

# CHAPTER 26

## VIRUNGA LANDSCAPE

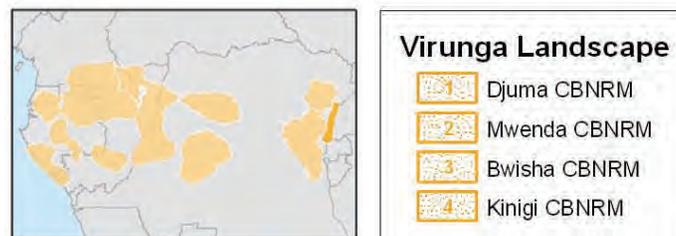
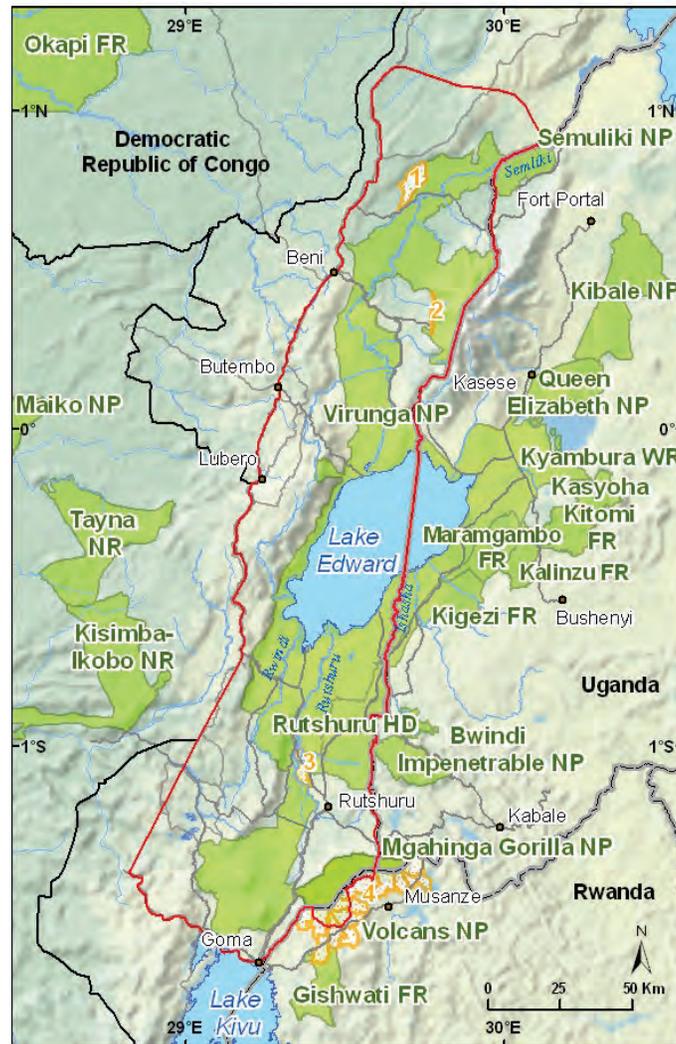
Thierry Bodson, Roy Bubendwa, Marc Languy, and Paya de Marcken

### Land Use Planning

The Virunga Landscape, located in eastern DRC and Rwanda along the Ugandan border, presents a unique and complex case study for land use planning. The region has a history of fierce conflicts and instability, and since the early 1990s different areas of the Landscape have been occupied by national forces (FARDC: *Forces armées de la République démocratique du Congo*) as well as numerous rebel groups, including: the ADF/NALU (Allied Democratic Front), Interahamwe groups (FDLR: *Forces démocratiques de libération du Rwanda*), Mai Mai and the CNDP (*Congrès national de défense du peuple*). Controlling natural resources, including gold, diamonds, tin and coltan, has played a role in recent conflicts and underscores the necessity of effective resource management in the region.

