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CONSERVATION ACTION PLAN 2012 – 2022 FOR THE GRAUER'S GORILLAS AND CHIMPANZEES IN EASTERN DEMOCRATIC REPUBLIC OF CONGO

IUCN

Grauer's Gorillas and Chimpanzees in Eastern Democratic Republic of Congo

(Kahuzi-Biega, Maiko, Tayna and Itombwe Landscape) Conservation Action Plan 2012-2022

SSC
Species Survival Commission

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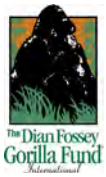
Web: www.primate-sg.org/

Grauer's Gorillas and Chimpanzees in Eastern Democratic Republic of Congo

(Kahuzi-Biega, Maiko, Tayna and Itombwe Landscape) Conservation Action Plan 2012-2022

Compiled and edited by Oscar Maldonado, Conrad Aveling, Debby Cox, Stuart Nixon, Radar Nishuli, Dario Merlo, Lilian Pintea & Elizabeth A. Williamson



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Foreword

the Jane Goodall Institute

In 2005, the Jane Goodall Institute began working in the eastern part of the Democratic Republic of the Congo (DRC). When we first initiated our projects there, we focused on the linkages between population, health and the environment thanks to funding from the American people through the U.S. Agency for International Development.

Over time, our work in DRC evolved to include the development of a Great Ape Conservation Action Plan (CAP) as DRC is critical to the survival of the great apes. DRC is the only country in the world to have the presence of so many of them—from chimpanzees and bonobos to gorillas, both Grauer's and mountain. In fact, it is home to an estimated 200,000 chimpanzees, the largest population in Africa.

The CAP process was led by the Jane Goodall Institute thanks to support from the Arcus and World We Want foundations. The process brought together 75 representatives from government institutions, including environment, mining, agriculture, security services, and the Institut Congolais pour la Conservation de la Nature (ICCN) – the national parks service. In addition, the process included more than 15 non-governmental organizations (NGOs) working on conservation and development in the landscape. This collaboration was the first of its kind in the region and I commend all the organizations that took part.

The CAP covered a very large area totalling more than 260,000 square kilometres of forest habitat stretched over five provinces and 20 territorial governments. When the researchers came together and shared their data, they noted that there had been an alarming drop in known numbers of Grauer's gorillas.

The threats to chimpanzees and Grauer's gorillas are numerous, including the illegal commercial bushmeat trade and habitat degradation. Through the CAP process, we know where their populations are, where we need more information, and what we can start doing immediately to ensure that our closest living relatives are still thriving many years from now.

Despite the threats and challenges identified by the stakeholders and the remaining instability in parts of eastern DRC, there is now hope for the survival of great apes. Their fate lies in the hands of the various organizations that have committed to implementing the CAP and meeting its collective goals. This is a great responsibility and those involved in chartering a course for conservation of the great apes in this region should be proud.

The time for action to save the Grauer's gorillas and chimpanzees in eastern DRC is now. I encourage you to join this ambitious effort.

Jane Goodall, Ph.D., DBE
Founder – the Jane Goodall Institute & UN Messenger of Peace
www.janegoodall.org

Goma workshop participants

1. Executive Summary

In January 2011, the Jane Goodall Institute convened conservation partners to develop a conservation action plan for great apes in eastern Democratic Republic of Congo, in collaboration with the Ministry of Environment, Nature Conservation & Tourism and the Institut Congolais pour Conservation de la Nature. The main goal of this initiative was to identify critical threats to gorillas, chimpanzees and their habitats in the landscape, and to develop conservation strategies to address these threats. The Nature Conservancy's Conservation Action Planning methodology was followed. This approach is widely used and recognized as a rigorous, robust, and logical methodology due to the emphasis on science and use of the best available information. Given the vast area of the landscape and availability of the experts, partners and key actors, the conservation plan was conceived during a series of workshops with precise objectives, themselves preceded by preparatory meetings.

To guide the planning and implementation of this plan, the following vision was conceived and ratified by the participants in the workshops: *Viable populations of Grauer's gorillas, an endemic species, and chimpanzees in eastern DRC, their ecological diversity, together with the integrity and viability of their habitat, are ensured by the commitment of communities and authorities at all levels, forming a source of national pride.* The geographic scope of the plan was defined as a vast region of 268,814 km^2, bounded by the Lindi and Ituri rivers in the north, the Congo River in the west (a natural barrier to the distribution of chimpanzees) and the border with Rwanda in the east. In the south, the landscape includes the territory of Kalemie between Luama-Kivu and Lake Tanganyika, and extends into the provinces of Maniema and Katanga. The actors in this region represent a wide range of stakeholders, including local communities (both rural, living in the forest, and urban), local authorities (police, administrative and traditional authorities) and national authorities (the Institut Congolais pour la Conservation de la Nature and ministries, in particular the Ministry of Environment, Nature Conservation & Tourism). International conservation NGOs, local environmental and development NGOs, universities and research institutes also play an important part. In relation to threats, actors such as rebels, poachers and illegal miners were identified.

The conservation targets (species, ecological systems or ecological communities selected as the primary objectives of the conservation actions) were chosen in view of their importance for the conservation goals in the framework of the plan. The three conservation targets chosen were:

Young Grauer's gorilla in a group habituated for tourism in KBNP © John Martin

(1) The ecological and cultural diversity of eastern chimpanzees; (2) The socio-ecological diversity of Grauer's gorillas; and (3) Habitat diversity and connectivity.

Given that the strategies were developed around the three conservation goals, some components were repeated in the strategies for more than one goal. The strategies were later regrouped and composed by theme in order to avoid duplication and facilitate understanding of the strategies and the development of the workplan. The final result was the following:

- Strategy for assessing priority populations of great apes in the landscape
- Strategy for raising awareness and involving the population in conservation
- Strategy for consolidating land management
- Strategy for reinforcing protected areas, community forests and sanctuaries
- Strategy for enforcing law within the landscape

Adult male (silverback) Grauer's gorilla, KBNP © John Martin

2. Introduction

In 2011, the Jane Goodall Institute (JGI) convened conservation partners to develop a conservation action plan for great apes in eastern Democratic Republic of Congo (DRC), with financial support from the Arcus and World We Want foundations. The main goal of this initiative was to identify critical threats to gorillas, chimpanzees and their habitats in the landscape, and to develop conservation strategies to address these threats. Emphasis was placed on activities at a systemic and strategic level that could add value to the large-scale planning effort vis-à-vis site-level efforts. JGI, in collaboration with the Ministry of Environment, Nature Conservation & Tourism (MECNT) and the Institut Congolais pour Conservation de la Nature (ICCN), worked closely with many provincial and local Congolese stakeholders and international conservation organizations. Workshop participants are listed in Appendix I.

2.1 The Planning Process

2.1.1 Methodology

This conservation plan was developed using the Nature Conservancy's Conservation Action Planning (CAP) methodology. The TNC CAP is used throughout the world, recognized as rigorous, robust and logical, particularly because of its emphasis on science and on using the best information available. More than just a conservation planning methodology, the TNC CAP is a systematic approach to the management of conservation projects. It is based on the identification of conservation priorities ('Conservation Targets') in a precise geographic area ('Scope of the Project'), viability assessments of the targets, threats to the targets, as well as the context and important actors. These elements form the foundation for developing conservation strategies with precise, concrete and measurable objectives, as well as plans of action and monitoring with measures of success.

The advantage of the TNC CAP vis-à-vis other conservation planning methodologies is that it provides a solid platform for the later execution of activities and monitoring (measures of success) and encourages continuous revision, based on the plan's performance, as well as adaptive management. The following graphic shows the different phases of a TNC CAP in project management. In this diagram, the yellow circles at the top and on the right show the steps related to planning.

Figure 1. Conservation Action Planning © TNC

2.1.2 The Process

Given the large size of the landscape and availability of the experts, partners and key actors, the conservation action plan was conceived during a series of consecutive workshops with precise objectives, themselves preceded by preparatory meetings.

Preliminary Meetings
Meetings with the principal stakeholders were held in November 2010 and January 2011, to explain the CAP process and prepare participants to bring the maximum amount of information to the workshops.

First Workshop in Goma (7–8 February 2011)
The aim of the first meeting was to conceptualize the conservation plan for great apes in eastern DRC. More precisely, the scope of the plan, the conservation targets and a vision for the plan were addressed. The participants also developed analyses of the main threats negatively affecting the viability of the conservation targets. This meeting included multiple experts with advanced knowledge on the status of great apes in this region.

Second Workshop in Goma (9–11 February 2011)
This workshop brought together actors from Maiko, Tayna, Kisimba, Ikobo and the UGADEC Reserves and was designed to develop conservation strategies for the northern region of the conservation zone. That said, the participants found that their proposals were also applicable for the southern region, which is why their initiatives were presented at the third workshop.

Third Workshop in Bukavu (14–16 February 2011)
Having already developed a draft version of conservation strategies in Goma, the third workshop set out to complete and validate that work, and to prepare an initial version of the monitoring plan and measures of success.

2.2 Vision for the Conservation Action Plan for Great Apes in Eastern DRC

According to CAP methodology, a vision is a general summary of the desired state or ultimate condition of the project area or scope that a project is working to achieve. A good vision statement meets the criteria of being relatively general, visionary and brief. For most biodiversity conservation projects, the vision will describe the desired state of the biodiversity of the project area. Taking this definition into account, the workshop participants composed and agreed upon the following vision:

Viable populations of Grauer's gorillas, an endemic species, and chimpanzees in eastern DRC, their ecological diversity, together with the integrity and viability of their habitat, are ensured by the commitment of communities and authorities at all levels, forming a source of national pride.

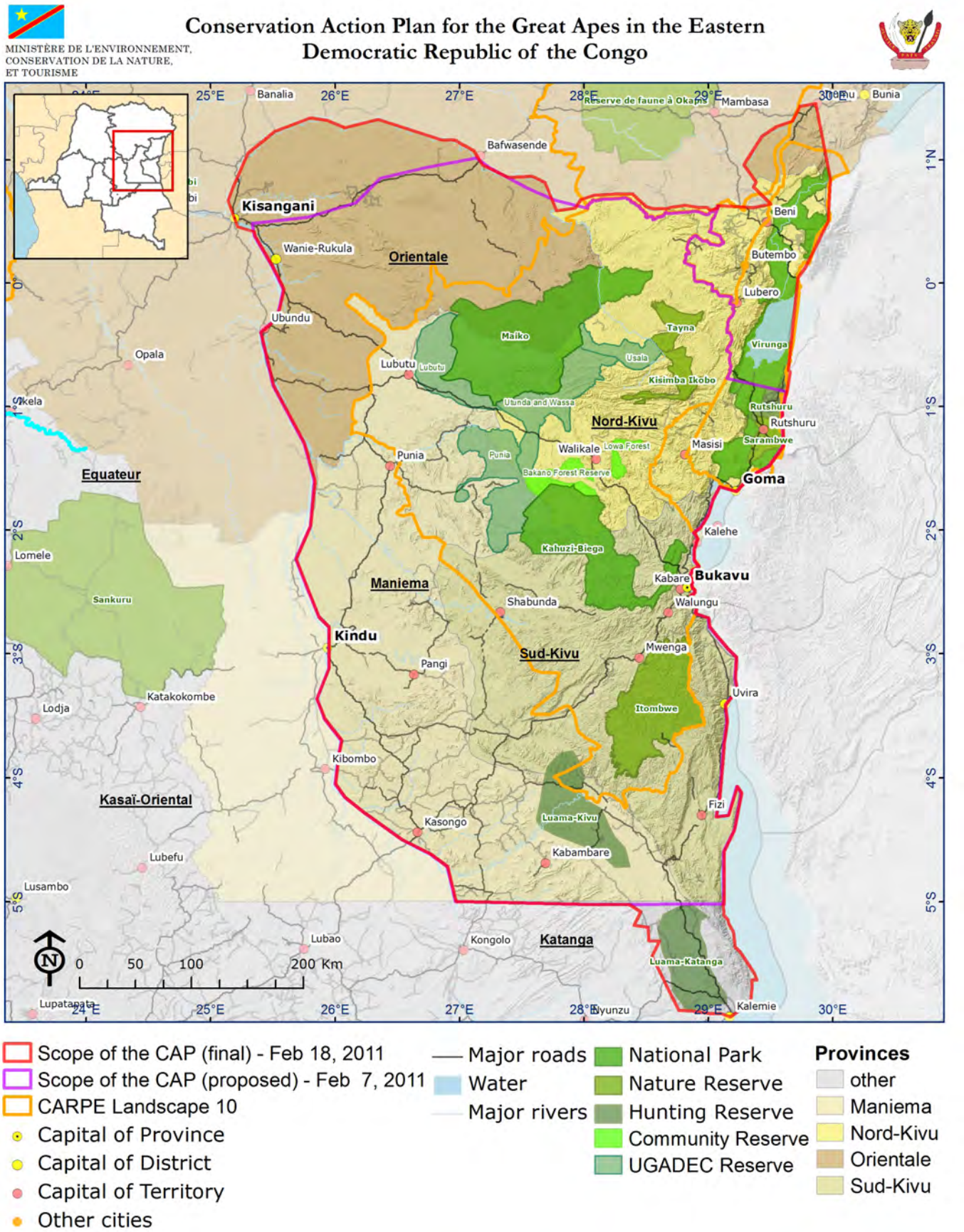
2.3 Geographic Context and Scope of the Plan

Eastern DRC comprises a spectacular range of habitats and constitutes one of the highest biodiversity areas in Africa. The region is dominated by lowland rainforest (~600–1,000 m elevation) and transitional forests (~1,000–1,700 m elevation). In the east, the Albertine Rift is dominated by mid-altitude forests and montane forests (1,700–3,475 m elevation, Mount Kahuzi being the highest peak). It is Africa's richest region for vertebrates and contains numerous endemic and threatened species (402 mammal species of which 34 are endemic; 5,793 plant species with 567 endemics). Heading west, the land descends progressively towards the dense, humid forests of the plains (400 m elevation along the Lualaba River).

This region is particularly important because of the intact forest covering much of its surface area. Recent studies of the Congo Basin forests indicate that the rates of deforestation in the DRC (which fluctuate between 0.2% and 0.3% per year) are among the lowest for tropical forest regions (MECNT 2009). However, if no strict forest protection measures are taken, this could change in the near future when conflict comes to an end and the country's economy starts to recover. In this respect, the development of industrial extractive industries (forestry and mining) will undoubtedly have negative impacts on the integrity of the target habitats.

The geographic scope of this plan encompasses an area of 268,814 km^2 bounded by the Lindi and Ituri rivers in the north, the Congo River in the west (a natural barrier to the distribution of chimpanzees)

Figure 2. Geographic scope of the conservation plan for great apes in eastern DRC



and the border with Rwanda in the east. In the south, the landscape includes the territory of Kalemie between Luama-Kivu and Lake Tanganyika, and extends into the provinces of Maniema and Katanga.

Initially, this plan was to focus on USAID's Central African Regional Programme for the Environment (CARPE) Maiko-Tayna-Kahuzi-Biega (including Itombwe) Landscape, Landscape 10, which encompasses the range of Grauer's gorillas but did not take into account the chimpanzees' range. For example, certain priority sites identified in the IUCN action plan for eastern chimpanzees (Plumptre *et al*. 2010) were not initially to be included in this plan. However, during the first workshop in Goma, ICCN and other stakeholders recommended including Luama-Kivu, south of Itombwe, a habitat judged important for chimpanzees that are highly threatened by poaching. During the same meeting, great apes experts proposed including the northern sector of Virunga National Park and the area north of CARPE Landscape 10 between Maiko National Park to the Ituri River. Tongo and Watalinga in Virunga National Park were added for their chimpanzee populations and Mount Tshiaberimu for a small population of Grauer's gorillas. These great ape populations are unique for their ecological diversity (occupying volcanic habitat and high altitude forests) and for their tourism potential.

2.4 The Human Context

Few demographic data are available for eastern DRC, especially since there have been large displacements of people due to armed conflicts in the region. In general, the human population is unevenly distributed, with density decreasing from east to west: the west is scarcely populated and about 80% is covered by lowland forest with no permanent settlements, while in the east human density in the highlands of the Albertine Rift reaches more than 300 inhabitants/km^2 (OFAC 2012). Around one third of this population is under 20 years of age.

The most widespread activities are farming, hunting, charcoal production and artisanal mining. In the west, farming is slash-and-burn and the main crops are manioc, rice and beans. In the east, people practice more permanent and intensive farming techniques. Near to villages one can find oil palm, banana, coffee and cocoa plantations. Palm oil, extracted manually, is an important product in the local markets. Most of the old commercial plantations are no longer operational. Large scale cattle breeding for meat and dairy products is limited to the more temperate eastern highlands.

Subsistence hunting is an omnipresent activity and mainly small ungulates, rodents and primates are targeted. The demand for bushmeat is particularly high around mining sites and villages close to forest. River fishing is practiced throughout the area, but a fishing culture exists in only a few localities.

Artisanal mining of gold, tin, tungsten, diamonds and, above all, coltan, seems to be intense in the entire region. The asphalt road between Walikale and Lubutu is often used as a landing strip

Artisanal mining in Lubutu © Stuart Nixon/FFI

by planes transporting minerals and sometimes passengers or those coming from urban centres. There are also multiple industrial gold mining concessions, notably near Bukavu (de Wasseige *et al*. 2009). However, in-depth studies should be undertaken.

There are few commercial logging concessions in the region, but small artisanal operations are everywhere. Charcoal production to supply urban centres is a major business in the east. Around Goma and Bukavu, charcoal production is particularly intense, even inside the national parks. The monthly consumption of fuel is estimated at 15 kg per inhabitant.

2.5 Actors and Stakeholders

There are many actors in the Grauer's landscape. The following is a brief description of a few that could have an impact on the conservation targets:

Rural people living in the forests. These people essentially live off subsistence slash-and-burn farming, which leads to progressive degradation of forest cover. As demographic pressure increases, fallow periods diminish and more forest is degraded. These populations are also dependent on natural forest resources such as bushmeat, fish and medicinal plants, and timber products (construction wood, firewood, charcoal). When subsistence activities become commercialized, as in the bushmeat trade, this contributes to impoverishment of forest resources.

Urban populations. Between 30% and 40% of people in DRC live in urban centres in difficult economic circumstances (World Bank 2012). They suffer a quasi-generalized lack of basic services—poor or nonexistent access to potable water, rare and unstable electricity, combined with a relatively slow development of basic infrastructure and facilities such as schools and health centres—and more than ever the urban population is dependent on forest resources. This dependence creates a demand in rural areas, which often leads to overexploitation. This is the case for the large and medium-sized mammals that become more and more scarce once commercial exploitation is established to meet urban demands. The demand for firewood and charcoal has devastating impacts on the forest surrounding urban centres.

Public Security Services (police, gendarmes, military, border security) are deployed throughout the landscape and are essential to the success of this conservation plan. These services can be involved in law enforcement measures in cooperation with ICCN and its conservation partners. During the insecurity of the last 15 years, certain factions of the security services and armed groups have facilitated or participated in illegal trafficking. The progressive return of peace should increase control over the agents, improve the intervention capacities of these services and avoid situations in which certain elements are complicit in some form in illegal trafficking.

Firewood being taken out of the forests of Maniema © Liz Williamson

The local administrative authorities are a major political partner and will help to ensure the effective implementation of this plan. Weakness of the provincial administrative institutions, linked to the unstable circumstances of the past, have limited the enforcement of regulations (forest, conservation, mining, among others). This situation is improving and the participation of territorial administrators in the development of this plan leaves hope for its wholehearted appropriation.

Traditional authorities. In DRC, traditional authorities are important and traditional leaders still have a mediating and counselling role for their people. When traditional authorities participate in conservation activities and rational use of natural resources, the results can be encouraging. ICCN and its conservation NGO partners should try to systematically involve traditional authorities in their activities.

Rebels and other armed groups. The various rebel groups and armed bands in eastern DRC constitute a clear threat within the landscape even though recent deployments of the Congolese Armed Forces are striving to reduce their presence. In addition to the atmosphere of insecurity attributed to these factions, they are accused of illegal exploitation of natural resources, particularly minerals.

ICCN has a mandate to manage the protected areas and to intervene within a 50-km buffer around protected areas. It also has a mandate to ensure legally protected species are protected throughout DRC. However, ICCN lacks resources, which is why NGOs and partner agencies provide financial and logistic support, and assist with the implementation of conservation projects. Because of its mandate, ICCN will be the key actor in the implementation of this plan.

Research institutes and universities are actively involved in ecological monitoring of great apes and their habitat. Researchers from Lwiro Centre for Research in Natural Sciences, park staff, teachers and students from two universities in Bukavu participate in studies of the flora and fauna in protected areas (KBNP, Itombwe Nature Reserve and Tayna Nature Reserve) assisted by international researchers. The universities provide students to investigate research topics related to protected area management and propose possible solutions to these management problems.

