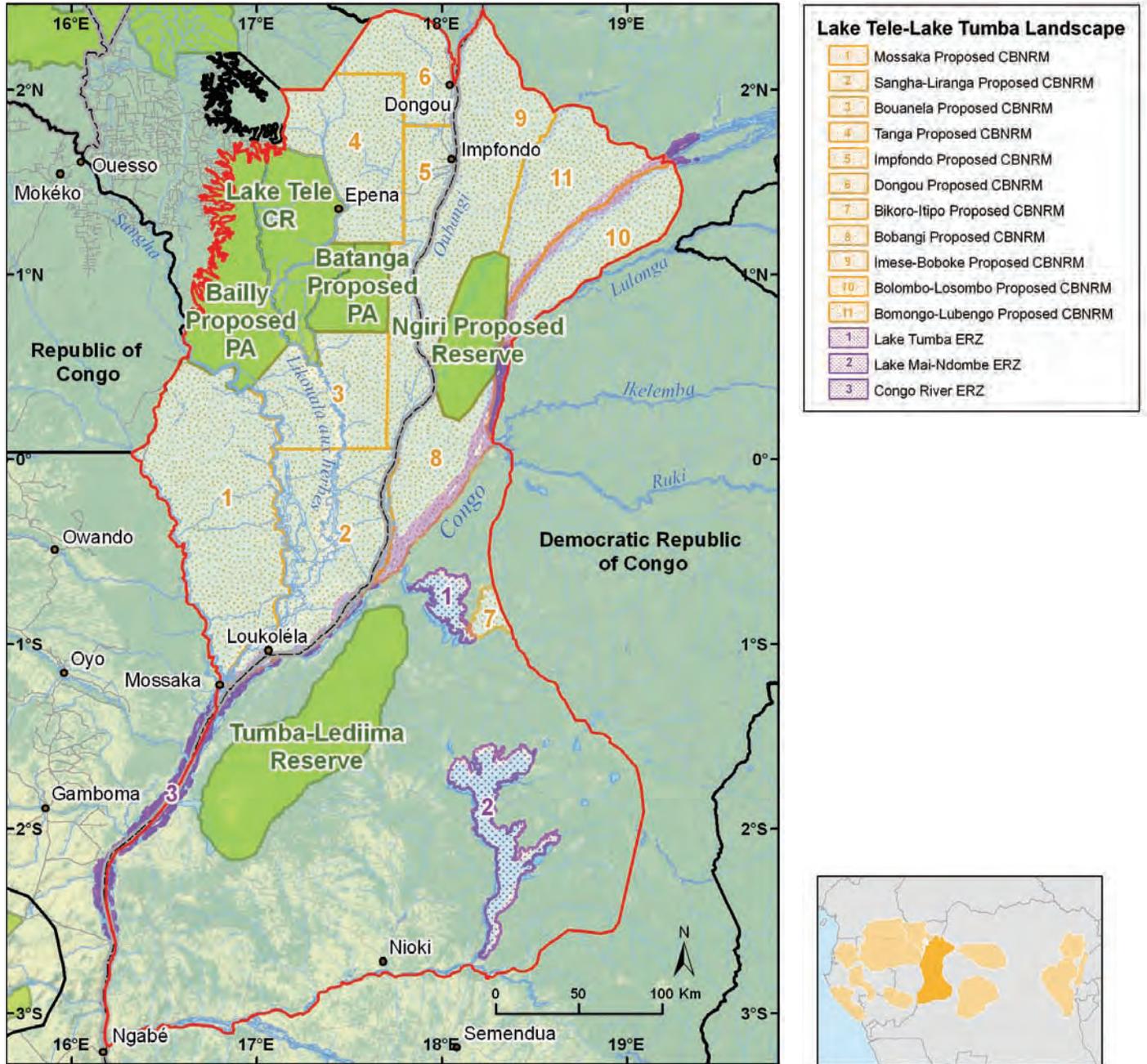


CHAPTER 21

LAKE TÉLÉ-LAKE TUMBA LANDSCAPE

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Land Use Planning



Sources: WCS, WWF, UMD-CARPE, OSFAC, FORAF, IUCN, Tom Patterson, US National Park Service.
 Figure 21.1: Macro-zones in the Lake Télé-Lake Tumba Landscape

Photo 21.1: The vast expanses of water and marshy meadows provide a rich landscape.



The Lake T  l   – Lake Tumba Landscape encompasses 126,000 km² in the Republic of Congo (ROC) and the Democratic Republic of Congo (DRC). There are currently two protected areas in the Landscape: Lake T  l   Community Reserve (in ROC) with an area of 4,400 km² created in 2001 and the Tumba-Lediima Natural Reserve (in DRC) with an area of 7,500 km² created in 2007.