In the midst of the ongoing conflicts and at the cornerstone of the Landscape is Virunga National Park (PNVi). Created in 1925, PNVi covers 784,368 ha and is under the authority of ICCN. Two smaller protected areas are also located within the Landscape: the Hunting Domain of Rutshuru in DRC and Volcans National Park in Rwanda. The primary objectives of these parks are to conserve the unique and diversified ecosystems that exist in the Albertine Rift.

Surrounding these protected areas, and in contrast to many of the other landscapes in the Congo Basin, the Virunga Landscape contains areas of very high population densities (up to 600 individuals/km<sup>2</sup>). These populations depend on the land and biological resources within the Landscape. The majority (80 %) of land outside of protected areas is used mainly for subsistence agriculture, but include also coffee, tea, cocoa and pyrethrum. A small percentage of land is also used for grazing. Charcoal is the main source of energy for permanent, as well as displaced, human populations.



Sources: WWF, AWF, UMD-CARPE, OSFAC, FORAF, IUCN, Tom Paterson, US National Park Service.

Figure 26.1: Macro-zones in the Virunga Landscape



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**Photo 26.1:** Large tracts of forest are often degraded before they are totally deforested.



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**Photo 26.2:** Improving public awareness of park limits and resource use regulations is important to maintaining the integrity of Virunga National Park.

In order to reconcile the objectives of different stakeholders, improve livelihoods and promote the sustainable management of natural resources, a consortium of four NGOs (WWF, WCS, SNV and AWF/IGCP) have been working in the Virunga Landscape since 2006 to promote land use planning at the landscape and macro-zone level. The consortium executes the activities planned in the Virunga Landscape with the collaboration of two national institutions: ICCN in DRC and ORTPN in Rwanda, as well as International NGOs (FZS, ZSL, and ACF), local NGOs (CREF, *Avocats Verts*, BREAD, etc.) and CBOs.

Two types of macro-zones form the basis for field activities: (1) protected areas (DRC: Virunga National Park and the Hunting Domain of Rutshuru; Rwanda: Volcans National Park) and (2) CBNRM areas (DRC: Mwenda and Bwisha; Rwanda: Kinigi). In a landscape where control over certain areas is uncertain, the legal status accorded to protected areas provides a framework in which to advance the land use plan. Simultaneously, in a landscape where the pressure on protected areas and natural parks is intense, CBNRM areas provide an opportunity to work with local communities to address their needs and develop sustainable management options. The dense human populations in the Virunga Landscape mean that many CBNRM areas are relatively small compared to other landscapes.

Despite the difficulties linked to the insecurity of the region and the disengagement of the SNV from the consortium in 2008, the Landscape Consortium has successfully advanced many aspects of land use planning in the past two years. Land use planning activities in the Virunga Landscape macro-zones have concentrated on: socio-economic and ecological studies to better understand resource use; a series of activities to mobilize stakeholders; increasing capacity to engage in land use planning, implementing agroforestry and promoting the more efficient use of resources; developing a system to resolve conflicts; establishing a greenbelt and buffer zone; delimiting macro-zones; and producing management plans.

In PNVi, the consortium held orientation meetings with ICCN, and a team charged with developing a management plan has almost completed the plan. Simultaneously, additional data continues to be collected on flora and fauna, as well as human activities, in the park. The consortium formed mixed commissions for the demarcation of the limits around the PNVi and worked in the Mavivi, Watalinga and Tshiaberimu areas

to specify the boundary of the NP. A management system to resolve conflicts linked to land use in the Rwenzori sector was established and a document on conflict resolution for the whole PNVi was produced. A forum gathering traditional chiefs and North-Kivu provincial authorities to garner support for the protection of Virunga NP was carried out and activities to develop management strategies in the buffer zone continue.