International conservation NGOs and donor agencies. Given the exceptional biological importance of the landscape, multiple donors and international NGOs are working to support conservation and natural resources management in eastern DRC. For example, the EC and GIZ (formerly GTZ, which has supported KBNP since 1983). USAID, through its CARPE programme, operates in the Maiko-Tayna-Kahuzi-Biega (including Itombwe) Landscape, which makes up more than half of the area covered by this CAP.

Local NGOs. Numerous local development and environmental NGOs operate in the Grauer's landscape. These include POPOF and UGADEC.

A member of ICCN staff talking to government soldiers about the need to protect forests and wildlife © ICCN/KBNP

3. Conservation Targets

The conservation targets are species, communities and ecological systems that are chosen to represent and encompass the full array of biodiversity found in a project area. They are the basis for setting goals, carrying out conservation actions, and measuring conservation effectiveness.

The three conservation targets chosen for eastern DRC were:

- Ecological and cultural diversity of eastern chimpanzees
- Socio-ecological diversity of Grauer's gorillas
- Habitat diversity and connectivity

3.1 Ecological and Cultural Diversity of Eastern Chimpanzees

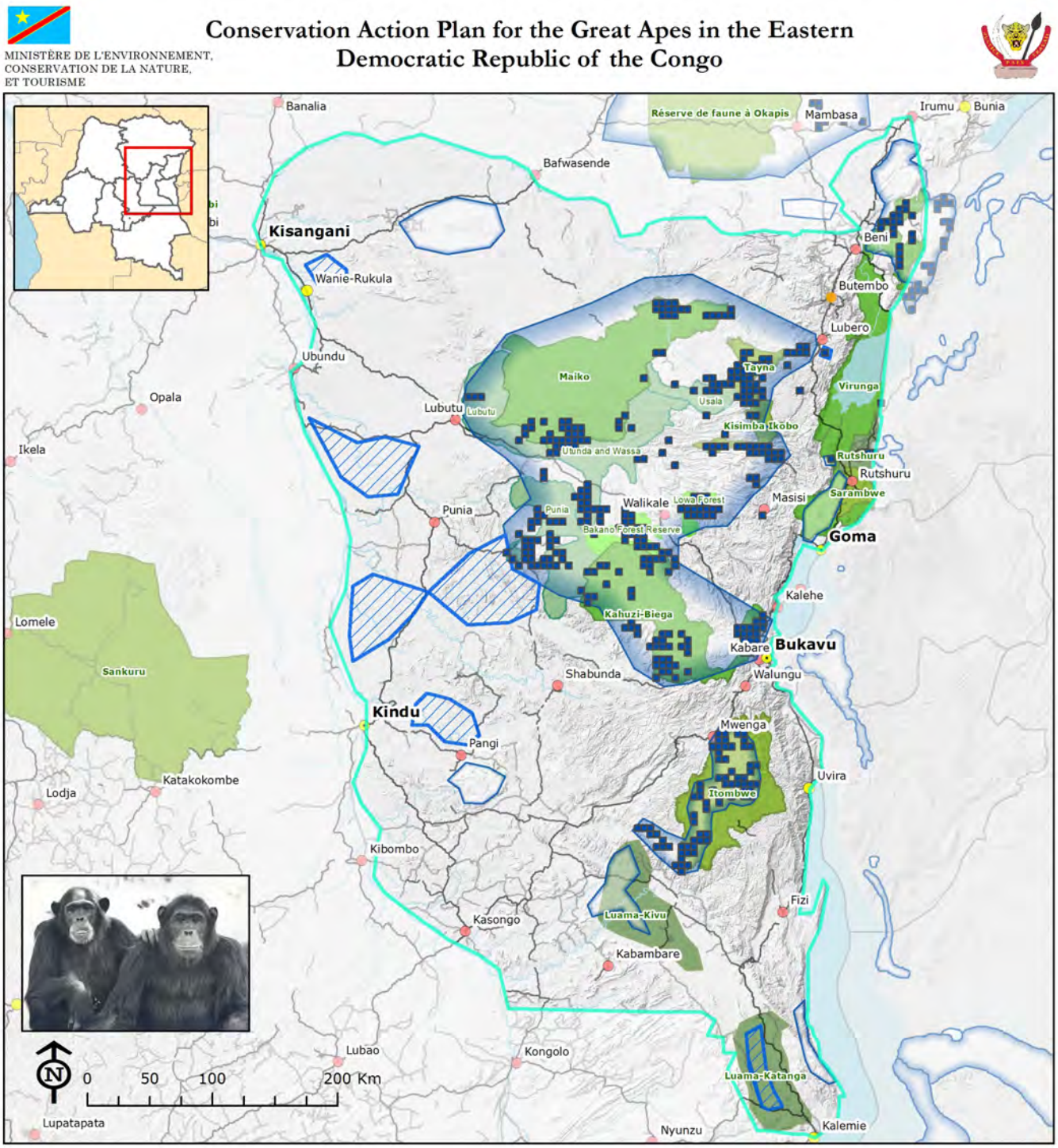
The chimpanzee (*Pan troglodytes*) is one of the three species of great ape found in DRC, the others being the eastern gorilla (*Gorilla beringei*) and the bonobo (*Pan paniscus*). Chimpanzees are currently divided into four subspecies, one being the eastern chimpanzee (*Pan troglodytes schweinfurthii*), which is found in eastern and northern DRC. This subspecies is the most numerous of the four. It occupies an area estimated at about 874,000 km^2, the largest population is found in eastern DRC (Plumptre *et al*. 2010). About a quarter of eastern chimpanzees occur within the geographic scope of this plan.

Groves (2005) described morphological differences in the skull size and limb length of chimpanzees in northern DRC and Central African Republic compared with those in southeastern DRC. Consequently, he proposed separating *Pan troglodytes schweinfurthii* into two groups, naming those of the southeast *Pan troglodytes marungensis*. However, this classification has not been accepted by the scientific community, mainly because of a lack of a clear limit between the two proposed taxa (Plumptre *et al*. 2010). Nonetheless, for the purposes of this plan, it is important to note that there is still little published information about the morphology and culture of chimpanzees in eastern DRC. Thus the loss of any subpopulation could lead to the extinction of a culturally distinct group, emphasizing the vital importance of conserving as many subpopulations as possible.

Chimpanzees are more versatile than gorillas in terms of the habitats they are able to occupy. They adapt to a wide range of habitat types, including forest-savanna mosaic, woodlands and humid tropical forests, and range from sea level to 2,790 m elevation (Kortlandt 1983; Butynski 2003; Gross Camp *et al*. 2009). Chimpanzees are fundamentally frugivorous, so they depend on forests having a high fruit production, from which we see the importance of access to both primary and

Adult male eastern chimpanzee feeding on figs
© Alain Houle

Figure 3. Distribution of chimpanzees in eastern DRC © Lilian Pintea



secondary forests. The loss of large areas of forest and the degradation of their habitat could cause reductions in chimpanzee numbers, leading to their local extinction in the medium to long term. If forest degradation and fragmentation by mining and forestry operations, as well as by human demographic pressures on natural habitats, continue to increase (Potapov *et al*. 2012), this risk is not far from becoming reality in some areas.

Chimpanzees live in communities of 20–150 individuals (Watts 2004). They have a complex multi-male and territorial social system. Their fission-fusion society allows communities to disperse in parties of differing size and composition during the day. Communities can thus regroup or separate while maintaining social relations and defending the home range (Goodall 1986; Emery Thompson & Wrangham 2013; Williamson *et al*. 2013).

Chimpanzees are both terrestrial and arboreal and they locomote by brachiation, bipedalism, quadrumanous climbing and quadrupedal knuckle-walking (ibid.). They eat and rest on the ground and in the trees, but when moving if travelling long distances, they always travel on the ground, which makes them vulnerable to direct and even indirect hunting, as they can be caught by traps and snares intended for other animals (Muller & Wrangham 2000).

Chimpanzees build nests to sleep in every night, occasionally reusing a nest (e.g., Brownlow *et al*. 2001). They construct night nests in circular fashion in trees using solid branches as a foundation or in the form of a fork and bending, breaking and interlacing the branches (e.g., Humle 2003). They also construct day nests on the ground (e.g., Goodall 1986). Nests can be used to estimate the size of great ape populations and are particularly useful when populations are not habituated to human presence and cannot be observed directly (Kühl *et al*. 2008).

All chimpanzee taxa are classified as Endangered on the Red List of Threatened Species (IUCN 2012). Under the Convention on the International Trade of Species of Wild Fauna and Flora (CITES), chimpanzees are classified in Appendix I, which comprises all species threatened with extinction of their specimens or parts is authorized only in exceptional conditions (Rosser *et al*. 2001). Chimpanzees received protected status in 1969 under Congolese law (Law No. 69, 22 August 1969).

Chimpanzee at Tongo in Virunga National Park © The Forgotten Parks

The ancestral lines of humans and chimpanzees are thought to have separated about five million years ago. Chimpanzees and humans share about 98% of their DNA and, in biological terms, chimpanzees are more closely related to humans than they are to gorillas (Williamson *et al*. 2013). Because of this close proximity between humans and chimpanzees, the conservation and survival of the latter has as much a moral as a practical implication.

3.2 Socio-Ecological Diversity of Grauer's Gorillas

Grauer's gorilla (*Gorilla beringei graueri*) is endemic to the mixed tropical and montane forests of the western Albertine Rift escarpment and eastern lowlands of DRC. It is classified as Endangered on the IUCN Red List (IUCN 2012), listed on Appendix I of CITES, and has full legal protection under DRC and international laws.

Grauer's gorilla is one of two subspecies of eastern gorilla (*Gorilla beringei*), the other being the mountain gorilla (*Gorilla beringei beringei),* found in the Virunga Volcanoes of DRC, Rwanda, and Uganda, and the Bwindi and Sarambwe forests of Uganda and DRC. Grauer's gorilla is often called the eastern lowland gorilla, though this nomenclature is misleading as the subspecies occurs over the widest altitudinal range of any gorilla, from approximately 600 m to 2,900 m, overlapping considerably with the altitudinal range of the mountain gorilla (1,400–3,800 m; Williamson *et al*. 2013). Grauer's gorilla populations are geographically isolated from mountain gorilla populations, and a distance of approximately 900 km separates eastern from western gorillas (*Gorilla gorilla*). The largest on average of all gorilla taxa (Goodall & Groves 1977), significantly less is known about Grauer's gorilla ecology and behaviour than about either mountain or western gorillas, although several studies have revealed a diet rich in herbaceous vegetation, lianas and vines, leaves, bark, rotting wood, seasonally available fruits, bamboo at higher altitudes, and occasionally ants and other small invertebrates (Goodall 1977; Schaller 1963; Yamagiwa *et al*. 2005). As Grauer's gorillas have a preference for plant species associated with regenerating forests, they are often found near active or abandoned agricultural clearings, mines, villages and other sites of human disturbance (Schaller 1963; Omari *et al*. 1999; Nixon *et al*. 2006; Nixon *et al*. 2007). Grauer's gorillas also opportunistically raid fields to feed on crops such as bananas and sugar cane. Like the other gorilla taxa, Grauer's gorillas typically live in relatively stable "harem-like" family groups consisting of 2–36 multi-aged individuals led by a single dominant "silverback" male.

The historic range of Grauer's gorilla was estimated to cover 52,000 km^2 (Mehlman 2008), from the Albertine Rift escarpment in the east towards Punia in the west, and from the Lindi River in the north to the Itombwe massif in the south. Today four broad population centres are recognized:

1. Maiko region (encompassing Maiko National Park and adjacent forests)
2. Tayna-Walikale region (Tayna Nature Reserve, Kisimba-Ikobo Nature Reserve and the Usala forest)
3. Kahuzi-Kasese region (the Kahuzi-Biega National Park (KBNP) lowlands and adjacent Kasese forest)
4. Itombwe massif (including Itombwe Natural Reserve)

Additional isolated populations are found in Masisi, the KBNP highlands and on Mount Tshiaberimu in Virunga National Park. Historically, gorillas also ranged south of Itombwe in the bamboo forests of the western rift escarpment, although these populations have now been extirpated (J. Hart pers. comm.). All of these protected areas were created specifically or at least in part to protect Grauer's gorillas, with KBNP and Maiko National Park believed to support the most important populations. Maiko National Park is the only protected area that harbours Grauer's gorilla alongside important populations of okapi, Congo peafowl and forest elephant.

Contemplative silverback Grauer's gorilla © Holly Carroll

The first surveys of this taxon (then grouped with the Virunga and Bwindi populations as mountain gorillas) by Emlen and Schaller in 1959 documented that gorillas west of the Albertine Rift occurred at low overall density with a highly fragmented and patchy distribution. High densities were found in small, localized subpopulations, while large areas of contiguous and seemingly suitable habitat were unoccupied (Emlen & Schaller 1960). They concluded that gorillas were rare and likely undergoing a rapid population decline due to habitat conversion and widespread hunting in retaliation for crop raiding and, opportunistically, for meat. Based on limited data, they broadly estimated the existence of 5,000–15,000 individuals (Emlen & Schaller 1960; Schaller 1963).

As predicted, during the 1960s and 1970s a significant percentage of Afromontane habitat in the Kivu provinces was converted to pasture and agricultural land. A concurrent proliferation of 12-gauge shotguns promoted by the then-Zairian government facilitated the hunting of large mammals such as gorillas, resulting in their local extinction in many areas (P. Anderson, pers. comm.). Subsequent surveys did not take place until the 1990s and then focused on KBNP and the adjacent Kasese forests (Hall *et al*. 1998a), Itombwe (Omari *et al*. 1999) and Maiko National Park (Hart & Sikubwabo 1994). These surveys found that gorillas remained highly threatened, primarily by hunting and expanding human settlements. The loss of several subpopulations in Itombwe was documented, as was a range reduction in the Kahuzi-Kasese region. From these surveys, Hall *et al*. (1998b) estimated a total population size of 8,660–25,500 individuals with a central tendency of 16,900.

This broad abundance estimate overlaps and considerably increases that previously estimated by Emlen and Schaller despite substantial habitat loss and several localized extinctions being recorded since 1959. The wide estimates calculated from both studies show clearly the difficulties associated with calculating accurate abundance estimates from one-off surveys. Thus, caution should be exercised when referring to these estimates in the context of perceived population declines.

Existing threats to gorillas were massively exacerbated throughout the 1990s and early 2000s with the onset of fierce conflict in the Great Lakes region. In 1994, hundreds of thousands of refugees fled into DRC following the Rwandan civil war and genocide, settling in forest areas throughout the east including in KBNP. This destabilized the already fragile Zairian government, plunging the country into civil war and humanitarian crisis. Refugees, internally displaced people and numerous armed groups placed enormous pressure on DRC's forests through uncontrolled hunting, harvesting of wood for fuel, habitat conversion for farmland, timber extraction and mining.

Road conditions in rural DRC, south of Kisangani © Stuart Nixon/ DFGFI

Although the historic distribution of Grauer's gorilla is reasonably well documented, knowledge of its current conservation status is limited. High levels of insecurity and poor access to remote regions during recent decades have prevented a coordinated, range-wide effort to assess their status, although preliminary work has been possible in some areas. For example, several previously unconfirmed subpopulations have been documented in Tayna (Mehlman 2008), Maiko south (Nixon *et al*. 2006), Usala (Nixon *et al*. 2007), Walikale (J.C. Kyungu pers. comm.) and Itombwe (WCS unpublished data). However, the subspecies is believed to be in severe decline across most of its range. In 2008, it was estimated that approximately 25% of gorilla habitat first identified by Schaller has been lost in the Albertine Rift highlands, reducing Grauer's gorilla range of occupation to 21,600 km^2 (Mehlman 2008). In KBNP, the highland population decreased by almost 40% between 1996 and 2000, though recent surveys show a small increase in the population (WCS 2010). In the lowland sector, gorillas appear have undergone a catastrophic decline since 1995 and the forest corridor connecting the two populations has been severed by extensive illegal human settlement (Amsini *et al*. 2008). In a recent analysis of great ape habitat in Africa, Junker *et al*. (2012) have shown that

the extent of suitable environmental conditions for Grauer's gorillas has declined by 52% since the 1990s.

Hunting of gorillas within the southern sector of Maiko National Park has been recorded, and at least one subpopulation on the north bank of the Lowa River, near Maiko National Park, has been exterminated since its was first documented in 2005 (Nixon 2010). The status of the Maiko populations is precarious – the southern populations exist in a region occupied by Simba rebels and the status of the northern population remains completely unknown since 1994 due to a lack of park infrastructure and the presence of militia linked to illegal mining. In North Kivu, the extermination of at least one remnant Masisi population has been reported (C. Aveling pers. obs.). Reports exist of military, rebels and civilians in Walikale Territory hunting gorillas, and several gorillas were killed in the Tayna Nature Reserve between 2004 and 2007 (Nixon unpublished data). The remnant population at Mount Tshiaberimu in Virunga National Park exists in a perilous situation. Numbering fewer than 10 individuals and isolated from other gorilla populations in a 60-km^2 island of montane forest, it remains highly threatened by deforestation and low genetic viability (J.C. Kyungu pers. comm.).

Since 2003, ICCN and its partners have confiscated 16 Grauer's gorilla infants from military and civilian society. Casualties of illegal hunting, these individuals are housed at the Gorilla Rehabilitation and Conservation Education (GRACE) Centre. Possible future reintroduction of these confiscated individuals to sites such as Mount Tshiaberimu may offer some hope for small yet isolated subpopulations in well-protected areas.

Given the gaps in our knowledge, it is extremely difficult to estimate the current abundance of Grauer's gorilla. However, based on data collated over the past decade, an overall decline of 50–75% across its entire range is suspected and it is likely that Grauer's gorilla now numbers somewhere between 2,000 and 10,000 individuals (Nixon *et al*. 2012). A Population and Habitat Viability Assessment (PHVA) for the mountain gorilla (Werikhe *et al*. 1998) suggested that the risk of extinction increases with small population size, exposure to human diseases, habitat destruction and fragmentation. When war in the region surrounding mountain gorilla range was added to

Itombwe landscape: Asukulu M'mema, a newly recruited guard, was tortured and killed by unidentified armed men while investigating a gorilla slaughter in August 2009. He was posthumously awarded the Abraham Prize for Nature Conservation © Faustin Batechi/ICCN

the model, severe reductions in female breeding success and survivorship (among both infants and adults of both sexes) were observed. In all scenarios where war was included, encompassing differing levels of habitat loss as well as direct and indirect loss of gorillas, mountain gorilla populations declined steadily over the 100-year time frame of the simulations. Scenarios in which the direct effects of war were more intense resulted in the greatest decline in population size and extent of genetic variability and the greatest overall risk of population extinction.

Long-term conflict and insecurity in DRC have resulted in rebel and civilian occupation of the forests, including protected areas, and have severely restricted the ability of conservation organizations to monitor and protect gorillas, enforce hunting and protected area regulations, and keep pace with intensifying threats. In the presence of such threats, subpopulations will gradually be reduced by hunting, and exterminated rapidly when new settlements or mining operations are established, and/or become increasingly isolated from each other by habitat loss and degradation. These impacts disrupt metapopulation dynamics within and between subpopulations, resulting in the loss of genetic diversity and, ultimately, leading to localized extinction. Current evidence suggests that without concerted efforts to conserve Grauer's gorilla, the next decade will be marked by further declines and widespread local extinctions of this little known subspecies.

In the current social and political context of eastern DRC, the threats to Grauer's gorilla are intense, yet Grauer's is the only gorilla subspecies not classified as Critically Endangered on the Red List (IUCN 2012), due simply to a lack of data demonstrating its overall rate of decline. Establishing accurate baselines on the distribution and abundance of Grauer's gorillas and conducting research with a view to understanding their ecological requirements, dispersal patterns and the genetic relationships between subpopulations will all be essential to developing realistic and successful conservation strategies.

On the positive side, the highly localized distribution of Grauer's gorillas in discrete subpopulations could facilitate the efficient prioritization of valuable resources. A recently documented increase in the KBNP highland population (WCS 2010) is evidence that highly targeted conservation efforts can be successful even in the face of acute pressures.