In July 2007, government officials, COMIFAC representatives, Ramsar focal points, scientists and members of the Landscape Consortium met in Brazzaville to discuss the land use planning process, focusing primarily on establishing a cross-border agreement for landscape management and on the Ramsar process to classify part of the Landscape as one of the world’s largest wetland sites. A strategy with benchmarks was adopted and a draft document for the bilateral agreement was developed.

Creating a transboundary Ramsar site in the Landscape, spanning ROC and DRC, was deemed

an important part of the strategy for the land use planning process because it provides an international legal framework for a large portion of the Landscape, which will be adopted in national legislations in both DRC and ROC. Ramsar sites have now been officially classified in both DRC and ROC, but the inter-ministerial agreement for the transboundary management of these sites has been delayed. With 65,696 km² of the Ramsar site in DRC alone, it will be the world’s largest Ramsar site. The Landscape is currently divided into 23 macro-zones including 4 proposed PAs, 13 CBNRMs and 6 ERZs. The boundaries of the macro-zones will likely change as these areas are poorly known and sites with high conservation value are still being identified. The survey work is being conducted zone by zone, focusing on empowering local communities to become part of the planning teams (with special attention to women and marginalized groups).



Photo 21.2: Products from harvesting, fishing and hunting co-exist in markets.

Bailly PA (proposed) and Batanga PA (proposed), ROC

Under Congolese law, the Lake T  l   Community Reserve (LTCR) is a recognized protected area. During participatory mapping of villages in the LTCR, it was found that the community territories of Bouanela and Dzeke villages overlap the proposed Batanga PA. The community territories

of Mougouma-Bailly and Kinami village also overlap the proposed Bailly PA. It is therefore logical and, from a management perspective, more efficient to propose an extension of the limits of the existing PA (LTCR) to also include these areas.

Lake Télé Protected Community Reserve, ROC

In the LTCR, all villages in the reserve were mapped and community regulations allowing the communities to manage their resources have been drafted. Additionally, the mapping of community areas outside of LTCR, including the Bailly zone and the southern Likouala-aux-herbes (e.g., Mougouma-Moke and Ebambe) in the Bouanéla CBNRM, has been finalized. Aware-

ness campaigns explaining landscape activities and targeting local and regional authorities such as the *Préfet*, the *Sous Préfets* and the Departmental Directors were conducted. These authorities have agreed to actively participate in the land use planning, which is important for the success of the process.

Tumba-Lediima Reserve, DRC (IUCN cat. II)

Planning sessions were organized between ICCN and WWF to agree on the management of the reserve. An agreement was reached to include local communities in the process of implementing the management plan for the reserve. A human occupational map documenting changes

in land occupation between 1986 and 2006 was produced and will feed into the development of the management plan. The map and on-going local consultations will generate a management *modus operandi* between local communities and the ICCN Management team.

Lake Tumba ERZ (proposed), DRC

Local Committees for the Management of Natural Resources (LCMNR) have been created for most of the villages surrounding the lake. The LCMNR's *raison d'être* is to constitute the planning group at a local level because there is a need to train communities in advocacy and organization. After the creation of these LCMNRs, the second phase of the process was the selection of pilot communities for the establishment of a community based fisheries monitoring system and organization of stakeholder groups to improve the quality of post-harvest fish processing. A general meeting, including both provincial and territorial authorities, LCMNRs and other stakeholders, was held in September – October 2008 to agree on the management of the lake. A draft of the management plan was produced and is going through the approval process.



Photo 21.3: Fishing village on the Ruki River.

Ngiri Biosphere Reserve (proposed), DRC (IUCN cat. II)

Biological data have been collected and key biodiversity areas identified. Some important biodiversity areas geographically overlapped with the Bobangi, DRC CBNRM (proposed), indicating the need to undertake a fine scale participatory mapping exercise. Currently, negotiations are under way with ICCN to conduct another assess-

ment, which will include the creation of LCMNRs and the drafting of a preliminary agreement between ICCN and the local communities on the appropriate ways to manage different micro-zones within the PA.

SEBO (*Société des Élevages du Bandundu Occidental*) Grazing Concession and Adjacent Forests ERZ (proposed), DRC

LCMNRs were created in villages located within the SEBO grazing concessions. The LCMNR of Mpelu, Nkala, and Nko have met several times and are now working, with critical input from the NGO Mbou-Mon-Tour (MMT), toward the implementation of a CBNRM in the

gallery forests of Nkala. WWF is helping to negotiate proper community land tenure of these lands. Next steps include negotiations with the territorial authorities as part of the planning process, and the submission of an official request for tenure, as required by the DRC forestry law.

Imese CBNRM (proposed) and Bomongo-Lubengo CBNRM (proposed), DRC

In both of these proposed CBNRMs, fine-scale biological surveys were conducted and local areas of biological importance were identified. Re-

sults of these surveys will inform the micro-zoning process when the LCMNRs are developed.

