

## 18. Lake Télé-Lake Tumba Landscape

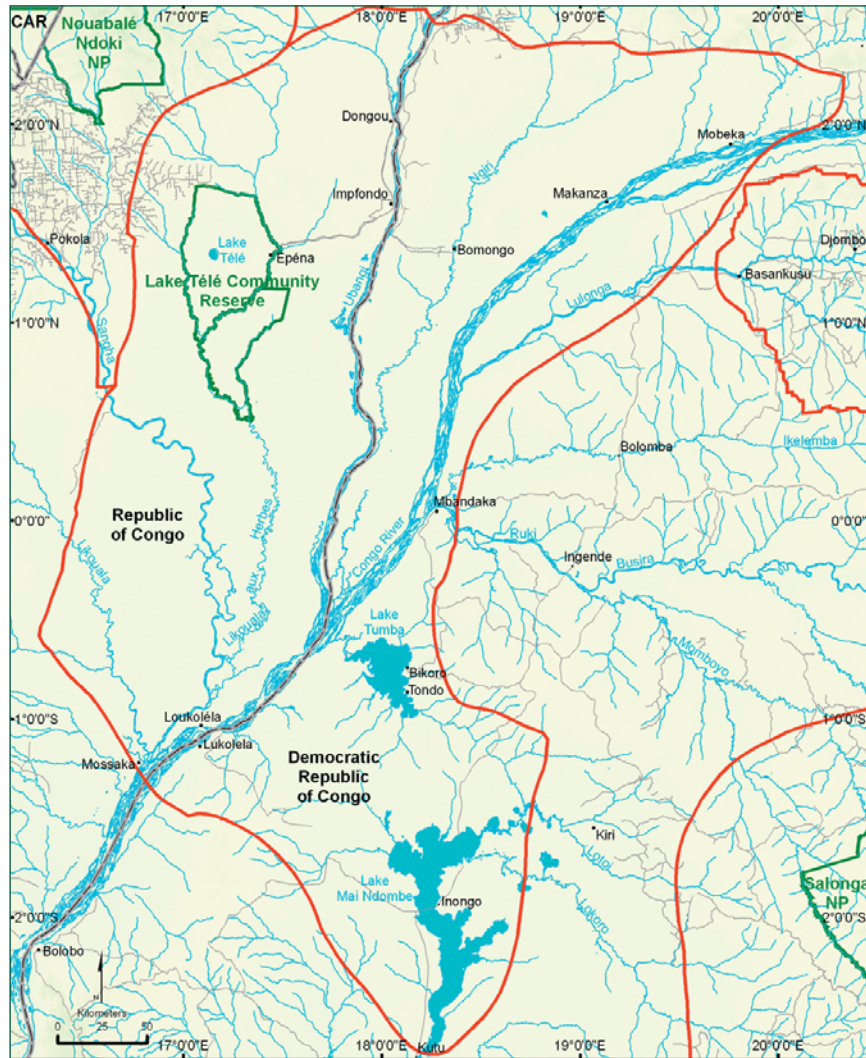


Figure 18.1. Map of Lake Télé-Lake Tumba Landscape (Sources: AWF-DRC, CARPE, JRC, SRTM, WCS-Congo, WWF-DRC).

### The Landscape in brief

**Coordinates:** 2°35'2"N – 2°41'27"S; 16°16'15"E – 20°19'35"E

**Area:** 126,440 km<sup>2</sup>

**Elevation:** 300-330 m

**Terrestrial ecoregions:** Northwest Congolese forests ecoregion

Western Congolese swamp forests ecoregion

Eastern Congolese swamp forests ecoregion

Central Congolese forests ecoregion

**Aquatic ecoregions:** Ubangui ecoregion

Central Basin ecoregion

Lake Tumba ecoregion

Lake Mai-Ndombe ecoregion

Kasai ecoregion

**Protected areas:** Lake Télé Community Reserve, 440,000 ha, 2001,

Republic of Congo

Mabali Scientific Reserve, 1,900 ha, Democratic Republic of Congo

### Location and area

The Lake Télé-Lake Tumba Landscape is situated at the heart of the Congo Basin region, centering on Lake Télé in the Republic of Congo, and the Tumba and Mai-Ndombe lakes in DRC (Figure 18.1). It extends over an area of 126,440 km<sup>2</sup>. The 54,001 km<sup>2</sup> western section is situated in the Republic of Congo and the 72,439 km<sup>2</sup> eastern section is in DRC. It includes one protected area: Lake Télé Community Reserve in the west.

