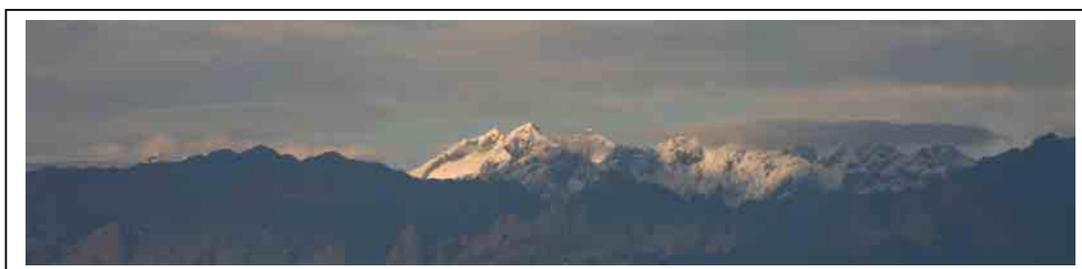




# INTERNATIONAL CONSERVATION

# AFRICA



Rwenzori peaks with glaciers

© A.Poekempner

- Botswana
- Cameroon
- Central African Republic
- Congo Republic
- Democratic Republic of Congo**
- Gabon
- Ivory Coast
- Kenya
- Madagascar
- Namibia
- Nigeria
- Rwanda**
- Tanzania
- Uganda**
- Zambia
- Zimbabwe

Regional Africa

## THE GREATER VIRUNGA LANDSCAPE - SUMMARY

The Greater Virunga Landscape (GVL) is one of the most biodiverse landscapes in Africa. It is a landscape of contiguous protected areas that include three world heritage sites and a biosphere reserve. The total area encompasses 13,200 km<sup>2</sup> of varied habitats including glaciers and rock, montane and lowland forest, savannas, wetlands, bamboo, hotspots and active volcanoes with lava flows (Nyiragongo and Nyamulagira). As a result of this habitat diversity there is a very high species diversity, with more vertebrates than any other landscape on the continent.

Until recently this landscape was managed as separate protected areas with little thought about the connectivity and inter-relationships between the areas. Yet several species rely on the larger area in order to survive as viable populations. For example there are only about 250 lions in the Ugandan portion of the landscape and these rely on migrations from DR Congo to keep the gene pool healthy. Elephants migrate back and forth between DR Congo and Uganda regularly, and as a result, have been able to survive heavy poaching during times of civil wars in Uganda and subsequently in DR Congo. WCS is working with the protected area authorities in Uganda, DR Congo and Rwanda to encourage a wider landscape approach to the management of these protected areas and the species they contain.

## Human Aspect

The GVL not only supports a high diversity of wildlife but also supports many people in Uganda, Rwanda and DR Congo. This region has one of the highest human population densities in Africa and as a result there are many pressures on the protected areas. It is an important water catchment area providing millions of people with fresh water. Lake George and Edward have two of the most productive fisheries in Africa, which provide protein and a source of income to many families in the region. It also supplies forest and savanna products such as fuel wood, medicinal plants, building materials and grass thatch. A recent survey by WCS of how much people obtain from the forests in this region showed that up to 30% of people's annual income come from the forests in the GVL. Managing the sustainable harvesting of these forest products and the fisheries is one of the major challenges protected area managers face in the landscape.

- **Total area** - 13.200 km<sup>2</sup>

- **Habitat**  
Montane and lowland forests, bamboo, wetlands, volcanic lava, savannas and glaciers.

- **Key Wildlife Species Present:**

**Endemic species:**  
*Mountain gorilla, Golden monkey, Rwenzori duiker, Rwenzori otter shrew, Rwenzori Tauraco, Strange-horned chamaeleon*

**Mammals:**  
*Elephant, Hippopotamus, Rwenzori duiker, Giant Forest Hog, Mountain gorilla, Golden monkey, Chimpanzee, Red Colobus, Uganda Kob, Lion, Leopard*

