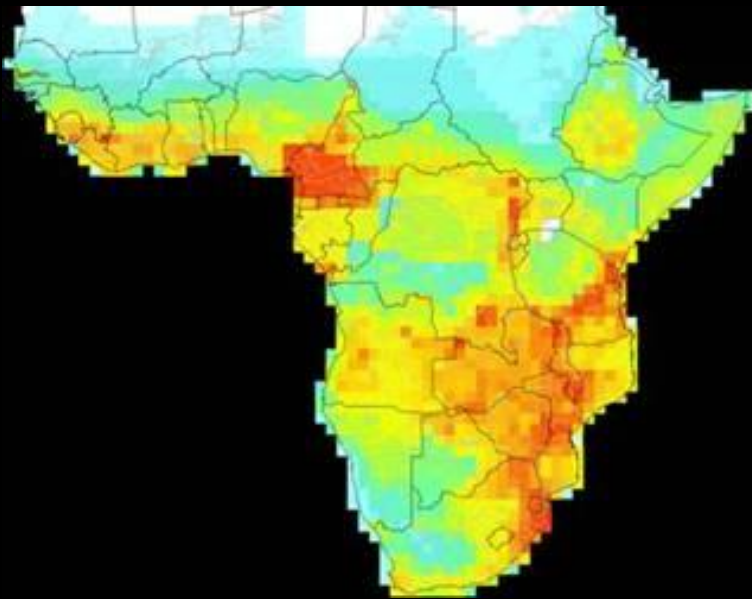
Ursula's mouse-colored  
sunbird  
(*Nectarinia ursulae*)



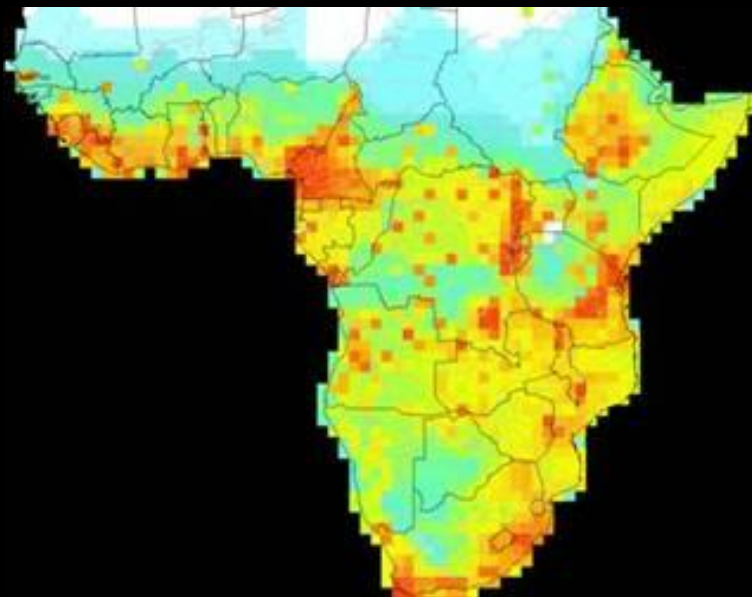
# Amphibians

Possibly the highest  
amphibian species richness  
in Africa

-52 endemic species



(a)



(b)

Amphibian species (a) richness and  
(b) endemism in sub-Saharan Africa.  
Species richness and level of  
endemism increase with increasing  
warmth of color.





Black long-fingered Frog (*Cardioglossa pulchra*)



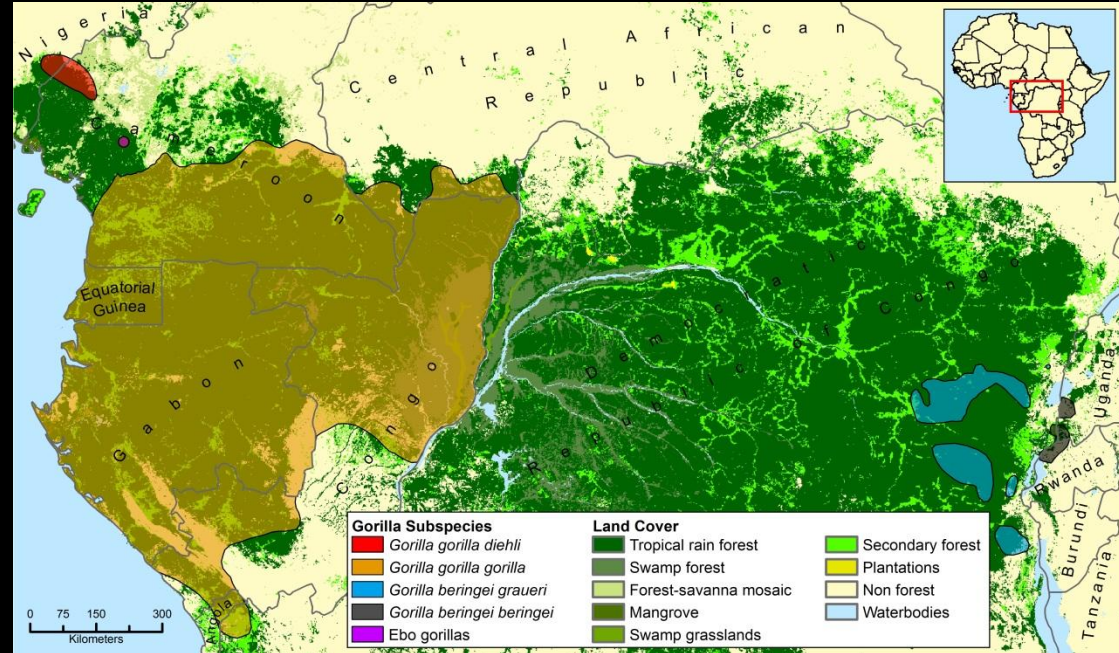


Cameroon slippery  
frog  
(*Hyperolius  
riggenbachi*)



# The Cross River Gorilla (*Gorilla gorilla diehli*): endemic to the forests of Nigeria-Cameroon border.

- Critically Endangered.
- The most endangered African ape taxon.
- Only about 300 left.
- Long history of hunting.
- Poorly studied. Even their distribution and total population size is not fully understood.