### Physical environment

#### Relief and altitude

The entire Landscape is located in the alluvial plain of the Central Basin region of the Congo

River. The altitude varies between 300 and 330 m and its relief is highly uniform, with very indeterminate watersheds separating the poorly-defined drainage basins.

## Geology and soils

The bedrock of Cretaceous sediment is entirely covered by post-Upper Pliocene lacustrine or fluvio-lacustrine sediment forming yellow sandy-clay soils. The alluvial formations from the Holocene era, which occupy the floors of the large valleys and the whole region between the Congo and Ubangui rivers, have a low clay content and are characterized by a very fine sandy fraction. The soil is waterlogged throughout the year, often having a black, organic, peaty or semi-peaty superficial horizon. (Marlier, 1973).

## Hydrology

The entire Landscape is located in the basin of the Congo River, which traverses this area over a length of nearly 500 km (Figure 18.2). It comprises the confluence of the Congo River with the Ubangui, Sangha, Likouala-aux-herbes and Ngiri rivers. Two very shallow lakes are located in the eastern section. Lake Tumba (765 km<sup>2</sup>) drains the Loko, Bituka, Lobambo and Nganga rivers; it flows directly into the Congo River via the Irebu channel and its maximum depth does not exceed 8 m, but seasonal variations in its level may reach 4 m (Figure 18.3). Lake Mai-Ndombe (2,300 km<sup>2</sup>) drains the Lokoro and Lotoi rivers and flows indirectly into the Congo River via the Fimi, Lukenie and Kasai rivers. Its average depth is 3 m. The waters of these lakes are black, humic, acidic, chemically poor and loaded with plant detritus<sup>1</sup>. In the western section, Lake T  l   is smaller in size, at 23 km<sup>2</sup>, but physically resembles the other large lakes in the Landscape. Unlike the waters of the swamp and floodable forests, water in the lakes is oxygenated to its full depth because of the violent winds that periodically agitate the surface. All watercourses have a very shallow incline (3 cm/km) and therefore run very slowly. Throughout the Landscape water levels vary by around 3 m, but in the Ubangui these variations may reach 5 m. During periods of flooding in the southern part of the Congo Basin, the direction of water flow is actually reversed and the water washes back hundreds of kilometers northwards. In addition to the principal waterways, the Landscape is crossed by a dense maze of narrow channels that link together the major watercourses. A large part of the Landscape is flooded permanently or



Figure 18.2. The Congo River with its multiple side-arms.



Figure 18.3. Lake Tumba.

during the flood period, which limits access and hampers road construction. During the main flood periods, water accumulates behind natural dams formed by alluvial levees and only flows very slowly through small channels.

## Climate

Annual rainfall ranges from 1,600 to 2,000 mm on average. Precipitation reaches a maximum in October-November and March-May, but there is no real dry season in the areas close to the equator. Hours of sunshine exceed 2000 per annum. The mean annual temperature is 25°C with very little seasonal variation (Marlier, 1973).

<sup>1</sup>The pH of the water in Lake Tumba is 4.5-5.5 and transparency is limited to 2 m (Corsi, 1984). Plankton are rare (Bailey, 1986).

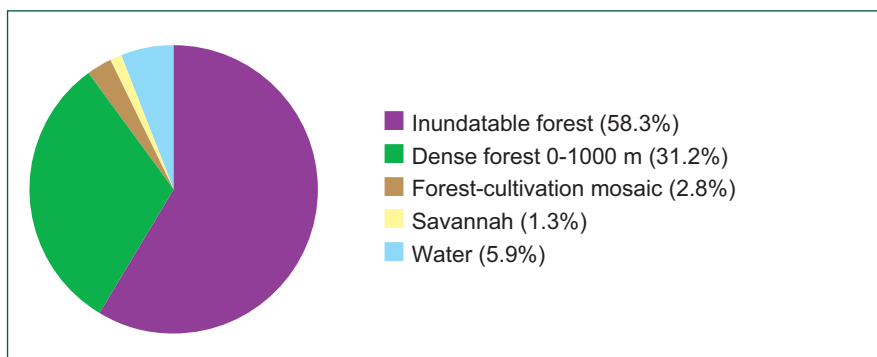


Figure 18.4. The main vegetation types (Source: JRC).

## Vegetation

In the western section, apart from rare islands of dryland forest, the majority of the forests are permanently or temporarily flooded (Figure 18.4). According to estimates by Poulsen & Clark (2002) carried out for the community reserve of Lake Télé, dryland forests cover 44,000 ha (10%), swamp forests 215,600 ha (49%), riparian forests 35,200 ha (8%) and floodable forests 74,800 ha (17%). Floodable herbaceous vegetation covers 70,400 ha (16%).