Human Activities

The top three commercial agricultural products in the ROC section of the Landscape are cassava, Koko leaves and palm nuts. Data were collected from the market of Epena, the district capital, where cassava is sold in three forms: cassava leaves, cassava flour and cassava *baguette*. The leaves are the most abundantly sold at CFA 100 (\$ 0.09) for 1,200 g. Cassava flour (*“le fougou”*) is sold in small plastic bags of 500g at CFA 100 (\$ 0.18). It is possible to get 1 sack of flour of 50 kg for CFA 8,000 (\$ 14.5), if ordered in advance. The sale of agricultural products is done exclusively by women. The cooked cassava *ba-*

guette is also exclusively made by women and is derived from the cassava root which is pounded, wrapped, and cooked in *Marantaceae* leaves. The 2nd and 3rd most abundantly sold products in the Epéna market are the leaves of *Gnetum africanum* (*“koko”*) which are gathered in the forest, and palm nuts, respectively. In the DRC part of the Landscape, the most common commercial agricultural products are: palm oil which is sold in containers of 25 liters, bananas which is sold in bunches or *“régimes”* and peanuts which are sold in 80-kg sacks

Bushmeat data were collected in the villages of Mokengui, Koundoumou and Dzéké (ROC). The top three commercialized species are dwarf crocodile (*Osteolaemus tetraspis*), monkeys (*Cercoptes sp.*) and red river hog (*Potamochoerus porcus*). The prices vary between \$ 10 and \$ 15 for an entire dwarf crocodile; between \$ 3 and \$ 5 for a monkey and \$ 6 and \$ 9 for a quarter of red river hog. Bushmeat is mostly exported to Impfondo and Brazzaville. Other species found on the market are sitatunga, duiker, and turtle. In the ROC part of the Landscape there is also a high consumption of fish, with *Clarias* and *Parachanna* being the most commercialized species. In DRC, the products which are most sold are red river hog, monkeys and sitatunga at Mbandaka market. The prices vary from \$ 22 for a monkey to \$ 111 for a red river hog.



Photo 21.4: A stand of *Terminalia* along the river.

Table 21.1a: Important agricultural products in the Lake Télé-Lake Tumba Landscape

Agricultural product	Unit	Purchase price/unit (\$)	Primary destinations	Date	Data collection	Sources
Town of Mbandaka						
Palm oil	Can (25 l)	8.88	Mbandaka	May-05	Household and market interviews	Lake Tumba socioeconomic study, 2006
Banana	Whole bunch	4.00	Mbandaka	May-05	Household and market interviews	Lake Tumba socioeconomic study, 2006
Peanuts	Sack (80 kg)	111.11	Mbandaka	May-05	Household and market interviews	Lake Tumba socioeconomic study, 2006
CBNRM Lake Télé, markets of Epéna and Dzeke						
Cassava leaves (<i>Manihot esculenta</i>)	1,200 g	0.09	Epéna	Apr-07	Market surveys	Otto <i>et al.</i> , 2007
Cassava meal (<i>Manihot esculenta</i>)	500 g	0.18	Epéna	Apr-07	Market surveys	Otto <i>et al.</i> , 2007
Cassava stick (<i>Manihot esculenta</i>)	50 g	0.18	Epéna	Apr-07	Market surveys	Otto <i>et al.</i> , 2007

Table 21.1b: Bushmeat trade in the Lake Télé-Lake Tumba Landscape

Bushmeat species	Unit	Purchase price/unit (\$)	Primary destinations	Date	Data collection	Sources
Mbandaka						
Red river hog (<i>Nsombo</i> , <i>Potamocheirus porcus</i>)	Whole	111.44	Mbandaka	May-05	Market survey	Lake Tumba socioeconomic study, 2006
Monkey (non specified)	Whole	22.22	Mbandaka	May-05	Market survey	Lake Tumba socioeconomic study, 2006
Sitatunga (<i>Tragelaphus spekei</i>)	Packet of 3	111.11	Mbandaka	May-05	Market survey	Lake Tumba socioeconomic study, 2006
Village of Dzeke (CBNRM Lake Télé)						
Dwarf crocodile (<i>Osteolaemus tetraspis</i>)	Whole	14.55	Dzeke	Jun-07	Household surveys	Otto <i>et al.</i> , 2007
Spot-nosed guenon (<i>Cercopithecus nictitans</i>)	Whole	3.64	Dzeke	Feb-07	Household surveys	Otto <i>et al.</i> , 2007
Red river hog (<i>Potamocheirus porcus</i>)	Quarter (gigot)	9.09	Dzeke	Jun-07	Household surveys	Otto <i>et al.</i> , 2007
Village of Koundoumou (CBNRM Lake Télé), periphery of the Reserve						
Dwarf crocodile (<i>Osteolaemus tetraspis</i>)	Whole	9.09	Koundoumou	Jun-07	Household surveys	Otto <i>et al.</i> , 2007
Caterpillar (Chenille)	Cooking pot	0.18	Koundoumou	Aug-07	Household surveys	Otto <i>et al.</i> , 2007
Red river hog (<i>Potamocheirus porcus</i>)	Piece	1.09	Koundoumou	Mar-07	Household surveys	Otto <i>et al.</i> , 2007
Village of Mokengui (periphery of the LTRC)						
Dwarf crocodile (<i>Osteolaemus tetraspis</i>)	Whole	12.73	Mokengui	Aug-07	Household surveys	Otto <i>et al.</i> , 2007
Spot-nosed guenon (<i>Cercopithecus nictitans</i>)	Whole	3.64	Mokengui	Aug-07	Household surveys	Otto <i>et al.</i> , 2007
Red river hog (<i>Potamocheirus porcus</i>)	Quarter	6.36	Mokengui	Jun-07	Household surveys	Otto <i>et al.</i> , 2007