Land use planning in the DRC CBNRM areas is still in its early stages. In order to engage stakeholders, the consortium and its partners worked to organize multiple workshops bringing together local authorities (administrators, traditional chiefs and community leaders) in the land use planning process. They endeavored to identify additional stakeholders (primary and secondary), including women, marginalized groups, and different ethnic groups in multiple areas of the Landscape, including the territories of Beni (Mwenda CBNRM) and Rutshuru (Bwisha CBNRM). In Bwisha and Mwenda, they undertook socio-economic and ecological surveys and held meetings to sensitize the communities to various concepts of natural resource management in the Landscape, and collected the opinions and views of the communities about developing CBNRM areas.

In Rwanda, preliminary studies in the Kinigi region revealed high population densities, vulnerable groups within the population, highly degraded soils and low productivity. Consultations with various stakeholders highlighted the need to harmonize and share the same understanding of the CBNRM implementation strategy among all stakeholders and the importance of a legal framework for the CBNRM plan implementation. Eventually it was decided that the CBNRM implementation plan should be part of the districts' planning process and implemented at a sector level, under the overall guidance of districts' authorities with technical support from NGOs and respective central government agencies. The management plan for the CBNRM has been completed and adopted.

## Human Activities

In this section, we provide an update on human populations in the Virunga Landscape. The DRC census in 1984 showed an average annual growth rate of 3 %. In the Virunga Landscape, the main ethnic groups remain the Nande (Beni and Lubero), Hutu and Tutsi (Rutshuru and Masisi), Hunde (Masisi, Nyirangongo, Karisimbi) and Bashi. The primary activity for most people is subsistence farming (80 %), although a small percentage also fish and/or raise cows, sheep and/or poultry. In 2008, the widespread presence of armed groups (CNDP, FDLR and Mai Mai rebels) and the presence of 6 FARDC brigades in the Virunga Landscape produced significant popula-

tion movement from the countryside to the urban centers surrounding PNVi. The territories of Masisi, Rutshuru and Lubero have been especially affected by the problems in North Kivu. Demographic data have not been collected in the areas controlled by the armed groups, but it is known that there are armed groups (FDLR, CNDP, Mai Mai, etc.) and the national army with their families inside the park and in the surrounding area.

The people living in the Kinigi area are predominantly subsistence farmers with 90 % of the households engaged in agriculture, less than 1 % engaged in aquaculture, and more than 30 % practice forestry.



*Photo 26.3: Livestock husbandry is not prevalent in Central Africa. The exception is the Masisi region near Virunga National Park.*

*Table 26.1: Neighboring populations of PNVi in the Virunga Landscape in 1998*

Territory/ Entity	Population				Density (km <sup>2</sup> )
	Male	Female	Children ≤ 15 years	Total	
Beni	204,012	215,465	347,812	767,289	102.5
Lubero	235,408	251,550	403,765	890,723	49.2
Rutshuru	157,128	160,174	263,093	580,395	109.7
Nyirangongo	8,630	9,084	14,686	32,400	198.7
Karisimbi	27,378	29,931	47,520	104,829	103.2
Masisi	157,905	162,692	263,339	583,936	122.7
<b>Total</b>	<b>790,461</b>	<b>828,896</b>	<b>1,340,215</b>	<b>2,959,572</b>	

Source: Division provinciale du Plan au Nord-Kivu.



*Photo 26.4: Water collection is a daily activity for many families.*

**Table 26.2: Estimate of displaced families near Virunga National Park**

Site	Families	Persons	Status
<b>Goma area</b>			
Bulengo	3,594	17,968	Camp
Mugunga 1	5,102	25,501	Camp
Mugunga 2	2,592	12,962	Camp
Buhimba	2,459	12,297	Camp
Kibati 1	14,261	71,306	Camp
Kibati 2	534	2,671	Camp
Nzulo	1,000	+/- 5,000	Unofficial camp
<b>Total</b>	<b>29,542</b>	<b>147,714</b>	
<b>East of PNVi</b>			
Kalengera Rubare 1	8,650	+/-43,250	Host families
Kalengera Rubare 2	350	+/- 1,750	Unofficial camp
Kiwanja-Rutshuru	20,000	+/- 80,000	Host families
<b>Total</b>	<b>29,000</b>	<b>125,000</b>	
<b>West of PNVi</b>			
Bambu	3,000	+/-15,000	Unofficial camp
Tongo	4,900	+/-24,500	Host families
<b>Total</b>	<b>7,900</b>	<b>39,500</b>	

Sources: HCR, IRC, Solidarités, November 2008.