**Birds:**  
*Rwenzori Tauraco, Crowned eagle, Crowned Crane, Lesser Flamingo*

**Reptiles:**  
*Strange-horned chamaeleon, Jackson's chamaeleon*





## The Greater Virunga Landscape Biodiversity

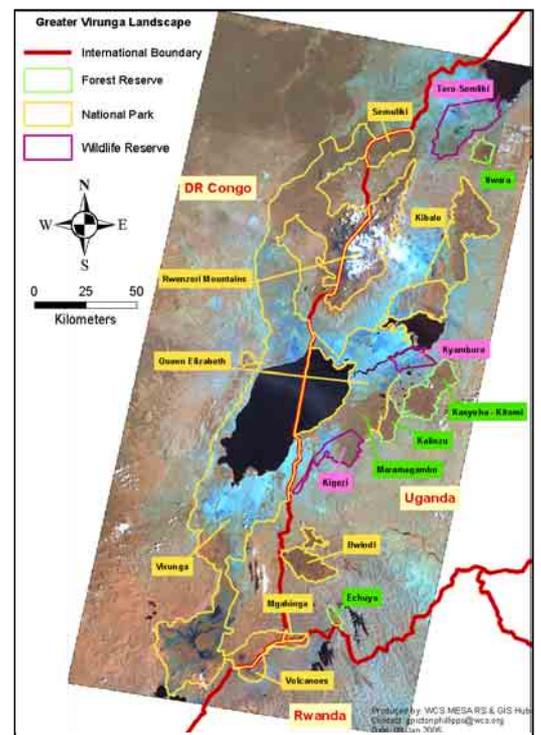
The Greater Virunga Landscape (GVL) straddles the international boundaries of the Democratic Republic of Congo (DRC), Rwanda and Uganda and includes three UNESCO World Heritage Sites and one Biosphere Reserve. Comprising eight national parks, two forest reserves and two wildlife reserves it covers an area of 13,200 km<sup>2</sup> of some of the most diverse habitats in Africa. These range from glaciers and rock at 5,100 metres (16,000 feet) down to lowland tropical forest at 600 metres (1,800 feet) and encompass montane forest, bamboo, savanna woodland and grassland, swamps, active volcanoes and volcanic lava. As a result the GVL contains more vertebrate species than any other landscape of contiguous protected areas in Africa, with 278 mammals, 871 birds, 134 reptiles, 84 amphibians and at least 81 fish species recorded. At least 3,180 plant species have also been collected in the GVL but this number is increasing all the time as more species are identified.

However, it is not just important because of its number of species. The GVL is also a critical landscape within the Albertine Rift. The Albertine Rift is an area that is globally identified as being important for conservation because of its high number of species that are found here and nowhere else. It is an Endemic Bird Area, Ecoregion and Biodiversity Hotspot under different global priority setting processes. The GVL contains many species endemic to the Albertine Rift including 30 mammals, 31 birds, 12 reptiles, 21 amphibians, 56 fish and at least 246 plants. At least 49 vertebrates and 27 plant species are also globally threatened under IUCN criteria (Critically endangered, Endangered or Vulnerable). Consequently the GVL is one of the most important conservation landscapes in Africa.

While for vertebrates we know what species occur in the GVL fairly well, there are many other taxa that have been poorly surveyed. It is likely that several amphibian and fish species could be discovered with more effort as well. We have little idea of how many of each species occur in the landscape or where they occur apart from large mammals in the savanna areas. WCS is undertaking surveys of mammals, birds and plants throughout the GVL with the aim of creating baseline numbers that can allow future monitoring of species of conservation concern in future.

There are several biological processes as well as the habitats and species that need to be conserved. This region had some of the highest biomasses of large mammals ever recorded on earth in the 1960s and these mammals had a major impact on determining habitat types. Hippos fertilise the waters of the lakes ensuring the productive fisheries and the forests soak up the rainfall and release the water slowly so that people benefit from streams that flow all year.

**Map 1.** Map of the Greater Virunga Landscape showing the various protected areas in the three countries. Virunga, Rwenzori and Bwindi Impenetrable National Parks are World Heritage Sites and Queen Elizabeth National Park is a Biosphere Reserve. WCS GIS Hub, Uganda