# Use of detection dogs to locate fecal samples for genetic census





# Distribution, numbers, protected area status

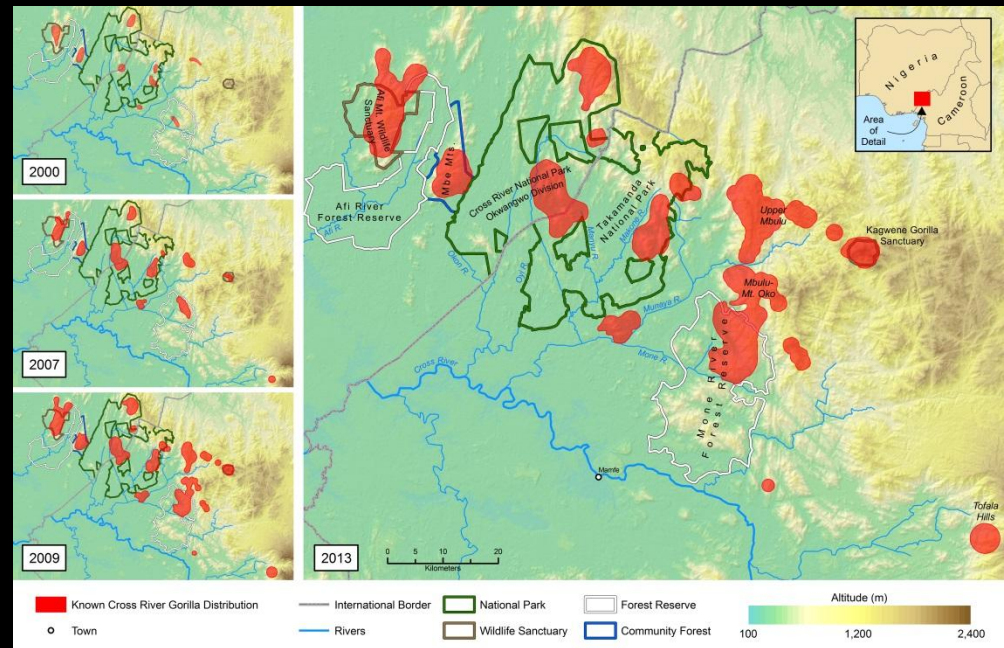
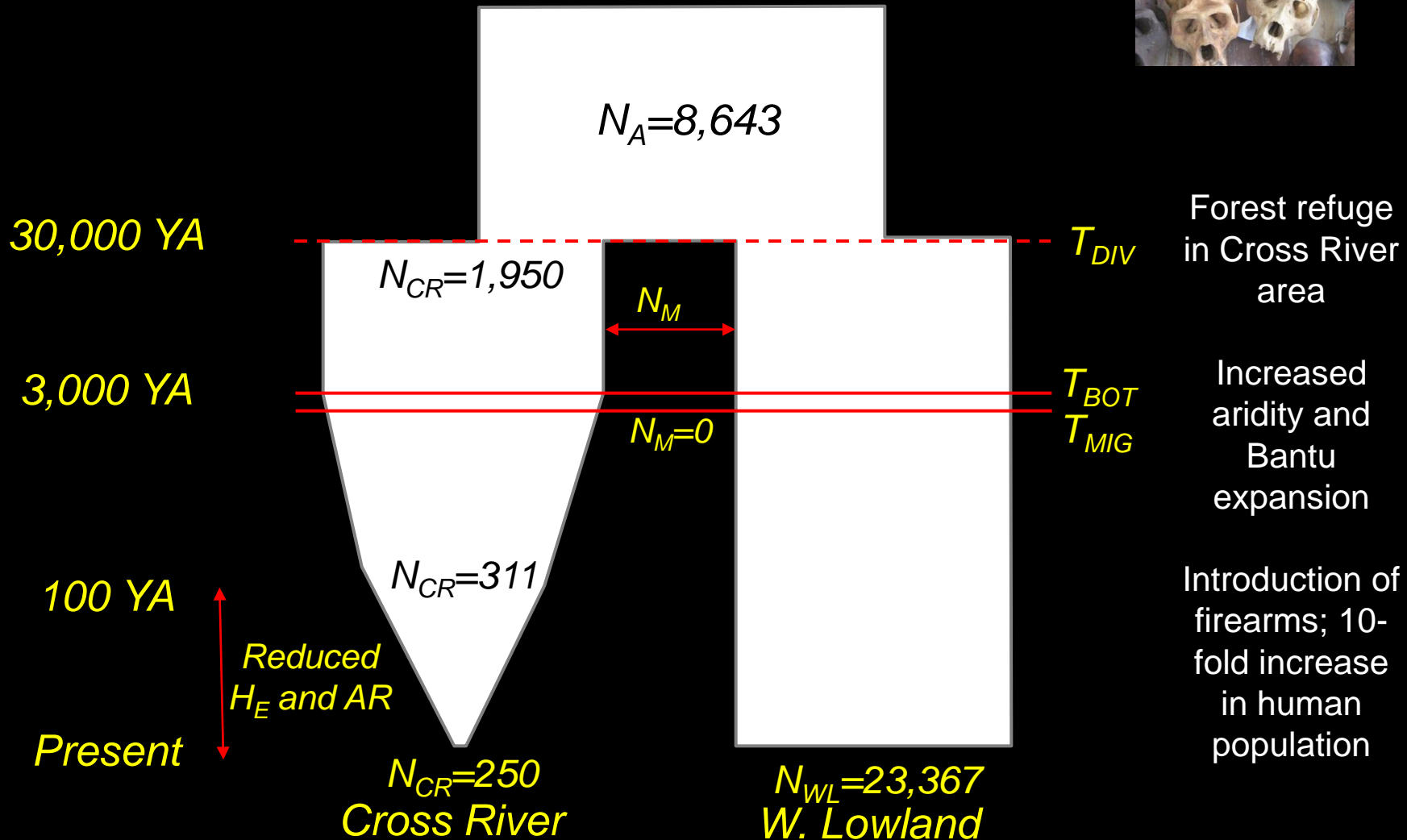
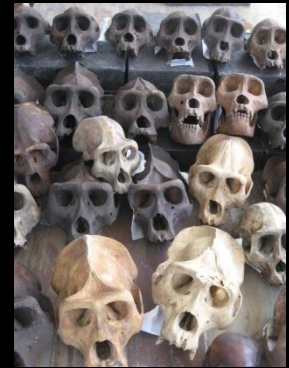


TABLE 1. KEY SITES AND ABUNDANCE ESTIMATES FOR CROSS RIVER GORILLAS

Country / Site	Status	Gorilla range (km <sup>2</sup> )	Altitude (m)	Estimated gorilla numbers
<b>Nigeria</b>				
Afi Mountain Wildlife Sanctuary	Wildlife Sanctuary	105	130–1,300	25–30
Mbe Mountains	Community Reserve	45	110–900	25–30
Cross River National Park–Boshi Extension	National Park	55	300–1,700	20–25
Cross River National Park–Okwa Hills (Nigeria) + Central Takamanda National Park (Cameroon)	Transboundary; two National Parks	80	150–800	15–30
<b>Subtotal Nigeria:</b>				<b>85–115</b>
<b>Cameroon</b>				
Takamanda National Park–East (Kekpane area)	National Park	50	175–900	8–12
Takamanda National Park–North (Atolo area)	National Park	20	300–1,500	10–15
Mawambi Hills	Unprotected forest	25	125–550	20–30
Mone Forest Reserve (northern half)	Forest Reserve	100	150–1,200	20–30
Mount Oko Area	Unprotected forest	60	250–1,700	6–15
Eastern Mone Forest Reserve	Unprotected forest	20	250–1,600	9–12
Upper Mbulu	Unprotected forest	100	500–2,000	20–25
Kagwene Gorilla Sanctuary	Wildlife Sanctuary	25	1,700–2,000	20–25
Tofala Hills	Unprotected forest	25	500–1,200	20–30
<b>Subtotal Cameroon:</b>				<b>132–194</b>
<b>TOTAL</b>				<b>218–309</b>

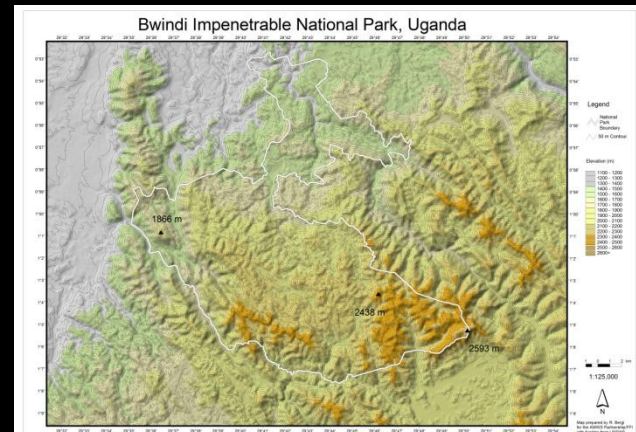
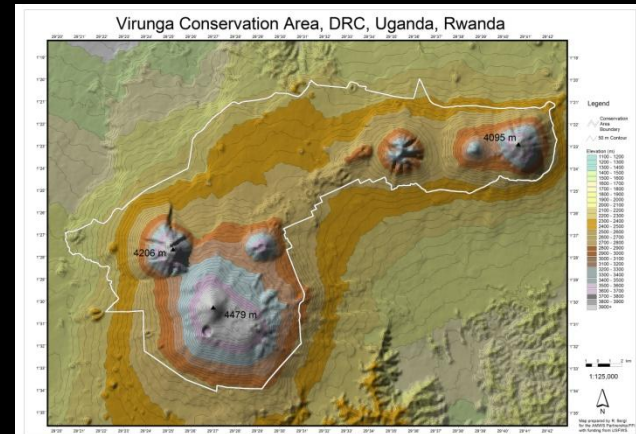
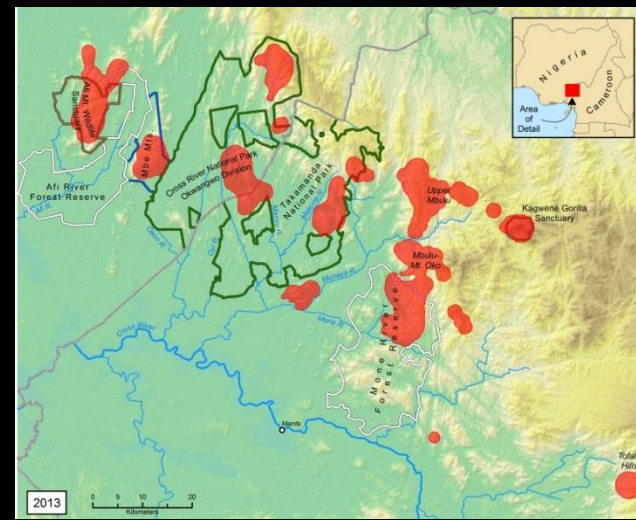
# Genetic analysis of population history using DNA from museum specimens