**Table 26.3: Populations living near Volcans National Park in Rwanda**

District/Town	Total population 30 Aug 2002	Total area km <sup>2</sup>	Habitable area km <sup>2</sup>	Physical density (ind./ km <sup>2</sup> )
Buhoma	89,210	154.5	144.1	577.4
Bukamba	118,466	185.1	145.8	640
Kinigi	62,798	162	110.1	387.7
Mutobo	97,180	189.3	141.8	513.3
Mutura	122,934	201.7	167.3	609.3
<b>Total</b>	<b>490,588</b>	<b>892.6</b>	<b>709.1</b>	
<b>Average</b>				<b>545.6</b>

Source: Community-based natural resource management plan, Kinigi Area, Rwanda. June 2006.

**Table 26.4a: Important agricultural products in the Virunga Landscape (Goma)**

Agricultural product	Unit	Purchase price/unit (\$)	Primary destinations	Date	Data collection	Sources
Cassava	Sack (100 kg)	45	Urban markets	May 2008	Market surveys	Survey in Goma market, 2008
Maize	Sack (100 kg)	30	Urban markets	May 2008	Market surveys	Survey in Goma market, 2008
Beans	Sack (100 kg)	65	Urban markets	May 2008	Market surveys	Survey in Goma market, 2008

**Table 26.4b: Bushmeat trade in the Virunga Landscape (Goma, Kiwanja (Rutshuru) and Ishasha)**

Bushmeat species	Unit	Purchase price/unit (\$)	Primary destinations	Date	Data collection	Sources
Elephant ( <i>Loxodonta africana</i> )	Pile (1 kg)	1	Kiwanja, Goma markets	Jun 2008	Market surveys	WCS/Goma, 2008
Hippopotamus ( <i>Hippopotamus amphibious</i> )	Pile (1 kg)	1	Ishasha market	Jun 2008	Market surveys	WCS/Goma, 2008
Uganda Kob ( <i>Kobus kob thomasi</i> )	Whole (1)	20	Kiwanja, Goma markets	Jun 2008	Market surveys	WCS/Goma, 2008