The entrance to Kahuzi-Biega National Park © Liz Williamson

Figure 4. Distribution of Grauer's gorilla

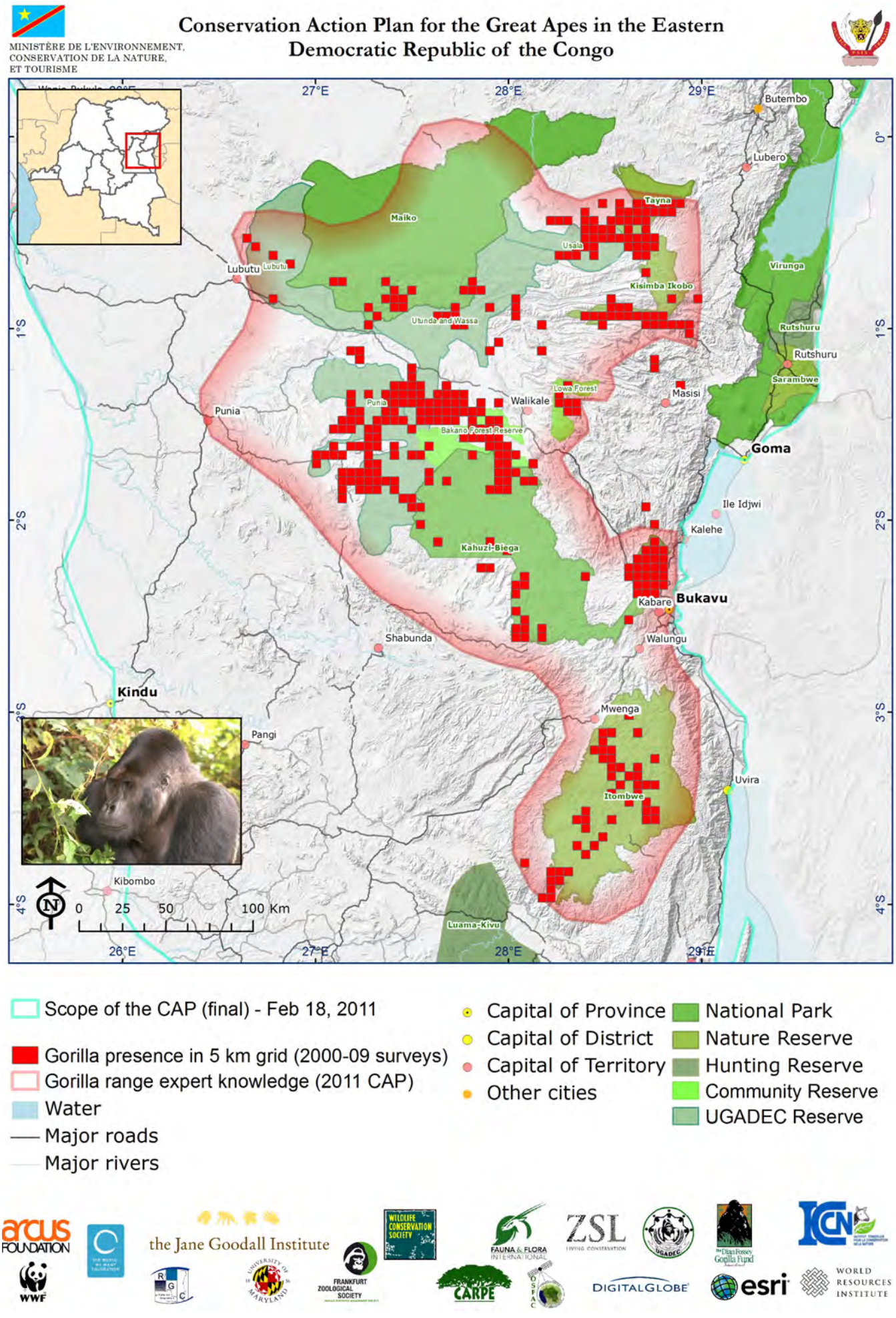
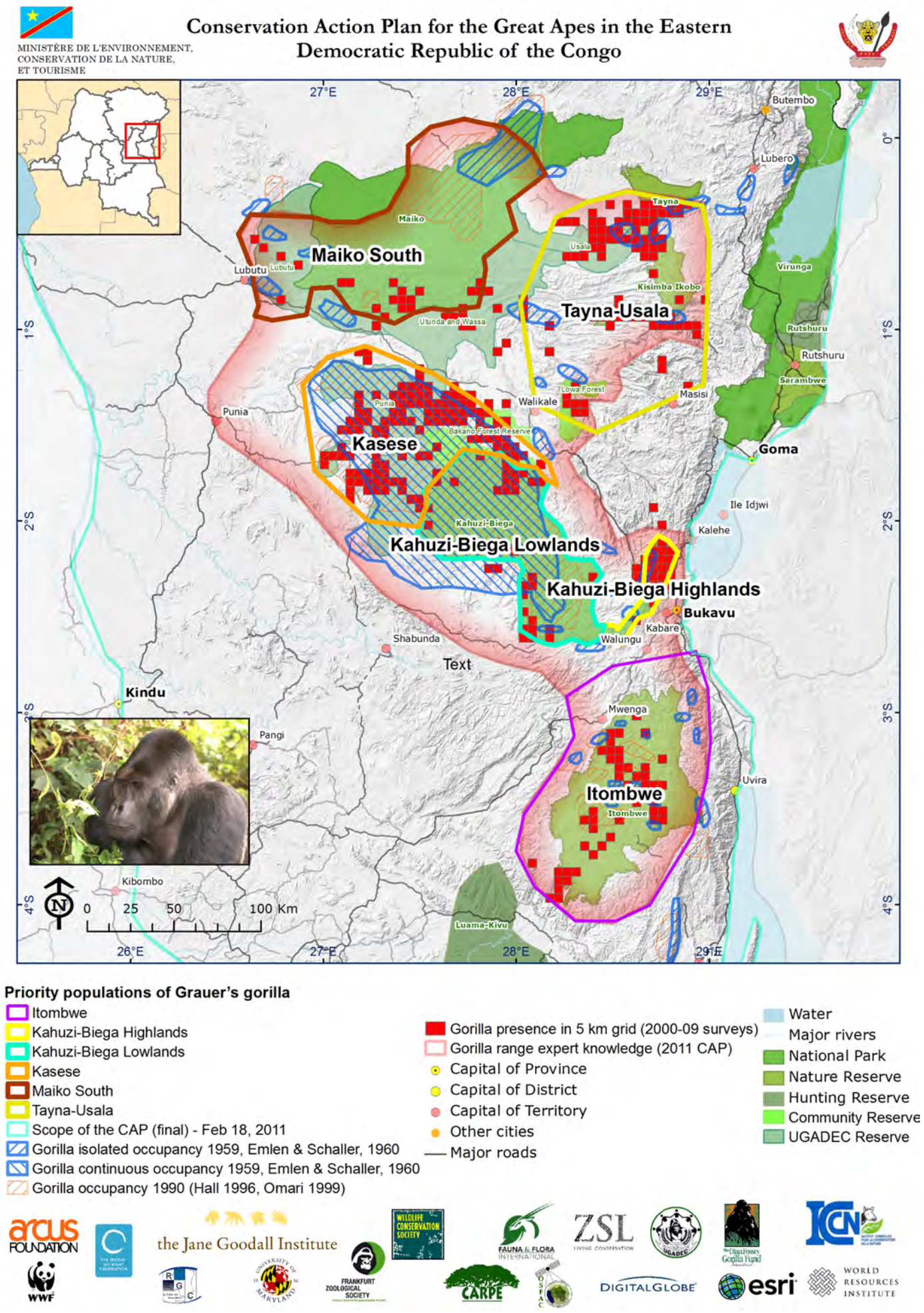


Figure 5. Priority populations of Grauer's gorilla



3.3 Habitat Diversity and Connectivity

Maintenance of large areas of intact habitat is critical to the survival of chimpanzees and gorillas. Forest integrity (low rates of clearing and fragmentation) also allows gene flow between populations to continue. Given the fragmented nature of the Grauer's gorilla distribution (the reasons for which are not fully understood), it is particularly important to maintain forest integrity, because gorillas will be vulnerable to the effects of forest fragmentation. Preserving the integrity of large swathes of forest will also enable us to save one of the most biologically diverse regions on the African continent.

The choice of habitat as a conservation target is also based on its importance as a carbon sink in the fight against global warming, its role in the regulation of local climate patterns, as well as the numerous environmental services that these ecosystems provide (e.g., animal and vegetable proteins, medicinal plants, hydrological services, pollination).

The choice of such a vast conservation target allows us to take into consideration sites for which data are lacking or are insufficient. Current knowledge of the distribution and abundance of great apes in eastern DRC is limited to a relatively small area that field staff have been able to access during almost 20 years of political turmoil. A large area of the south and west of the landscape has not been inventoried. Even if this area of the conservation target does not harbour large populations of gorillas, it is important for chimpanzees.

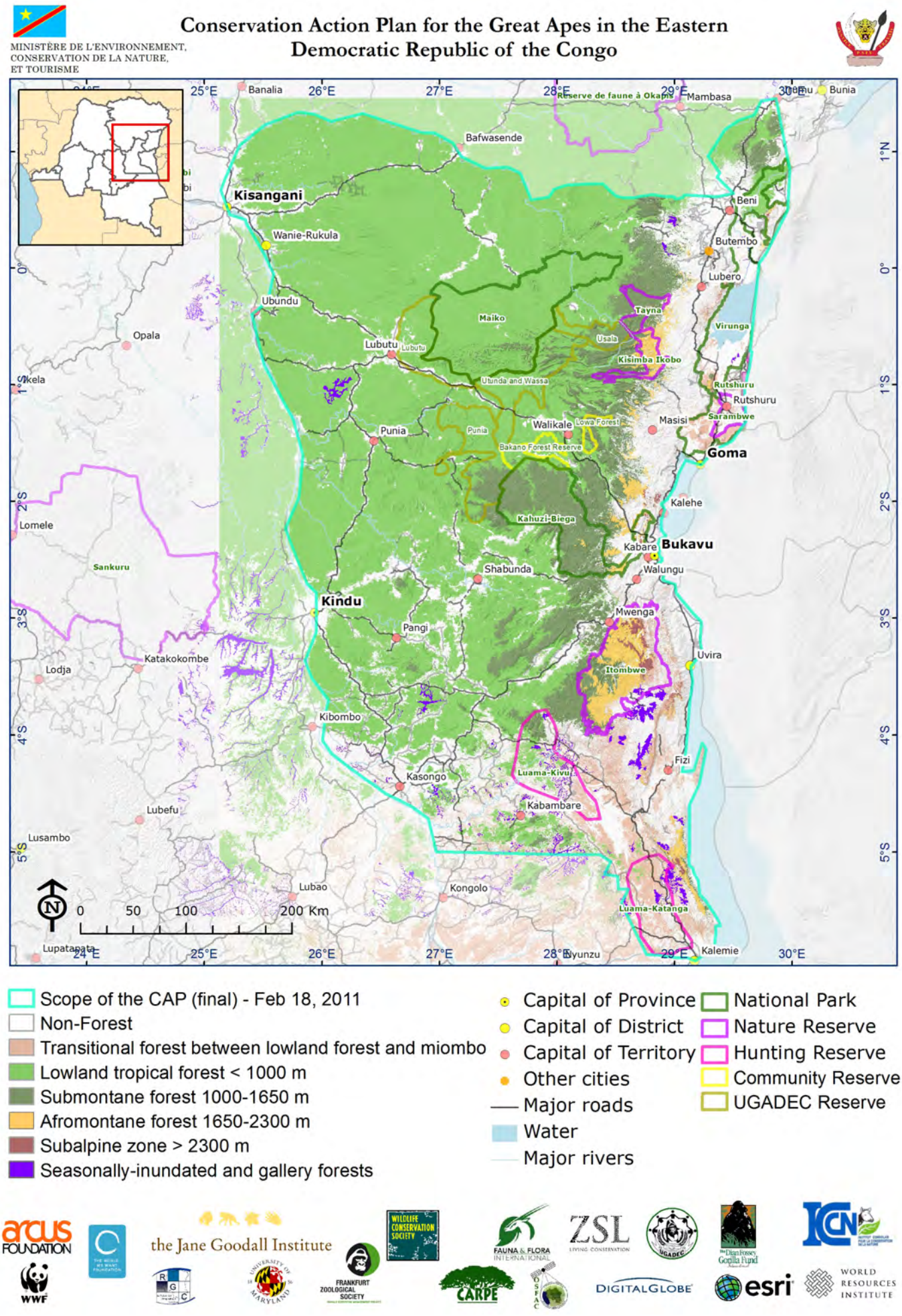
In the target habitats, the causes of forest loss are mainly farming (slash-and-burn agriculture) and, to a lesser extent, livestock farming to supply markets in Goma, Butembo and Beni, and illegal artisanal mining operations (see threat analysis). The area with the greatest forest loss is along the Albertine Rift to the west of Lakes Tanganyika, Kivu and Edward, where the human population exceeds 300 inhabitants per km^2. Forest loss is also occurring along the trans-African highway linking Bukavu to Kisangani via Walikale and Lubutu. Forest clearance is intensifying there with renovation of the road. A third area of deforestation can be found northeast of Shabunda and southeast of Mwenga. This is linked to deforestation of the mountainous area around Bukavu. However, since 2000, forest loss and degradation in the landscape covered by this plan total little more than 2% of the total surface area, according to the latest data from JGI. The existence of multiple protected areas conserving the target habitat is of crucial importance in light of the fragmentation that is likely in the future.

The lowland forest (~500 m elevation) in the west of the landscape along the Lualaba River is dominated by tree species belonging to the Caesalpiniaceae family. There are also large swathes of seasonally-inundated and gallery forests. Futher east, mixed forest with *Strombosia* and *Parinari*, as well as monodominant *Gilbertiodendron dewevrei* forest occurs up to 1,000 m elevation. Submontane or transitional forest is found at 1,000–1,650 m elevation and is characterized by the presence of the genera *Pentadesma, Lebrunia, Cynometra, Julbernardia, Pouteri* and *Staudtia*. Above 1,650 m, Afromontane forest is characterized by the genera *Diospyros, Entandrophragma, Ficalhoa, Olea, Parinari, Podocarpus, Prunus* and *Syzygium.* From 2,300 m, in the subalpine zone, bamboo (*Synarundinaria alpina*) is mixed with high montane forest species (*Hagenia, Olea, Podocarpus*). At this same elevation Ericacae cover and montane prairies are found. At the highest altitudes (e.g., summits of Mounts Kahuzi and Biega), small areas of groundsel (*Senecio* spp.) and giant lobelia (*Lobelia* spp.) are found.

The target habitats also include the transitional zone between the tropical forests of the Congo Basin and the dry miombo woodlands in the south. This zone, which includes the Luama Kivu hunting reserve, is characterized by a mosaic of forest and savanna. These dry forests harbour chimpanzees, but are outside the gorillas' geographic range.

Mid-altitude gorilla forest in Tayna Nature Reserve © Stuart Nixon/ DFGFI

Figure 6. Habitat types within the Grauer's gorilla landscape



3.4 Viability Assessment

The viability assessment is an important component of the TNC CAP because it helps us to assess the status or "health" of the conservation targets, to understand what their long-term conservation depends on, and to what point a conservation plan can guarantee their future survival. In this assessment, viability is understood as "the ability of a conservation target to withstand or recover from most natural or anthropogenic disturbances and thus to persist for many generations or over long time periods". Technically, the term "integrity" should be used for ecological communities and ecological systems with "viability" being reserved for populations and species. In the interest of simplicity, however, we use viability as the generic term for all targets.

3.4.1 Stages of the Viability Assessment

The viability assessment comprises the following four steps:

i. Identification of Key Ecological Attributes (KEAs)

Viability assessment begins by identifying Key Ecological Attributes (KEAs) for each of the focal conservation targets. KEAs are aspects of a target's biology or ecology that, if present, define a healthy target and, if missing or altered, would lead to the loss of that target over time. As such, KEAs define the target's viability or integrity.

Key ecological attributes can often be grouped into three classes:

Size is a measure of the area or abundance of the conservation target's occurrence.

Condition is a measure of the biological composition, structure and biotic interactions that characterize the occurrence.

Landscape context is an assessment of the target's environment including ecological processes and regimes that maintain the target's occurrence such as flooding, fire regimes and many other kinds of natural disturbance, and connectivity such as species targets having access to habitats and resources or the ability to respond to environmental change through dispersal or migration.

ii. Identification of indicators for the KEAs

The indicators are measurable entities related to a specific information need (for example, the status of a key ecological attribute, change in a threat, or progress towards an objective). A good indicator meets the criteria of being measurable, precise, consistent and sensitive.

iii. Determine ratings for variation in the indicators

Using the best available knowledge (expert advice, documentation), determine benchmarks for the ratings: Poor, Average, Good and Very Good.

iv. Definition of current status and desired future status

The final step of the viability assessment consists of defining the current status and the desired future status of each KEA of the conservation targets, and an approximate date to attain the desired status.

3.4.2 Limitations of the Viability Assessments

Viability assessments have limitations. Among them, lack of information is a major problem. Nonetheless, this should not be considered a reason to not undertake an assessment of the status of the targets. The CAP methodology recommends seeking the best available information and the advice of experts to address, at least temporarily, any shortcomings.

Another limitation of viability assessments is the potential for error. In this regard, we are not proposing a definitive assessment,

Afromontane forest at Mt. Tshiaberimu © Stuart Nixon

but rather a first attempt at understanding how the viability of the chosen targets can be examined and measured over time. In other words, the current assessment is just the beginning of a "work in progress", which must be constantly revised and improved upon as the plan is implemented and new information and data are obtained and disseminated.

Finally, the large scope of this plan, which covers more than 260,000 km^2, significantly complicates the assessment, notably with regard to the species ("fine filter" targets). Two factors contribute to these complications: first, their distribution throughout the landscape is uneven (particularly when we consider protected and non-protected areas) and second, the target species, Grauer's gorillas in particular, also have an irregular and scattered distribution.

3.4.3 Viability Assessment for Eastern Chimpanzees

Table 1: Results of Viability Assessment – Chimpanzee

KEA	Type	Indicator	Very good	Good	Average	Poor
Range	Size	Number and extent of polygons (home ranges) of subpopulations	+ 50% in relation to baseline	+ 30% in relation to baseline	No growth in relation to baseline	30% reduction in relation to baseline
Density	Size	Proportion of 50×50-km grid squares with chimpanzee presence	> 5000 chimpanzees (2 indiv/km^2)	2500 chimpanzees (1 indiv/km^2)	1250 chimpanzees (0.5 indiv/ km^2)	< 600 chimpanzees (0.25 indiv/ km^2)

ICCN guards with snares and other items confiscated from poachers in KBNP. Poaching is one of the biggest threats to wildlife in DRC. Although snares are not intended to catch gorillas and chimpanzees, many have been maimed by these traps © ICCN/KBNP

3.4.4 Viability Assessment for Grauer's Gorillas

The situation in 1959 described by Schaller (1963), minus populations known to have disappeared, plus recently discovered populations (Nixon *et al*. in prep.), was taken as the baseline for this assessment.

Size of the population

- Number of subpopulations
- Area occupied by the subpopulations (to determine the polygons delineating the subpopulations: for key subpopulations, superimpose observations on a map of the Schaller subpopulations; for isolated "outlier" observations, create a 25-km^2 polygon around the observations)
- Area of total range of the subpopulations (minimum convex polygons surrounding all subpopulations)
- Number of 25-km^2 grid squares where gorilla presence was recorded (a square is considered to have been surveyed if at least one 5-km transect has been carried out there). Baseline is the situation in 2011.
- Number of individuals in certain key populations (KBNP highlands, Tayna, Tshiaberimu)

Condition

Various criteria were combined to assess the condition of a population: distribution (see above), abundance (see above), rate of habitat destruction and hunting indicators (the latter are covered in Section 6, the monitoring plan).

Table 2: Results of Viability Assessment – Gorillas

KEA	Type	Indicator	Very good	Good	Average	Poor
Number of gorilla subpopulations	Size	Subpopulation	+50%	+30%	No growth in relation to baseline	30% reduction
Area of gorillas' range	Size	Area of occupation	+10%	Baseline	–15%	–30%
Relative abundance of gorillas	Size	Relative abundance in 25-km^2 grid squares[1]	+30%	+15%	No growth in relation to baseline	–20% of grid squares show reduction of relative abundance
Habitat continuity	Landscape context	See Habitat Viability Assessment				
Habitat loss	Condition	See Habitat Viability Assessment				

[1] Categories of relative density to be determined (Very High, High, Average, Low)

The forest of Usala © Stuart Nixon/DFGFI

3.4.5 Viability Assessment for the Habitat

Table 3: Results of Viability Assessment – Habitat

KEA	Type	Indicator		Very good	Good	Average	Poor
Habitat diversity	Size and condition	% forest cover for each habitat type at baseline (State of the Forest 2010)	low altitude dense humid forest	+20%	no change	–20%	–40%
			mid-altitude forest	+20%	no change	–10%	–25%
			Afromontane forests	+15%	+10%	+5%	baseline
			subalpine vegetation	+15%	+10%	+5%	baseline
Habitat connectivity	Condition	Extent of forest blocks delineated by roads or access routes		+10	no change	–10	–20
Habitat connectivity	Condition	Number of forest blocks delineated by roads or access routes in human-impacted strips		–20%	no change	+20%	+40%
Habitat integrity	Condition	Proportion of 25-km² grid squares impacted by humans[2]		+20%	no change	-20%	-40%
		No. of km of road/access routes where the human-impacted strip is >1 km wide		+20%	no change	-20%	-40%
		Proportion of 25-km² grid squares with rural complexes		+20%	no change	-20%	-40%

[2] Calculated for low and mid-altitude dense humid forest only

3.5 Research Needs

The viability assessments serve not only to determine the health status of the conservation targets and establish ratings for the indicators according to the best information available, but also to identify research needs. The viability assessments are developed with the understanding that they need to be improved upon as new data and information become available.