# Comparison with other better-known gorilla sites

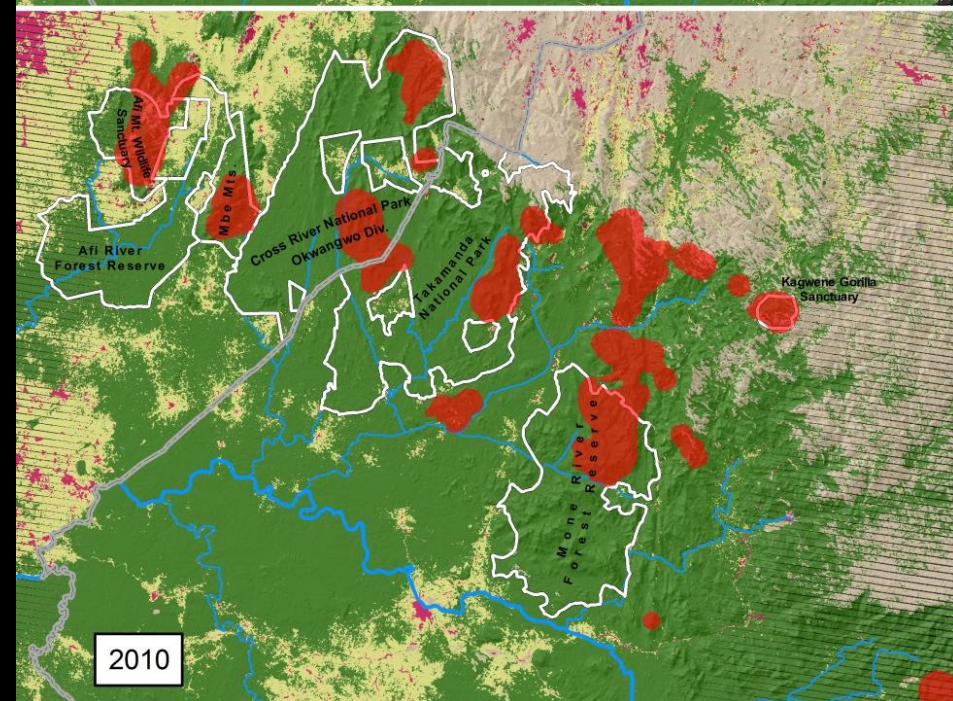
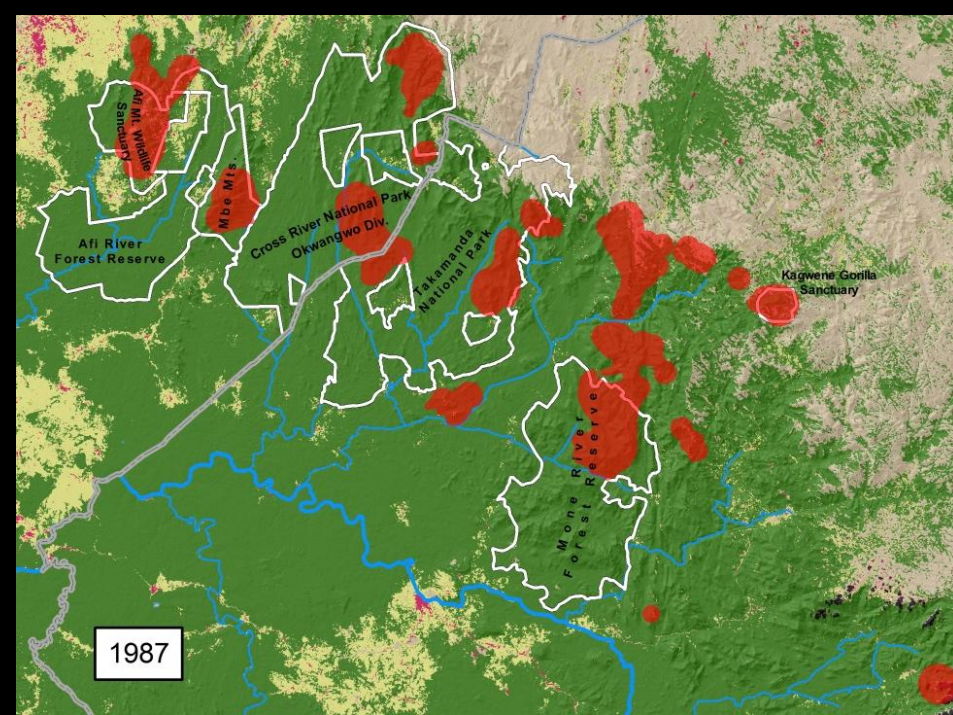
- The national park, forest reserves, wildlife sanctuaries and designated community land alone contain over 2,000 km<sup>2</sup> of tropical forest.
  - Almost six times the entire area of either Bwindi NP or Virunga Conservation Area.
  - Either park would fit inside CRNP or Takamanda NP.
  - Over 7,000 km<sup>2</sup> in the broader landscape.





# Habitat and population continuity

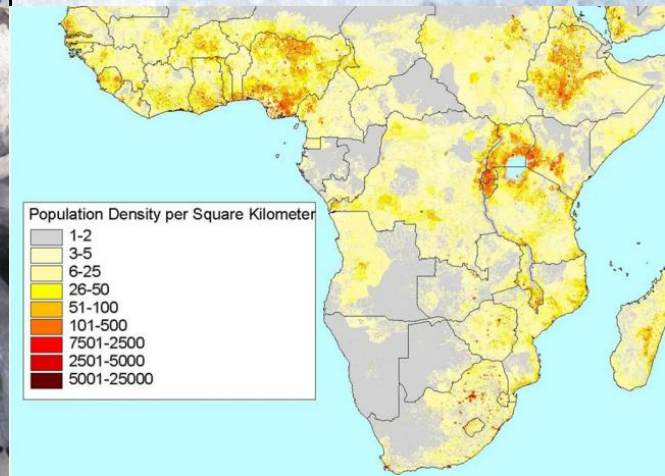
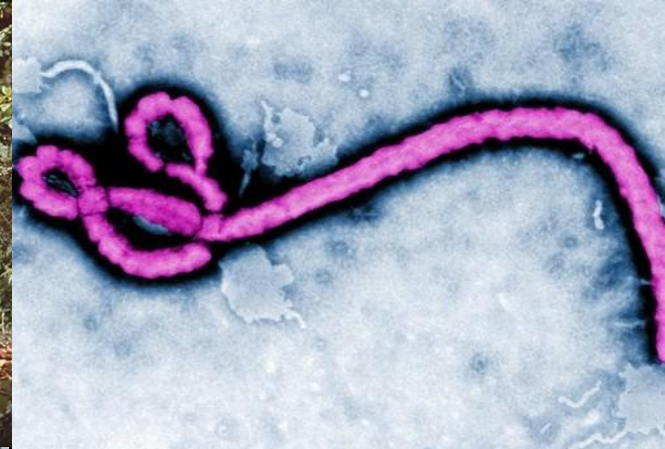
- Forest loss of almost 3% annually
- Genetic continuity
- Gorilla distribution driven by human activities not habitat requirements
- Unoccupied gorilla habitat