Human Density and Distribution in the Landscape

There have been no major changes in human density and distribution since the 2006 SOF report, except that the United Nations High Commission for Refugees (UNHCR) has repatriated a large number of the refugees in DRC, which might have impacts on the distribution of the population in the Landscape.

The main activities in the Landscape remain fishing and agriculture. Small-scale trade is practiced by migrant women from Brazzaville who come to buy fish and bushmeat. Below are the activities as reported from the 2007 census. The concession in Maboula Mbondo is now active in the ROC section.

Photo 21.5: Pirogues made from tree trunks are an important form of transportation in the Landscape.



Table 21.2: Principal activities for the populations of 27 villages of the Lake Télé Community Reserve

Activity	% main activity		% secondary activity	
	Men	Women	Men	Women
Farming (agriculture)	15.07	83.96	45.17	26.31
Fishing	57.20	8.84	26.38	55.63
Hunting	9.71	0.21	8.49	0
Traditional activities	3.11	0.79	13.19	4.13
Crafts	10.86	0.68	3.31	0.35
Cattle	0.07	0	0.62	0
Small trade	3.97	5.52	2.83	13.58

Source: Otto et al., 2007.

Direct Threats

There are three main direct threats to sustainable management of the Lake Télé – Lake Tumba Landscape: commercial hunting, refugees in the Landscape and roads.

Soldiers visiting the region while on holiday usually bring in weapons which are then given to the local population to hunt for the soldiers. The meat is then transported by boats to Brazzaville.

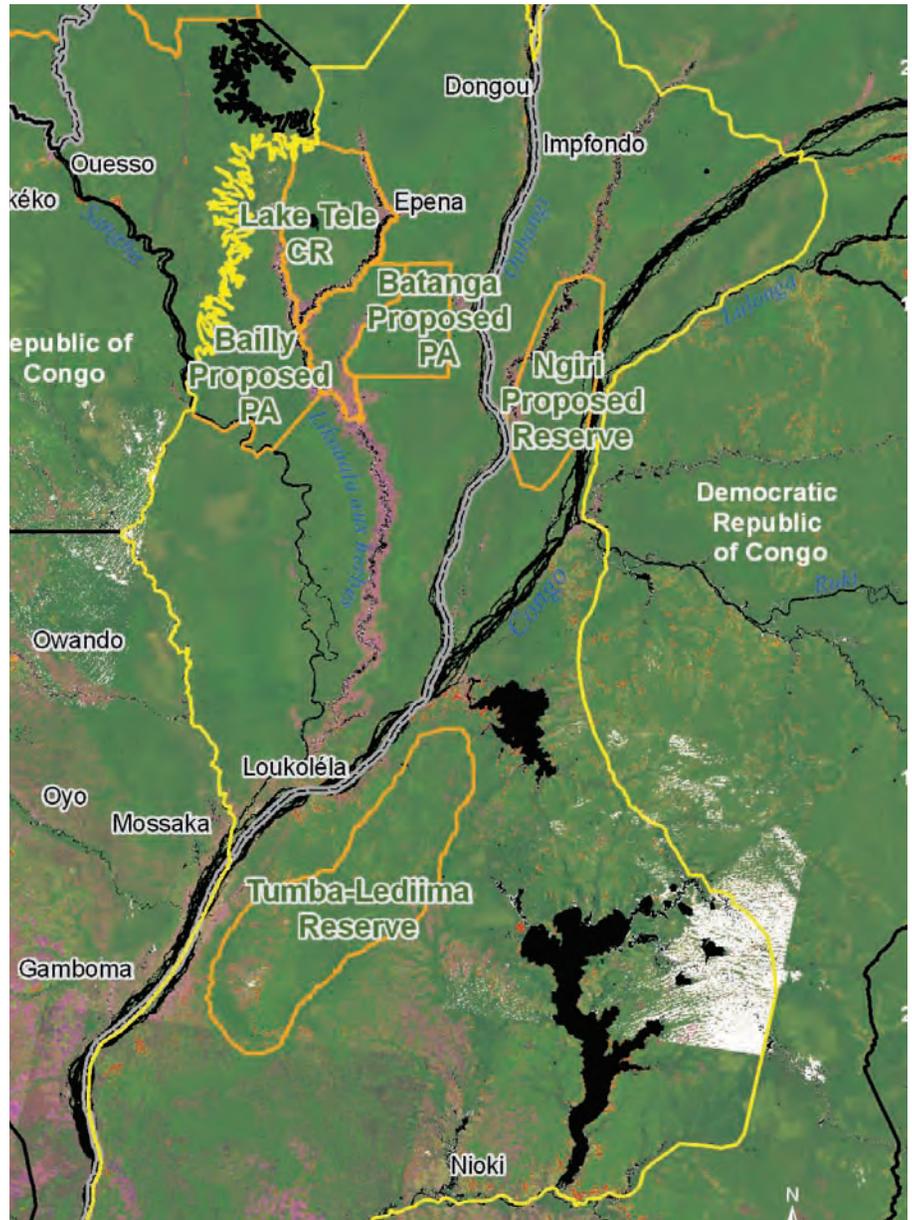
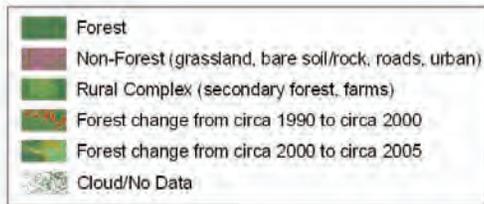
In the northeast of the Landscape (ROC), refugees from DRC living in the villages adjacent