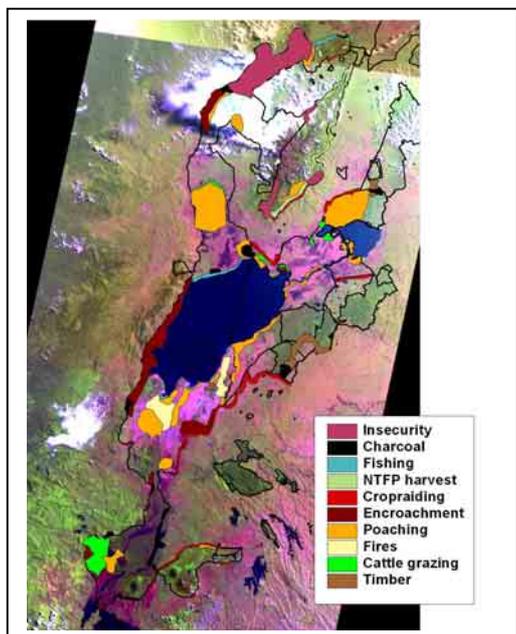
## Threats to the GVL

The human population density around parts of the GVL reaches 700 people per km<sup>2</sup>, 95% of whom are subsistence farmers. The population is increasing by 2-3% each year leading to a huge demand for farmland and consequently pressures on protected areas. These are some of the poorest people on the continent also and studies by WCS have shown that in certain seasons of the year when food is scarce the protected areas are very important in ensuring people can sustain themselves. Balancing people's needs with the sustainable management of the protected areas is a challenge.

The major direct threats that occur as a result of these underlying factors include poaching of large mammals, encroachment of habitat for farmland, fuelwood harvesting, timber harvesting, illegal grazing of livestock and harvesting of non-timber forest products. The Uganda Wildlife Authority (UWA), Institut Congolais pour la Conservation de la Nature (ICCN), and Office Rwandais pour le Tourisme et parcs Nationaux (ORTPN) tackle these threats in a variety of ways including law enforcement patrols, community conservation programmes, and working with District authorities and the police and military. The recent civil war in DRC has led to many pressures on the Virunga Park in particular and mapped threats show that this park is most impacted (map 2). It is impossible to access parts of this park because of rebel groups and military who have targeted parks staff, killing 11 rangers in 2004 alone.

WCS is working with ICCN (DRC) in particular to support the rehabilitation of patrol posts, providing basic field equipment and uniforms and some salary top-ups because ICCN staff haven't received any salary during the 7 years of civil war. In Uganda and Rwanda WCS is supporting aspects of transboundary law enforcement and training of staff to undertake applied monitoring and adaptive management (pages 5 & 6). We are supporting the monitoring of threats in the landscape and assessing whether the strategies being used to address these threats are succeeding or whether they need modifying and adapting to changing circumstances.

One particular potential threat to the GVL is the discovery of oil in the region. If large amounts were discovered it could have major environmental and social impacts, particularly as several of the exploration concessions are within the protected areas of the GVL. WCS will be assessing the environmental and social costs over the coming years and will be monitoring how the oil exploration progresses.



**Map 2.** Mapped threats occurring in the GVL. Threats are mapped on the outline of the landscape overlaid on a satellite image provided by Dr. N. Laporte, Woods Hole Research Centre





## Landscape Species

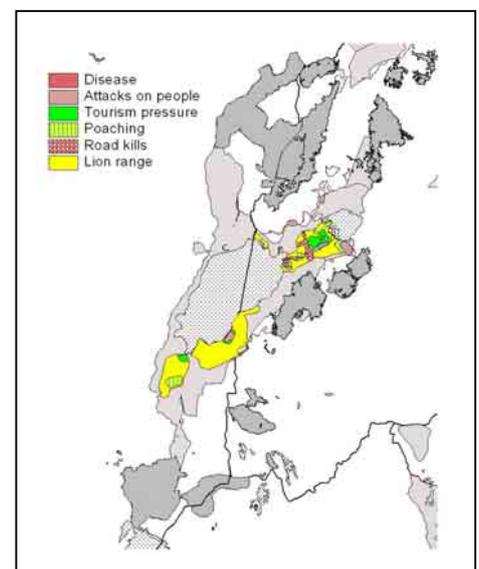
Landscape species are species that require management at a landscape scale rather than management within individual protected areas. Many planning processes for conservation areas assume that conserving habitats will assure the long term survival of all species present. Landscape species however will not survive if this approach is adopted and there is a need to ensure that specific management actions are taken to maintain their long-term viability. Landscape Species are usually wide ranging and occur at low density, are threatened, utilise a wide variety of habitats and have some socioeconomic significance. Large carnivores and ungulates are often landscape species as a result.

