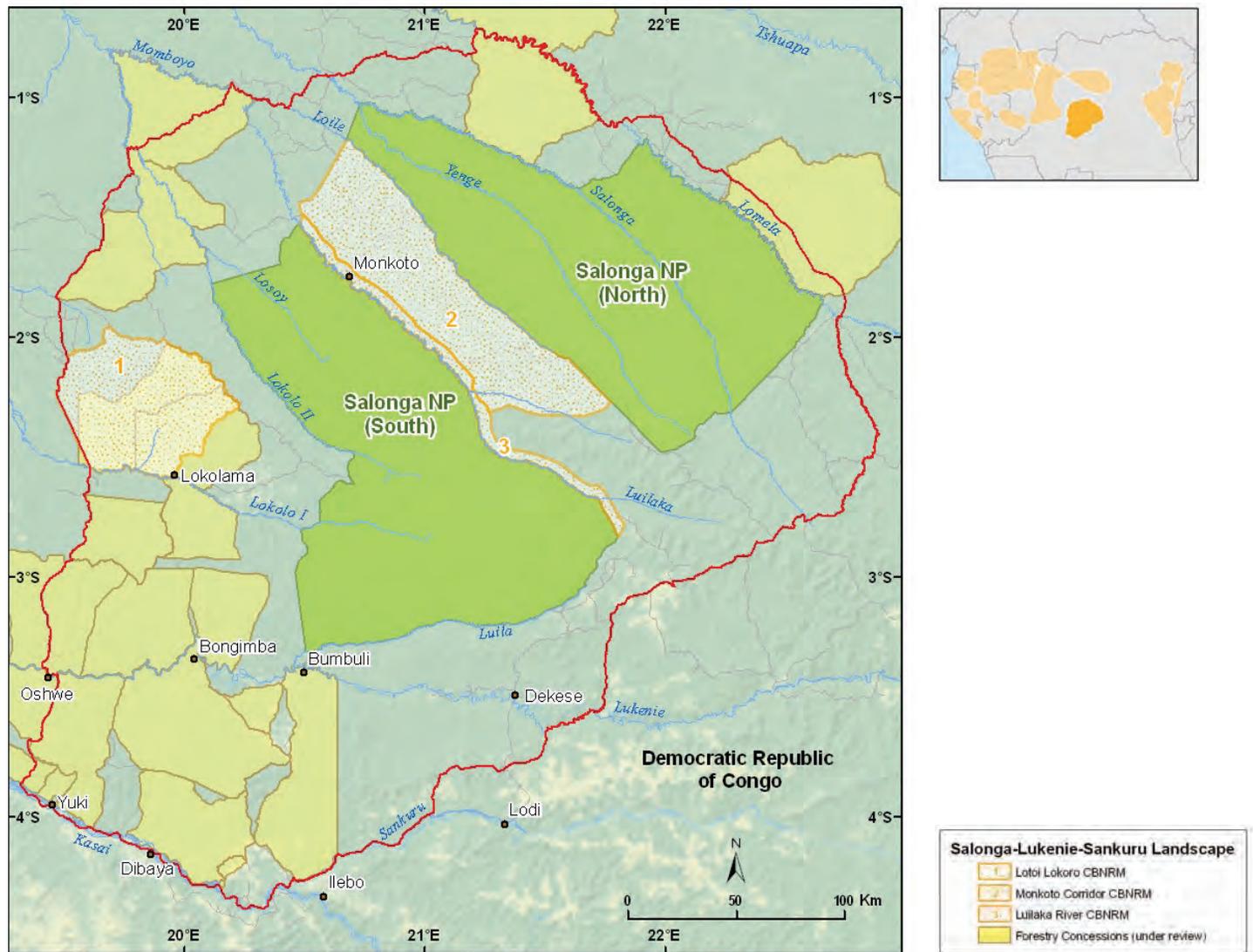


CHAPTER 22

SALONGA-LUKENIE-SANKURU LANDSCAPE

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Land Use Planning



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

Figure 22.1: Macro-zones in the Salonga-Lukenie-Sankuru Landscape

The Salonga-Lukenie-Sankuru (SLS) Landscape covers 104,144 km² of the “Cuvette Centrale” region of the Democratic Republic of Congo (DRC). Straddling the four provinces of Equateur, Bandundu, Kasai Oriental and Kasai Occidental, it contains the world’s second largest tropical forest park, Salonga National Park (SNP).