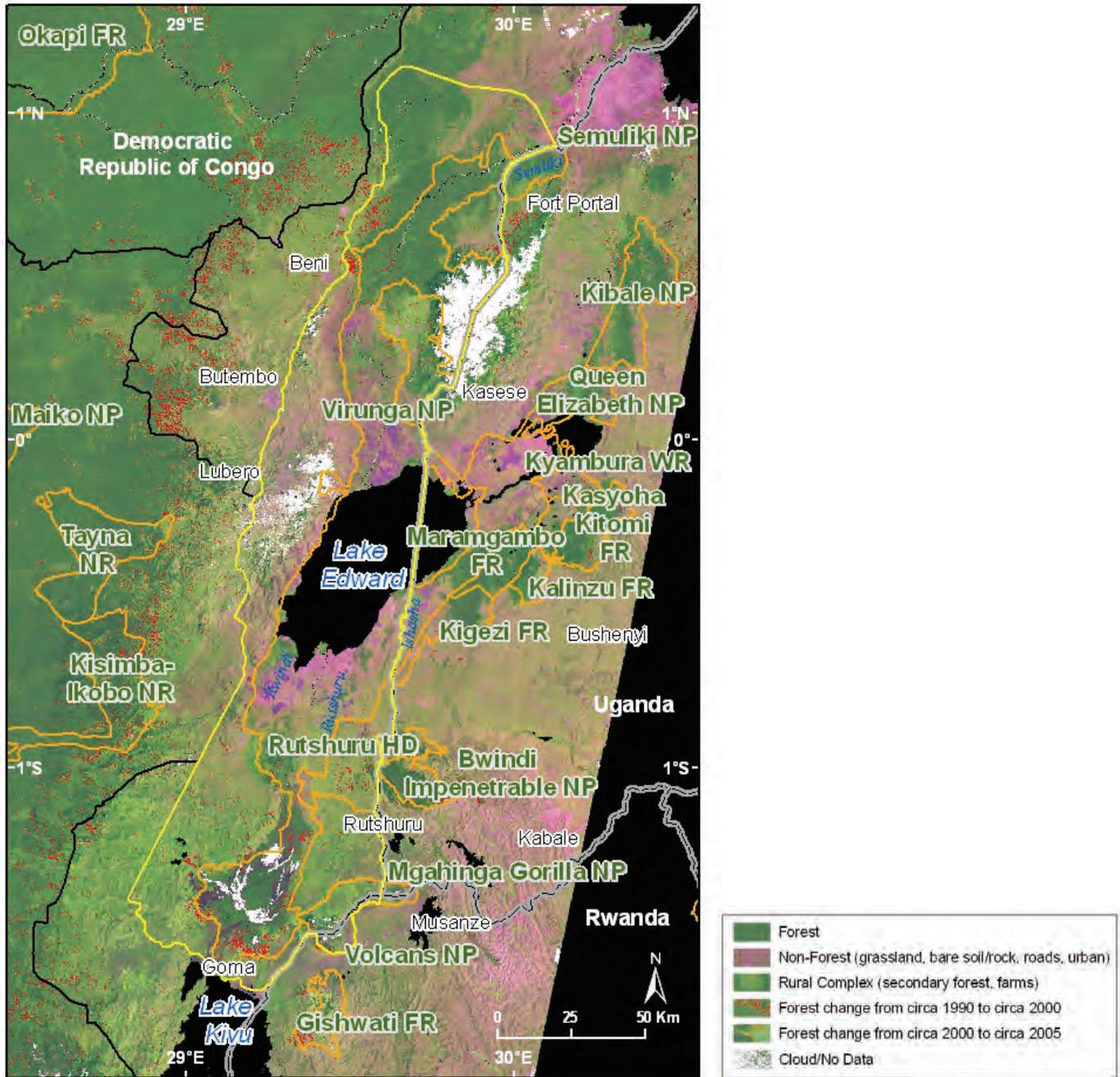
**Table 26.5: Forest cover and forest loss in the Virunga Landscape from 1990 to 2005**

Landscape area	Forest area			Forest loss			
	1990 (km <sup>2</sup> )	2000 (km <sup>2</sup> )	2005 (km <sup>2</sup> )	1990-2000 (km <sup>2</sup> )	1990-2000 (%)	2000-2005 (km <sup>2</sup> )	2000-2005 (%)
17,403	3,480	3,279	3,143	202	5.79	136	4.14

Forest cover and forest cover loss are derived from Landsat and MODIS satellite data.  
Sources: SDSU, UMD-CARPE, NASA.

The north of the Landscape (Rwenzori and Semiki sectors) and the Mikeno sector in the south are areas which are forested. The other areas are mostly savannas.