# Threats

- Habitat loss
- Hunting
- Disease
- (human population density)



# Revised conservation action plan



Fewer than  
300 left

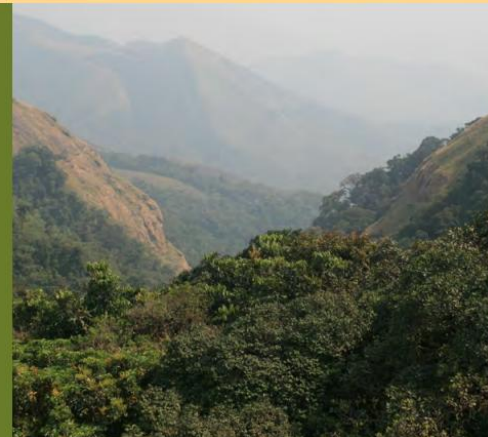
Today, the total population of Cross River gorillas may number fewer than 300 individuals

**Revised Regional Action Plan  
for the Conservation of the  
Cross River Gorilla (*Gorilla  
gorilla diehli*) 2014–2019**

Hope

Understanding the status of the changing threats across the Cross River gorilla landscape will provide key information for guiding our collective conservation activities

Survival





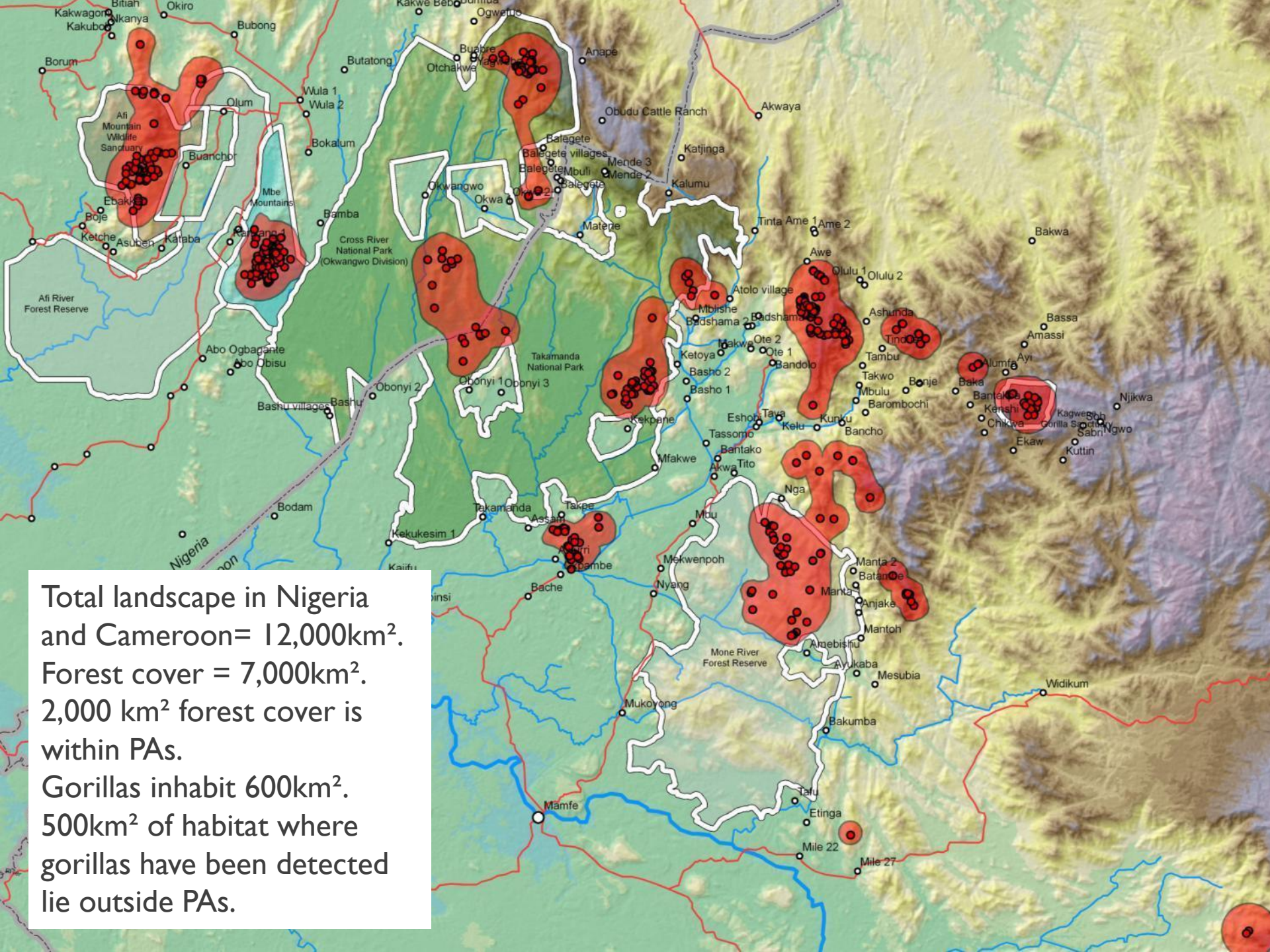
# Accomplishments of the previous plan

- Creation of three new protected areas
- Better understanding of gorillas' range
- Enhanced wildlife and law enforcement monitoring
- Greater trans-boundary collaboration
- Increased community involvement



# Across the Landscape





Total landscape in Nigeria and Cameroon = 12,000km<sup>2</sup>.  
Forest cover = 7,000km<sup>2</sup>.  
2,000 km<sup>2</sup> forest cover is within PAs.  
Gorillas inhabit 600km<sup>2</sup>.  
500km<sup>2</sup> of habitat where gorillas have been detected lie outside PAs.



# Key conservation actions

- ❖ Increased law enforcement
- ❖ Increased local awareness and engagement
- ❖ Alternative livelihood interventions