The Salonga-Lukenie-Sankuru Landscape consortium members³ and other partners⁴ are working with the government of DRC to develop, implement and monitor an integrated land use plan for the Landscape based on the designation of different use or macro-zones and associated management plans defining resource use and governance. The results are intended to mitigate the

³ WWF, Pact, WCS, ZSM

⁴ International Conservation and Education Fund (INCEF), GACC, INADES, CTSF/Smithsonian, American Museum of Natural History

threats to the Landscape's biodiversity and natural resources while contributing to the improved livelihoods of its human population.

When the CARPE Consortium began work in the Landscape in 2004, little baseline information was available aside from preliminary results of biological surveys in Salonga National Park. There was also no agreed upon road map to guide the land use plan development process. The government of DRC was promoting the idea of land use planning, but without a prescribed methodology.

In four years, the Consortium and its partners - with the technical support of CARPE/USAID and the US Forest Service (USFS) - have made important inroads in defining a land use planning process for the SLS Landscape and initiating its development.

The principal role of the Landscape planning team is to finalize a land use plan strategy and to oversee its development, monitoring and adoption nationally. Initial membership in 2007 included Consortium partner institutions and representatives of the Ministry of Environment and ICCN among other institutions. Further analysis revealed gaps in expertise. Consequently, a decision was made to include representatives from the

Ministries of Agriculture, Mines and Infrastructure. Other ministries and associated expertise may be included in the future on a permanent or *ad hoc* basis.

Provincial participation in the planning team remains under discussion and is complicated by two factors: (1) the boundaries of the SLS Landscape overlap with four provinces; and (2) there are differing opinions on the role of provincial governments in the process and validation of land use plan and land attribution. However, representatives from three provinces have participated in a planning team meeting and have assisted in developing specific elements of the land use plan (desired conditions, unique values, draft objectives, zoning criteria).

The Consortium and its partners have already assembled a wealth of information and data on the SLS Landscape including:

- *socioeconomic characteristics*: socioeconomic studies in 128 villages (18 % of total); commodity chain analyses.
- *ecological features*: biological inventories of 59 % of the Landscape; freshwater fish and floristic inventories; carbon quantification.
- *capacity assessment*: ICCN, civil society and communities.
- *spatial attributes*: administrative, protected area, logging concession, rivers, roads, villages, etc.
- *trends*: forest cover change, wildlife commerce (on-going).

The successful development and implementation of the SLS landscape land use plan depends on securing the commitment of a suite of stakeholder groups, each with a differing level of interest in conservation and sustainable natural resource use. Preliminary assessment of different landscape stakeholder groups revealed that they lacked the knowledge and capacity to participate in land use planning. Consequently, the stakeholder participation strategy includes three components: creating platforms of consultation, capacity building, and communications. Examples of the three components as they relate to specific macro-zones and stakeholder groups include:

Landscape planning team: Represents an opportunity to build capacity in land use planning and to secure the commitment of a group of multi-disciplinary and institutional actors including provincial governments.

CoCoSi and SNP: ICCN has already created a structure for SNP that lends itself to planning, the *Comité de coordination de site* or CoCoSi.



Photo 22.1: Monkoto wharf on the Luilaka River.

Community-based natural resource management (CBNRM) zones: Thematic commissions for 113 villages and 55 village-based “natural resource management committees” have been created in two CBNRM zones – Monkoto Corridor and Lotoi-Lokoro - with similar structures planned for a third zone, the Luilaka River. These structures have received capacity building and information on a variety of subjects including land use planning, community forest management, environmental legislation, and best land and natural resource practices. In one area a CBNRM governance committee is being installed, bringing together local authorities and village representatives to plan for and oversee the management of the zone in its entirety.

Building capacity of civil society: *l’Institut africain pour le développement économique et social (IN-ADES)*, a national NGO investing in building civil society capacity to act collectively to address market demands or to advocate on their own behalf in initiatives affecting their land and natural resources, has initiated a series of workshops in areas of the Landscape.