WCS recently led a process to identify Landscape Species for the GVL based on the approach developed by WCS's Living Landscapes Program in New York. Fourteen key landscape species were identified as being of primary concern and which use most of the habitats within the GVL : lion, leopard, elephant, buffalo, hippopotamus, gorilla, chimpanzee, golden cat, Rwenzori duiker, sitatunga, crowned eagle, lappet-faced vulture, lesser flamingo, and tilapia. The aim is to better understand the ecology of these species within the GVL so that specific management actions can be developed. For instance, a large carnivore project at Makerere University has identified that stress from tourist vehicles is leading to lower birth rates in the lion population in Queen Elisabeth National Park. Road mortality by speeding traffic through the park is also leading to a decline in the lion population. As a result management actions are being taken to address these threats to lions. Further research is needed in DRC to assess how many lions remain there and whether they mix with the Ugandan populations. WCS is beginning a study with UWA to look at large forest carnivores within the GVL, particularly leopards and golden cats using camera traps. A recent assessment of carnivores identified the golden cat as one of the least known carnivores in Africa.

WCS has been leading survey work in the GVL to assess and monitor ape populations. With the Jane Goodall Institute we surveyed forests in Uganda for chimpanzees and now have good baseline numbers from which populations can be monitored. We have also censused the mountain gorilla both in the Virunga Volcanoes and Bwindi Impenetrable National Park (both within the GVL) with our partners. These surveys show that the gorilla populations are steadily increasing and now total about 700 individuals.

Elephants are known to move back and forth between DRC and Uganda and since the 1960s they have taken refuge in neighbouring countries as first civil war broke out in Uganda in the 1970s and continued until the early 1980s and then in DRC in the 1990s and early 2000s. We have shown that the populations within the landscape have remained higher than we would expect because of this ability to flee to neighbouring countries.

**Map 3.** Lion range and threats to their survival identified for the GVL. Note the fragmented nature of their populations.



## Transboundary Collaboration

The GVL straddles three international borders; DRC, Uganda and Rwanda. The International Gorilla Conservation Programme (IGCP) has been supporting transboundary collaboration in the Virunga Volcanoes and Bwindi Impenetrable National Park since the early 1990s but this area is only about 5% of the GVL. There was a need to develop a similar collaboration throughout the landscape. ICCN and UWA started a process of informal meetings in 2003 but these did not have any finances and WCS was requested to help. WCS therefore started a program to support regular coordination between DRC and Uganda for the remaining transboundary areas in the GVL. These include Virunga, Queen Elizabeth, Rwenzori and Semuliki National Parks.

While the focus under the IGCP transboundary activities has been on the conservation of mountain gorillas, different issues are of concern in the area WCS is working with ICCN and UWA. Elephant poaching is a major concern in DRC in particular and there is some evidence that ivory is leaving DRC through Uganda. Similarly poaching for bushmeat has a transboundary nature with meat being poached in Uganda and sold in DRC. Illegal timber harvesting takes place in DRC and the wood is exported to Uganda and can move through to Kenya. The fisheries on Lake Edward also need to be managed through regional coordination because boats regularly cross the international border illegally to fish.

The transboundary activities that WCS supports include:

### *Law enforcement*

Often people involved in illegal activities are arrested outside their country but are rarely prosecuted as a result – they are usually deported and return almost immediately to their activities. The ability to coordinate law enforcement efforts so that people arrested can be handed over to their counterpart organisation is helping reduce poaching in this landscape. Coordinated patrols take place regularly with UWA and ICCN rangers maintaining contact as they patrol the international border enabling them to intercept poachers who try to flee across the border.

### *Intelligence network*

Cross-border intelligence sharing is helping tackle some of the transboundary trade in ivory, timber and bushmeat. UWA and ICCN are working with police, customs and the military to tackle this trade but it is a constantly changing scene and there is a need for regular vigilance and monitoring.

### *Information sharing and joint planning*

Regular wardens meetings (every quarter) and regional meetings between all partners and protected area staff (every six months) take place to ensure better cross-border coordination of activities and sharing of information about what is taking place. The regional meetings are used to provide training, as well as resolve critical issues affecting the GVL.