# Key conservation actions

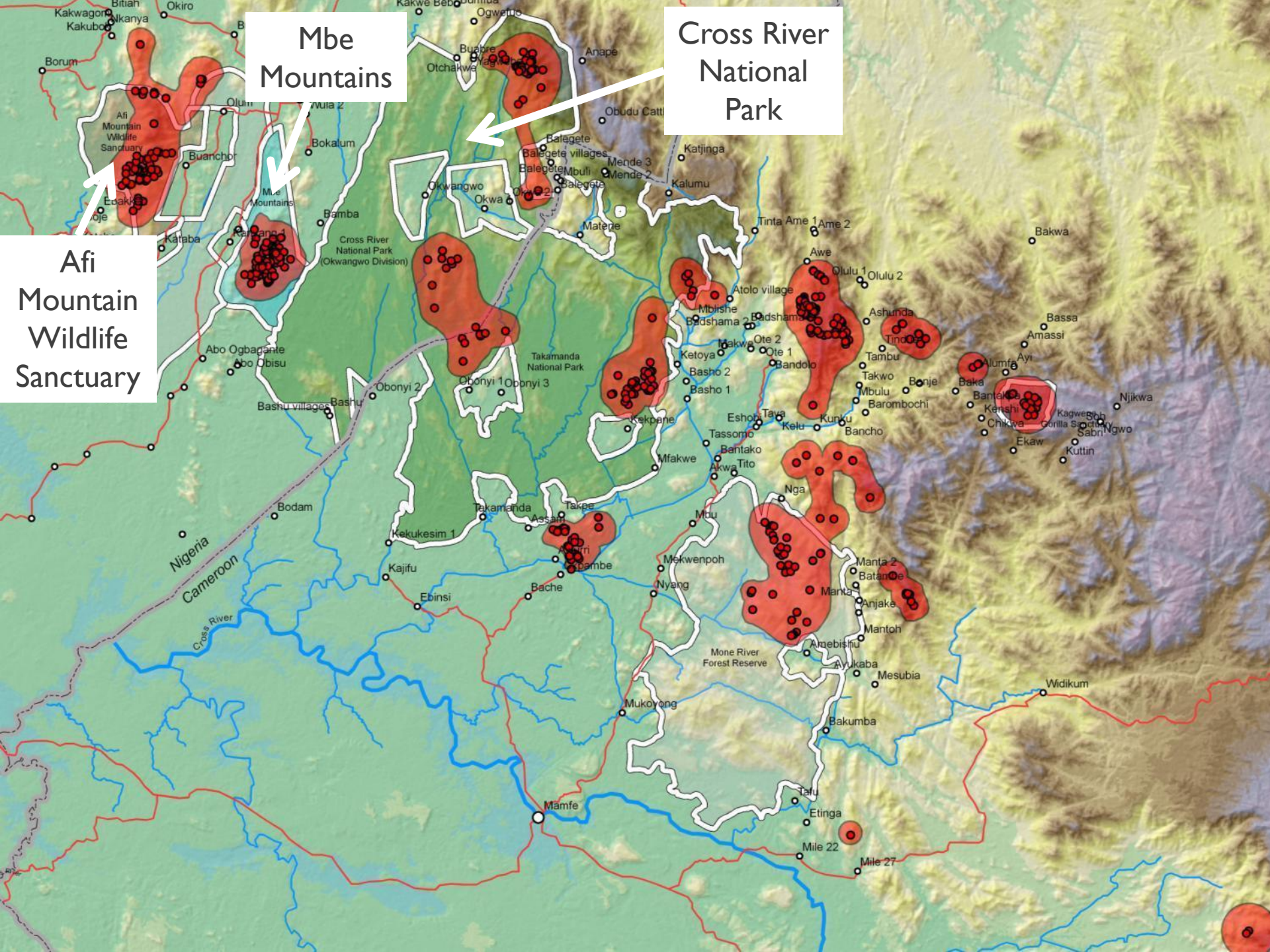
Transboundary collaboration

Ecotourism development, including gorilla habituation?

CRG health monitoring and disease prevention

**NIGERIA**





Mbe Mountains

Cross River National Park

Afi Mountain Wildlife Sanctuary

Nigeria  
Cameroon

Bitian  
Kakwagora  
Okanya  
Okiro  
Borum  
Afi Mountain Wildlife Sanctuary  
Edakpa  
Ajoke

Kakwe  
Ogwetto  
Buapre  
Otchakwa  
Anape  
Obudu Catt  
Balegete  
Balegete villages  
Mende 3  
Mende 2  
Okwangwo  
Okwa  
Materie

Mbe Mountains  
Bokalum  
Bamba  
Cross River National Park (Okwangwo Division)

Balegete  
Balegete  
Katjinga  
Kalumu  
Tinta Ame 1  
Ame 2

Abo Ogbagante  
Abo Obisu  
Bashu villages  
Bashu  
Obonyi 2  
Obonyi 1  
Obonyi 3  
Takamanda National Park  
Takamanda  
Assam  
Kakukesim 1  
Kajifu  
Ebinsi  
Bache

Atolo village  
Mbisheshe  
Bashama  
Ketoya  
Iwakpa  
Ote 2  
Ote 1  
Bandolo  
Basho 2  
Basho 1  
Kekpane  
Eshor  
Tava  
Kunku  
Bancho  
Mfakwe  
Bentako  
Akwa  
Tito  
Nga

Manta 2  
Batanda  
Manta 1  
Anjake  
Mantoh  
Amebisifu  
Ayukaba  
Mesubia  
Bakumba

Bakwa  
Bassa  
Amassi  
Ayi  
Iumfa  
Baka  
Bantaba  
Kenshi  
Chikwa  
Ekaw  
Kagwebo  
Gorilla Sanctuary  
Sabri  
Ngwo  
Kuttin

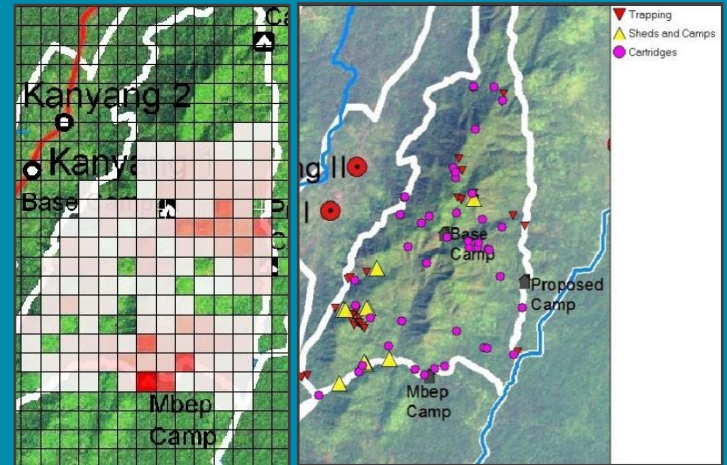
Mekwenpoh  
Nyang  
Mukoyong  
Mamfe  
Tafu  
Etinga  
Mile 22  
Mile 27

Widikum



# Improved Law Enforcement Monitoring with CyberTracker/SMART

❖ More efficient patrol  
planning



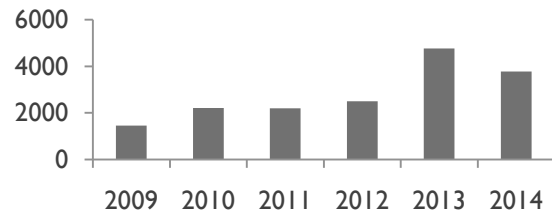
❖ Improved threats  
monitoring



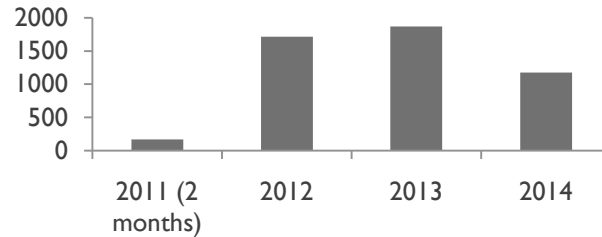


# Increased patrol effort → decreased human activity encounter rates

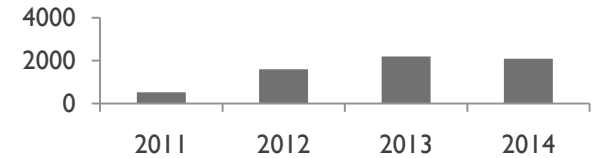
**Mbe: Patrol effort (km covered)**



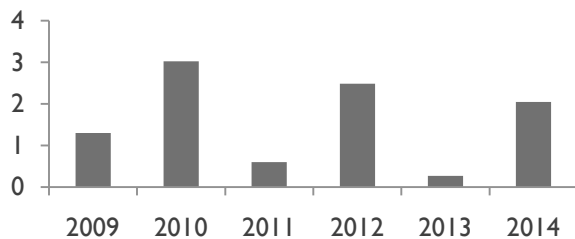
**Afi: Patrol effort (km covered)**



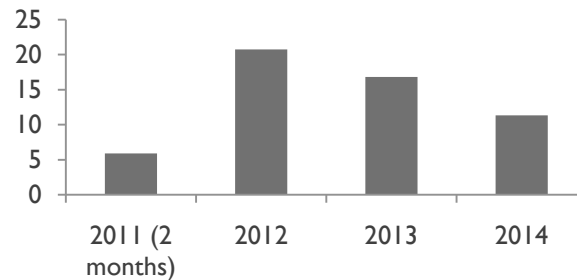
**Okwangwo: Patrol effort (km covered)**