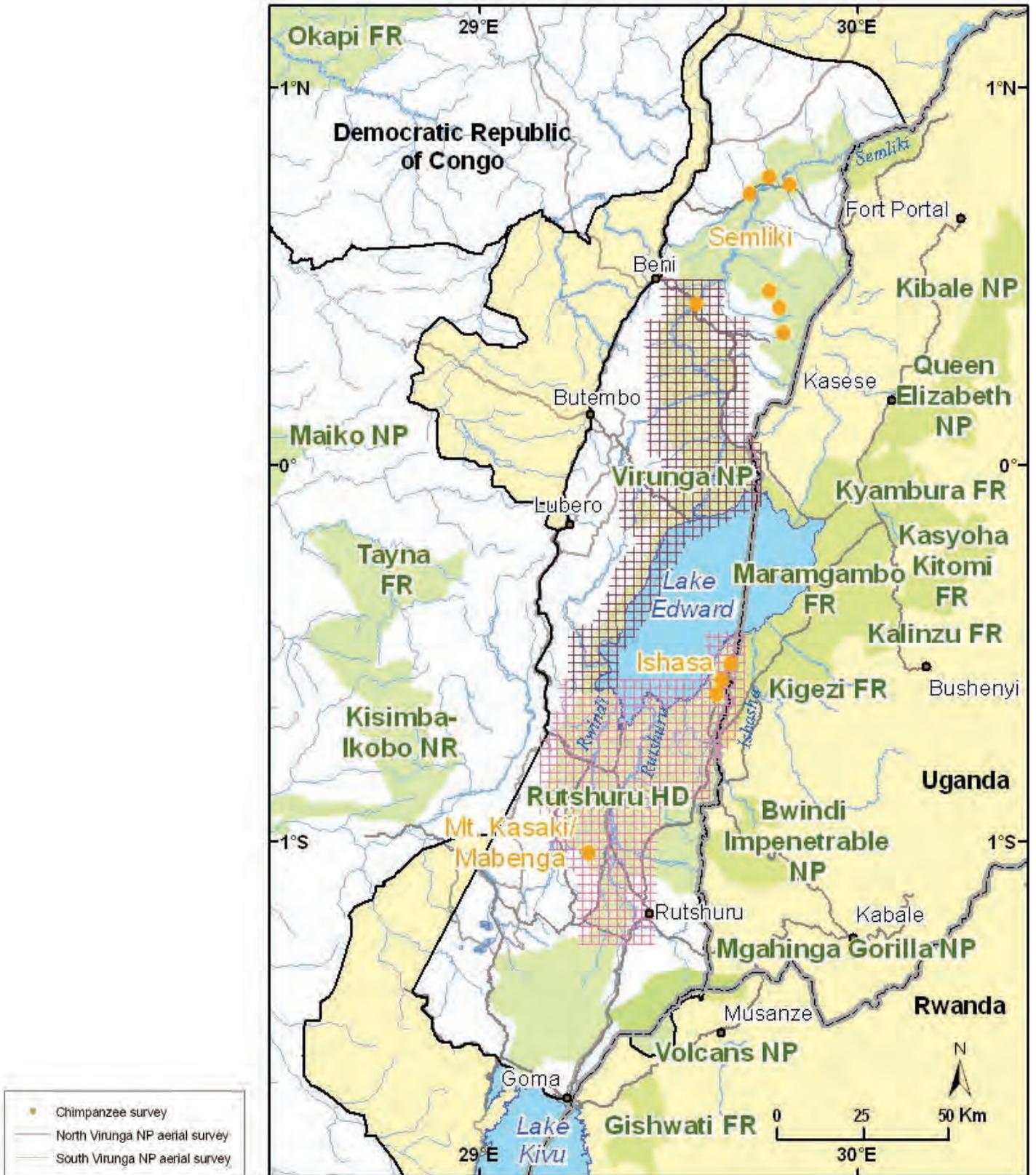
## Forest Cover



Sources: SDSU, UMD-CARPE, NASA, SRTM, IUCN, FORAF

Figure 26.2: Composite Landsat satellite image of the Virunga Landscape overlain with 1990 to 2000 forest loss (in red) and 2000 to 2005 forest loss (in orange)

## Large Mammal Monitoring



Sources: WWF, USFWS, WCS, MacArthur Foundation, Daniel K. Thorne Foundation, ICCN, UMD-CARPE, OSFAC, FORAF

Figure 26.3: Biological surveys conducted in the Virunga Landscape

The Virunga Landscape is an area that has long been recognized for its exceptional species richness and endemism, with dramatic habitat variations caused by extreme altitudinal and climate gradients. The history of species research and monitoring in the Landscape is rich and involves numerous individuals, organizations and a wide range of taxa<sup>7</sup>. In this 2008 State of the Forest report overview, we present a synopsis of recent findings, especially as concerns large mammals.