The swamp forests, which are almost permanently flooded, are characterized by the presence of the following species: *Entandrophragma palustre*, *Coelocaryon botryoides*, *Hallea stipulosa*, *Alstonia boonei*, *Nauclea pobeguinii* and *Symphonia globulifera*. The swamps associated with small streams are occupied by forests of *Lasiodiscus mannii*. The floodable forests are characterized by the presence of *Lophira alata*, *Gambeya perpulchra* and *Uapaca heudelotii*. The riparian forests are dominated by *Uapaca heudelotii* and *Guibourtia demeusei*. The dryland forests, mainly situated at the center of the reserve, are characterized by the presence of various species of *Entandrophragma* and by *Terminalia superba*, *Pterocarpus soyauxii* and *Piptadeniastrum africanum*. There are also monodominant stands of *Gilbertiodendron dewevrei*. Herbaceous vegetation is dominated by *Hyparrhenia diplandra*. There are also extensive areas of raffia palms (*Raphia* spp.).

In the eastern section, swamps or floodable forests cover 60–65% of the area. They are characterized by the presence of numerous Euphorbiaceae (*Alchornea floribunda*, *A. hirtella*, *A. cordifolia*, *Uapaca guineensis*, etc.) and Caesalpinioideae, notably *Guibourtia demeusei*. The remaining 35–40% of dryland forests, chiefly located in the south of the Landscape, are punctuated by islands of savannah. These forests comprise mixed vegetation, characterized by the presence of Burseraceae, such as *Dacryodes edulis*, *D. yangambensis* and *Canarium schweinfurthii*, and a monodominance

of *Gilbertiodendron dewevrei*. A large part of these forests were commercially harvested up until 1975 and were replaced by forests of Marantaceae (including *Haumania liebrechtsiana*, *Sarcophrynium* sp. and *Megaphrynium macrostachyum*).

## Fauna

### Mammals

In the western section, the forests of the community reserve are home to large populations of gorilla<sup>2</sup> and chimpanzee<sup>3</sup> (Fay *et al.* 1989, Fay & Agnagna 1992, Blake *et al.* 1994). In addition to primates, the four main species of large mammals are the elephant *Loxodonta africana cyclotis*, the hippopotamus *Hippopotamus amphibius*, the buffalo *Syncerus caffer* and the sitatunga *Tragelaphus spekei*. Nine species of diurnal primates are known, notably the agile mangabey *Cercocebus agilis*, the white-cheeked mangabey *Cercocebus albigena*, as well as the swamp monkey *Allenopithecus nigroviridis* and De Brazza's monkey *Cercopithecus neglectus* which are often found together. The mantled guereza *Colobus guereza* and Central African red colobus *Piliocolobus oustaleti* are found throughout the community reserve. Altogether, there are a total of 16 endangered species (Annex C).

In the eastern section, primates are represented by the bonobo *Pan paniscus* (on the left bank of the Congo River), the common chimpanzee *Pan troglodytes* (on the right bank of the Congo River), the Angola colobus *Colobus angolensis*, Thollon's red colobus *Piliocolobus tholloni*, the golden-bellied mangabey *Cercocebus chrysogaster*, the swamp monkey *Allenopithecus nigroviridis*, the black crested mangabey *Lophocebus aterrimus*, the red-tailed monkey *Cercopithecus ascanius*— which is replacing mustached guenon *C. cephus* in the eastern portion of the Landscape — and De Brazza's monkey *C. neglectus*. Among the other large mammals that are variably present are the elephant, buffalo and leopard *Panthera pardus*. The hippopotamus is also present.

### Birds

In the western section, over 350 species have been found in the community reserve and this is considered to be an important area for bird conservation, particularly owing to the presence of large colonies of water birds: the African darter *Anhinga rufa* and the purple heron *Ardea purpurea* (Fishpool & Evans, 2001). There are three threatened species in the reserve: Hartlaub's duck

<sup>2</sup> Recent censuses (2002–2005, Poulsen & Clark, 2004) have recorded a density of gorillas of 3–4/km<sup>2</sup>. Gorillas move seasonally between terra firma forests and swamps or floodable forests. Local density may reach 20/km<sup>2</sup>. Blake (1994) also found gorillas in raffia palm areas at a density of 5/km<sup>2</sup>.

<sup>3</sup> The density of chimpanzees is 0.7/km<sup>2</sup>.



*Pteronetta hartlaubi*, the great snipe *Gallinago media* and the African skimmer *Rynchops flavirostris*.