The following research needs were identified to better establish the health status of the conservation targets:

- Establish a more precise baseline for the number of subpopulations of gorillas and chimpanzees
- Establish a baseline for the number of 25-km² grid squares containing gorillas and/or chimpanzees
- Establish a baseline for the number of gorilla observations by km of recce survey in each altitudinal band
- Establish baselines for the habitat KEAs (proportion of human-impacted grid squares, number of kilometres of road with human-impacted strips >1 km)
- Establish a baseline for the proportion of human-impacted grid squares
- Establish a baseline for the percentage of forest cover in each altitudinal band
- Establish a baseline for the number of kilometres of access route where the width of the human-impacted strip exceeds 1 km

4. Threats to the Conservation Targets

The threats to conservation have a different impact on each of the conservation targets of this plan (see Figs. 13, 14 and 15). However, there was a strong consensus among the conservation community regarding the main direct threats to the targets. The following threats were therefore identified as critical by the workshop participants:

- Hunting
  - Cultural hunting
  - Subsistence hunting for bushmeat
  - Commercial hunting for bushmeat
- Habitat loss
- Habitat fragmentation
  - Habitat degradation
  - Deforestation
  - Natural disasters
- Trade in live chimpanzees
- Trade in live gorillas
- Disease transmission (of human origin)

Victims of the bushmeat trade: chimpanzees at Lwiro Sanctuary
© Christina Ellis

4.1 Bushmeat Hunting

Despite the fact that all killing, capture or consumption of great apes is illegal, hunting represents the principal direct threat to great apes in eastern DRC. This threat is growing with the soaring human colonization and subsequent installation of settlements close to previously undisturbed forested areas. The permanent presence of people who provide the workforce for the legal and illegal exploitation of natural resources (minerals, wood) also constitutes a major factor in this problem. In addition, armed rebels residing in the forests increase the extent and intensity of this threat, as they are dependant upon wildlife to feed themselves. The poaching problem, particularly in protected areas, is exacerbated further by the lack of anti-poaching patrols.

4.1.1 “Cultural” Hunting

Cultural hunting includes the practices of some ethnic groups who believe that ingesting particular animal parts can confer strength, courage, virility, fertility, and so on. Such hunting does not reach the same level as hunting for bushmeat, nonetheless cultural hunting is illegal and constitutes a threat to great ape populations (D.A. Cox pers. obs.).

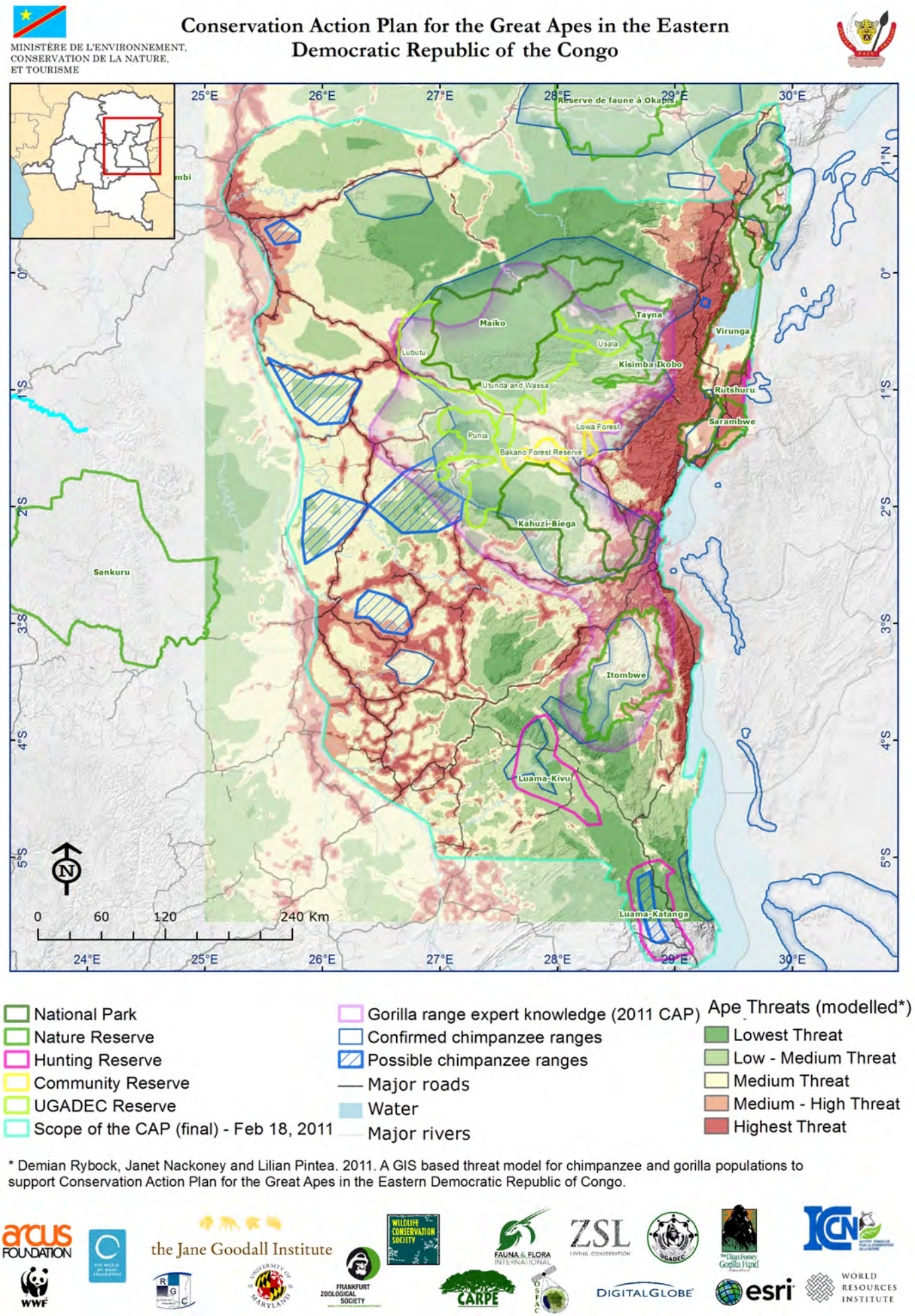
4.1.2 Bushmeat Hunting (Subsistence and Commercial)

Hunting for bushmeat, which is more often than not poaching and therefore illegal, is by far the greatest driver of human predation on great apes and the main threat to their long-term conservation (e.g., Wilkie *et al*. 1998; Walsh *et al*. 2003; de Merode *et al*. 2004; Fa *et al*. 2005). Human demographic increases and immigration associated with forestry and mining operations aggravate the pressures. A study in the Twabinga-Mundo region of eastern DRC was able to show a clear relationship between mining activity and poaching (Nixon 2010). A study in northern Congo estimated an offtake of 5–7% of the gorilla and chimpanzee population per year (Bowen-Jones & Pendry 1999). This is unsustainable due to the great apes’ slow rates of reproduction and compromises the future of these species.

4.1.3 Secondary Impacts of Bushmeat Hunting

Bushmeat hunting has two main secondary impacts: on the one hand, numerous young primates and chimpanzees in particular, are orphaned. Many die, some are kept as pets, a few reach sanctuaries such as Lwiro (Cox *et al*. 2000; Goossens *et al*. 2003). On the other hand, both gorillas and chimpanzees can be accidentally caught in snares and traps that have been set to catch other animals, such as antelopes. Such accidental snaring may cause serious wounding, amputation of a hand or foot or even death from gangrene or septicaemia. Many gorillas and chimpanzees survive with disabling injuries (Byrne & Stokes 2002; Reynolds 2006).

Figure 7. Spatial modelling of threats in the Grauer's gorilla landscape



* Demian Rybock, Janet Nackoney and Lilian Pintea. 2011. A GIS based threat model for chimpanzee and gorilla populations to support Conservation Action Plan for the Great Apes in the Eastern Democratic Republic of Congo.

Figure 8. Areas where chimpanzees are threatened by poaching

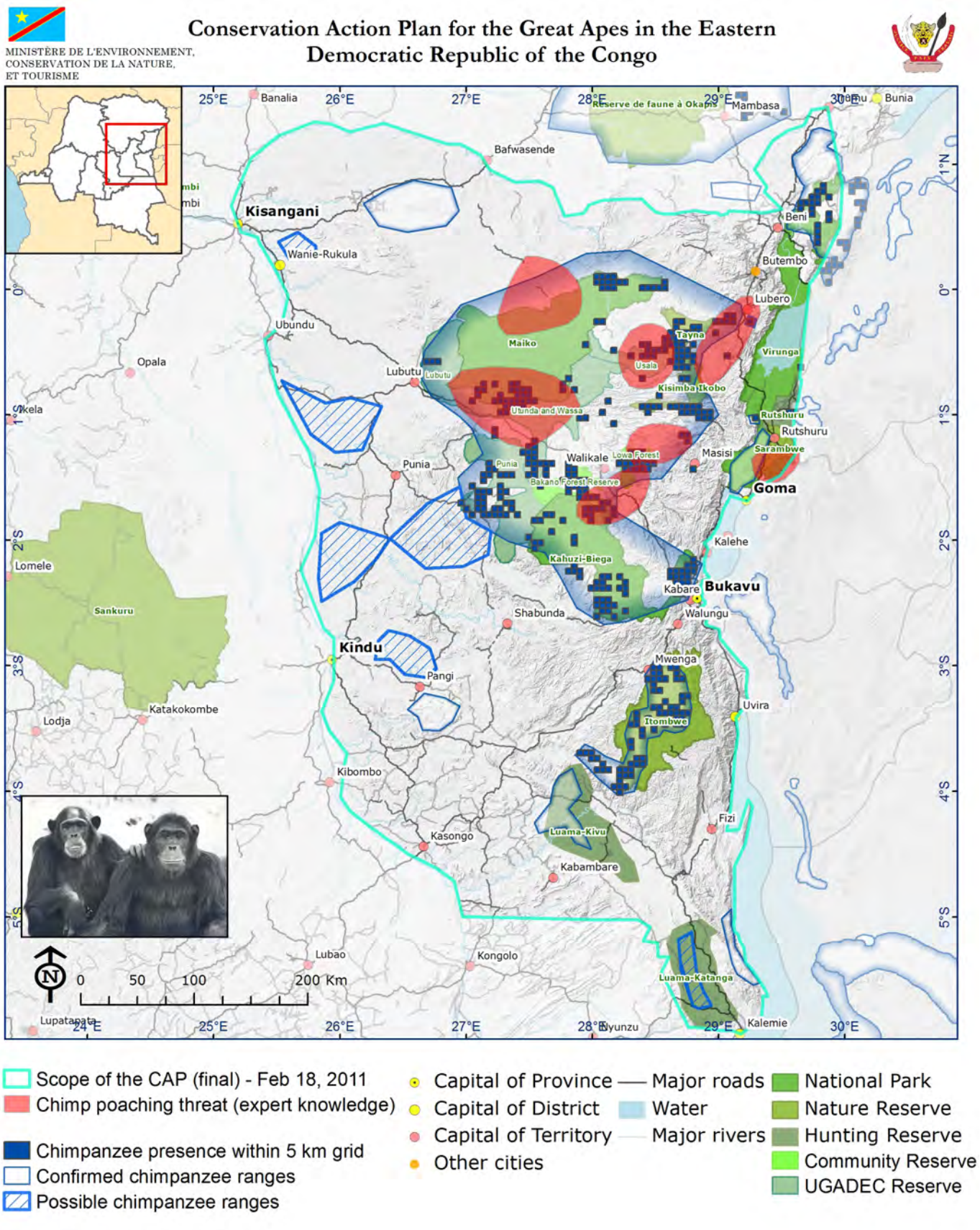
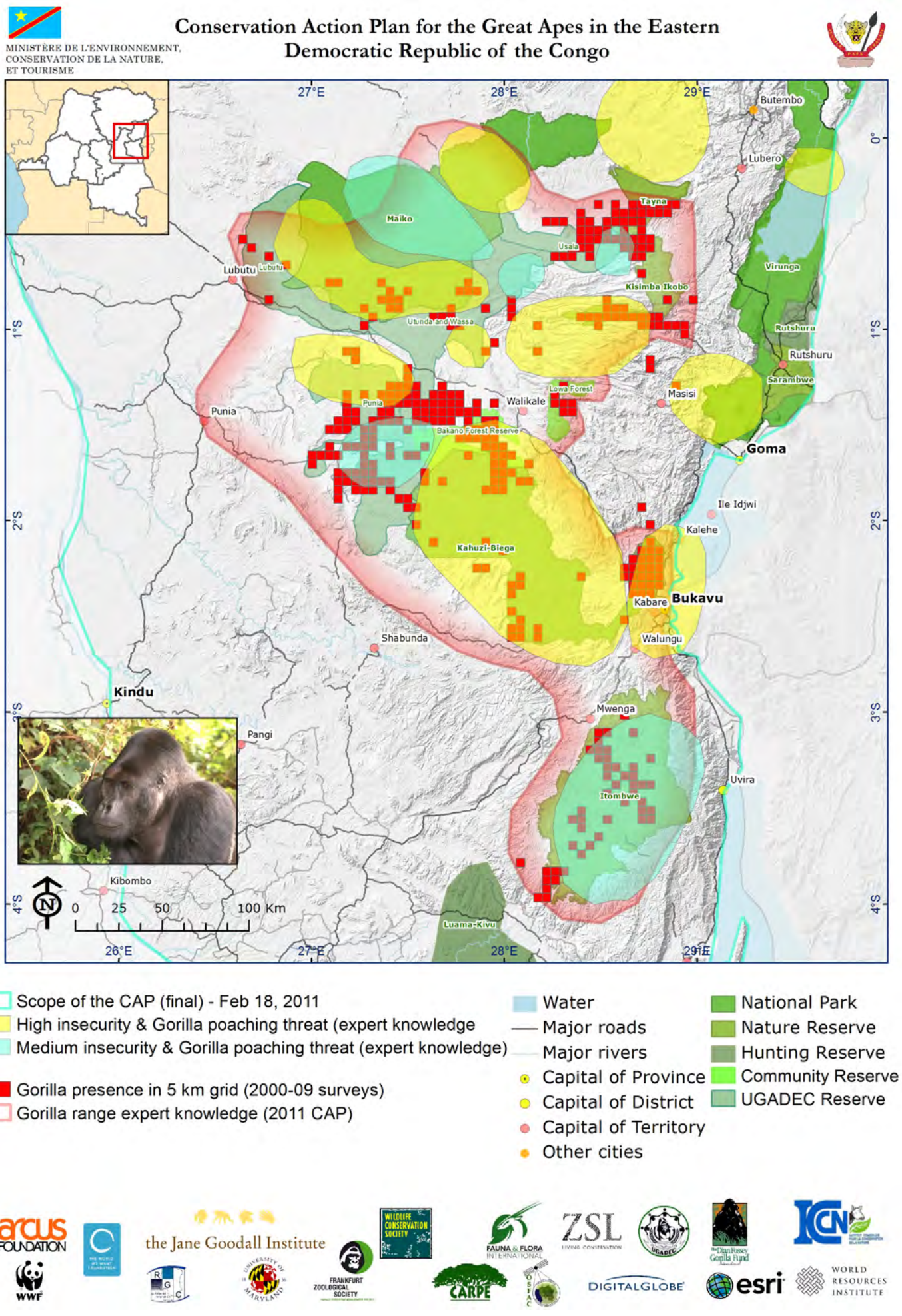


Figure 9. Areas where gorillas are threatened by poaching and insecurity



4.2 Habitat Loss

Human population growth and the demand for land to cultivate are the main causes of habitat loss in eastern DRC (Hall *et al*. 1998b; Butynski 2003; Junker *et al*. 2012), and habitat loss is one of the major threats to great apes. The rate of forest conversion to arable land is increasing and the problem is exacerbated by poor farming practices, such as migratory farming and poor methods of crop rotation, pushing people towards a continued invasion of the forest.

More than legal operations, the illegal exploitation of forest resources contributes to the problem significantly, not only through direct impacts (total deforestation in the affected areas), but also through indirect impacts such as the opening of access routes and drawing in a work force. The same problems are associated with mining, one of the main sources of increasing pressure on the forests of eastern DRC (IES 2008).

4.2.1 Habitat Fragmentation and Degradation

Forest fragmentation, caused by conversion into farmland or by unsustainable exploitation of resources, contributes to the isolation of great ape populations. Their populations are highly susceptible to fragmentation and isolation given that estimates suggest that 500–2,000 individual apes are needed to maintain a stable population over the long term (Soulé 1987; Harcourt 2002; Reed & Hobbs 2004). In some areas, such as Itombwe, the great ape populations have already been highly fragmented by human colonization of their natural habitat, and the corridor linking the lowland and highland populations in KBNP has been severed. Reduced gene flow and loss of genetic diversity could disadvantage these populations in the future (Butynski 2003).

4.2.2 Deforestation

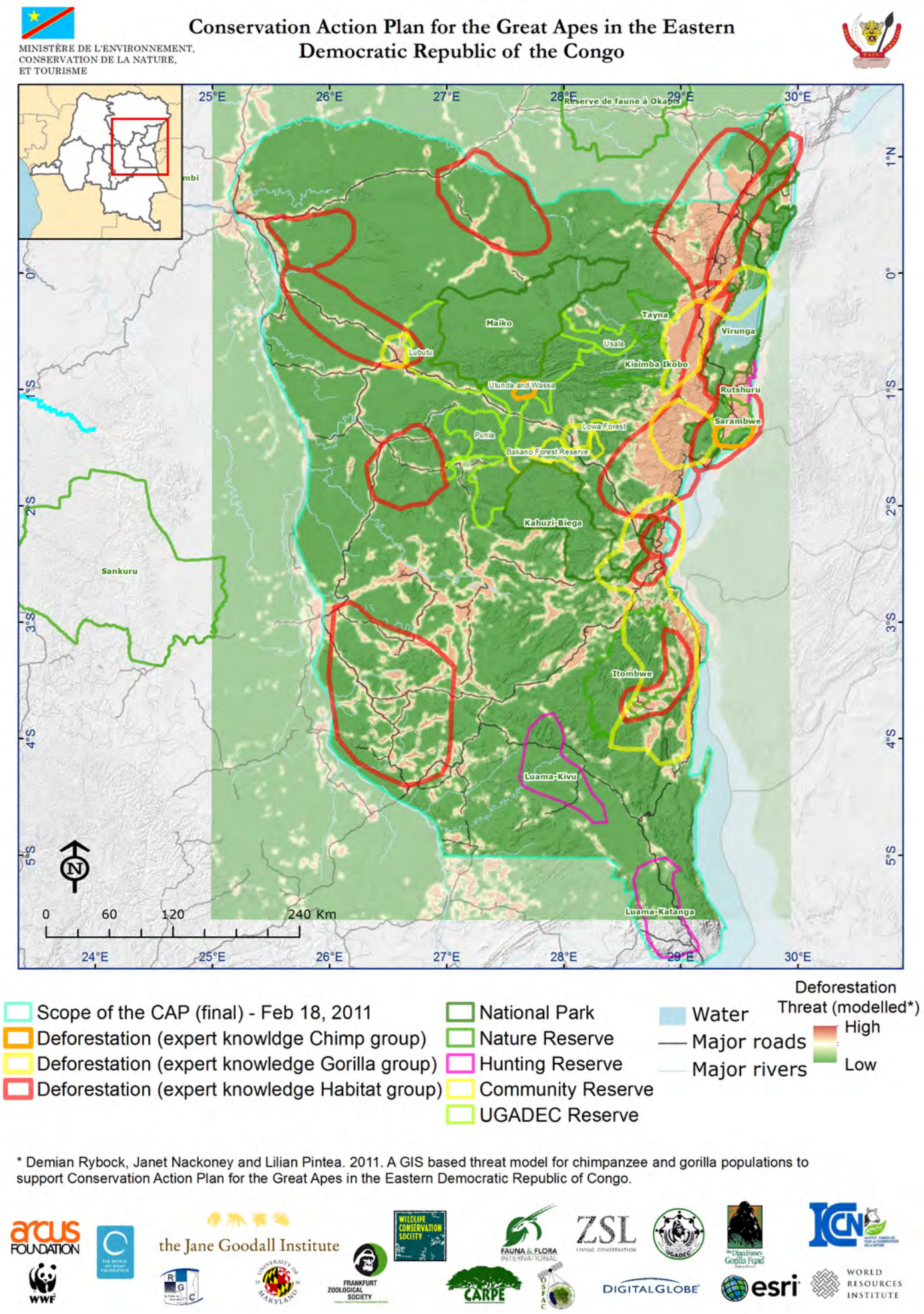
Thus far, the average rate of deforestation in the DRC has been relatively low (0.2–0.3% per year) compared to the global average (0.6% per year) (Hansen *et al*. 2011; Ernst *et al*. 2012). However, if the rate of demographic growth continues and if the permits already issued for natural resource exploitation (minerals and wood) are put in operation, the rate of deforestation will increase dramatically. Political instability caused by the presence of armed rebels has prevented exploitation under many of the permits already granted, but numerous illegal operations constitute a significant driver of deforestation and degradation. Currently, the main cause of deforestation is still the conversion of land for farming, which is accompanied by poor agricultural techniques (such as burning). There is also a high consumption of wood as a principal source of energy for cooking, aggravating the problem further.