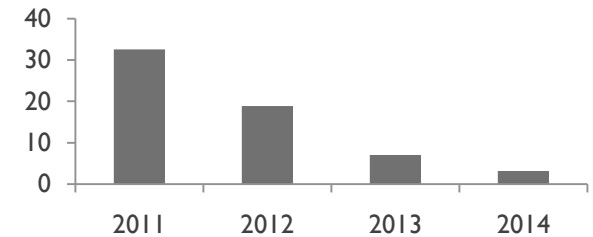
**Mbe: Wire snares/10km**



**Afi: Wire snares/10km**

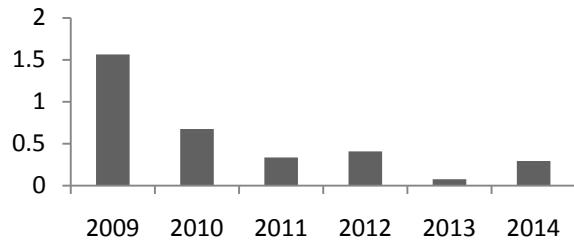


**Okwangwo: Wire snares/10km**

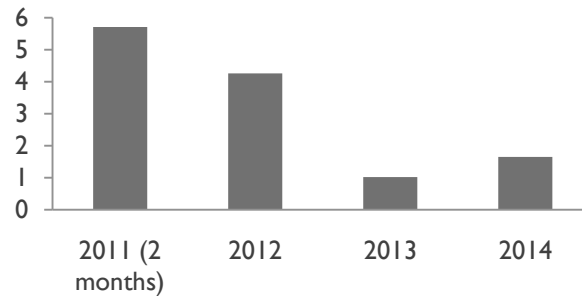


# Increased patrol effort → decreased human activity encounter rates

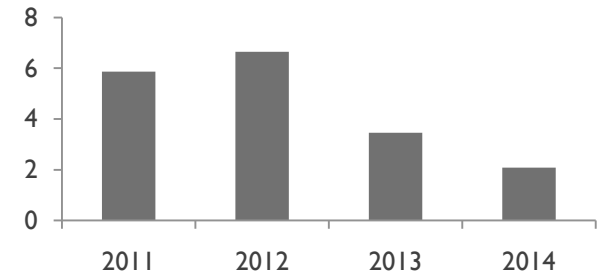
**Mbe:**  
**Used cartridges/10km**



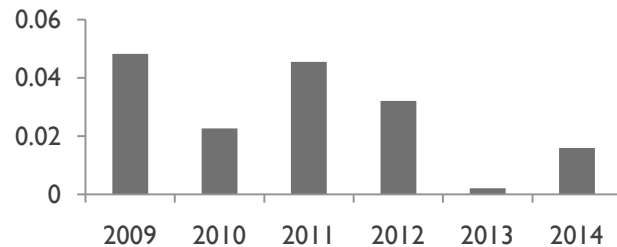
**Afi:**  
**Used cartridges/10km**



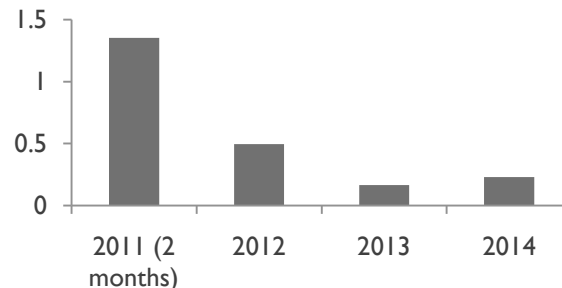
**Okwangwo: Used cartridges/10km**



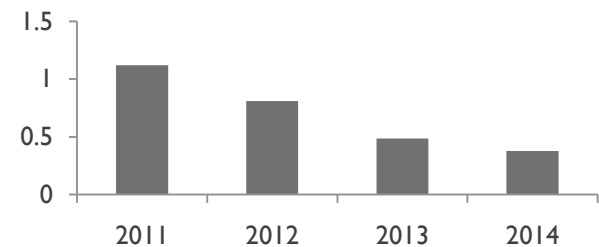
**Mbe:**  
**Hunting sheds/10km**



**Afi:**  
**Hunting sheds/10km**



**Okwangwo: Hunting sheds/10km**





# Conservation Education



❖ 37 community meetings per year



❖ Conservation clubs in 56 schools; >100 visits

❖ ~40 field trips



❖ Films in 43 villages, >16,000 viewers

*Adopting new approaches...*

# Entertainment-Education



*“My Gorilla-My Community”  
Radio Program*



pci media impact • ))