to the Oubangui River are poaching intensively. Ivory and meat are transported by boat to be sold in Impfondo and Brazzaville. Additionally, the refugees have developed intensive agriculture in the forest along the river; the consequence is severe degradation of the ecosystem in the area.

In the western part of the reserve, roads and agricultural paths are being opened which creates easy access to the forest for hunters, and facilitates the transportation of bushmeat.

Forest Cover

With around 1 % of forest loss, the rate of forest loss was high between 1990 and 2000 in the Landscape. However, the net loss in forest cover went down to about 0.2 % between 2000 and 2005. Most forest cover changes occurred in the southern part of the Landscape in the DRC segment where most of the logging concessions are located. Overall, swamps prevented forest cover losses because logging activities are difficult to undertake and prohibitively expensive in such inundated and/or seasonally inundated habitat. Fire is also apparent in all the Landscape, particularly in the forest-savanna mosaics and along major rivers. Fire is used as a management tool for raising cattle (especially in the DRC segment). The decrease in forest cover lost between 2000 and 2005 may reflect the impact of the moratorium that was imposed on allocations of new concessions in the DRC.



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

Figure 21.2: Composite Landsat satellite image of the Lake Télé-Lake Tumba Landscape overlain with 1990 to 2000 forest loss (in red) and 2000 to 2005 forest loss (in orange)