Slash-and-burn of the forest to cultivate cassava and other crops
© Stuart Nixon/DFGFI

4.3 Natural Disasters

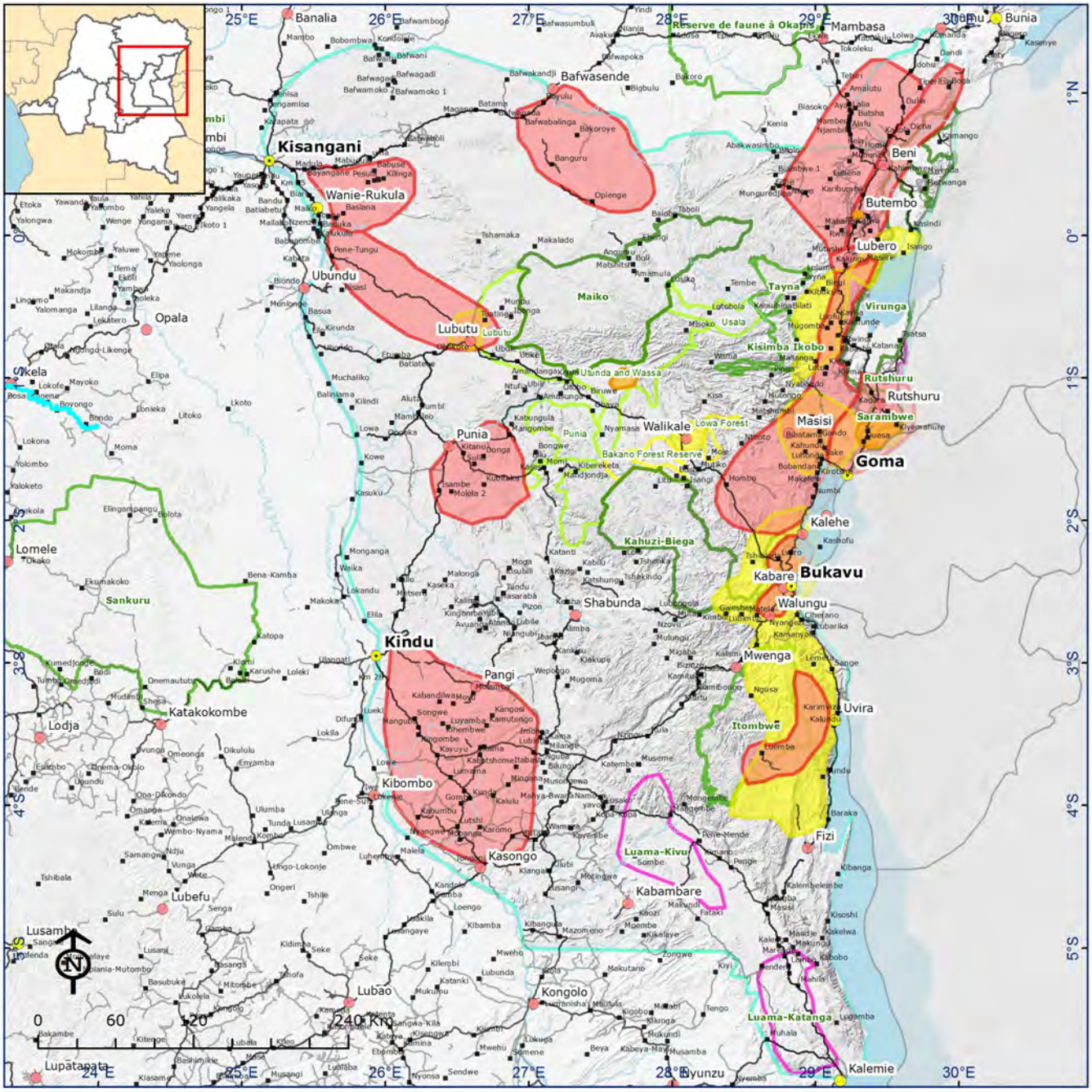
Natural disasters, such as volcanic eruptions with their emissions of toxic gases, lava flows and forest fires, may further impact great ape populations that have already been isolated by habitat destruction. Both Nyiragongo and Nyamulagira in Virunga National Park have erupted in recent years, and chimpanzees residing on the slopes of Nyamulagira were threatened by the eruptions of January 2010. In addition to the direct impact of mortality, further loss of habitat caused by these eruptions reduces the chimpanzees' ability to survive in a region where human development around the volcanoes prevents migration to other areas. Natural disasters also have the potential to cause local extinctions.

Figure 10. Spatial modelling of habitat loss within the Grauer's gorilla landscape



* Demian Rybock, Janet Nackoney and Lilian Pintea. 2011. A GIS based threat model for chimpanzee and gorilla populations to support Conservation Action Plan for the Great Apes in the Eastern Democratic Republic of Congo.

Figure 11. Areas within the Grauer's gorilla landscape threatened by deforestation



4.4 Trade in Live Infant Chimpanzees and Gorillas

Adult female eastern chimpanzee © Alain Houle

There is no known formal network of great ape traffickers in eastern DRC. Any live trade is opportunistic, but strongly linked to poaching for bushmeat. However, infant gorillas and chimpanzees are popular as pets as much in DRC as in foreign countries (D.A. Cox pers. obs; F. Chantereau pers. comm.). Young great apes cannot be captured without killing the mother and other family members that come to their defence.

4.5 Disease Transmission

The genetic and physiological closeness of great apes and humans makes great apes particularly susceptible to diseases of human origin. Viruses, bacteria, fungi, protozoa and numerous other pathogens are easily transmissible between human beings and great apes. This risk is increasing with closer and more frequent contact between the two. Respiratory infection, polio, Ebola, anthrax and scabies have all been documented in great apes (e.g., Butynski & Kalina 1998; Wallis & Lee 1999; Leendertz *et al*. 2004; Leroy *et al*. 2004; Ryan & Walsh 2011; Palacios *et al*. 2011).

4.6 Threats Analysis: Status of Threats to Conservation Targets in the Grauer's Landscape

The status of threats to the conservation targets in eastern DRC is shown in Table 4. Threats were ranked (Low, Moderate, High, Very High) according to the following variables for each of the threats acting on a conservation target:

Scope: Defined as the proportion of the conservation target that can reasonably be expected to be negatively impacted by the threat within 10 years under current circumstances (i.e., given the continuation of the existing situation). Normally, it is defined geographically, but in the case of species, it can be measured as a proportion of the population.

Severity: The level of damage to a target that the threat could cause under current circumstances. For species, it is generally measured by the degree of population reduction in the landscape; for ecosystems, it is measured by the degree of destruction or degradation in the landscape (scope of the plan).

Irreversibility: The degree to which the effects of a threat can be reversed, and the target impacted by the threat can be restored.

Table 4. Status of threats to the conservation targets

Threat/Conservation Target	Ecological and cultural diversity of chimpanzees	Diversity and connectivity of habitats	Socio-ecological diversity of gorillas	Summary of threat estimate
Bushmeat hunting (cultural/ subsistence/ commercial)	High		Very high	High
Trade in live chimpanzee infants	Moderate			Low
Habitat loss	Moderate		High	Moderate
Degradation	Moderate	Moderate	Moderate	Moderate
Fragmentation	Moderate	High		Moderate
Disease transmission	Moderate		Moderate	Moderate

Table 4 continued on next page

Table 4 continued from previous page

Threat/Conservation Target	Ecological and cultural diversity of chimpanzees	Diversity and connectivity of habitats	Socio-ecological diversity of gorillas	Summary of threat estimate
Natural disasters	Moderate	Low	Low	Low
Deforestation	Moderate	Moderate	Low	Moderate
Trade in live gorilla infants			Moderate	Low
Summary of estimate per conservation target	High	Moderate	High	High

4.7 Conceptual Models

Conceptual models are increasingly used in conservation planning. They facilitate better understanding of the relationships between direct threats to the conservation targets and the underlying factors that cause them. They are a graphic tool that shows the context affecting the conservation targets as a flow diagram. These models do not replace situation analyses, but provide a synthesis and make it easier to analyse the context. In addition, conceptual models help in identifying "gateways" for the development of conservation strategies.

The workshop participants developed conceptual models for each conservation target. The first (Figure 12) is a synthesis of the latter three and shows how the combined threats affect the three conservation targets.

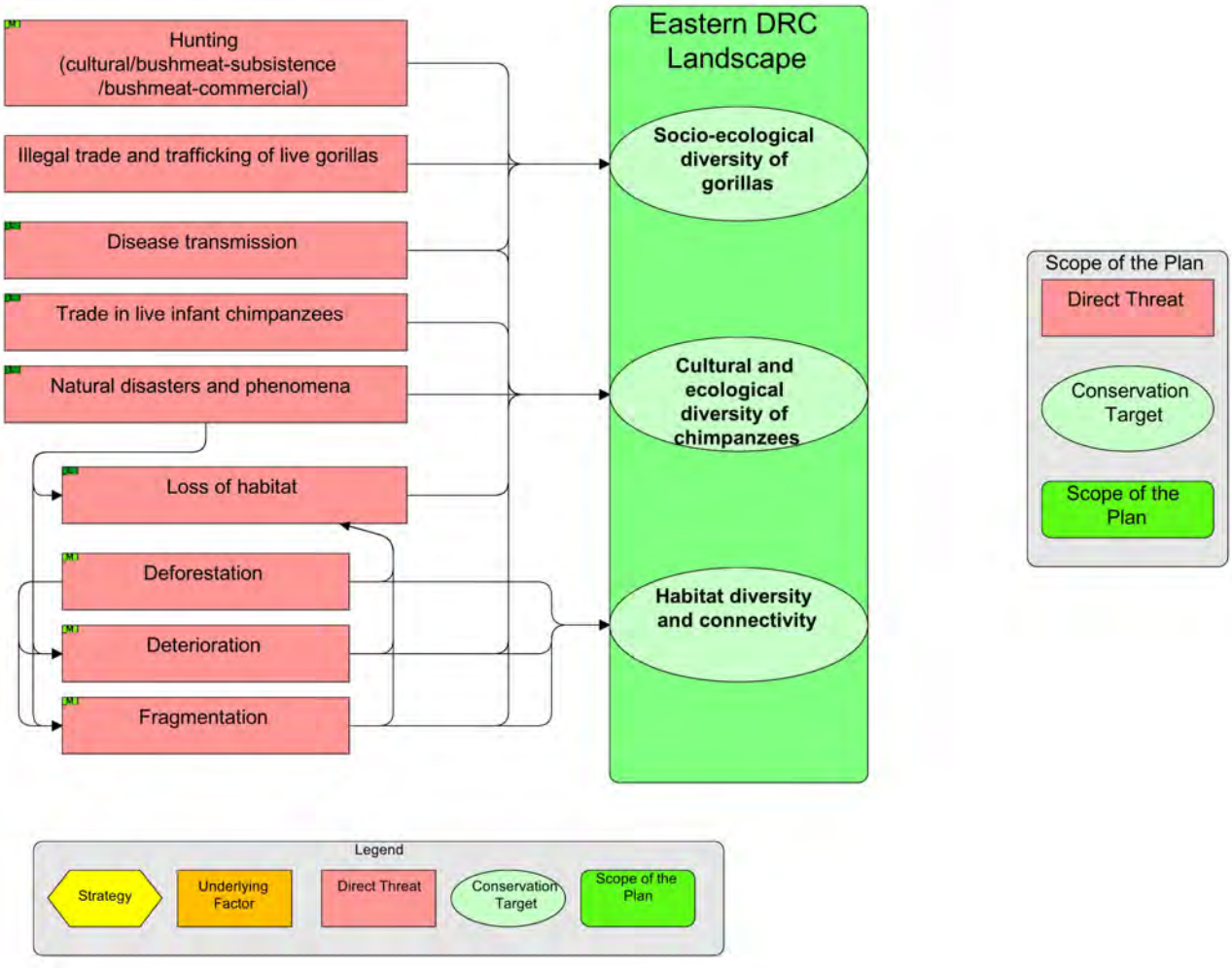


Figure 12. Direct threats to the conservation targets

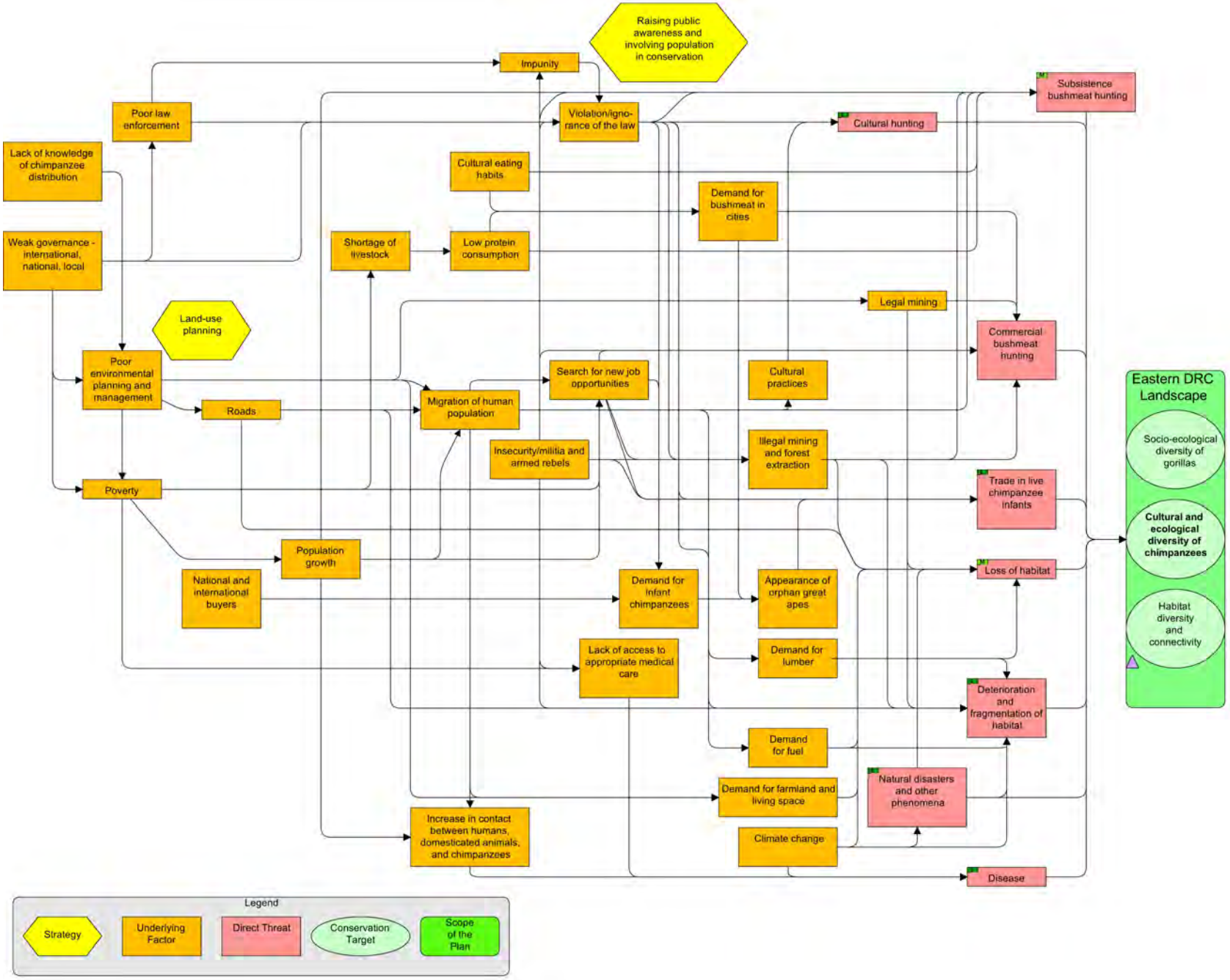


Figure 13. Underlying factors and direct threats to the ecological and cultural diversity of eastern chimpanzees

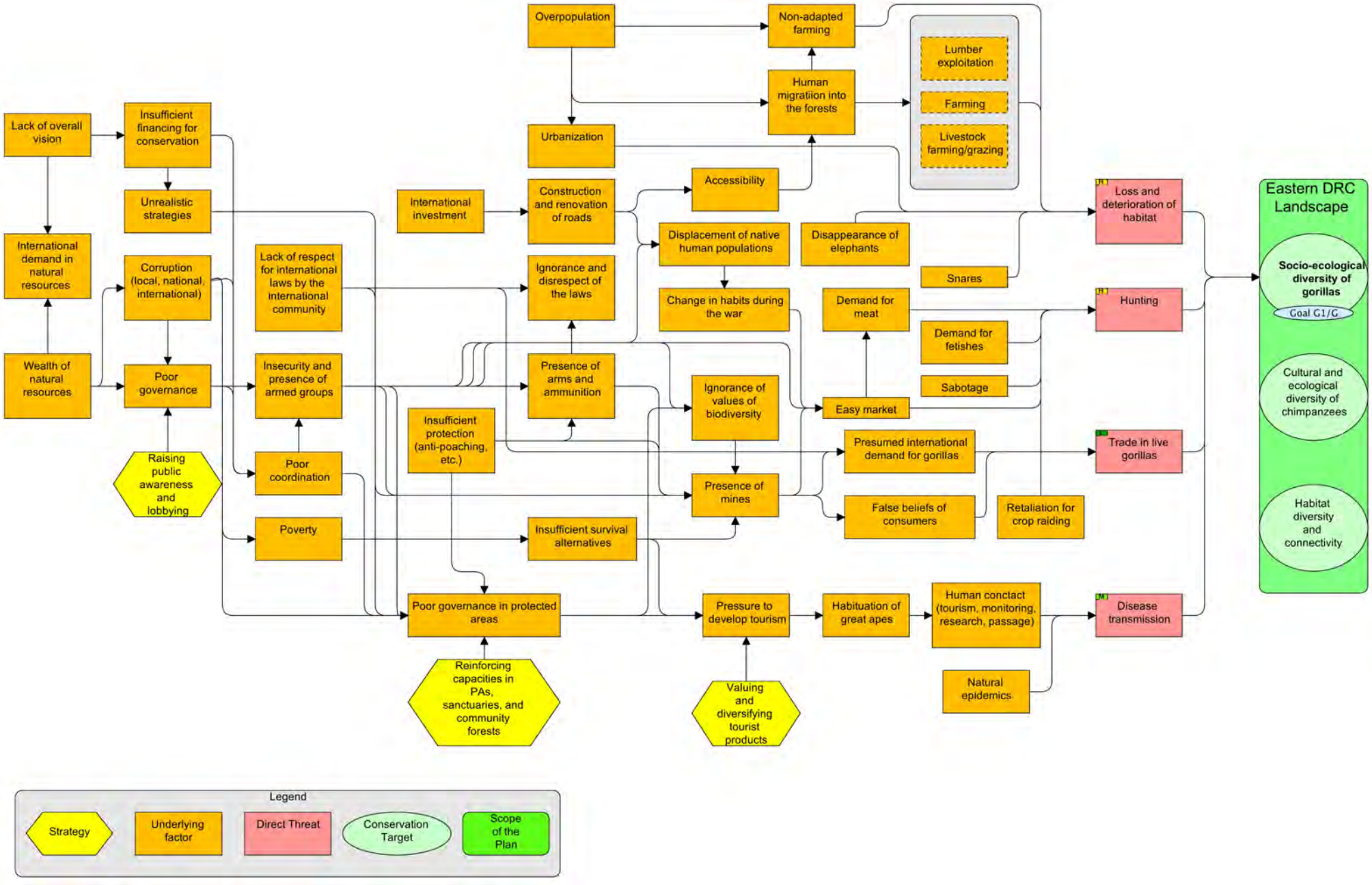


Figure 14. Underlying factors and direct threats to the socio-ecological diversity of Grauer's gorillas

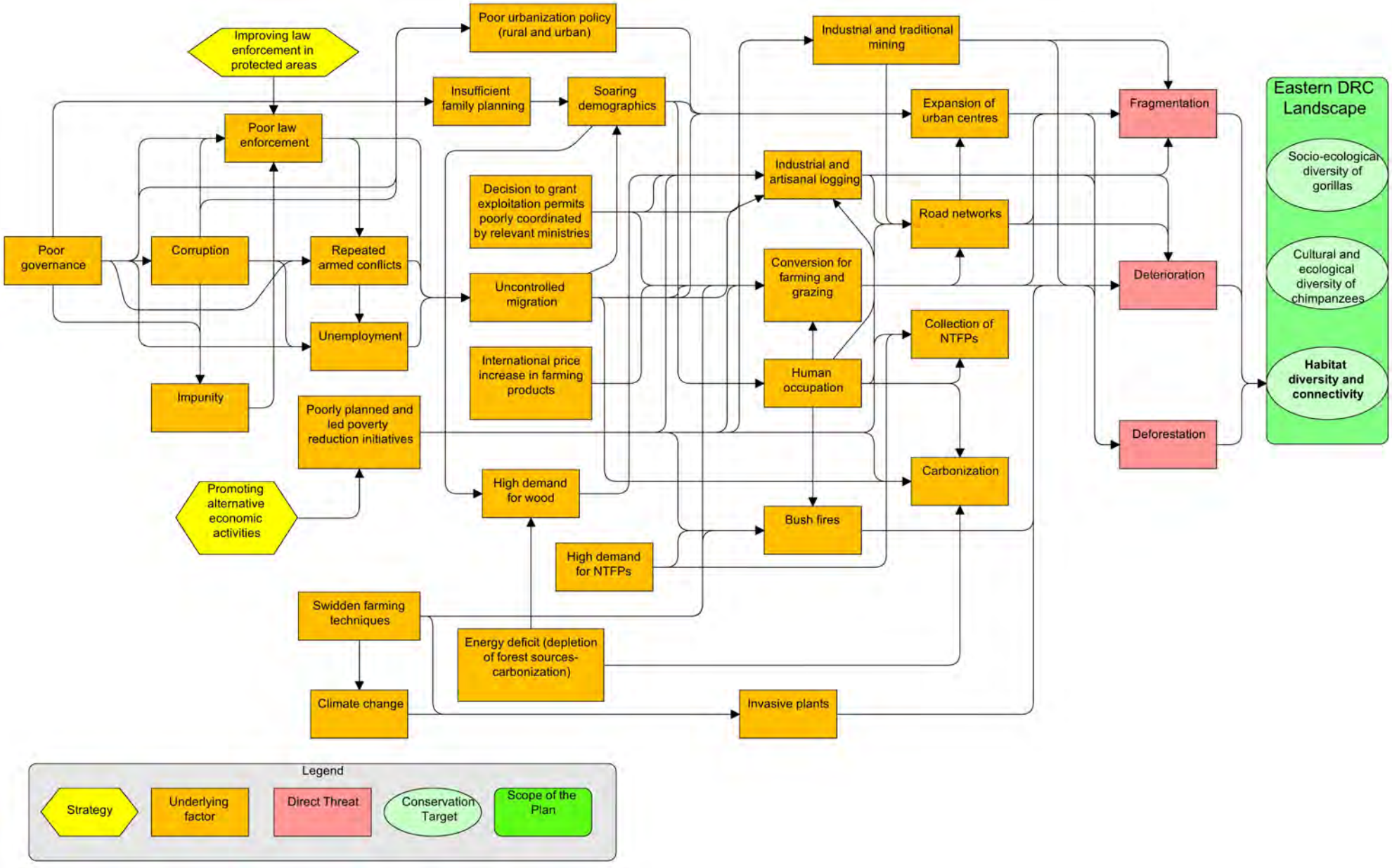


Figure 15. Underlying factors and direct threats to habitat diversity and connectivity

5. Conservation Strategies

Conservation strategies are the activities that stakeholders agree to undertake to mitigate or eliminate the threats to the conservation targets and assure their long-term viability.