## Herpetofauna

In both sections (Republic of Congo and DRC), the three African species of crocodile are present. The Nile crocodile *Crocodylus niloticus* inhabits the large watercourses in small numbers, the slender-snouted crocodile *Crocodylus cataphractus* is very widespread, also in low-density populations, while the dwarf crocodile *Osteoleaemus tetraspis* is restricted to the swamp forests. A complete inventory of herpetofauna has not been carried out.

## Ichthyofauna

The Landscape is divided into five aquatic ecoregions: Ubangui, the Central Basin, Lake Tumba, Lake Mai-Ndombe and Kasai. It is probable that the ichthyofauna is very rich. In the western section, it has been studied by WCS and at least 40 species have already been recorded. In the eastern section, ichthyological studies have been conducted in the Tumba and Mai-Ndombe lakes (Corsi, 1984; Bailey, 1986). Lake Tumba is home to 119 fish species (Marlier, 1973; Compere & Simmoens, 1987) the most common of which are *Auchenoglanis occidentalis*, *Clarotes laticeps*, *Gephyloglanis congicus*, *Clarias buthopotogon*, *Distichodus sp.* and *Channa obscurus* (Corsi, 1984). Several species are endemic to the lake or its immediate environs, in particular *Clupeocharax schoutedeni* and *Tylochromis microdon*. Lake Mai-Ndombe is much less well known, but its ichthyofauna was recorded at 41 species in 1918 and it is probable that the actual number is much higher. Three species are endemic: *Amphilius opisthoptalmus*, *Hemichromis cerasogaster* and *Nanochromis transvestitus*. The Landscape also comprises an extensive portion of the middle reaches of the Congo River, where 206 species of fish have been recorded, including *Protopterus dolloi*, *Hydrocyon vittiger* and *Hydrocyon goliath*, three species endemic to the Congo Basin.

## Humans in the Landscape

### Density and Distribution

In the western section, almost all the landscape villages are situated along roads and rivers. In 2001, 22 villages surveyed in the community reserve of Lake Télé had a total population of 13,400 inhabitants (Poulsen & Clark, 2002).

New censuses in 2005 found a total population of 14,390 inhabitants (RCLT Project, not published), suggesting an increase of 1-2% a year. However, this second census included workers living temporarily in the reserve. The village populations range from 64 to 2,280 people. The population is young: 59% under 20 years of age. The regional capital, Impfondo, numbers at least 14,000 inhabitants.

In the eastern section, the population density is variable, with significant clusters around Mbandaka, the main town in the province of Equateur. Situated at the heart of the eastern section of the Landscape, this town has grown rapidly: in 1984 it had 124,263 inhabitants. The population rose to 136,738 in 1990 (De Saint Moulin, 1991) and is probably around 500,000 at present. The 300,000 people displaced by the war between 1998 and 2003 need to be added to this figure. Outside of Mbandaka, the population density is estimated to be 23.9 inhabitants/km<sup>2</sup> in the Bikoro area, 6.2 inhabitants/km<sup>2</sup> around Makanza, 18.5 inhabitants/km<sup>2</sup> around Lukolela and 7.9 inhabitants/km<sup>2</sup> around Bomongo (UNDP/UNOPS, 1988).

### Ethnic groups

In the western section, 91% of the population in the community reserve belongs to the Bomitaba group, represented by the subgroups Babole, Nzobo and Bokolou. A small number of semi-nomadic Pygmies also live around the reserve, often for short periods. The rest of the population consists of Congolese from other regions of the country and some immigrants from neighboring countries.

In the eastern section, the southeast portion is inhabited by six Mongo groups: the Basengele, Bolia, Bokote, Ekonga, Ntomba and Losakanyi. They cohabit with a minority of Batwa Pygmies. The Ntomba are the dominant group in the area of Bikoro within Equateur province. The northwest part, between the Congo River and the Ubangui, is inhabited by a cultural mosaic of 13 ethnic groups with very different sensibilities and knowledge concerning the use of renewable natural resources. These groups are the Bobangi, Baloi, Libinza (or Balobo), Boloki (or Iboko-Mabale), Bapoto, Djamba, Lobala, Likoka (or Ngili or Likawe), Bamwe (or Djando), Bonkula, Bodzinga, Ndobu, Mbonji and Ngombe. This broad cultural diversity is further increased by the fact that certain groups are actually an amalgam of subgroups with different cultural characteristics<sup>4</sup>. However, what all these groups have in com-

<sup>4</sup> The Bamwe are divided into 12 smaller entities: the Monya, Giyando, Moliba, Ebuku-Lingonda, Sombe, Lifonga, Limpoko, Likata, Bomole, Libobi, Mondongo and Bobaza.

mon is that their livelihoods basically depend on aquatic resources, particularly fish.