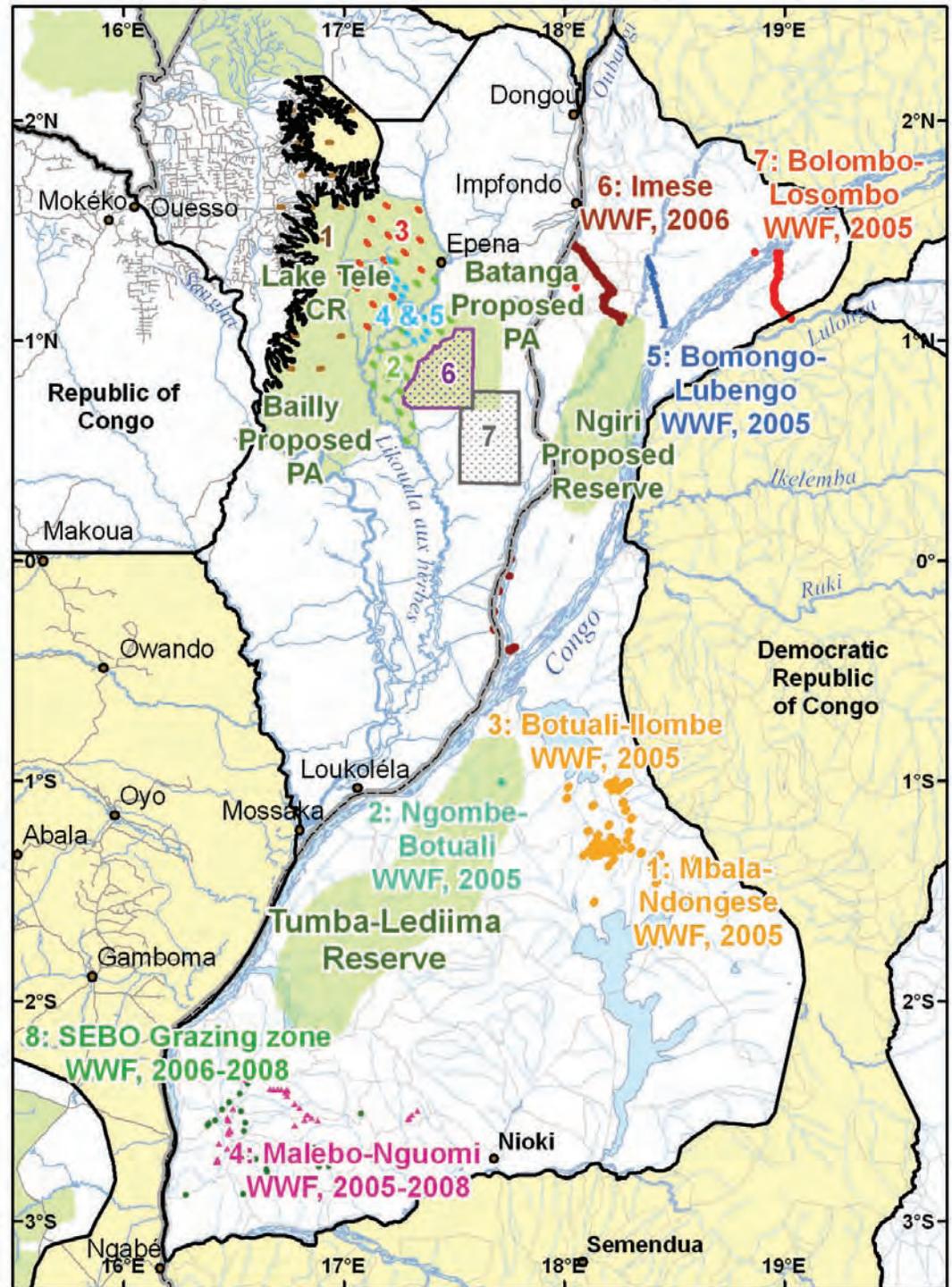
Table 21.3: Forest cover and forest loss in the Lake Télé-Lake Tumba Landscape from 1990 to 2005

Landscape area	Forest area			Forest loss			
	1990 (km ²)	2000 (km ²)	2005 (km ²)	1990-2000 (km ²)	1990-2000 (%)	2000-2005 (km ²)	2000-2005 (%)
130,710	100,285	99,366	99,177	919	0.92	189	0.19

Forest cover and forest cover loss are derived from Landsat and MODIS satellite data.

Sources: SDSU, UMD-CARPE, NASA.

Large Mammal and Human Impact Monitoring



Sources: WCS, WWF, UMD-CARPE, OSFAC, FORAF

Figure 21.3: Biological surveys conducted in the Lake Télé-Lake Tumba Landscape

Table 21.4a: Biological survey results for the Lake Têlé-Lake Tumba Landscape, DRC segment

Survey	Site name	Survey date	Total km of recces	Number of transects	Other	Elephant presence	Elephant dung pile encounter rate (N/km)	Ape presence	Ape nest group encounter rate (N/km)	Ape nest group density (N/km ²)	Human sign (N/km)
1	Mbala-Dokese	May 05- Feb 06	324	75		Yes	0.14	<i>Pan paniscus</i>		0.27	Snares = 0.54
2	Ngombe-Botuali	May 05- Feb 07									
3	Botuali-Ilombe	May 05- Feb 08						<i>Pan paniscus</i>		0.27	
4	Malebo-Nguomi	May 05- Feb 09						<i>Pan paniscus</i>		2.2	
5	Bomongo - Lubengo	May 05- Feb 10	111	12		Yes		<i>Pan troglodytes</i>	0.019		Hunting camps = 0.020
6	Imese	May 05- Feb 11	111	15		Yes	0.018	<i>Pan troglodytes</i>	0.009		Hunting camps = 0.032
6	Imese	May 05- Feb 13	61	10		No		<i>Pan troglodytes</i>	0.041		Hunting camps = 0.027
7	Bolombo-Losombo	May 05- Feb 12						<i>Pan paniscus</i>	0.057		
8	SEBO grazing zone	2006- 2008			Presence-absence using McKenzie occupancy models						Major trails = 0.22
8	South of the SEBO grazing zone	2006- 2008	148	6	Presence-absence using McKenzie occupancy models	Yes	0.038	<i>Pan paniscus</i>	1.02		Hunting camps = 0.019

1-5; 7-8) Inogwabini et al., 2007; 6) Biological inventory in the north of Lake Têlé-Lake Tumba Landscape (DRC segment);-10) Large mammals inventory in the south of the Lake Têlé-Lake Tumba Landscape (DRC segment).