Communication tools: A recent initiative by the Consortium’s newest partner, the International Conservation and Education Fund (INCEF), will support the development and execution of a community-based media campaign. Communities and partners such as ICCN, together with national level counterparts, will translate threats, lessons learned and other information into a locally targeted, culturally appropriate format. Themes for production include the importance of SNP, monkeypox, promotion of collective action, bushmeat trade, and poaching.

Despite the success and promise of the aforementioned strategies, the participation of marginalized groups such as women and Batwa has been insufficient, and new strategies are required to insure their inclusion.

The adoption of the process of land use planning at the national level has been promoted and discussed at a series of workshops starting with the September 2007 intergovernmental workshop on large scale land use plan organized by CARPE/USAID and the USFS. The Ministry of Environment held a second workshop on the process of forest zoning in May 2008. The government and institutions such as the World Bank have now designated the landscapes, including SLS, as pilot sites for large scale land use planning. A technical team created at the national Ministry of Environment is to be tasked with further refining the process, including the steps leading to the formal recognition of the plan.

The planning team includes several institutions and individuals who will be instrumental in promoting the adoption of land use plans—in particular the Director of SPIAF (*Service permanent d’inventaire et d’aménagement forestier*), an advisor to the Minister of Environment, and Provincial Environmental Ministers.

The planning team has drafted the unique values and desired conditions for the SLS Landscape. Using the public participation strategy as a reference, the drafts will be vetted with a series of stakeholder groups ranging from national and provincial ministries to scientific organizations and civil society representatives.

The development of a Landscape zoning plan is on-going. As a first step, the Consortium mapped existing legally recognized land use units totaling 58 % of the Landscape, including SNP (33,346 km² or 32 % of the Landscape) and 21 logging concessions (27,340 km² or 26 % of the Landscape). The results of biological and socio-economic baseline work and consultation with stakeholder groups led to identification of three potential CBNRM areas totaling 10,499 km² or 10 % of the Landscape. The limits of CBNRM areas are being further refined through participatory mapping with community groups.

Spatial analysis and decision support systems such as Marxan modeling are allowing the planning team and other partners to study different zoning options based on existing and future trends in resource use and management. The process is taking into consideration desired biological conditions (persistence of ecological processes, habitat, species) as well as improved livelihoods by mapping and forecasting for future agricultural needs and identifying areas most suitable for economic development (looking at population concentrations, market and transport access).



Photo 22.2: Involving traditional authorities is essential to manage local conflicts.

Human Activities

Humans in the SLS Landscape are mostly a homogenous population comprised of sub-groups of the nation's second largest ethnic group, the Mongo, although there are also small numbers of Batwa, Ngombe and Mbole. There are an estimated 180,586 inhabitants, residing in 716 villages and 4 towns. The population density outside of Salonga National Park is 2.5 people per km².

The low number of immigrants, estimated at 1.7 % of the total population, does not capture the impact of semi-permanent and seasonal residents on natural resources. During the dry season, fisher families from as far away as Mbandaka establish camps on the banks of rivers bordering SNP. Poaching camps that litter the Landscape are often controlled or manned by hunters originating from outside of the Landscape.

Almost 100 % of the population is dependent on the exploitation of natural resources. Agriculture and the collection of non-timber forest products (NTFPs) represent the most widely practiced activities with each engaging over 95 % of Landscape households. Hunting and fishing are the third and fourth most practiced activities, reported by more than 75 % of the population.

While agriculture remains the principal economic activity, transport systems are severely degraded and often limited to travel by foot, bike or dugout canoe. As market opportunities are limited within the Landscape and terms of trade unfavorable, merchants may travel weeks to reach their destinations often pushing bikes loaded with

their products. The economies of scale of this type of transport favor less perishable products with a higher rate of return per kilogram of weight, i.e. bushmeat versus crops such as maize. Agricultural production has been further hindered by decreased yields due partially to disease and lack of access to new cultivars and cropping techniques.

However, and as illustrated in table 22.1, there are considerable profits to be made from agriculture. In the Lokolama sector where hunting for the bushmeat trade has reached a disconcerting magnitude, beans have the potential to generate far greater financial gains. With a 0.25 hectare field yielding at least 100 kg, farmers could sell their harvest locally to traders for at least \$ 145. In bushmeat terms this translates to over 70 blue duikers and almost 22 red duikers. In the Monko-to Corridor CBNRM area between the two sectors of SNP, products with a potential profit margin include maize as well as mushrooms, fumbwa (*Gnetum africanum*), fish, caterpillars and copal (Rokotondranisa *et al.*, 2006).