## Activities

In the western section of the Landscape, the greater part of the population is principally engaged in farming; as well as other activities: fishing, hunting, trade and livestock farming (Table 18.1). About 85% of the protein in the diet of the population is derived from fishing and 6% from hunting. The populations depend on the forest and rivers for more than 90% of their normal protein intake. The main staples are cassava, maize and bananas, with seasonal crops of the African plum. The main livestock are poultry, ducks, pigs, goats and sheep.

In the eastern section, socioeconomic studies by WWF around Lake Tumba have shown that farming, fishing and the gathering of non-timber forest products constitute the main occupations and generate the bulk of the income of local communities (Table 18.2). Approximately 15% of the population has permanent employment in education, local administration or the police, but these activities only provide very low incomes and the majority of these employees report that they have to supplement their salaries from farming and fishing.

Cassava, maize and bananas are the staple cultivated crops throughout the eastern section of the Landscape. Plantations of oil palms are the principal commercially cultivated product in the northern part of this section, particularly in the areas of Bomongo and Mankanza. Groundnuts and rice are cultivated in the southern part, but rice cultivation has also recently been introduced in the north. In addition, sweet potatoes and sugarcane are found throughout in small quantities.

Fishing is the second most important activity and fish is the most highly regarded food culturally in most areas of the Landscape. In certain regions (Mobeka, Mankanza, Bomongo) fish is also a commercial product: the fish is smoked and sold to the boats which go down to Mbandaka, Kinshasa and Brazzaville. In the region of the Tumba and Mai Ndombe lakes, studies have shown that fishing is also practiced by fishermen who come from distant towns situated outside the Landscape and who use a large number of nets. The local inhabitants complain about the commonly acknowledged reduction in fish stocks. This perception is confirmed by WWF studies carried out at Lake Tumba<sup>6</sup>.

The gathering of non-timber forestry products is carried out on a large scale. The raffia palm *Raphia sese* and rattan *Laccosperma secundiflorum* are collected for craft activities. Other products sought include the bark of *Scorodophloeus zenkeri*, the roots of *Aframomum*, copal from *Guibourtia demeusei*, leaves or young shoots from Marantaceae, the fruits of *Dacryodes edulis*, *Coula edulis*, *Canarium schweinfurtii* and *Anonidium manni*, mushrooms and caterpillars. All these products are traded to different degrees, but apart from firewood, they generate very little monetary income. They are common property and collected within well defined areas for each village<sup>7</sup>.

## Land use

Within the Landscape, 3.5% of the area (440,000 ha) is occupied by the community reserve. The remainder (12,644,000 ha) is made up of land that has not been zoned (Figure 18.5). In the eastern section, there is the small Mabali Scientific Reserve (1,900 ha or 0.02% of the eastern part of the Landscape).

## Logging

In the western section of the Landscape, industrial logging is restricted to the outskirts of the Landscape, where it adjoins the Sangha Tri-National Landscape. The poor quality of timber and logistical or access problems only permit very limited small-scale exploitation in the swamps or floodable forests.

In the eastern section of the Landscape there are 10 concessions—8 in the south, 2 in the north—four of which are in operation. These concessions have been awarded to six companies (CFT, SODEFOR, SCIBOIS, SOCOBELAM, BIMPEAI and SOMI-CONGO) who are engaged in prospecting or logging. These conces-

<sup>5</sup> Not to be confused with occupation: many children report 'going to school' as an activity and 60% of the women report working 'in the home'.

<sup>6</sup> These studies show that while there is a considerable amount of fishing, the fish catches per unit are extremely low and certain species formerly known to be in the lake seem to have disappeared.

<sup>7</sup> Each village has a clear knowledge of the boundaries of its territory, which is used not only for farming but also for foraging, hunting and fishing. These territories are administered by the traditional chief, assisted by a cohort of elders acting as advisers to the chief.

Table 18.1. Activities of populations in the community reserve of Lake T  l  , Republic of Congo (Poulsen & Clark, 2002).

Activity <sup>5</sup>	% primary activity		% secondary activity		% tertiary activity	
	Men	Women	Men	Women	Men	Women
Farming	51	85	32	15	13	5
Fishing	22	12		77		
Hunting	10		13			
Small-scale trade		2		5		27
Stock farming			29		47	47
Crafts					10	

Table 18.2. Economic activities in the area surrounding Lake Tumba, DRC, calculated on the basis of 460 households surveyed in 36 villages selected at random.