### *Monitoring*

Ranger-based monitoring is taking place in all three countries and most protected areas in the GVL. The harmonisation of methods has been made to ensure comparability of data. WCS will be working with ICCN and UWA to develop transboundary comparisons of the data collected and regular updates of the status of the GVL.





## Monitoring and Adaptive Management

Management of any protected area should be a process of learning and adaptation. The complexity of ecosystems means that their management is far from simple and there is a need to adapt strategies as the need arises. This requires a process of monitoring to be able to firstly assess changes that are taking place and then secondly to take action when needed to address these changes.

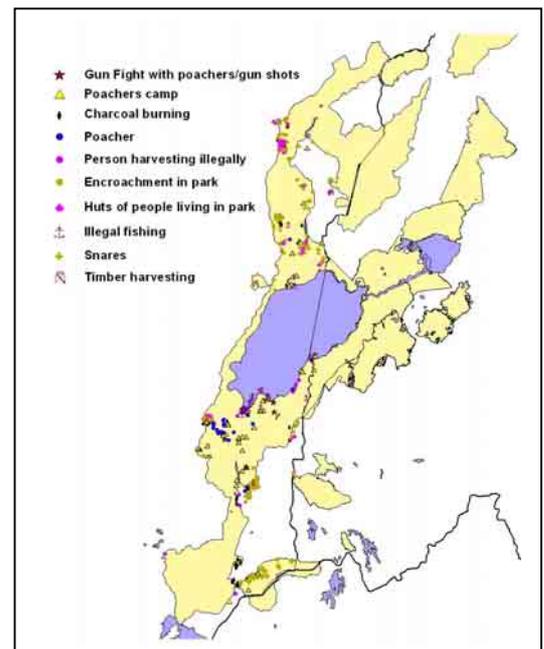
WCS has been supporting Uganda and Rwanda and will soon be supporting DRC to develop monitoring plans for the GVL protected areas. A standard process has been developed that ensures that monitoring parameters and indicators provide useful information to allow adaptive management :

- Initially a process identifies the conservation targets for the protected area
- Threats to the conservation targets are then identified and ranked
- The strategies that are being adopted to address these threats are listed
- Monitoring parameters and indicators (where they cannot be directly measured) are then identified
- Who is responsible, who collects the data and when it is analysed and summarised are identified
- Annual assessments of trends are made to identify which strategies may not be succeeding and may need adapting.

Monitoring can take place at several scales: large scale (satellite image analysis); protected area scale (ranger-based monitoring) and detailed scale (sites within protected areas). WCS is supporting monitoring at all three scales within the GVL. At the largest scale we have been working with the University of Maryland and Woods Hole Research Centre to assess forest loss in and around the GVL and Albertine Rift since the mid 1980s. At the protected area scale we have been supporting the development of ranger-based monitoring in Virunga, Queen Elizabeth, Rwenzori, Kibale and Semuliki national parks (map 4). Ranger-based monitoring involves rangers collecting data on illegal activities and sightings of key species while on antipoaching patrols. At the smallest scale WCS is supporting research by the Institute for Tropical Forest Conservation (ITFC), part of Mbarara University, to monitor legal harvesting of plants in sustainable use areas, water quality, attitudes towards conservation and mountain gorilla populations in Bwindi Impenetrable National Park. We are also starting a process of large carnivore monitoring with UWA wardens for monitoring and research using camera trapping techniques.

Monitoring of socioeconomic information is also planned as baseline data are collected around the GVL. These will include measures of wealth, use of forest products and attitudes towards conservation.

**Map 4.** Illegal activities recorded by rangers in Virunga park between March and August 2004.. From ICCN ranger data.



## Capacity building of Protected Area Authority Staff

WCS believes that it is critical that protected area authorities build the skills to be able to undertake the full management of this landscape themselves. We do not want to support the same activities forever as ultimately this will not be sustainable. We try as far as possible to keep WCS staff to a minimum and to implement our activities through the protected area authority staff. Consequently a large part of our focus in the GVL is training and building the capacity of UWA, ICCN and ORTPN staff.