Commercial hunting represents a threat to the Landscape's biodiversity and to the socioeconomic well-being of its communities. Not only is the sale of bushmeat ranked second only to agriculture as an income-generating activity, but bushmeat is the principal protein source for many communities. The continuing decline in wildlife will impact local livelihoods by further marginalizing communities already struggling to meet their basic necessities, with the most immediate threat to vulnerable populations such as children and the elderly.



Photo 22.3: Crocodiles of the Luilaka River are not immune to poaching activities.

Table 22.1: Important agricultural products in the Salonga-Lukenie-Sankuru Landscape

Agricultural product	Unit	Purchase price /unit* (\$)	Primary destinations	Date	Data collection	Sources
Cassava	Sack (80 kg)	6.00 10.00 20.00	Monkoto (internal market) Mbandaka (external market) Kinshasa (external market)	Jul 06- Aug 06	Interviews at markets, with traders, and with producer groups in Monkoto (Participatory Rapid Rural Appraisal)	Rokotondranisa <i>et al.</i> , 2006.
Palm oil	Container (25 l)	7.00 8.00	Monkoto (internal market) Mbandaka (external market)	Jul 06- Aug 06		
Maize	Sack (60 kg)	6.00 14.00 28.0	Monkoto (internal market) Mbandaka (external market) Kinshasa (external market)	Jul 06- Aug 06		
Beans	Glass (200 g) Sack (100 kg)	0.29 (1.45/kg) 180.00	Lokolama (internal market) Kinshasa (external market)	Mar 08- Jul 06- Aug 06	Collected as a part of surveys on household production and marketing potential	Partially from: Rokotondranisa <i>et al.</i> , 2006.
Maize	Bucket (10 kg)	0.89	Local/Lokolama	Mar 08		
Groundnuts/peanuts	Glass (200 g)	0.20	Lokolama (internal market)	Mar 08		

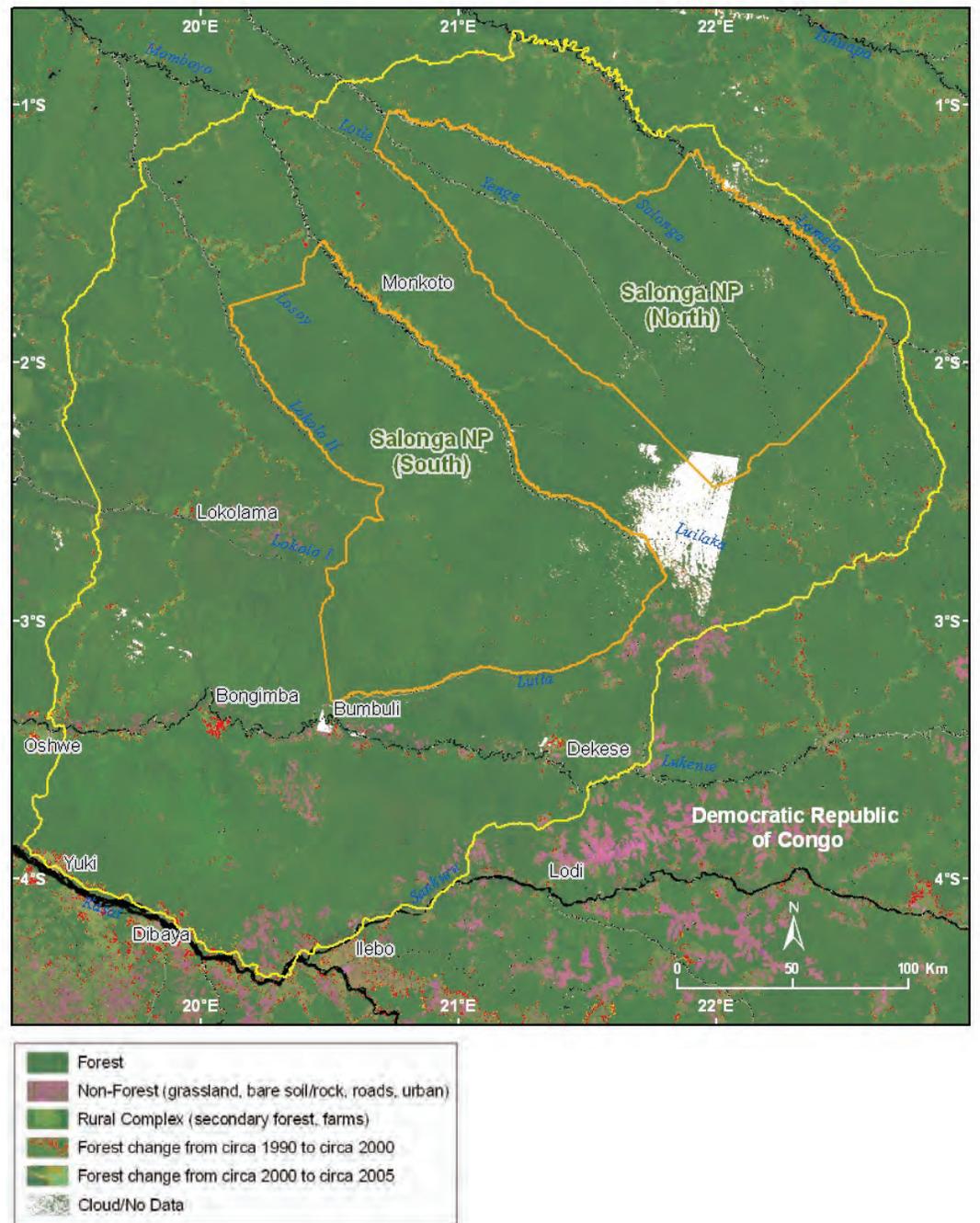
* Based on an exchange rate of \$ 1=500 Congolese Francs.