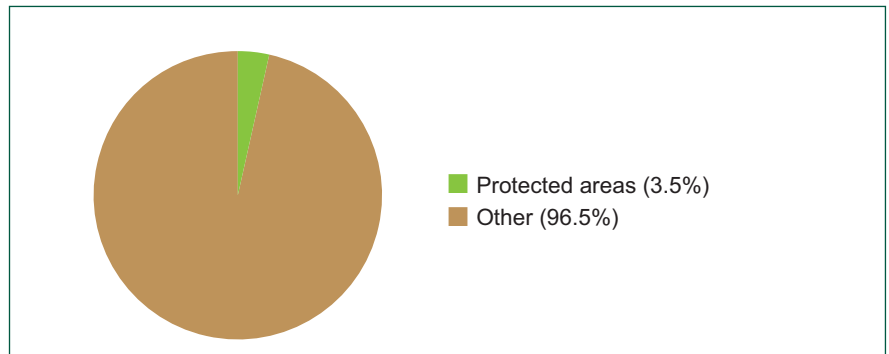
Activities	Absolute frequency	Relative frequency
Farming	96.7 %	28.4 %
Hunting	36.1 %	10.6 %
Fishing	82.6 %	24.2 %
Foraging	54.6 %	16.0 %
Trade	33.7 %	9.9 %
Crafts	22.2 %	6.5 %
Traditional medicine	7.2 %	2.1 %
Temporary employment	2.2 %	0.65 %
Permanent employment	15.2 %	0.04 %
Retired	0.2 %	0.06 %
Other	1.7 %	0.50 %
Average number of activities per family	3.5 %	1.03 %

Figure 18.5. Main land use types.

sions cover almost 40% of this section of the Landscape. Most are concentrated in the south where there is an abundance of species such as tiamma *Entandrophragma angolense*, sipo *E. utile*, dabema *Piptadeniastrum africanum*, afina *Strombosia tetrandra* and, above all, wenge *Millettia laurentii*. Wenge accounts for about 75% of the wood extracted between the Tumba and Mai Ndombe lakes.

## Reasons for the identification of the Landscape.

- (1) The region of flooded and floodable forests of the central region of the Congo Basin covers a total area of over 200,000 km<sup>2</sup>, representing the second-largest swamp after the Pantanal in South America and the largest tract of floodable forest in the world (Vandeweghe, 2004). It constitutes a unique ecosystem in Africa.
- (2) The region plays a key role in regulating the hydrological conditions of the Congo Basin and the climate of Central Africa.
- (3) The only protected area in this complex, the community reserve of Lake Télé (440,000 ha) in the Republic of Congo, is one of the few protected areas of Central Africa to preserve huge expanses of flooded and floodable forest. Initial surveys show that it is rich in both botanical and zoological species and that it has at least 23 species of mammals and birds on the IUCN red list, the highest density of gorillas observed in Central



Africa, a highly diversified herpetofauna and ichthyofauna with several endemic species and a very large population of black crocodile, one of the most endangered crocodile species in the world.

- (4) The Mai-Ndombe and Tumba lakes alone represent two aquatic ecoregions with their particular range of species and endemic species.

## Conservation

### History

In the Republic of the Congo, Lac Télé Community Reserve was created on 21 May 2001. It comes under category VI of protected areas according to the IUCN and covers 440,000 ha. In the DRC, the Landscape accommodates

<sup>8</sup> The Mabali reserve was created in 1949 by the Belgian government for the *Institut de recherche scientifique en Afrique centrale* (IRSAC) to study the regeneration of low altitude forest following timber extraction, the ecology of four primate species present at the time (the black crested mangabey, the red-tailed monkey, Wolf's mona monkey and the Angola colobus) and in particular the response of primates to forest exploitation.

the small Mabali Scientific Reserve of almost 1,900 ha and representing just 0.02% of this section of the Landscape<sup>8</sup>.

## Players

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The community reserve of Lake Télé is managed in partnership by the Ministry of the Forest Economy and Environment and WCS. There are also local NGOs, the most effective of which is *Conservation de la Fauna Congolaise* (CFC). It is active on the outskirts of the reserve and assists in developing the sustainable management of resources in two villages. In the eastern sector, administration of the Mabali reserve has been entrusted to the *Centre de recherche en écologie et foresterie*, a body of the Scientific Research Ministry of DRC. Within this segment of the Landscape, WWF is working in cooperation with the Ministry for the Environment, Nature Conservation, Water and Forests, the Bonobo Conservation Initiative (BCI) and Innovative Resources Management (IRM).

## Direct threats

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### (1) Commercial hunting.