Table 21.4b: Biological survey results for the Lake Télé-Lake Tumba Landscape, Congo segment

Survey	Site name	Survey date	Total km of recces	Number of transects	Total km of transects	Elephant presence	Elephant dung pile counter rate (N/km)	Elephant dung pile density (N/km ²)	Ape presence	Ape nest group encounter rate (N/km)	Ape nest group density (N/km ²)	Human sign (N/km)
1	Bailly	Jan-May 06	341	24	48	Yes	2.68 ± 2.57	432.44 ± 416.4	Yes	0.65 ± 0.33	26.6 ± 13.58	0.75 ± 0.09
2	Lake Télé mixed forest	Jan-May 06	117	21	42	Yes	0.07 ± 0.20	11.49 ± 31.7	Yes	0.66 ± 0.73	26.65 ± 29.36	1.07 ± 0.33
3	Lake Télé swamp forest	Jan-May 06	132	17	34	Yes	0.06 ± 0.17	9.47 ± 16.4	Yes	1.06 ± 0.62	42.88 ± 25.42	0.71 ± 0.60
4 and 5	Lake Télé Terra Firma	Jan-May 06	55	15	30	No	0	0	Yes	1.30 ± 0.88	52.64 ± 35.91	0.5 ± 0.27
6	Batanga	Mar-Apr-07	118	21	42	Yes	1.1 ± 4.12	176.43 ± [40.75;763.85]	Yes	4.64 ± 5.88	217.29 ± [120.23-392.68]	0.10 ± 0.26
7	Impfondo	Mar-Apr 08	139	22	44	Yes	0.52 ± 1.42		Yes	1.25 ± 1.26	83.9 ± [48.62;144.799]	0.11 ± 0.38

1) *Iyenguet et al., 2006; 2, 3, 4 and 5) Malanda et al., 2006; 6) Malanda et al., 2007; 7) Iyenguet et al., 2008.*

In the Lake T  l  -Lake Tumba Landscape the trend is that populations of great apes remain constant or are increasing slightly. In the eastern part of the Landscape in DRC, the data gathered from the bonobo habituation program indicates an increase in the number of individuals of the

three monitored groups, as shown in the table 21.5. The group at Nkala has increased by 32 % since 2006. Despite this increase, there was evidence of bonobo hunting for bushmeat in the region of the Malebo proposed ERZ, DRC.

Table 21.5: Population of bonobos (*Pan paniscus*) in selected sites in the eastern part (DRC) of the Lake T  l   – Lake Tumba Landscape.

Site	Group size		Group composition			
	2006	2008	Male	Females	Juveniles	Babies
Nkala	40	53	15	20	10	8
Mpelu	23	25	*	*	*	2
Edzaengo	20	20	*	*	*	*
Tsieli	*	15	*	*	*	*
Lenga	*	25	*	*	*	3

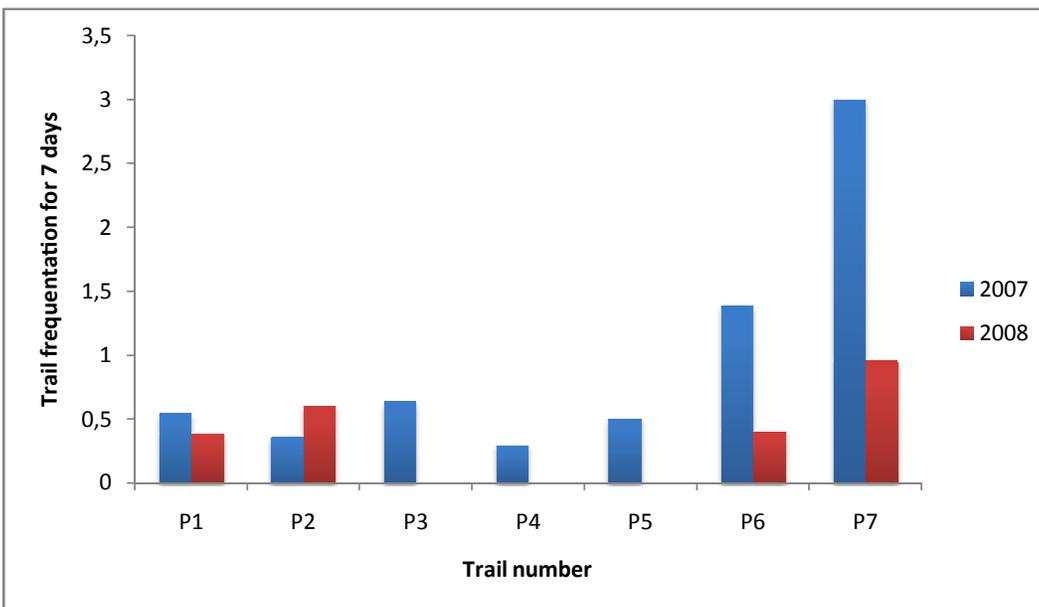
Source: WWF Lake Tumba Project – Technical Progress Report 2008.