# Alternative livelihoods

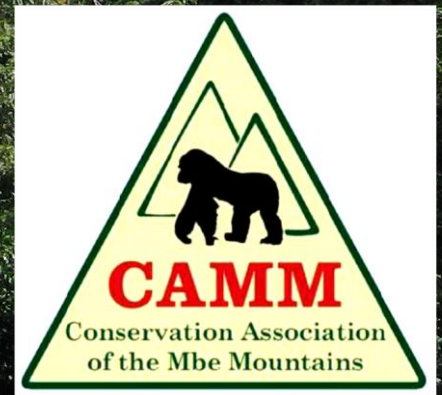


✓ Ex-hunters  
trained and  
supported in  
bee keeping



# Increasing Community Involvement

Community Wildlife Sanctuary created  
in the Mbe Mountains



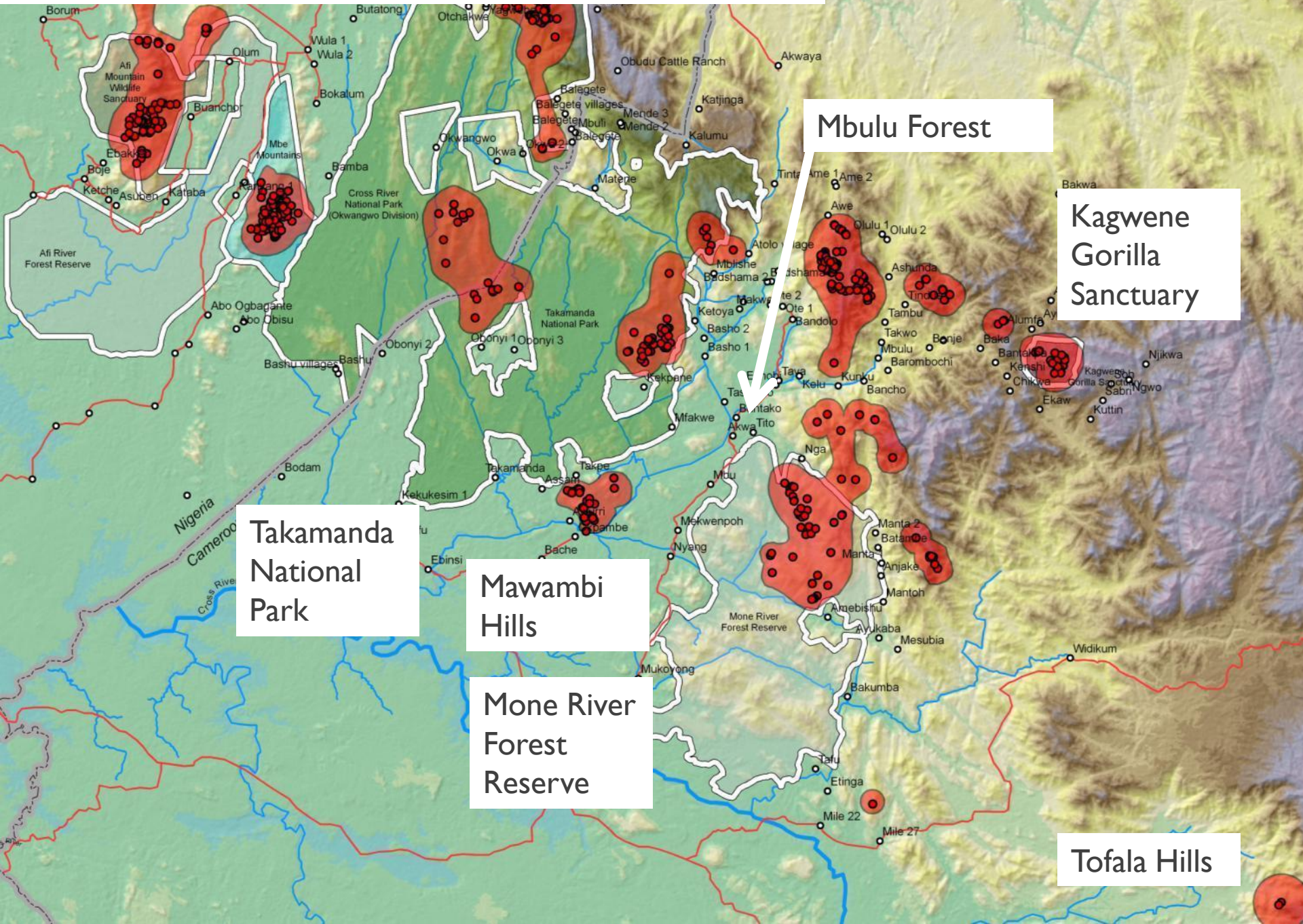


# CAMEROON





# Takamanda-Mone Landscape: Sites of importance.



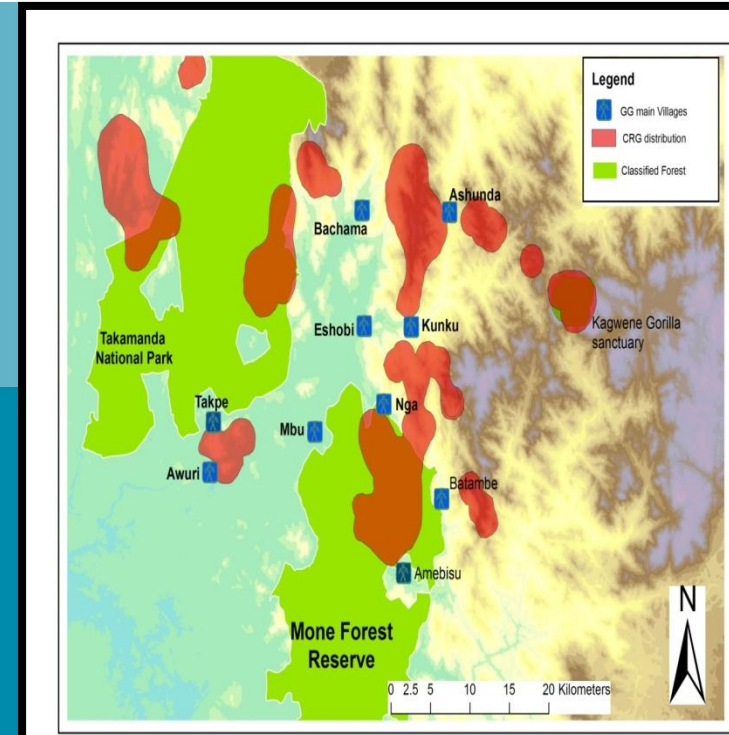


# Gorilla Guardian Network

- ❖ 12 communities involved with active Village Forest Management Committees.

- ❖ Wire snares have been removed from areas near gorillas.

- ❖ Communities organized their own Executive Committee.



# Protocols and technology - monitoring wildlife and threats

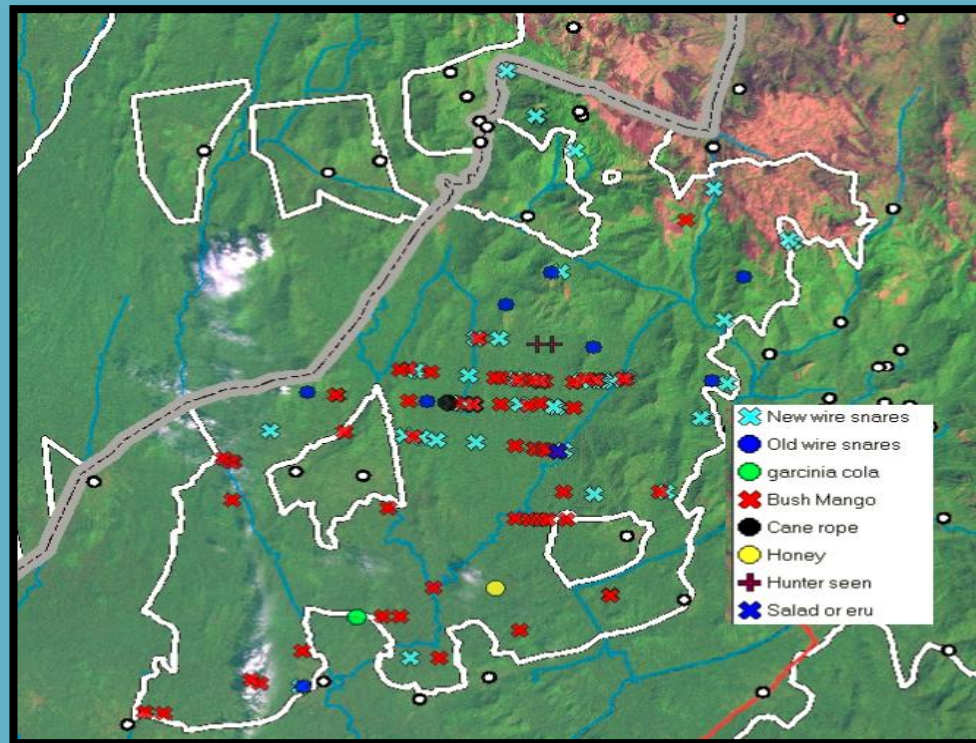
CyberTracker software is used across  
Cameroonian landscape.

SMART will be implemented in TNP, Korup  
National Park, Mount Cameroon National  
Park and Bayang-Mbo Reserve in 2015



# Results and impact of patrolling and reporting.

Non-Timber Forest Product collection zones overlap with wire snare use in TNP.



Survey of Cross River Gorilla populations during 2014 in TNP provides minimum population estimate of 22, with no significant change from last survey in 2008.

Large mammal surveys in TNP during 2013 show no significant increase in populations of mammal species such as duiker nor significant reduction in hunting signs.

In both Ashunda and Bachama there was a drop in both empty cartridges and wire snares after the VFMCs were created and trained.