Approximately 218 species of mammals are known to occur in the Virunga area; however, many species have seen dramatic decreases in numbers over the last few decades. At one point, the total biomass of the main ungulate species in the Rwindi-Rutshuru-Ishasha plains (1,250 km<sup>2</sup>) was estimated as the highest in the world (Bourlière and Verschuren, 1960). However, this high biomass was due to the presence of the world's largest population (numbering roughly 26,530 in 1959) of hippopotamus, *Hippopotamus amphibius*. In a very short period poaching has decimated this population to near extinction. In 2005, a census of hippopotamus in four rivers and around Lake Edward estimated the total population at 887 individuals (de Merode, 2006), representing a decline of 97 %. Hunting of other species, including buffalo, elephant and kob also continues (Kujirakwinja *et al.*, 2008).

The Landscape has 22 primate species and three taxa of great apes: the Mountain Gorilla (*Gorilla beringei beringei*) the Eastern Lowland Gorilla (*Gorilla beringei graueri*) and the Eastern Chimpanzee (*Pan troglodytes schweinfurthi*). Systematic surveys of ape populations in the forested regions of PNVi have been difficult since the early 1990s due to ongoing rebel activities; however, in 2008, WCS with support from the USFWS undertook chimpanzee surveys in three areas of the national park (see figure 26.3). In the Semliki area, 72.7 km of transects were walked, in Ishasha 42.8 km and in the Mount Kasali/Mabenga

region, 8.3 km. No chimp signs were encountered in Ishasha, however chimp nests were encountered in the other two areas. Encounter rates were used to estimate the total chimp population in the Semliki forest at between 950 and 1,000 individuals (Plumptre *et al.*, 2008). Mountain gorilla populations in the Mikeno sector in DRC were estimated at 380 (representing approximately 53 % of the world's total population) in 2003 (Gray *et al.*, 2005). In 2008, access to this area of the park was affected by the presence of CNDP rebel groups. However, in November 2008 ICCN was able to negotiate a deal which allows them to continue to monitor gorilla populations and a survey is currently underway and a recent study in Tshiaberimu revealed 19 gorillas.

The most recent systematic surveys of large mammals in savanna areas were aerial surveys carried out in 2003 and 2006 with support from the USFWS, WCS, the MacArthur Foundation and the Daniel K. Thorne Foundation (see table 26.6). These surveys suggest a slight increase in certain populations between 2003 and 2006 (Mushenzi *et al.*, 2003 and Kujirakwinja *et al.*, 2006). However, overall mammal populations, including elephant and buffalo, are a fraction of what they once were and current populations cannot be considered stable (see table 26.6).

Finally, a small, recently rediscovered population of Okapi (*Okapia johnstoni*) has survived on the banks of the Semliki River, in the extreme northern reaches of PNVi. These okapi have been recorded using camera traps and a 2008 study by the Zoological Society of London that covered 216 km, calculated a dung encounter rate of 0.20/km (Lusenge and Masudi, 2008). This population remains threatened by commercial hunting and charcoal production. The problems associated with overexploitation of fish species in Lake Edward reported in the 2006 State of the Forest Report (CBFP, 2006) continue.

<sup>7</sup>For a comprehensive review of monitoring and research through 2006 as well as the evolution of species' populations in PNVi, refer to Languy and de Merode (2006).