Table 22.2: Bushmeat trade in the Salonga-Lukenie-Sankuru Landscape

Bushmeat species	Unit	Purchase price/unit* (\$)	Primary destinations	Date	Data collection	Sources
1. Red duiker (<i>Cephalophus spp</i>)	Whole	6.60	Lokolama market. Purchase price paid by market vendor, either directly to hunter or middleperson.	Nov 07 – Feb 08	Market surveys	WWF SLS Landscape database. Preliminary analysis of field data.
2. Tshuapa red colobus (<i>Piliocolobus tholloni</i>)	Whole	3.80				
3. Blue duiker (<i>Cephalophus monticola</i>)	Whole	2.00				
1. Red duiker (<i>Cephalophus spp</i>)	Half	6.40	Ilebo market, just south of the Landscape limits. Purchase price paid by vendor, either directly to hunter or middleperson.	Nov 07 – Feb 09	Market surveys	
2. Monkey (red colobus, de brazza, black mangabey)	Whole	4.40				
3. Blue duiker (<i>Cephalophus monticola</i>)	Whole	3.90				
1. Red duiker (<i>Cephalophus spp</i>)	Half	3.40	Delese market. Purchase price paid by market vendor, either directly to hunter or middleperson.	Nov 07 – Feb 10	Market surveys	
2. Blue duiker (<i>Cephalophus monticola</i>)	Whole	2.10				
3. Monkey (red colobus, de brazza, black mangabey)	Whole	3.00				
1. Red duiker (<i>Cephalophus spp</i>)	Whole	13.20	Oshwe market. Purchase price paid by market vendor, either directly to hunter or middleperson.	Nov 07 – Feb 11	Market surveys	
2. Blue duiker (<i>Cephalophus monticola</i>)	Whole	2.80				
3. Red river hog (<i>Potamochoerus porcus</i>)	Whole	20.50				

Based on an exchange rate of \$ 1=500 Congolese Francs.

Forest Cover



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

Figure 22.2: Composite Landsat satellite image of the Salonga-Lukenie-Sankuru Landscape overlain with 1990 to 2000 forest loss (in red) and 2000 to 2005 forest loss (in orange)

Table 22.3: Forest cover and forest loss in the Salonga-Lukenie-Sankuru 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 (%)
104,205	101,570	101,198	99,177	343	0.37	264	0.26

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

Sources: SDSU, UMD-CARPE, NASA.