An overall fine-scale survey was conducted in the northern part of the Landscape and has provided critical information about chimpanzees in the region and in the region of the Bomongo-Lubengo proposed CBNRM, DRC. In addition, during this same period, the project has initiated a wildlife-domestic livestock interaction and health monitoring component, which is in its early stages.

In the ROC the monitoring results from the surveys between 2006 and 2008 show that the number of the great apes remains constant, prob-

ably due to the fact that the local communities are not targeting great apes in their hunting activities. The area of highest great ape potential (based upon the abundance of *Raphia* and an herbaceous coverage of *Cyperacae* which are preferred great ape food items) is in the Batanga zone proposed PA, ROC.

In the DRC Landscape segment, elephants were monitored through a pre-established network of elephant trails in the region of Malebo. As shown in Figure 21.4, the use of trails by elephants significantly decreased between 2007 and 2008.



Source: WWF Lake Tumba Project – Technical Progress Report 2008.

Figure 21.4: Frequency of trail use by elephants in the region of Malebo (DRC).



Photo 21.6: Waterways represent a primary transportation network throughout much of the Congo Basin.

In the ROC, the elephants are more localized in the periphery of the LTCR (Batanga proposed PA, Bailly proposed PA) and the Impfondo proposed CBNRM, ROC. A small population that was found inside the reserve by Poulsen and Clark (2002) was almost decimated when there was an

increase in human traffic along the rivers in the south, which included the arrival of a large number of automatic weapons from recent war activities. The remaining elephant population is currently found in the swamp forests near the center of the reserve.

Human Signs

In the DRC, snares are mostly found in the Mbala-Dokese proposed ERZ. In the other surveyed areas, the human signs found were mostly hunting camps.

In the ROC, especially the eastern part of the LTCR and Bailly, there is moderate human en-

croachment because of proximity to villages, and especially the settlements and fishing camps along the rivers, which, in many cases, are transformed into hunting camps. In contrast, there is only one village in the entire Batanga zone proposed PA, ROC.

Special Interest

High Density of Great Apes in Africa's Largest Wetland

At 126,000 km², the Lake Télé-Lake Tumba Landscape is Africa's largest wetland and is made up mostly of swamp forest. Until the 1990s, these forests were believed to have relatively few large mammals because of the flooded nature of the region. Three endangered great ape species occur in DRC and ROC, western lowland gorillas (*Gorilla g. gorilla*), chimpanzees (*Pan troglodytes*) and bonobos (*Pan paniscus*), and all three can be found in the swamp forests of the Lake Télé - Lake Tumba.

Until recently, the Lake Télé Community Reserve (LTCR) in the western part of the Landscape was the sole protected area in the Landscape. In 2001, WCS estimated a population of over 13,000 gorillas and 3,000 chimpanzees in the 4,400 km² reserve. In the DRC portion of the Landscape where bonobos occur, no surveys to estimate their abundance or distribution had ever been attempted.

In 2007, WCS carried out additional surveys in the periphery of the LTCR to determine the value of swamp forests for great apes. As a result, several very important and previously unknown populations of gorillas were identified. The area surveyed included 1,029 km² in the south east of the LTCR. The density of gorilla was estimated there at 5.72 gorillas/km² (2.97 – 11.05). A less conservative analysis produced an estimate of 7.90 gorillas/km² (4.34 - 14.39). These are the highest recorded densities of great apes in Central Africa. Thus swamp forests in ROC could hold a very large proportion of the world's remaining gorilla population and be vital for long term gorilla con-

servation. As these forests are very difficult to penetrate and the timber quality is poor; they provide natural protection for the swamp gorillas.

In DRC, the bonobos were surveyed and the main populations were found in the south of the Lake Tumba and in the west of the Lake Mai Ndombe. The largest population was found at Malebo-Nguomi with an estimate of 2,300 bonobos, exhibiting the highest ever recorded mean density for this species (2.2 individuals/km², within the margins of 1.8 – 3.4 individuals/km²) (Inogwabini *et al.*, 2007). As a result of these findings, the DRC government decided to protect the area and ensure conservation for the species by creating the Tumba-Lediima Natural Reserve, an area of 7,500 km².