**Table 26.6: Animal population estimates from aerial surveys in June 2006 in PNVi**

	Northern sector		Southern sector		Total
	Estimated number	95 % confidence interval	Estimated number	95 % confidence interval	
Buffalo	74	12-208	3748	811-6,685	<b>3,822</b>
Elephant ( <i>Loxodonta africana</i> )	50	8-153	298	145-470	<b>348</b>
Uganda kob ( <i>Kobus kob thomasi</i> )	583	94-1,172	12,399	6,654-18,144	<b>12,982</b>
Defassa waterbuck ( <i>Kobus ellipsiprymnus defassa</i> )	6	1-17	368	130-600	<b>374</b>
Topi ( <i>Damaliscus lunatus jimela</i> )	0	0	1,353	408-2,298	<b>1,353</b>
Bushpig ( <i>Potamochoerus larvatus</i> )	0	0	694	347-1,041	<b>694</b>
Baboon ( <i>Papio anubis</i> )	0	0	737	104-1,389	<b>737</b>

Source: Kujirakwinja et al., 2006.

## Special Interest

### Hope in the Face of Crisis in the Democratic Republic of Congo

Thanks to conservation efforts during the last 20 years, the Mountain Gorillas of the Virunga Massif, shared between DRC, Rwanda and Uganda, have enjoyed a steady population increase, from 254 in 1981 to 380 in 2006. The year 2007 brought a strong reminder that these magnificent creatures, and the revenues they generate from tourism, are not yet out of the woods and remain critically endangered. From January to July 2007, 10 gorillas were killed in the Mikeno sector of Virunga National Park, in DRC, leading to what is now called the Mikeno crisis.

As a result of this crisis, ICCN called for international support. Our conservation partners, including WD, ZSL and FZS reacted quickly and

met with ICCN to jointly develop an emergency plan. The CARPE consortium quickly joined in and pledged support. As the Consortium lead, WWF was tasked by ICCN to request supplemental support from USAID to fund part of the plan. This was done, and by October 2007, USAID committed additional funds while conservation partners initiated the work with their own resources.

The fact that the CARPE Program decided to join an initiative launched by ICCN and supported by sister-projects greatly helped ensure that activities are identified and implemented in a concerted way and that ICCN has a strong leadership and a clear operational document to which everyone refers.

### Wood Crisis

WWF, as CARPE consortium leader, secured resources to provide firewood to over 35,000 internally displaced people (IDPs) who fled the fighting in the Masisi area. Displaced people received support from humanitarian NGOs in terms of shelter, water and food, but were left to their own devices when it came to finding essential wood for cooking. As a result, they invaded Virunga NP in search of firewood and put further pressure on the rare montane forest of the area. By implementing a program to import firewood from neighboring wood plantations, WWF managed to alleviate a humanitarian crisis and a conservation crisis at the same time.

To face the continuous and important demand for firewood in the refugee camps and charcoal in the city of Goma, WWF is developing an ambitious program which aims to introduce the use of improved stoves that heats food quickly and reduces food consumption for each family living in the area. The next objective is to reduce the consumption of wood by half.



**Photo 26.5: The tourism potential of Virunga National Park is huge, but insecurity and lack of infrastructure hinder its development.**



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*Photo 26.6: Forest products often come directly from Virunga National Park, while the buffer zone is being exploited in an unsustainable manner.*

### Hope of a Peaceful Cohabitation between the Local Population and ICCN in the Rutshuru Hunting Domain.

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The Rutshuru Hunting Domain (RHD) is located between Virunga National Park limits and Bwisha in the territory of Rutshuru. Recognizing the intense pressure on the Park in this area, it was urgent to initiate a new dynamic involving all stakeholders. ICCN, with support from WWF and USAID, organized a series of meetings to gather all stakeholders.

Instigated by the Provincial Government, ICCN organized a workshop on management issues concerning the RHD in February 2008. The Provincial Minister in charge of the environment and his colleague in charge of agriculture, as well as the Province Governor's adviser, military and

police authorities, local associations, traditional Chiefs and representatives of religious faiths all actively participated.

At the end of this workshop, an agreement on a management model for this zone was signed by all parties, enabling local communities to use practices which support sustainable agriculture. This zoning-based management model will help the communities to increase their agricultural output and attenuate the quasi permanent conflict related to the limits between the RHD and the Park.