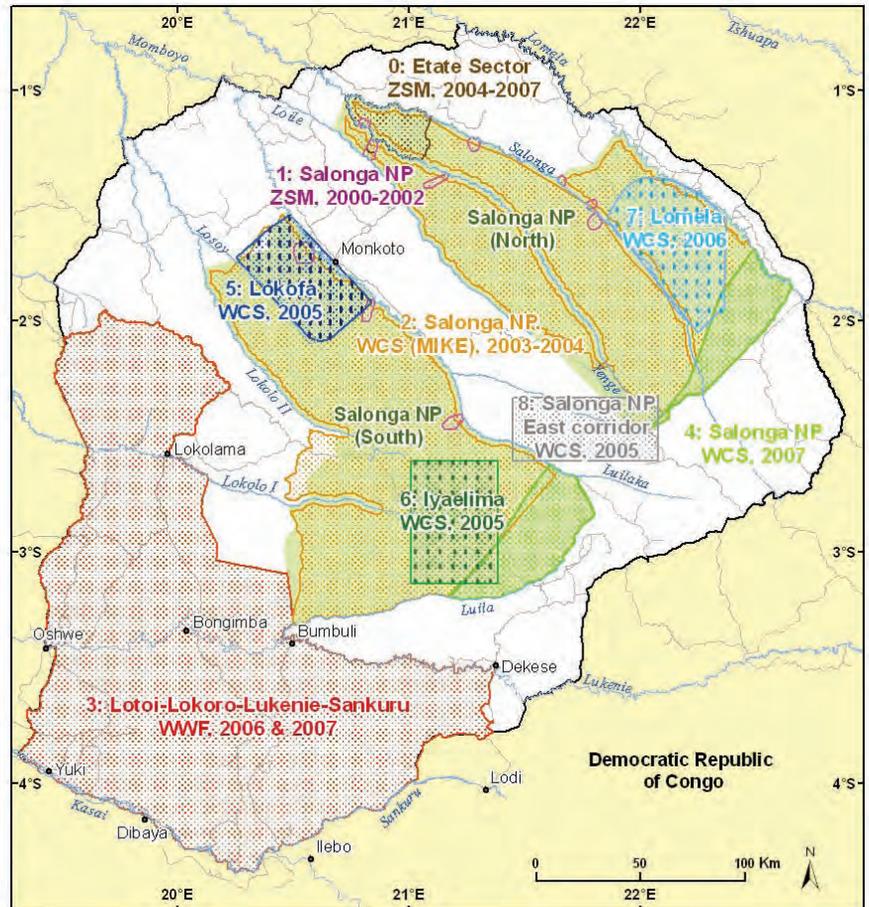
Forest cover loss in the Salonga-Lukenie-Sankuru, at a rate of less than 0.4 % between circa 1990 and circa 2000, was mostly limited to agricultural expansion around villages, towns and along roads and rivers. Analysis indicated that most 97.8 % of forest loss occurred within 2.5 km of existing non-forest, indicating an absence of new settlements and associated habitat fragmentation.

An estimated 25 % of the Landscape has been consigned to logging companies. Continued monitoring of forest cover change will be crucial for lobbying private companies and government officials to mitigate environmentally destructive practices including excessive road construction, destruction of waterways, and the unchecked expansion of logging-related human settlement and resource use.

Large Mammal and Human Impact Monitoring

The Landscape is of global significance for the long term survival of the bonobo (*Pan paniscus*), one of the world's four great apes. Inventories covering 60 % of the Landscape have documented a significant bonobo population across the Landscape. Their distribution is often referred to as "patchy" which is partially explained by the positive association of nesting habitat with lowland, *terra firma* forest with *Maranthaceae* under-story and the negative impact of hunting (Reinartz *et al.*, 2008). The estimated mean population of nest-building bonobos in SNP is 14,880 individuals (Grossman *et al.*, 2008).

The results of MIKE surveys (Blake, 2005) in Salonga National Park, the centerpiece of the Landscape, portray a bleak picture for the status of the forest elephant (*Loxodonta africana cyclotis*) conservation. Fewer than 0.3 dung piles per km were recorded signifying only 2,000 elephants. However, more intensive and targeted surveys continue to document occurrence and congregation of elephants associated with water habitats and bays. If protected, elephant populations could rebound.