Conservation strategies were planned by analyzing the conceptual models and identifying possible "gateways" for developing activities. To do this, the workshop participants took into account the value of different factors in a conceptual model in order to identify those that are most important in driving one or more of the threats. They also considered the strategic advantage (i.e., if addressing one problem could resolve multiple threats and their causes), as well as the capacity and available or accessible resources to implement these actions.

Young Grauer's gorilla: highland sector of KBNP © Stuart Nixon/FFI

Strategies were developed for each of the conservation targets, as follows:

Strategies for conservation of the ecological and cultural diversity of eastern chimpanzees
Goal of the strategies: By 2036, the chimpanzee population will be stable

- Strategy C.S1: Public awareness campaigns and local involvement in conservation
- Strategy C.S2: Land-use planning

Strategies for conservation of the socio-ecological diversity of Grauer's gorillas
Goal of the strategies: By 2021, the abundance and distribution of priority Grauer's gorilla populations are stable compared to 2014.

- Strategy G.S1: Public awareness campaigns and lobbying
- Strategy G.S2: Reinforce capacity in protected areas, sanctuaries and community forests
- Strategy G.S3: Promote and diversify tourism products

Strategies for conservation of habitat diversity and connectivity
Goal of the strategies: TBD

- Strategy H.S1: Enforcement of laws in protected areas
- Strategy H.S2: Promotion of alternative activities

The 'Results Chains' in Appendix II illustrate the logic used in construction of the strategies. They show, in flow diagrams, the premises and general assumptions of the strategies.

Given that the strategies proposed were based on conservation targets, some components were repeated in the strategies of two or even three targets (e.g., lobbying and public awareness campaigns). To avoid duplication, facilitate understanding of the strategies and development of the workplan, the strategies were later regrouped and composed by theme. The final result was the following:

- Strategy for assessing priority populations of great apes in the landscape
- Strategy for raising awareness and involving the population in conservation
- Strategy for consolidating land management
- Strategy for reinforcing protected areas, community forests, and sanctuaries
- Strategy for enforcing law within the landscape

The general Results Chain for all strategies is presented in Figure 16.

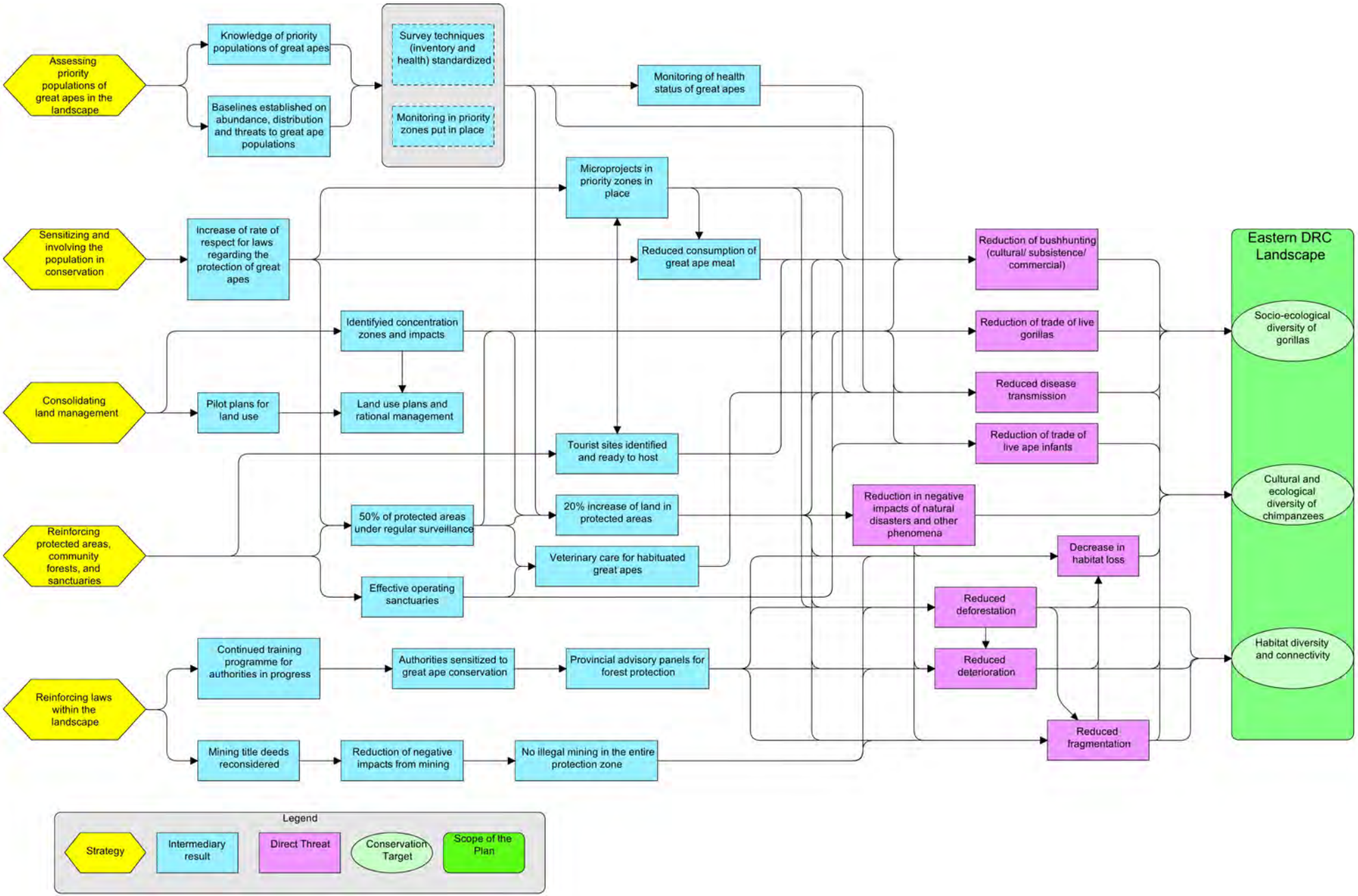


Figure 16. General results chain for all strategies

5.1 Strategy for assessing priority populations of great apes in the landscape (PP)

Objective	Activities	Actors
PP/O1 By 2014, great ape priority populations are known and baselines of abundance, distribution and threat established in consultation with the local authorities	PP/O1/A1 Identify priority sites for intervention and produce basic maps.	ICCN/WCS/FFI/FZS/DFGFI/JGI
	PP/O1/A2 Define survey protocols for great ape habitats	ICCN/WCS/FFI/FZS/DFGFI/JGI
	PP/O1/A3 Select survey teams	ICCN/WCS/FFI/FZS/DFGFI/JGI
	PP/O1/A4 Organize *in situ* training of survey techniques and carry out a survey	ICCN/WCS/FFI/FZS/DFGFI/JGI
	PP/O1/A5 Deploy teams in the field and begin great ape surveys in priority sites (known and potential)	ICCN/WCS/FFI/FZS/DFGFI/JGI
PP/O2 From 2013, monitoring techniques (surveys and health) are standardized and monitoring is in place at priority sites	PP/O2/A1 Develop a standard data collection protocol to compile data in centralized database	ICCN/WCS/FFI/FZS/DFGFI/JGI/MGVP
	PP/O2/A2 Develop a standard methodology for surveys and monitoring (*c.f.* Kühl *et al.* 2008)	ICCN/WCS/FFI/FZS/DFGFI/JGI/MGVP
	PP/O2/A3 Reinforce capacity of ICCN, research centre and community forest guards to survey and monitor great ape populations	ICCN/WCS/FFI/FZS/DFGFI/JGI/MGVP
	PP/O2/A4 Implement surveys of great ape populations in priority sites and other potential sites	ICCN/WCS/FFI/FZS/DFGFI/JGI/MGVP
Objective PP/O3 From 2013, the health status of great apes undergoes regular monitoring.	PP/O3/A1 Implement regulations for great ape visits to limit the risks of disease transmission (*c.f.* Macfie & Williamson 2010)	ICCN/MGVP/CRPL
	PP/O3/A2 Regular health monitoring of habituated great apes	ICCN/MGVP/CRPL
	PP/O3/A3 Non-invasive health monitoring of unhabituated great ape populations	ICCN/MGVP/CRPL
	PP/O3/A4 Regular health monitoring of staff working with great apes and in great ape habitat	ICCN/MGVP/CRPL

5.2 Strategy for raising awareness and involving the population in conservation (LC)

Objective	Activities	Actors
LC/O1 By 2016, the rate of respect for the laws on great ape protection by the populations targeted has increased by 60%	LC/O1/A1 Develop and implement a public awareness program in the landscape (including salaries, transport, etc.)	ICCN/JGI/FFI
	LC/O1/A2 Recruit and train public awareness educators	ICCN/JGI/FFI
	LC/O1/A3 Support ICCN's anti-poaching activities in PAs and those of community guards in community forests	ICCN/Community Conservation Network
LC/O2 By 2016, the consumption of great ape meat by the target populations has diminished by 51%	LC/O2/A1 Implement socio-economic studies (pre and post) at great ape priority sites and other potential sites to identify alternative activities/ community initiatives needs	FFI/JGI/WCS
	LC/O2/A2 Develop activities to produce alternative protein sources (e.g., raising of small livestock) at priority sites	FFI/JGI/ICCN/Ministries
	LC/O2/A3 Support family planning programmes of the public health services in villages bordering PAs	JGI
LC/O3 By 2015, at least one specific project is put in place at each great ape priority site	LC/O3/A1 Establish community projects integrated into local development plans	FFI/JGI

5.3 Strategy for consolidating land management (LM)

Objective	Activities	Actors
LM/O1 By 2016, pilot land-use plans are developed and implemented in 3 administrative territories identified as priorities and LM/O2 By 2021, 30% of the landscape will be rationally managed under land-use plans	LM/O1-O2/A1 Prioritization of territories for land-use planning	CI/DFGFI/JGI
	LM/O1-O2/A2 Development of a land-use planning framework adapted to a territorial scale	CI/DFGFI/JGI
	LM/O1-O2/A3 Recruit and reinforce capacity of personnel to develop land-use plans	CI/DFGFI/JGI
	LM/O1-O2/A4 Carry out land-use planning for 3 pilot priority territories	CI/DFGFI/JGI
LM/O3 By 2014, the sites impacted by communities living next to and in great ape habitats are identified	LM/O3/A1 Develop protocols to survey local communities (census/ elections) (e.g., civil registry, affected groups)	WCS/FFI/ICCN
	LM/O3/A2 Deploy teams in the field	WCS/FFI/ICCN
	LM/O3/A3 Map and analyze data	WCS/FFI/JGI

5.4 Strategy for reinforcing protected areas, community forests and sanctuaries (PA)

Objective	Activities	Actors
PA/O1 By 2016, at least 50% of the surface area of PAs is undergoing regular monitoring	PA/O1/A1 Participative documenting of PA boundaries with reference to the legal texts that created them	ICCN/FFI
	PA/O1/A2 Put in place a standardized system for collecting data on illegal activities (MIST)	ICCN/WCS
	PA/O1/A3 Equip and deploy patrols in the field following a procedural manual and maps with quadrats	ICCN/FFI/JGI/DFGFI
	PA/O1/A4 Participative delineation of PA boundaries based on an established plan	ICCN/FFI/WWF
	PA/O1/A5 Construct facilities and provide PA staff with communications equipment and vehicles	ICCN
PA/O2 By 2016, sanctuaries are able to take in all confiscated great apes and provide appropriate conditions for their potential reintroduction into a natural environment	PA/O2/A1 Increase the holding capacity of existing sanctuaries to receive confiscated animals	CRPL/DFGFI/GRACE/PASA
	PA/O2/A2 Strengthen and standardize management capacity of existing sanctuaries (salaries, personnel, study trips)	PASA/ICCN
	PA/O2/A3 Recover protected species held illegally and provide medical care to great apes	ICCN/MGVP
	Intensive care and regular health monitoring of great ape orphans	ICCN/MGVP
PA/O3 By 2021, the surface area of PAs and community forests will increase by more than 20% and protected area management will improve	PA/O3/A1 Carry out a rapid assessment of the capacity of existing PAs	ICCN/WWF
	PA/O3/A2 Train and/or retrain conservation actors in PA management	ICCN/FFI/WCS
	PA/O3/A3 Revitalize SYGIAP (Protected Area Information Management System) with equipment, training, development of a database to include all pertinent data (contracts for mining, logging, farming, etc.) and/or create a central server to compile all data under the tutelage of ICCN or create a network to centralize data on great apes in eastern DRC	ICCN, JGI
	PA/O3/A4 Create new PAs and community forests with local community participation	ICCN, WCS, local community, governments (Provincial, Territorial), MECNT, other NGOs

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Objective	Activities	Actors
PA/O4 By 2014, the tourist sites identified are qualified to receive tourists	PA/O4/A1 Identification and assessment of tourist sites and their potential economic value	ICCN/MECNT/private sector tourism agencies/IUCN
	PA/O4/A2 Develop and put in place a marketing plan to promote tourism	ICCN/MECNT/private sector tourism agencies/FFI/JGI
	PA/O4/A3 Support local communities to promote ecotourism attractions in their neighbourhoods	ICCN/IUCN/conservation NGOs/ USAID/EC/GIZ
	PA/O4/A4 Set up facilities and a great ape habituation programme, where appropriate	ICCN/IUCN/conservation NGOs/ USAID/EC/GIZ
Objective PA/O5 By 2014, veterinary care for all habituated great apes is ensured	PA/O5/A1 Recruit and train a veterinary team to care for habituated chimpanzees and gorillas.	CRPL/ICCN/MGVP
	PA/O5/A2 Provide urgent medical attention to great apes with life-threatening conditions (to include necropsies)	CRPL/ICCN/MGVP
	PA/O5/A3 Carry out specific and in-depth research on disease in great apes	CRPL/ICCN/MGVP

5.5 Strategy for enforcing law within the landscape (LE)

Objective	Activities	Actors
LE/O1 By 2012, the politico-administrative, judiciary, traditional authorities, police and ANR are sensitized to great ape conservation and a continuous training programme is ongoing	LE/O1/A1 Direct informational and public awareness activities towards politico-administrative, military and traditional authorities and other opinion makers (continuous)	ICCN/JGI/WWF
	LE/O1/A2 Strengthen the operational capacity of environment and border police in the field of conservation (Y3)	Judicial authorities, ICCN, Ministry of the Interior, Intelligence Services, Interpol, NGOs working in law enforcement
	LE/O1/A3 Strengthen local NGO capacity in judicial matters relating to conservation (Y3)	NGOs working in judicial matters, ICCN, military, police, conservation NGOs, traditional leaders, civil society, local authorities
	LE/O1/A4 Strengthen the operational capacities of military personnel and intelligence services in conservation matters (Y3)	NGOs working in judicial matters, ICCN, military, police, conservation NGOs, traditional leaders, civil society, local authorities
LE/O2 An advisory panel for forest protection is established in each province and operational by 2012	LE/O2/A1 Support the development and validation of provincial decrees	ICCN/provincial ministries
	PA/O2/A2 Put in place an advisory panel for each province	

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Objective	Activities	Actors
LE/O3 By 2013, 100% of mining, forestry and farming title deeds in protected areas and 50% of sites important for great apes are reconsidered	LE/O3/A1 Inventory all existing mining, forestry and farming title deeds	ICCN/provincial ministries
	LE/O3/A2 Develop memoranda for the reconsideration of permits (contracts)	
	LE/O3/A3 Appeal for a decision to reconsider (cancel) contracts	
LE/O4 By June 2015, a 60% reduction in the negative impacts of mining, forestry and farming is achieved	LE/O4/A1 Define indicators to monitor the impacts of various forms of exploitation	ICCN/CI/DFGFI/JGI/WWF
	LE/O4/A2 Develop monitoring protocols	ICCN/CI/DFGFI/JGI/WWF
	LE/O4/A3 Develop a training programme in impact assessment	ICCN/DFGFI/JGI
	LE/O4/A4 Deploy teams in the field for monitoring	ICCN/DFGFI/JGI
	LE/O4/A5 Analyse monitoring reports	ICCN/DFGFI/JGI
LE/O5 By 2021, no illegal mining activity in any fully protected area	LE/O5/A1 Inventory mining activities throughout the landscape	ICCN/JGI/WCS/FZS
	LE/O5/A2 Encourage the removal of illegal mining operations	ICCN
	LE/O5/A3 Monitor the departure of miners from PAs	ICCN

Goals for the whole strategy

By 2016, the rate of degradation of great ape habitats will diminish by 20%

By 2021, the abundance and distribution of priority populations of great apes are stable compared to the situation in 2014

6. Monitoring Plan

6.1 Monitoring of the strategy for assessing priority populations of great apes in the landscape (PP)

Objective PP/O1: **By 2014, great ape priority populations are known and baselines of abundance, distribution and threat established in consultation with the local authorities**							
Indicator	**Type**	**Method**	**Existing Data**	**Group(s) Responsible**	**When (frequency)**	**Where**	**Cost**
Number of sites identified Indices of abundance	Progress and Impact	Fieldwork (transects/ recces/interviews)	Yes (ICCN, partners)	Local communities, ICCN, partners	Every 5 years at each site	Protected areas and other important sites	Very High
Objective PP/O2: **From 2013, monitoring techniques (surveys and health) are standardized and monitoring is in place at priority sites**							
Indicator	**Type**	**Method**	**Existing Data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
Number of gorillas	Impact	Surveys	No	Advisory Panel	Continual, annual report	*In situ* and *ex situ*	High
Objective PP/O3: **From 2013, the health status of great apes undergoes regular monitoring**							
Indicator	**Type**	**Method**	**Existing Data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

The commercial bushmeat trade is the biggest threat to great apes in DRC: gorillas, chimpanzees and bonobos are killed by poachers for their meat. This photograph was taken in the TL2 landscape in central DRC © Terese Hart