In the western section of the Landscape, commercial hunting for bushmeat and ivory is the greatest immediate threat to the fauna. Much of this activity is organized by people who live outside the community reserve, but who supply guns and organize the export of the products. This hunting is carried out mainly along the roads and rivers and has had a devastating effect all along the road running from Impfondo to the reserve. In the northwest, logging companies have created new roads which now reach into the reserve and have opened up the forest to hunters and meat traders. This trade combines with that in ivory along the same roads. Ivory buyers, soldiers and police officers bring in weapons (AK47s and grenades) and leave with the tusks and meat which are resold in the markets of Brazzaville and Impfondo.

In the eastern section, hunting is also a serious threat, particularly in the southern part of the Landscape where there are larger tracts of terra firma forest. The greatest danger comes from the military training camp situated at the mouth of the Irebu Channel, 90 km southwest of Mbandaka. Unpaid and undisciplined soldiers live from hunting, notably elephant, hippopotamus, red river hog and buffalo (WWF/BCI, 2005). However, all the large mammals are hunted. Hunting using metal snares is very intensive and the most sought after species are those with significant meat: elephant, hippopotamus, buffalo, red river hog and

all the diurnal primates.

One particular case of hunting is the hunting of the live young of great apes (bonobo and chimpanzee) for sale as domestic pets in the large towns. This hunting is all the more destructive as it necessitates slaughtering the adults.

### (2) Village hunting and foraging

In the 22 villages situated in the community reserve there are some 14,000 people of whom 95% are highly dependent on fishing, hunting and the sale of other forest products for their survival. In the medium term, this situation cannot be sustainable.

### (3) Fishing

In the eastern section of the Landscape, fishing is practiced in an intensive, anarchic and uncontrolled fashion, mainly by fishermen coming from regions outside the Landscape. National regulations concerning the mesh size of nets are completely disregarded.

### (4) Brush fires

Each year huge tracts of forest around savannah areas, particularly riparian forests, are deliberately burned, creating problems that affect fishing, increase erosion, reduce the navigability of rivers and deplete available firewood.

### (5) Diseases

No epidemic diseases have been recorded in the fauna, but owing to the high-density of gorillas, Ebola fever could have a devastating effect. Unvaccinated domestic animals could also transmit diseases to wild bovids, particularly as many cattle are imported into the region using opened roads.

### (6) Oil extraction

Oil prospecting by ESSO has revealed the presence of hydrocarbon deposits in the Congo Basin near Mbandaka. For political reasons, these deposits have never been worked, but could be in the future. This would risk increasing immigration into the region and could have disastrous environmental impacts on the aquatic ecosystems and the very fragile environments of the flooded and floodable forests.

## Indirect threats

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### (1) Geographical location

Situated at the confluence of several major waterways, large numbers of people are continually crossing through the Landscape in boats.

They trade products, such as soap, sugar, salt, fishing hooks, nets and clothing for smoked fish and bushmeat, which encourages non-sustainable hunting and fishing.

### (2) Demography

With an internal demographic growth rate of 3.8% per year in the eastern section (De Saint Moulin, 1991), the increase in the population has accelerated, partly due to the immigration of labor for logging operations located at the heart of the eastern section of the Landscape and partly due to the displacement of people by war, specifically into the eastern part.

### (3) Lack of knowledge

It is unknown if the fish catches, which provide 90% of protein intake for the human populations, are sustainable. A study to monitor the situation has been launched in the community reserve of Lake Télé and a study of fish stocks is in progress in Lake Tumba and the Congo River.

### (4) Poverty and the lack of alternative means of subsistence

This is a very important factor in encouraging people to exploit the available forest resources in an ever more intensive and unsustainable manner.

### (5) Absence of supervision

In the scientific reserve there is nobody to enforce laws and regulations<sup>9</sup>.

### (6) Climatic and hydrological disturbances

Currently, the hydrological balance in the central basin region appears to be negative and the level of Lake Tumba, for example, is dropping at an alarming rate<sup>10</sup>. This phenomenon may be temporary, cyclical or a manifestation of longer-term climatic changes. Any additional extraction of water from the Congo Basin, notably in connection with the planned construction of the Ubangui-Chari canal, however, could exacerbate and seriously affect the fragile ecosystem of flooded and floodable forests in the central basin region.

## State of the vegetation

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In the western section of the Landscape, the forests are still quite intact thanks to their impenetrability, both on foot and by vehicle. In the eastern section of the Landscape, a halo of rapid deforestation has developed around Mbandaka, not only for the construction of housing but also for producing firewood.