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

Figure 22.3: Biological surveys conducted in the Salonga-Lukenie-Sankuru Landscape



Photo 22.4: Indication of the presence of elephants in Bofula, along the Salonga River.

Special Interest

Information as a Tool for Good Governance and Improved Natural Resource Management

The Strategic Objective of the CARPE program is to reduce the rate of forest degradation and loss of biodiversity through increased local, national, and regional natural resource management capacity. For local communities to assume management in rural landscapes such as Salonga-Lukenie-Sankuru they must first be provided with the tools and capacity to define, defend, and implement their vision for natural resource management and governance. To achieve this objective, in August 2007, WWF partnered with *Avocats Verts*, a national DRC NGO, whose mission is to protect the environment and to defend the rights of local communities. *Avocats Verts* lawyers are also principals in the development of national environmental legislation.

Avocats Verts was tasked specifically with introducing communities to Congolese legislation governing natural resource use and management. This new knowledge could then be used to guide decision-making on the management of land and natural resources in community areas. Working with the four thematic commissions comprised of representatives from Monkoto Corridor villages, *Avocats Verts* presented and discussed DRC legislation on:

1. Nature conservation (wildlife exploitation, management and trade, protected areas);
2. Fishing and freshwater resources;
3. Forests (protection, zoning, classification and management regimes, etc.).

To assist commission members during the debates and during debriefings in their respective villages, each participant received two legal guides: *Les Forêts de la RDC* and *La conservation de la nature, la protection de la faune, des ressources halieutiques et des forêts en RDC*. Copies of the 2002 Forest Code in Lingala and in an illustrated format were also distributed.

The workshop was an overwhelming success for participants and facilitators alike. Prior to the workshop most participants had little or no knowledge of Congolese law. At the end of the workshop participants recognized the illegality of many of their present practices. They also concluded that other government officials including ICCN would greatly benefit from similar workshops.

Facilitation by *Avocats Verts* was particularly valued. A telling remark, echoed by several participants, was that the presence of *Avocats Verts* lent credibility to the presentation and discussion on protected area laws and particularly those governing national parks such as Salonga. Participants stated that if the same presentations had been made by ICCN, the information would have been questioned if not treated as lies and deception.

Avocats Verts also benefited from the exchange, gaining important insight on *de facto* and traditional systems of resource use and governance by landscape communities. It is hoped that this knowledge will inform *Avocats Verts*' contributions to the on-going development of implementing decrees for resource and land use and management.

As national governments, the donor community and international NGOs correctly promote community participation, decentralized management and respect of customary norms, the interactions between legal experts and rural communities highlight the need for increased dissemination and discussion of laws and potentially further legal reform. The discussions during the workshop demonstrated that customary use and governance are often in contradiction to national law. One striking example is illustrated in figures 4 and 5. At the workshop customary chiefs wore emblems of their societal ranking including leopard skins and teeth, and eagle feathers. They were surprised that the law did not provide exemptions for customary use of protected species. In another example, communities or clans traditionally "own" fishing areas each with their own limits and rules governing access. This *de facto* ownership contradicts national law which states that fishing is open to all. However, traditional systems based on limited access are likely to be the most conducive to sustainability and improved management of the resource base.



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Photo 22.5: "Piroguier" awaiting departure on the Luilaka River.

Numerous other contradictions were highlighted during the workshop and will only be resolved through increased exchange between lawmakers and rural communities. However, for communities to participate as equal partners in

these debates, they must first be provided with the knowledge and tools, which include information and an understanding of the laws that impact their very livelihoods.



Photo 22.6: Forest resources are an inextricable part of daily lives in much of the Congo Basin.



Photo 22.7: Chief wearing a necklace of leopard teeth, a headdress of eagle feathers and animal skins during a 2007 workshop.



Photo 22.8: Meeting of traditional leaders in Monkoto.