# Conservation Education

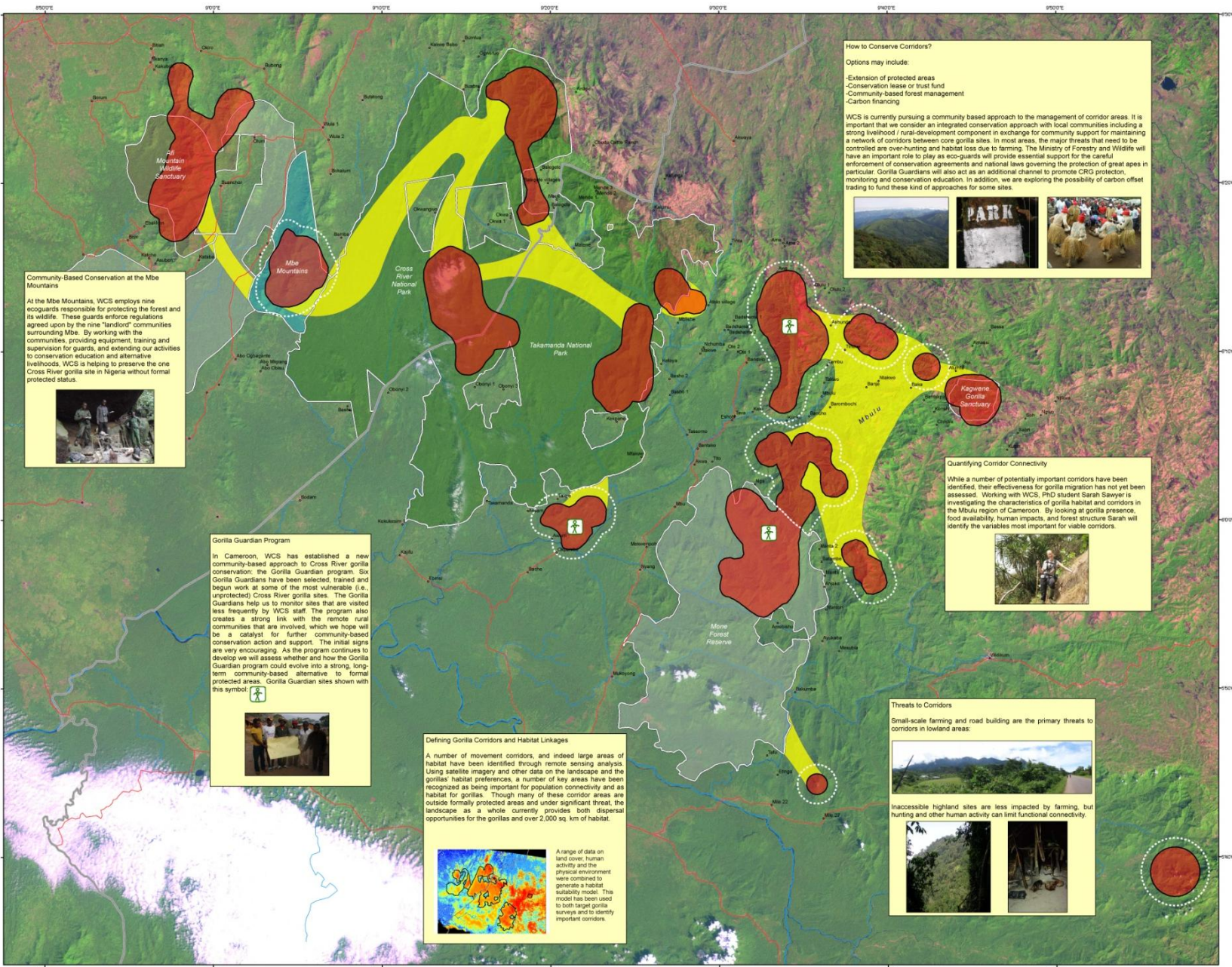


34 villages (11,100 people),  
27 schools (4,850 pupils) have been sensitized.

Activities include film  
shows, lectures, competitions and  
sensitization on Cameroonian wildlife law.

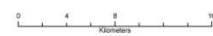
Production of Conservation Education  
materials such as large mammal  
posters, education handbooks and films.

# Cross River gorilla connectivity.



## Legend

- Cross River gorillas**
- Approximate gorilla distribution
  - Important corridor areas
  - Gorilla sites without formal protection
  - Gorilla Guardian sites
- Protected areas**
- National Park
  - Wildlife Sanctuary
  - Forest Reserve
  - Community Forest
- Physical features**
- International border
  - Towns and villages
  - Roads
  - Rivers



Map prepared by Richard Bergl using data from A. Dunn, I. Imong, J. Sunderland-Groves, J. Oates, K. McFarland, C. Ransom, A. Eshindo, Y. Warren, A. Nicholas and R. Bergl.



**How to Conserve Corridors?**

Options may include:

- Extension of protected areas
- Conservation leases or trust fund
- Community-based forest management
- Carbon financing

WCS is currently pursuing a community based approach to the management of corridor areas. It is important that we consider an integrated conservation approach with local communities including a strong livelihood / rural-development component in exchange for community support for maintaining a network of corridors between core gorilla sites. In most areas, the major threats that need to be controlled are over-hunting and habitat loss due to farming. The Ministry of Forestry and Wildlife will have an important role to play as eco-guardians will provide essential support for the careful enforcement of conservation agreements and national laws governing the protection of great apes in particular. Gorilla Guardians will also act as an additional channel to promote CRG protection, monitoring and conservation education. In addition, we are exploring the possibility of carbon offset trading to fund these kind of approaches for some sites.



**Community-Based Conservation at the Mbe Mountains**

At the Mbe Mountains, WCS employs nine ecoguards responsible for protecting the forest and its wildlife. These guards enforce regulations agreed upon by the nine "landlord" communities surrounding Mbe. By working with the communities, providing equipment, training and supervision for guards, and extending our activities to conservation education and alternative livelihoods, WCS is helping to preserve the one Cross River gorilla site in Nigeria without formal protected status.



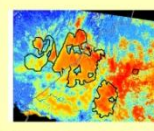
**Gorilla Guardian Program**

In Cameroon, WCS has established a new community-based approach to Cross River gorilla conservation: the Gorilla Guardian program. Six Gorilla Guardians have been selected, trained and begun work at some of the most vulnerable (i.e., unprotected) Cross River gorilla sites. The Gorilla Guardians help us to monitor sites that are visited less frequently by WCS staff. The program also creates a strong link with the remote rural communities that are involved, which we hope will be a catalyst for further community-based conservation action and support. The initial signs are very encouraging. As the program continues to develop we will assess whether and how the Gorilla Guardian program could evolve into a strong, long-term community-based alternative to formal protected areas. Gorilla Guardian sites shown with this symbol:



**Defining Gorilla Corridors and Habitat Linkages**

A number of movement corridors, and indeed large areas of habitat have been identified through remote sensing analysis. Using satellite imagery and other data on the landscape and the gorillas' habitat preferences, a number of key areas have been recognized as being important for population connectivity and as habitat for gorillas. Though many of these corridor areas are outside formally protected areas and under significant threat, the landscape as a whole currently provides both dispersal opportunities for the gorillas and over 2,000 sq. km of habitat.



A range of data on land cover and human activity and the physical environment were combined to generate a habitat suitability model. This model has been used to both target gorilla surveys and to identify important corridors.

**Quantifying Corridor Connectivity**

While a number of potentially important corridors have been identified, their effectiveness for gorilla migration has not yet been assessed. Working with WCS, PhD student Sarah Sawyer is investigating the characteristics of gorilla habitat and corridors in the Mbulu region of Cameroon. By looking at gorilla presence, food availability, human impacts, and forest structure Sarah will identify the variables most important for viable corridors.



**Threats to Corridors**

Small-scale farming and road building are the primary threats to corridors in lowland areas:



Inaccessible highland sites are less impacted by farming, but hunting and other human activity can limit functional connectivity.





# Cross River gorilla connectivity

Program for the Sustainable Management of Natural Resources (PSMNR) have funds to develop corridor management approach as part of land-use management.

Community forest creation is favored as the mechanism for management of corridors.

Gorilla Guardian Network can be entry point to Community based management of corridors.

# REDD+ and PSMNR



Proposed landscape nested jurisdictional approach

Program for the Sustainable Management of Natural Resources in the South West Region (PSMNR-SWR) extended until 2017.

Interest from KfW in continuing to support activities beyond the end of the Program through WCS.



# Challenges

- Opportunistic hunting of gorillas
- Future of enclaves unresolved
- Capacity of government staff remains low
- Long term funding not secured
- No easy way to monitor the CRG population – still relying on indirect threats



# Key achievements

Creation of 3 PAs and their Management

Reduction of hunting in sites

Greater donor awareness and involvement



Training of scientists and conservationists for  
the future

Increased buy-in from Nigerian and  
Cameroonian Governments

Development of global partnership for  
CRG

Transition from donor to partner

USFWS first 5 year cooperative agreement

Improvement of wildlife law in Nigeria



Support from International Agencies  
GRASP, CMS.

Improved understanding of ranging and  
habitat requirements of CRG

Creation of innovative community  
conservation programs



# Future outlook

A lush green forest with a small waterfall cascading over rocks in the foreground. The scene is filled with dense foliage and tall trees, creating a serene and natural environment.

- ✓ Improved law enforcement effectiveness and threats monitoring
- ✓ Significant areas of forest still exist to support a possible population expansion
- ✓ Increasing awareness and local support



# Future outlook

- ✓ Increasing local capacity for research and conservation management
- ✓ 5 year cooperative agreement successful
- ✓ Increasing understanding of distribution, ecology and conservation needs



# With thanks to our partners and funders