6.2 Monitoring of the strategy for raising awareness and involving the population in conservation (LC)

Objective LC/O1: **By 2016, the level of respect for the laws on great ape protection by the populations targeted has increased by 60%**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
Number of chimpanzees arriving at the sanctuaries	Impact	Monitoring in the sanctuaries	Yes (ICCN, JACK, Grace, Lwiro, PASA, GRASP, conservation NGOs)	ICCN, sanctuaries, PNC, FARDC	Yearly	ICCN, sanctuaries, PNC, FARDC	Low
Records of arrests for poaching	Progress	Patrols and monitoring in PAs					
Objective LC/O2: **By 2016, the consumption of great ape meat by the target populations has diminished by 51%**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
Number of chimpanzees arriving at the sanctuaries	Impact	Monitoring in the sanctuaries	Yes (ICCN, JACK, GRACE, Lwiro, PASA, GRASP, conservation NGOs)	ICCN, sanctuaries, PNC, FARDC	Yearly	ICCN, sanctuaries, PNC, FARDC	Average
Records of arrests for poaching	Progress	Patrols and monitoring in PAs; KAP (Knowledge, Attitude and Practice) studies					
Objective LC/O3: **By 2015, at least one specific project is put in place at each great ape priority site**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**When (Frequency)**	**Where**	**Cost**
Number of micro-projects in the landscape	Progress and impacts	Collaborative agreements	Yes	Local communities, ICCN, partners	2015	All sites	Very High

The habituated silverback Cimanuka © ICCN/KBNP

6.3 Monitoring for the strategy for consolidating land management (LM)

Objective LM/O1: **By 2016, pilot land-use plans are developed and implemented in 3 administrative territories identified as priorities**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
Territories implementing land-use plans (criteria to be defined)		Monitoring of administrative territories	JGI, WCS, ICCN, MECNT	MECNT, ICCN, JGI WCS	Every 3 years	Territories in the landscape	Average
Objective LM/O2: **By 2021, 30% the landscape will be rationally managed under land-use plans**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
Territories implementing land-use plans (criteria to be defined)	Progress	Monitoring of administrative territories	JGI, WCS, ICCN, MECNT	MECNT, ICCN, JGI WCS	Every 3 years	Territories in the landscape	Average
Objective LM/O3: **By 2014, the sites impacted by communities living next to and in great ape habitats are identified**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**When (Frequency)**	**Where**	**Cost**
Number of villages in and around PAs and other important sites	Progress	Fieldwork, SYGIAP	Yes (SYGIAP, partners)	Local communities, ICCN, partners	Before 2014 and then every year	All sites	Very High
Indices of abundance of human activities	Impact						

6.4 Monitoring of the strategy for reinforcing protected areas, community forests and sanctuaries (PA)

Objective PA/O1: **By 2016, at least 50% of the surface area of PAs is under regular surveillance**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
Coverage of monitoring	Progress	Patrols for on site monitoring	Yes	ICCN, MECNT	4–5 Years	PAs	High
Objective PA/O2: **By 2016, sanctuaries are able to take in all confiscated great apes and provide appropriate conditions for their potential reintroduction into a natural environment**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
Holding capacity of the sanctuaries (assessment criteria to be defined according to PASA and IUCN standards)	Progress	PASA and IUCN standards	PASA, sanctuaries, GRASP, zoos, animal welfare NGOs)	ICCN, sanctuaries	2016	sanctuaries	Low
Objective PA/O3: **By 2021, the surface area of PAs and community forests will increase by more than 20% and PA management will be improved**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
% increase in surface area of PAs		Monitoring of official publications	MECNT, ICCN, JGI, WCS	MECNT, ICCN, JGI, WCS	Every 5 years	PAs	Low

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Objective PA/O4: **By 2014, the tourist sites identified are qualified to receive tourists**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
Satisfaction of tourists	Progress	Study	No	Advisory panel	Continual, annual report	Exit posts (borders) Airport	Moderate
Number of tourists	Progress	Verification of immigration records	Yes	Local authorities	Annual	Border post Airport	Low
Objective PA/O5: **By 2014, veterinary care for all habituated great apes is ensured**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

6.5 Monitoring of the strategy for enforcing law within the landscape (LE)

Objective LE/O1: **By 2012, the politico-administrative, judiciary, traditional authorities, police and ANR are sensitized to great ape conservation and a continuous training programme is ongoing**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
Number of people trained	Performance	Record of training sessions	No	ICCN and partners	2012, then every year	Various	Low
% of administrators trained	Progress	Study	No	ICCN, politico-representatives, administrators, police, traditional authorities	2012, then every year	Various	Low
Objective LE/O2: **An advisory panel for forest protection is established in each province and operational by 2012**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
Provincial decrees	Indicator of progress		No	Provincial authorities		By province	Low
Proceedings of establishment	Progress	Meeting	Yes	Local communities, ICCN, partners	Before 2014	PAs and other important sites	Average
Minutes of meetings	Progress and impacts						
Number of collaborative agreements with community leaders	Progress and impacts						
Objective LE/O3: **By 2013, 100% of mining, forestry and farming title deeds in protected areas and 50% of sites important for great apes are reconsidered**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
New legislation (national and provincial ministerial decrees)	Progress			National and provincial authorities	2013	At national and provincial levels	Low

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Objective LE/O4: **By June 2015, a 60% reduction in the negative impacts of mining, forestry and farming is achieved**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**When (Frequency)**	**Where**	**Cost**
Number of permits operational and cancelled	Impact	Field verification missions (ground truthing)			2015, then every 5 years	PAs and other important sites	High
Number of operations without permits	Impact						
Surface area of regeneration	Impact	Remote detection	Yes (de Wasseige *et al*. 2009)	ICCN (SYGIAP)	Every 5 years		Average
Objective LE/O5: **By 2021, no illegal mining activity in any fully protected area**							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
Mining quarries closed	Impact	Results of monitoring	Yes	ICCN, MECNT, Ministry of Mines	Annual	ICCN, Ministry of Mines	Average

6.6 Monitoring of the goals for all strategies combined

By 2016, the rate of degradation of great ape habitats will diminish by 20%							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
% loss of forest in the landscape	Impact	GIS, satellite	ESRI, WHRC, JGI	WHRC, JGI	Every 5 years	Whole landscape	Average
By 2021, the abundance and distribution of priority populations of great apes are stable compared to the situation in 2014							
Indicator	**Type**	**Method**	**Existing data**	**Group(s) Responsible**	**Date or Frequency**	**Place**	**Cost**
Change in great ape populations after 10 years	Impact	Monitoring of great apes in their natural habitats	WCS, WWF, ICCN, FFI, FZS, ZSL, JGI, USFWS, ARCUS	ICCN, community forest guards, WCS, JGI, FZS, ZSL, FFI WWF	Every 5 years	PAs, priority sites	Very High

Monigo village, Tayna Nature Reserve, where inhabitants live alongside gorillas and chimpanzees © Stuart Nixon/ DFGFI

7. Acknowledgements

In the face of the urgency to find concerted and long-lasting solutions for the survival of great apes in eastern DRC, we wish to thank all those who contributed to the development of this conservation action plan – and the list is long. Although the guidelines for the strategies are well defined, the planning process can change in light of new data, discoveries and situations. This is why we also wish to acknowledge the actors who continue to contribute to the improvement of this document to this day.

We express our gratitude to the government of the DRC and more particularly to the Ministry of Environment, Nature Conservation and Tourism which, together with the Jane Goodall Institute, was the instigator of this action plan and we thank them for their contributions to the success of these workshops. Thank you to the Provincial Ministries of Environment, Mines and Hydrocarbons and Ministries of the Interior of the Provinces of Maniema, South Kivu, North Kivu and the Eastern Province for their contributions and investment in the development of the strategies and activities.

We wish to pay tribute to the presence of the Territorial Administrators, who helped us understand situations particular to their governing structures and proposed practical and enlightened solutions.

Thank you to ICCN whose support was affirmed from the first hours of the development of this action plan. We pay tribute to the limitless involvement of the National Park Directors and Chief Park Wardens – their passion equalled only by the sacrifices they make to protect the nature of DRC.

Thank you also to the universities and research centres that offered their expertise to contribute to this plan, and to the Centre for Research in Natural Sciences at Lwiro for the use of its facilities – among the most beautiful in Central Africa.

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As said previously, the list is long and we end by thanking the NGOs that contributed to this document. The spirit of cooperation and constructive exchange was a model for future meetings. Each one pushed themselves to exceed their institutional guidelines to meet the challenge of securing a future for the great apes. This mindset, as we finalize this document, is a reality in the implementation of activities on the ground for a number of them.

Mountains in the southern sector of Maiko National Park © Stuart Nixon/FFI

8. Acronyms and Abbreviations Used

CAP	Conservation Action Plan
CARPE	Central African Regional Programme for the Environment
CITES	Convention on International Trade in Endangered Species
CRPL	Lwiro Sanctuary (Centre de Réhabilitation des Primates de Lwiro)
CRSN	Centre for Research in Natural Sciences (Centre de Recherche en Sciences Naturelles)
DFGFI	Dian Fossey Gorilla Fund International
DRC	Democratic Republic of the Congo
EC	European Community
FARDC	Armed Forces of the DRC (Forces Armées de la République Démocratique du Congo)
FFI	Fauna & Flora International
FZS	Frankfurt Zoological Society
GIZ	German Agency for International Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit); formerly known as GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit)
GIS	Geographic Information System
GRASP	Great Apes Survival Partnership
ICCN	Congolese Institute for Nature Conservation (Institut Congolais pour la Conservation de la Nature)
IUCN	International Union for Conservation of Nature
JGI	The Jane Goodall Institute
JPE	Jeunesse pour la Protection de l'Environnement
KBNP	Kahuzi-Biega National Park
MECNT	Ministry of the Environment, Conservation and Tourism (Ministère de l'Environnement, Conservation de la Nature et Tourisme)
NGO	non-governmental organization
NTFP	Non Timber Forest Product
OFAC	Observatoire des Forêts d'Afrique
PA	protected areas
PASA	Pan African Sanctuary Alliance
PNC	Congolese National Police (Police Nationale Congolaise)
POPOF	Pole Pole Foundation
SYGIAP	Information Management System for Protected Areas (Système de Gestion d'Information pour les Aires Protégées)
TCCB	Tayna Centre for Conservation Biology
TNC	The Nature Conservancy
UGADEC	Union of Associations for Gorilla Conservation and Community Development in Eastern Congo
UOB	Universite Officielle de Bukavu
USAID	United States Agency for International Development
USFWS	United States Fish & Wildlife Service
WCS	Wildlife Conservation Society
WWF	World Wide Fund for Nature
ZSL	Zoological Society of London

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Gorilla tourism began in KBNP in the 1970s, but has been interrupted for long periods by insecurity in eastern DRC
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Eastern chimpanzees feeding
© Alain Houle

Appendix I. List of Workshop Participants

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Appendix 1, continued on next page

Appendix 1, continued from previous page

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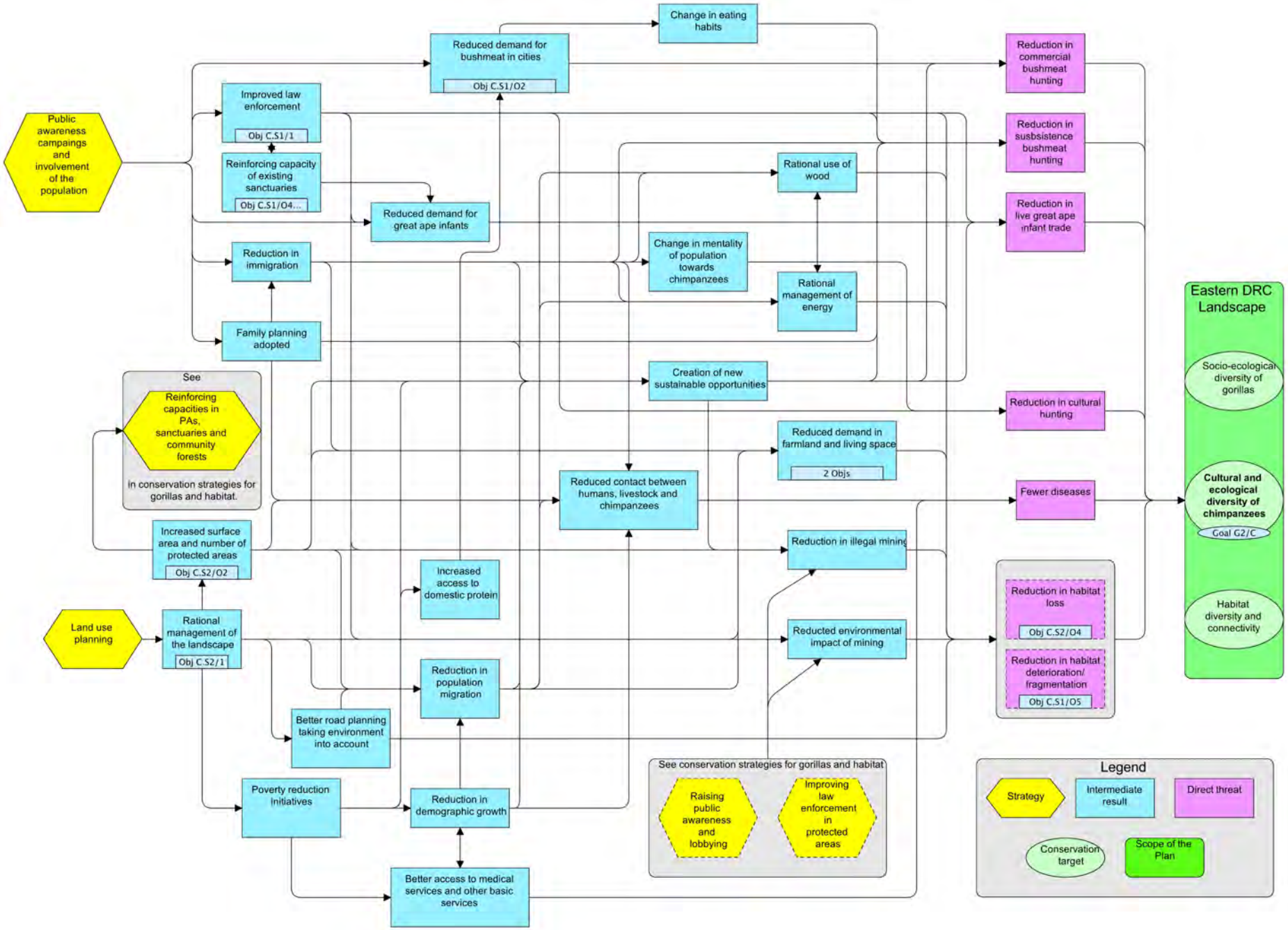
Appendix II. Preliminary Results Chains

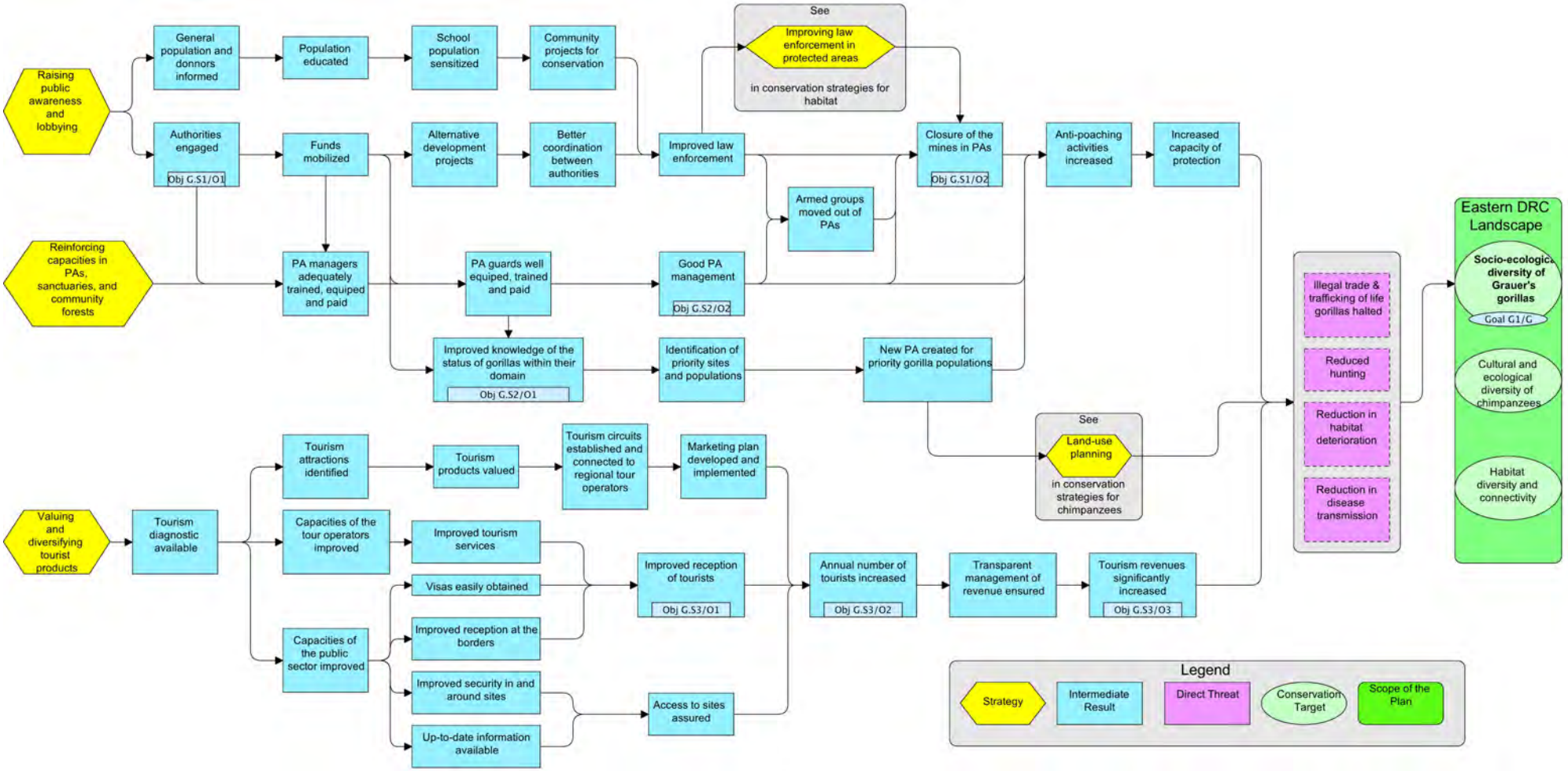
The Results Chains in Appendices IIa, IIb and IIc show preliminary analysis of the strategies developed to address threats to the conservation targets. These Results Chains were used to develop strategies by thematic area in this conservation action plan.