In the eastern section of the Landscape, the dryland forests in the south are chiefly older secondary forests. The last timber felling operations date back to 1975. In the scientific reserve, large expanses have been cleared to plant cassava crops by the staff at the research station<sup>11</sup>. The local population also uses the reserve for farming, fishing and illegal felling of wenge. A tree found in the riparian forest, *Guibourtia demeusei*, is highly prized as firewood and becoming increasingly rare around Mbandaka; gatherers have to go ever further into the forest to find it.

## State of the fauna

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In the western section, the swamp and floodable forests of the community reserve still contain substantial populations of large mammals, notably gorilla, but certain areas have nevertheless been overexploited by commercial hunting for meat and ivory<sup>12</sup>.

In the eastern section, the Angola colobus has become very rare or has disappeared from the scientific reserve<sup>13</sup> and WWF studies underway at Lake Tumba indicate a severe decline both in the specific composition and in the abundance of fish. In addition, these studies have revealed the existence of small populations of forest elephants in the region situated between the Tumba and Mai Ndombe lakes, as well as between Bomongo and the Congo River. These studies have supplemented those conducted by BCI and make it possible to pinpoint six groups of bonobo in the area between the Tumba and Mai Ndombe lakes, as well as at the edge of the Landscape between Bolobo, Fimi and Mushie, in the province of Bandundu.

## Environmental education and capacity building

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Teams of training and information personnel regularly visit each village and two new staff members have been recruited.

## Management and governance in the field of renewable natural resources

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### (1) Across the Landscape

No zoning or planning exists for the Landscape as a whole.

### (2) In the community reserve

In the western section, management has been developed using a Landscape-wide approach and conservation of biodiversity has been included in a sustainable community management policy for

<sup>9</sup> Despite the support of the Bonobo Conservation Initiative (BCI) and in spite of its old but substantial infrastructures, the scientific reserve remains a reserve on paper only.

<sup>10</sup> These observations are confirmed by the Mabali research station.

<sup>11</sup> These personnel have not been paid for a long time and, all research having ceased, there were no means of survival other than cultivating crops.

<sup>12</sup> Blake (1995) counted 228 gorilla nests in 1993 near the road shortly after its completion. Observations in the same areas in 2005 did not record a single nest.

<sup>13</sup> According to a recent study conducted by WWF in the scientific reserve, no member of this species was observed (Mwanza, pers. comm.).



the reserve and for areas on the outskirts of the Landscape.

The Lake Télé Community Reserve project has the primary objective of implementing and improving a participatory approach to managing the renewable natural resources of the local communities. Each community has traditional territories in which it has the authority to utilize its resources for hunting, fishing and farming. All the territories were mapped in 2005 and, as 95% of the population is made up of indigenous Bomitaba, it is anticipated communities will be motivated to implement sustainable management. Participatory management is in the process of being implemented in the reserve. In 2006, pilot development programs will be launched for alternative means of subsistence.

Supervision is being provided by staff from the Ministry of Forest Economy and the Environment (MEFE): one conservation officer and seven eco-guards. In addition, the regional MEFE office in Impfondo is cooperating, within the limits of its resources, to organize joint patrols of the roads and rivers leading to this town. The regional office also takes part in monitoring cross-border movements of bushmeat. In 2005, ten military weapons with their ammunition and a grenade were seized by the staff of the community reserve. The establishment of a network of informers has allowed information to be obtained about individuals possessing weapons and their location in the reserve. Part of the development of participatory community management consists of encouraging observance of the law by the communities and visitors to the reserve.

In the eastern section, there are no protected areas—apart from the token scientific reserve—and in order to preserve the environment of this Landscape with its fauna, in particular the bonobo, it is essential that one be created. The government of DRC, in partnership with WWF and local communities, is therefore working on a project to create a reserve of 750,000 ha in category VI according to IUCN criteria. However, this project requires the involvement of donor funding, which could be achieved through the CBFP.

## Monitoring renewable natural resources and their management

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### (1) *Large mammals*

Monitoring populations of large mammals entered its third year in 2006 and aims to evaluate the effects of management on the animal populations. The evaluations in 2004 showed that the populations are probably stable but that it will take four years of monitoring to determine the precise trends.

### (2) *Aquatic birds*

In 2006, monitoring of aquatic bird populations entered its 10th year and showed that the populations are stable.

### (3) *Hunting, fishing and the trade in bushmeat*

Programs to monitor levels of hunting and fishing were started in 2005 in the community reserve, by WCS, to establish whether these are sustainable. A program has been launched to determine the origin and volume of bushmeat going to Impfondo. Monitoring of the cross-border trade in bushmeat will be discussed at a meeting between the partners of the Republic of Congo and those of DRC in 2006.