These days with most people using computers there is a need train wardens in their use. Much of the ranger-based monitoring data are entered in computers, either in MS Excel or MIST (Management Information System), a computer package designed by GTZ and Ecological Software Solutions for UWA. Data from the ranger-based monitoring need to be analysed to compute trends in the data and this is achieved in MS Excel. WCS has been training UWA wardens in survey methods using perpendicular distance sampling and the software DISTANCE.

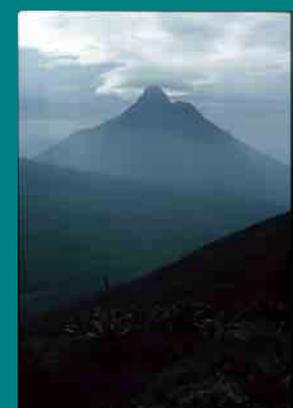
Training is also needed in management skills and the latest conservation thinking and ideas. It is hard for protected area staff in Africa to keep abreast of the current ideas and techniques. Issues such as landscape species analysis, adaptive management and monitoring, conflict resolution skills, remote sensing monitoring, priority setting for conservation, Integrated Conservation and Development projects etc. are currently undergoing a fair amount of thinking and revision. These ideas need communicating to people involved in the management of protected areas on the ground.

## Long-term financial sustainability

The long-term survival of the GVL depends on regular financial support. At present most protected areas in the GVL do not generate sufficient funds to be self financing (only the gorilla tourism sites do). Much of the funding for these areas comes from donors and this can fluctuate from very high amounts to nothing depending on the political and security situation as well as the trends in funding of the donor community. Consequently there is a need to identify more stable sources of funds.

WCS is developing a program to support :

- the economic valuation of protected areas in the GVL to be able to argue that they provide environmental services that should be paid for by businesses, government or the international community. To date we have shown that montane forest in Rwenzori park is worth about \$14,300 per square kilometre per year to people living around its borders or \$13.8 million/year for this massif alone. Currently the government does not value these services in the national accounting and so assume forests are disposable if another landuse is proposed.
- training UWA and ICCN in the development of business plans for each protected area to identify the real costs of the management of these areas and possible funding sources beside ecotourism
- identification of possible sustainable funding sources outside tourism and the piloting of potential mechanisms.





Dawn over the GVL

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## Summary of WCS Activities

WCS is promoting the management of this larger landscape with its protected area authority and NGO partners. Only a concerted effort by everyone will ensure that an area of this size is managed coherently. WCS objectives in the landscape are focused on transboundary collaboration between DRC and Uganda, monitoring the threats and species within the landscape and building the capacity of UWA) ICCN and ORTPN to undertake adaptive management using monitoring results. Using WCS's Living Landscapes Approach we are assessing which species may need more active management interventions than they currently receive.

Current interventions include:

- Transboundary natural resource management between Uganda Wildlife Authority (UWA) and ICCN to support field activities to tackle regional and transboundary threats: coordinated patrols by the two institutions, regional wardens and technical meeting, intelligence information gathering and public awareness,
- Developing and supporting a ranger based monitoring system throughout the landscape that can be used to manage in an adaptive manner
- Surveys and research: We have completed biodiversity surveys of the Virunga Volcanoes, Bwindi, Kibale, Rwenzori, Semuliki and forest reserves in Uganda and plan to undertake more surveys when security improves in parts of Virunga park in DR Congo.

## Next Steps

- Work with partners to develop a landscape management plan
- Undertake landscape species analyses
- Support transboundary collaboration and management and improve its sustainability
- Develop business plans and look at sustainable financing possibilities
- Investigate the recent discovery of oil in the region and its possible impacts on the landscape
- Implementation of monitoring plans and institutionalising adaptive management

## Partners

This support to the GVL is managed by WCS's Albertine Rift and DR Congo programs. We work with UWA, ICCN and ORTPN closely and with several other International and national NGO partners.

## The Greater Virunga Landscape contains more vertebrate species than any other landscape in Africa

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[www.albertinerift.org](http://www.albertinerift.org)

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### Mission

The Wildlife Conservation Society's International Conservation program saves wildlife and wild lands by understanding and resolving critical problems that threaten key species and large, wild ecosystems around the world.

- **WCS Strategies**
- Site-based conservation
- Research
- Training and capacity-building
- New model development
- Informing policy
- Linking zoo-based and field-based conservation

### Support this Project!

Contributions to this project can be sent to the WCS Africa Program in NY (address above).