A path through bamboo forest at Mt. Tshiaberimu © Stuart Nixon

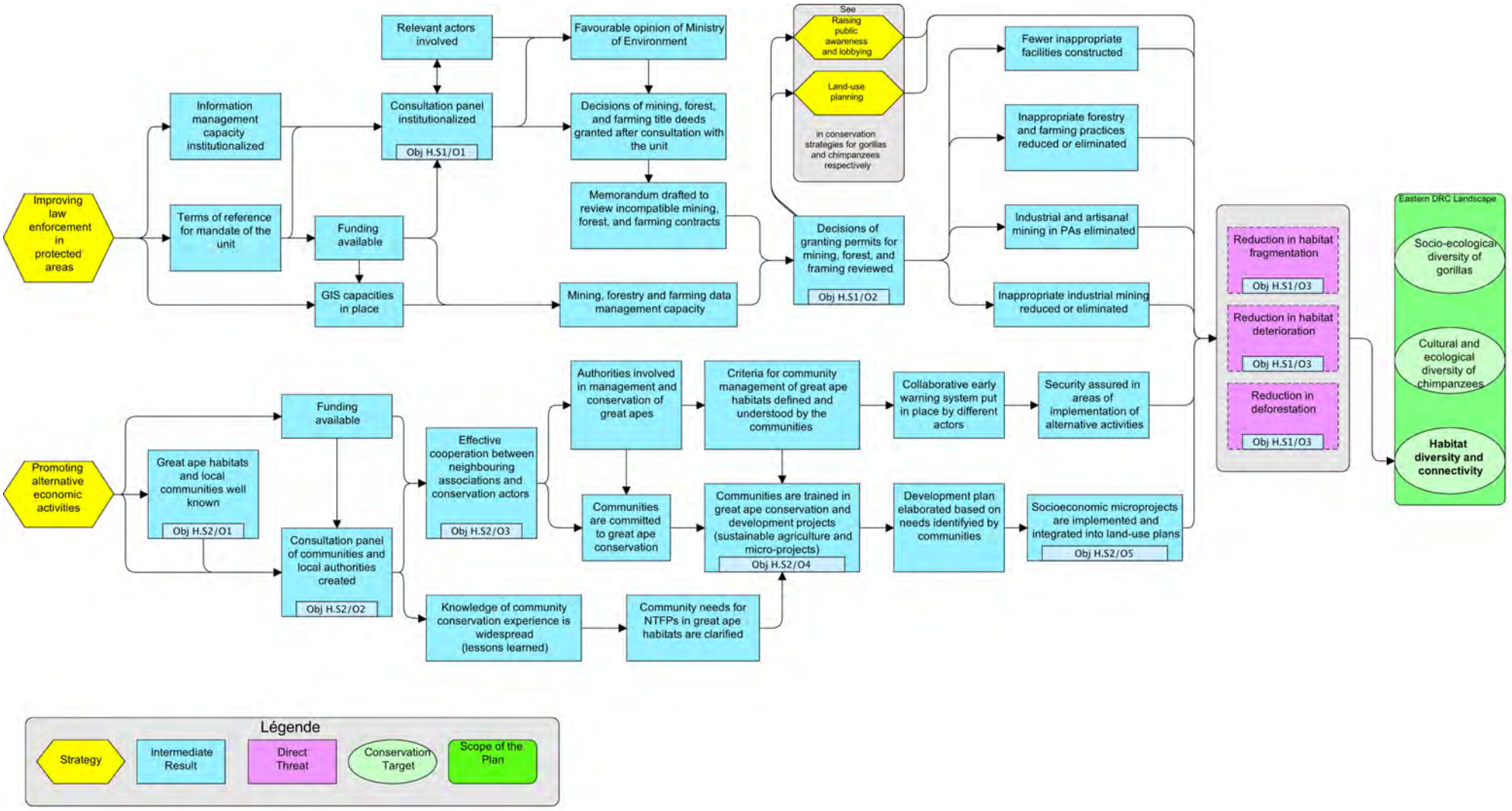
Appendix IIa. Results chain of the strategies for conservation of the ecological and cultural diversity of eastern chimpanzees



Appendix IIb. Results chain of the strategies for conservation of the socio-ecological diversity of Grauer's gorillas



Appendix IIc. Results chain of the strategies for conservation of habitat diversity and connectivity



Appendix III. Workplan for Year 1

Strategy 1: Strategy for assessing priority populations of great apes in the landscape (PP)					
Objective PP/01: By 2014, great ape priority populations are known and baselines of abundance, distribution and threat established in consultation with the local authorities					
			Cost		
No.	Activities	Group(s) Responsible	A1	A2	A3
1	Identify priority sites for intervention and produce basic maps	ICCN/WCS/FFI/FZS/DFGFI/JGI	$ 50,000		
2	Define survey protocols for great ape habitats	ICCN/WCS/FFI/FZS/DFGFI/JGI	$ 15,000		
3	Select survey teams	ICCN/WCS/FFI/FZS/DFGFI/JGI	$ 5,000		
4	Organize *in situ* training of survey techniques and carry out a survey (Tayna proposed for pilot study)	ICCN/WCS/FFI/FZS/DFGFI/JGI	$ 75,000		
5	Deploy teams in the field and begin great ape surveys in priority sites (known and potential)	ICCN/WCS/FFI/FZS/DFGFI/JGI	$ 250,000	$ 250,000	
	Subtotal		**$ 395,000**	**$ 250,000**	
Objective PP/O2: From 2013, monitoring techniques (surveys and health) are standardized and monitoring is in place at priority sites					
No.	Activities	Group(s) Responsible	A1	A2	A3
6	Develop a standard data collection protocol to compile data in centralized database	ICCN/WCS/FFI/FZS/DFGFI/JGI/MGVP	$ 50,000		
7	Develop a standard methodology for surveys and monitoring	ICCN/WCS/FFI/FZS/DFGFI/JGI/MGVP	$ 40,000	$ 40,000	
8	Reinforce capacity of ICCN, research centre and community forest guards to survey and monitor great ape populations	ICCN/WCS/FFI/FZS/DFGFI/JGI/MGVP		$ 400,000	$ 400,000
9	Implement surveys of great ape populations in priority sites and other potential sites	ICCN/WCS/FFI/FZS/DFGFI/JGI/MGVP		$ 200,000	$ 100,000
	Subtotal		**$ 90,000**	**$ 640,000**	**$ 500,000**
Objective PP/O3: From 2013, the health status of great apes undergoes regular monitoring					
No.	Activities	Group(s) Responsible	A1	A2	A3
10	Implement regulations for great ape visits to limit the risks of disease transmission	ICCN/MGVP/CRPL	$ 100,000	$ 100,000	
11	Intensive care and regular regular health monitoring of habituated great apes	ICCN/MGVP/CRPL	$ 50,000	$ 75,000	$ 100,000
12	Non-invasive health monitoring of unhabituated great ape populations	ICCN/MGVP/CRPL		$ 50,000	$ 50,000
13	Regular health monitoring of staff working with great apes and in great ape habitat	ICCN/MGVP/CRPL	$ 100,000	$ 150,000	$ 150,000
	Subtotal		**$ 250,000**	**$ 375,000**	**$ 300,000**

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Strategy 2: Strategy for raising awareness and involving the population in conservation (LC)					
Objective LC/O1: By 2016, the rate of respect for the laws on great ape protection by the populations targeted has increased by 60%					
No.	Activities	Group(s) Responsible	A1	A2	A3
1	Develop and implement a public awareness program in the landscape (include salaries, transport, etc.)	ICCN/JGI/FFI	$ 250,000	$ 300,000	$ 350,000
2	Recruit and train public awareness educators	ICCN/JGI/FFI	$ 30,000	$ 45,000	$ 60,000
3	Support ICCN's anti-poaching activities in PAs and those of community guards in community forests	ICCN/Community Conservation Network	$ 300,000	$ 300,000	$ 300,000
	Subtotal		**$ 580,000**	**$ 645,000**	**$ 710,000**
Objective LC/O2: By 2016, the consumption of great ape meat by the target populations has diminished by 51%					
No.	Activities	Group(s) Responsible	A1	A2	A3
4	Implement socio-economic studies (pre and post) at great ape priority sites and other potential sites to identify alternative activities/ community initiatives needs	FFI/JGI/WCS	$ 120,000		$ 120,000 (Y5)
5	Develop activities to produce alternative protein sources (e.g., raising of small livestock) at priority sites	FFI/JGI/ICCN/Ministry in charge	$ 400,000	$ 400,000	$ 400,000
6	Support family planning programmes of the public health services in villages bordering PAs	JGI	$ 200,000	$ 250,000	$ 300,000
	Subtotal		**$ 720,000**	**$ 650,000**	**$ 820,000**
Objective LC/O3: By 2015, at least one specific project is put in place at each great ape priority site					
No.	Activities	Group(s) Responsible	A1	A2	A3
7	Establish community projects integrated into local development plans (e.g., construction of a school or health centre, supply electricity to a village)	FFI/JGI	$ 400,000	$ 400,000	$ 400,000
	Subtotal		**$ 400,000**	**$ 400,000**	**$ 400,000**
Strategy 3: Strategy for consolidating land management (LM)					
Objective LM/O1: By 2016, pilot land-use plans are developed and implemented in 3 administrative territories identified as priorities					
Objective LM/O2: By 2021, 30% the landscape will be rationally managed under land-use plans					
No.	Activities	Group(s) Responsible	A1	A2	A3
1	Prioritization of territories for land-use planning	CI/DFGFI/JGI	$ 15,000		
2	Development of a land-use planning framework adapted to a territorial scale	CI/DFGFI/JGI	$ 15,000		
3	Recruit and reinforce capacity of personnel to develop land-use plans	CI/DFGFI/JGI	$ 25,000		
4	Carry out land-use planning for 3 pilot priority territories	CI/DFGFI/JGI		$ 60,000	$ 60,000
	Subtotal		**$ 55,000**	**$ 60,000**	**$ 60,000**

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Objective LM/O3: By 2014, the sites impacted by communities living next to and in great ape habitats are identified					
No	Activities	Group(s) Responsible	A1	A2	A3
5	Develop protocols to survey local communities (census/elections) (e.g., civil registry, affected groups)	WCS/FFI/ICCN	$ 45,000		
6	Deploy teams in the field	WCS/FFI/ICCN	$ 75,000		
7	Map and analyze data	WCS/FFI/JGI	$ 40,000		
	Subtotal		**$ 160,000**		
Strategy 4: Strategy for reinforcing protected areas, community forests and sanctuaries (PA)					
Objective PA/O1: By 2016, at least 50% of the surface area of PAs is undergoing regular monitoring					
No.	Activities	Group(s) Responsible	A1	A2	A3
1	Participative documenting of PA boundaries with reference to the legal texts that created them	ICCN/FFI	$ 400,000	$ 400,000	
2	Put in place a standardized system for collecting data on illegal activities (MIST)	ICCN/WCS	$ 40,000	$ 25,000	
3	Equip and deploy patrols in the field following a procedural manual and maps with quadrats	ICCN/FFI/JGI/DFGFI	$ 350,000	$ 350,000	
4	Participative delineation of PA boundaries based on an established plan	ICCN/FFI/WWF	$ 800,000	$ 800,000	$ 800,000
5	Construct facilities and provide PA staff with communications equipment and vehicles	ICCN	$ 500,000		
	Subtotal		**$ 2,090,000**	**$ 1,575,000**	**$ 800,000**
Objective PA/O2: By 2016, sanctuaries are able to take in all confiscated great apes and provide appropriate conditions for their potential reintroduction into a natural environment					
No.	Activities	Group(s) Responsible	A1	A2	A3
6	Increase the holding capacity of existing sanctuaries to receive confiscated animals	CRPL/DFGFI/GRACE/PASA	$ 400,000	$ 400,000	
7	Strengthen and standardize management capacity of existing sanctuaries (salaries, personnel, study trips)	PASA/ICCN	$ 200,000	$ 200,000	
8	Recover protected species held illegally and provide medical care to great apes	ICCN/MGVP	$ 30,000	$ 60,000	$ 40,000
9	Intensive care and regular health monitoring of orphaned great apes	ICCN/MGVP	$ 150,000	$ 200,000	$ 250,000
	Subtotal		**$ 780,000**	**$ 860,000**	**$ 290,000**

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Objective PA/O3: By 2021, the surface area of PAs and community forests will increase by more than 20% and protected area management will improve					
No.	Activities	Group(s) Responsible	A1	A2	A3
10	Carry out a rapid assessment of the capacity of existing PAs	ICCN/WWF	$ 25,000		
11	Train and/or retrain conservation actors in PA management	ICCN/FFI/WCS	$ 200,000	$ 100,000	
12	Revitalize SYGIAP (Protected Area Information Management System) with equipment, training, development of a database to include all pertinent data (contracts for mining, logging, farming, etc.) and/or create a central server to compile all data under the tutelage of ICCN or create a network to centralize data on great apes in eastern DRC	ICCN/JGI		$ 75,000	$ 75,000
13	Create new PAs and community forests with local community participation	ICCN, WCS, local community, governments (Provincial, Territorial), MECNT, other NGOs			$ 400,000
	Subtotal		**$ 225,000**	**$ 175,000**	**$ 475,000**
Objective PA/O4: By 2014, the tourist sites identified are qualified to receive tourists					
No.	Activities	Group(s) Responsible	A1	A2	A3
14	Identification and assessment of tourist sites and their potential economic value	ICCN/MECNT/private sector tourism agencies/IUCN	$ 60,000		
15	Develop and put in place a marketing plan to promote tourism	ICCN/MECNT/private sector tourism agencies/FFI/JGI	$ 100,000	$ 100,000	
16	Support local communities to promote ecotourism attractions in their neighbourhoods	ICCN/IUCN/conservation NGOs/USAID/ EC/GIZ	$ 50,000	$ 80,000	$ 80,000
17	Set up facilities and a great ape habituation programme, where appropriate	ICCN/IUCN/conservation NGOs/USAID/ EC/GIZ	$ 120,000	$ 180,000	$ 180,000
	Subtotal		**$ 330,000**	**$ 360,000**	**$ 260,000**
Objective PA/O5: By 2014, veterinary care for all habituated great apes is ensured					
No.	Activities	Group(s) Responsible	A1	A2	A3
18	Recruit and train a veterinary team to provide care for habituated gorillas and chimpanzees	CRPL/ICCN/MGVP	$ 100,000	$ 125,000	
19	Provide urgent medical attention to great apes with life-threatening conditions (to include necropsies)	CRPL/ICCN/MGVP	$ 40,000	$ 50,000	$ 60,000
20	Carry out specific and in-depth research on disease in great apes	CRPL/ICCN/MGVP	$ 50,000	$ 100,000	$ 100,000
	Subtotal		**$ 190,000**	**$ 275,000**	**$ 160,000**

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Strategy 5: Strategy for enforcing law within the landscape					
Objective LE/O1: By 2012, the politico-administrative, judiciary, traditional authorities, police and ANR are sensitized to great ape conservation and a continuous training programme is ongoing					
No.	Activities	Group(s) Responsible	A1	A2	A3
1	Direct informational and public awareness activities towards politico-administrative, military and traditional authorities and other opinion makers (continuous)	ICCN/JGI/WWF	$ 150,000	$ 150,000	
2	Strengthen the operational capacity of environment and border police in the field of conservation (Y3)	Judicial authorities, ICCN, Ministry of the Interior, Intelligence Services, Interpol, NGOs working in law enforcement	$ 100,000	$ 100,000	$ 100,000
3	Strengthen local NGO capacity in judicial matters relating to conservation (Y3)	NGOs working in judicial matters, ICCN, military, police, conservation NGOs, traditional leaders, civil society, local authorities	$ 50,000	$ 50,000	
4	Strengthen the operational capacities of military personnel and intelligence services in conservation matters (Y3)	NGOs working in judicial matters, ICCN, military, police, conservation NGOs, traditional leaders, civil society, local authorities	$ 60,000	$ 60,000	$ 60,000
	Subtotal		**$ 360,000**	**$ 360,000**	**$ 160,000**
Objective LE/O2: An advisory panel for forest protection is established in each province and operational by 2012					
No.	Activities	Group(s) Responsible	A1	A2	A3
5	Support the development and validation of provincial decrees	ICCN/provincial ministries	$ 30,000		
6	Put in place an advisory panel for each province	ICCN/provincial ministries	$ 30,000	$ 45,000	$ 30,000
Objective LE/O3: By 2013, 100% of mining, forestry and farming title deeds in protected areas and 50% of sites important for great apes are reconsidered					
No.	Activities	Responsible (s)	A1	A2	A3
7	Inventory all existing mining, forestry and farming title deeds	ICCN/provincial ministries			
8	Develop memoranda for the reconsideration of permits (contracts)	ICCN/provincial ministries	$ 60,000	$ 30,000	
9	Appeal for a decision to reconsider (cancel) of contracts	ICCN/provincial ministries	$ 60,000	$ 60,000	$ 60,000
Objective LE/O4: By June 2015, a 60% reduction in the negative impacts of mining, forestry and farming is achieved					
No.	Activities	Group(s) Responsible	A1	A2	A3
10	Define indicators to monitor the impacts of various forms of exploitation	ICCN/CI/DFGFI/JGI/WWF	$ 10,000		
11	Develop monitoring protocols	ICCN/CI/DFGFI/JGI/WWF	$ 100,000	$ 60,000	
12	Develop a training programme in impact reduction	ICCN/DFGFI/JGI	$ 30,000		
13	Deploy teams in the field for monitoring	ICCN/DFGFI/JGI	$ 50,000	$ 50,000	
14	Analyse monitoring reports	ICCN/DFGFI/JGI	$ 15,000	$ 15,000	

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Objective LE/O5: By 2021, no illegal mining activity in any fully protected area LE/O5: By 2021, no illegal mining activity in any fully protected area					
No.	Activities	Group(s) Responsible	A1	A2	A3
15	Inventory mining activities throughout the landscape	ICCN/JGI/WCS/FZS	$ 70,000		
16	Encourage the removal of illegal mining operations	ICCN	$ 50,000	$ 50,000	
17	Monitor the departure of miners from PAs	ICCN		$ 20,000	$ 20,000
	Subtotal		**$ 505,000**	**$ 330,000**	**$ 110,000**
	TOTAL		**$ 7,130,000**	**$ 6,955,000**	**$ 5,045,000**

[left] ICCN guard with confiscated chimpanzee, Maiko National Park © Stuart Nixon/FFI

[right] Diverse habitat favoured by Grauer's gorillas in Tayna Nature Reserve © Stuart Nixon/DFGFI

Appendix IV. Conclusions and Lessons Learned from the Planning Process

Coordination meetings held with key stakeholders were essential, even indispensable, to ensure their full commitment during the planning process, particularly their participation in the planning workshops. Similarly, the collective work carried out under a common banner (a non-institutional logo and an encouraging slogan "Together, let's guarantee their future") also facilitated community participation and created a sense of involvement in the process.

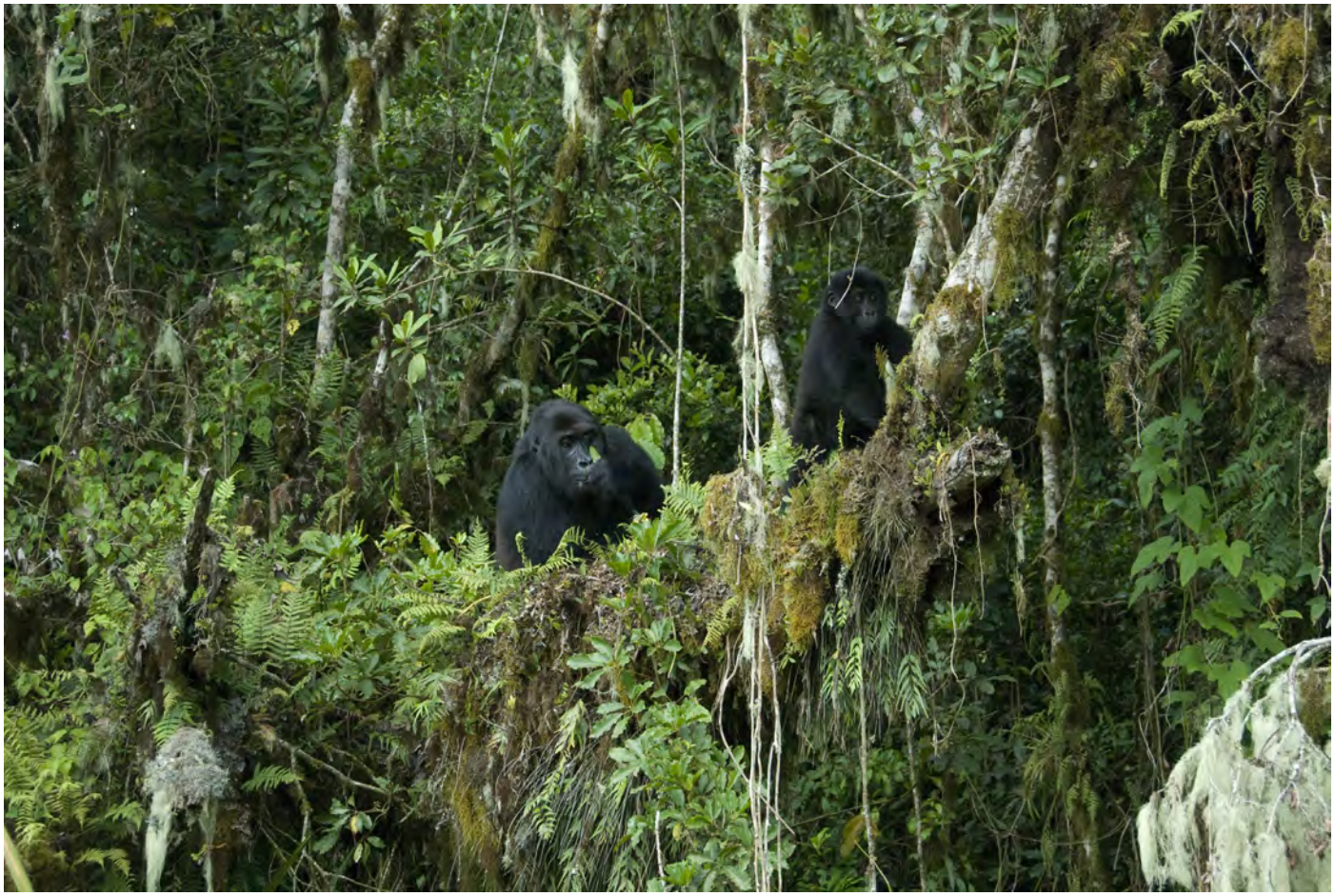
The invitation to stakeholders such as the police, armed forces and territorial administrators not traditionally included in conservation planning processes (but who are asked to participate in subsequent activities) was greatly appreciated. This invitation was fundamental in assuring their sense of ownership in the CAP and their involvement in its implementation.

On the scientific side, it is always necessary to do scientific analyses in a separate expert workshop and then to present the outputs to more open stakeholders meetings. For the next iteration of the planning process, it is advisable to start working now on the necessary data and key information for a more in-depth viability assessment. This analysis could be prepared well in advance and be developed during a separate expert workshop. In addition, the research results, as well as basic information on the ecology of great apes, should be made accessible to stakeholders who are unaware of the fundamental requirements for survival of the conservation targets.

Regarding the mapping, it was very useful to have a GIS expert in the workshops who knew the mapping needs that the CAP process entails. But mapmaking, as a fundamental part of the CAP process (which goes beyond planning and comprises implementation of activities and monitoring) must be part of permanent CAP activities and use various methods, notably participative mapmaking.

Finally, it is very important to emphasize the idea that workshops are only the beginning of the process and not the end. The commitment of a group of stakeholders, particularly organizations and individuals that decide to be part of the core team, is indispensable to guaranteeing the completion of the action plan in good time, particularly in revising preliminary versions, in providing information necessary and in ensuring scientific validity.

Adult male eastern chimpanzee calling © Alain Houle



Montane forest in the highland sector of KBNP © John Martin

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