Table 22.4: Biological survey results for the Salonga-Lukenie-Sankuru Landscape

Survey	Site name	Survey date	Lead organization(s)	Total km of recces	Number of transects	Total km of transects	
0	SNP: Estate sector	Dec 2004-2007	ZSM	145.9	58	70.3	
0	SNP: Estate Transect Area	Dec 2004-2007		0	28	47.5	
1	SNP: Lokofa	Apr 02		32.7	7	10.76	
1	SNP: Estate	Nov 00		17.8	5	7.5	
1	SNP: Beminyo	Apr 02		12.5	4	2.75	
1	SNP: Isanga	Aug 01		7	5	10	
1	SNP: Yongo	Nov 01		9.9	8	8.83	
1	SNP: Ikolo	Dec 00		10	6	9	
1	SNP: Bonima	Aug 01		37.3	5	10	
1	SNP: Biondo-Biondo	Aug 01		3	1	1.5	
1	SNP: Lotulo	Nov 00		3	5	7.5	
1	SNP: Nkinki	Nov 01		15.3	0	0	
1	SNP: Bekongo	Apr 02		13.7	0	0	
2	SNP: north and south sectors	May 03-Jul 04		WCS (MIKE)	1,727	130	130
3	SLS Landscape: Lotoi-Lokoro	Apr-Jun 2006	WWF	82.5	Low intensity methodology using combination of guided/directed and non-guided recces. Only guided recces are reported on here.		
3	SLS Landscape: Lokoro-Lukenie	Jun-Jul 06; Feb-Mar207		67.5			
3	SLS Landscape: Lukenie-Sankuru	Oct-Dec 2006; Feb-Apr 2007		77.5			
4	SNP: southern block, south-east portion	Oct-Dec 2007	WCS	233	0	0	
4	SNP: northern block, south east portion	Oct-Dec 2007		270	0	0	
5	SNP: block Lokofa	2005		Compass line: 583	55	76.6	
6	SNP: block Iyaelima	2005		Compass line: 511	63	88.2	
7	SNP: block Lomela	2006		Compass line: 515	68	95.2	
8	SNP: east corridor	2005		Compass line: 205	0	0	

* Human sign: Relative hunting level index, per block, integrating encounter rates of snares, hunting camps, direct encounters of hunters, and gun shot. See Hart et al., 2008 for definitions.

	Elephant presence	Elephant dung pile encounter rate (per km)	Elephant dung pile density (per km ²)	Ape presence	Ape nest group encounter rate (per km)	Ape nest group density (per km ²)	Ape nest density (Transect)	Human sign encounter rate (per km)
	Yes	0.17 +/- 0.08		Yes	0.65 +/- 0.17			0.60 +/- 0.15
	No	0		Yes	2.4 +/- 0.49	Not calc.	Not calc.	0
	Yes	2.7		Yes	2.3	55.1	275	0.65
	No	0		Yes	1.5	37.7	160	0.53
	Yes	0		Yes	1.1	18.7	135	0
	Yes	3.3		Yes	0.4	10.5	10	0.1
	Yes	0.7		Yes	0.7	14.4	18.5	0
	No	0		Yes	0.1	2.9	5.9	9.33
	No	0		Yes	0	0	0	1
	No	0		No	s	0	0	3.4
	Yes	3.2		No	0	0	0	0.53
	No	0		Yes	0	0	0	0
	No	0		No	0	0	0	0
	Yes	0.29 low human impact -transects 0.28 high human impact - transects	91.6	Yes	0.26 +/- 0.14	Not calc.	Not calc.	0.76 transects 1.00 recce-voyage
	Yes	1.4		Yes	0.44			0.3
	Yes	0.43		Yes	1.2			0.33
	Yes	0 (dung piles only observed on non-guided recces)		Yes	0.6			1.3
	Yes	0.14		Yes	0.32			1.5
	Yes	0.09		Yes	0.18			2
	Yes	Mean: 0.780	No data	Yes	Average, total effort: 0.954	29 (16-52)		Intermediate*
	Yes	Mean: 0.322	No data	Yes	Average, total effort 1.950	55 (32-94)		Intermediate*
	Yes	Mean: 0.01	No data	Yes	Average, total effort 4.821	90 (62-131)		High*
	Yes	Mean: 0.206	No data	Yes	Average, total effort 1.553	No data		Intermediate*

(0) Reinartz et al., 2008; 1) Reinartz et al., 2006; 2) Blake, 2005; 3) Steel, 2007; 4) Maisels, F. pers. com; 5) Grossmann et al., 2008; 6) WCS-DRC, IMU, 2006; 7 and 8) Hart et al., 2008.

