Chapter II
Population Survey

Lioness of Benin, Konkombri Hunting Area (Photo : C. Morio & V. Morio).

"*In the bush the king of the animals is the lion. He roars once a year. The* toa *(blue duikers) are scared of being eaten. They hide themselves and they are so frightened that they eventually die in their refuge. The lion of Mounts Nimba used to be hunted but he did not stay; he was coming from Touba in Côte d'Ivoire, passing through Foumandou and finally reached the Mounts Nimba where he remained 6 months before leaving again.*"

A *Konon* hunter, the old chief of Gbakoré village,
Guinea, 01.08.1999,
Solange Chaffard-Sylla, 2002, pers. comm.

1. CONTINENTAL OVERVIEW

1.1. DISTRIBUTION AREA

1.1.1. Presence

- **Range borders**

- **Latitudes**

The extreme latitudes of the lion range are:

Highest latitudes

- Northern Hemisphere

The African lion has been extirpated from all the former high latitudes where it used to live, both in the Northern (North Africa) and Southern Hemisphere (the Cape). Rock paintings also attest to the former presence of lion deep inside what is now the Sahara Desert. The famous Theodore Monod reported in Northern Chad that a lion was shot in 1927 in the region of Erdi Dji (as far North as 19°N, just where the 3 borders Chad, Libya, Sudan meet), and another lion was shot in 1940 near Mourdi (18°30'N) (Smithers, 1983). Now lions are still present in Central Africa up to 15°N (Hoinathy Honimadji, pers. comm.; J. Tubiana, pers. comm.). The Northernmost lion populations are probably:

(i) The few remaining individuals of Boucle du Baoulé National Park in Mali (if they still exist);
(ii) The small relict population of Kapka mountain range, a non-gazetted area in North-Eastern Chad (the Ennedi mountain range seems to have lost its lion population), and;
(iii) The population of Dinder National Park, Sudan, and of the neighbouring area in Ethiopia.

- Southern Hemisphere

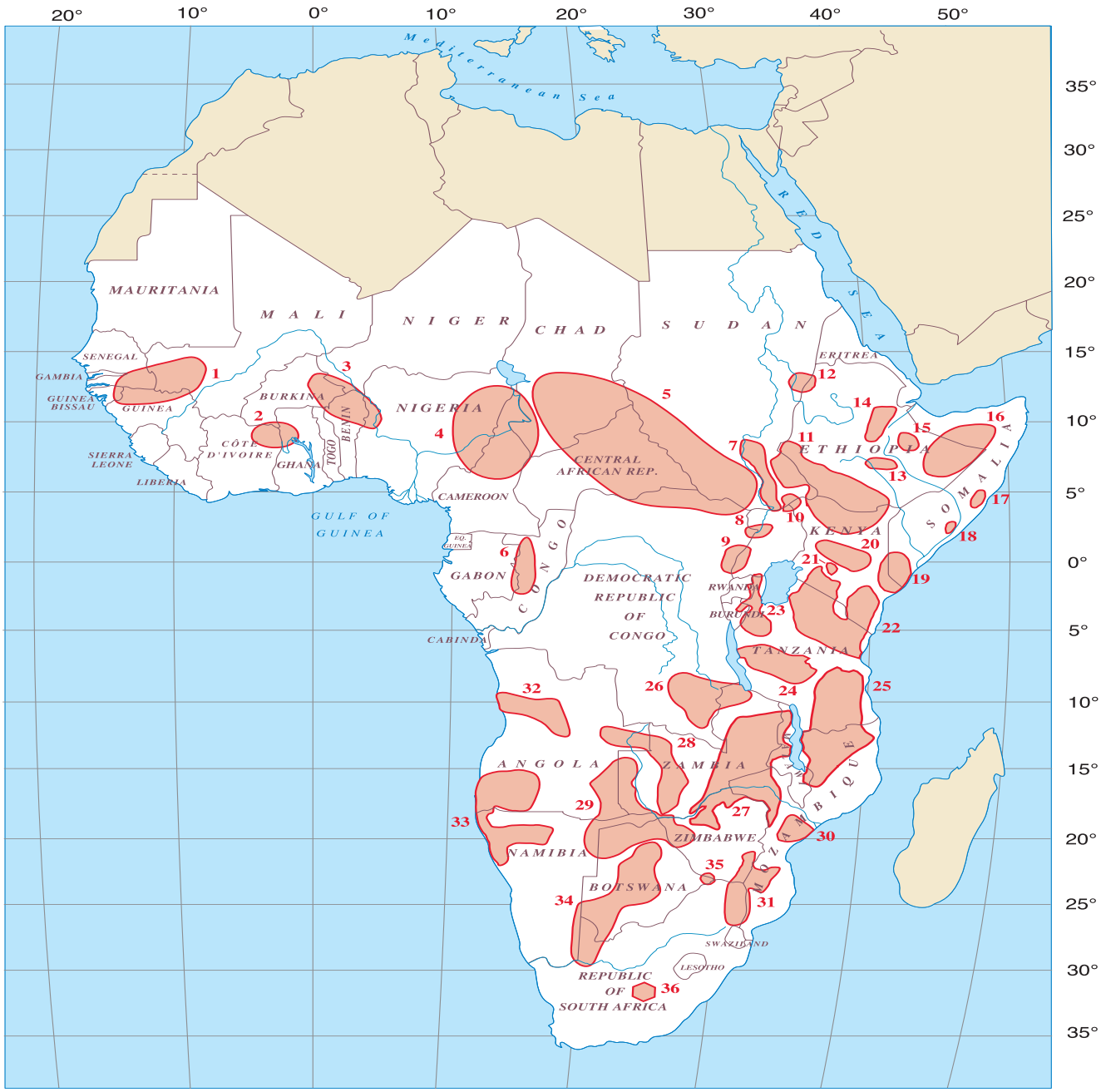
Free-ranging lions do not presently occur farther South of latitude 24° South. However, enclosed lions have been reintroduced as far South as the Southern coast of South Africa.

Lowest latitudes

6 lion sub-populations (see maps) have been identified to live on or near the Equator:

- Sub-population n°6: Congo and Gabon;
- Sub-population n°9: DRC and Uganda;
- Sub-population n°19: Somalia and Kenya;
- Sub-population n°20: Kenya;
- Sub-population n°21: Kenya, and;

The African Lion : global distribution area



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International border	Lion subpopulation
GHANA Name of Country	2 Lion subpopulation reference number
Main river	

- Sub-population n°22: Kenya.

- **Longitudes**

The extreme longitudes of the lion range are:

- In the West, as far as Guinea Bissau where the lion penetrates westwards into the country along the course of the Corubal river (Ph. Chardonnet, pers. comm.), and;
- In the East, where in Somalia the map of the lion range by Laurent (2002) shows the presence of lion as far as the Indian Ocean coastline.

- **Range size**

Although it remains extremely difficult to assess the range size of large predators that may sometimes wander great distances and of which the density is always low compared to other mammals such as their prey, the range size of the African lion has been tentatively estimated as the following:

- The global African lion distribution range covers about 3 million km², and;
- The distribution area of the lion covers approximately 10 % of the whole continent, about 15% of SSA.

TABLE 4 - EXTENT AND STATUS OF LION DISTRIBUTION AREAS IN SUB-SAHARAN AFRICA

Lion range (km² & %*)		Total	Protected Areas			Non-gazetted areas
			Nat. parks	Reserves	Hunting areas	
Western Africa	**Km²**	121,980	43,190	14,690	18,400	45,700
	%	4	35	12	15	37
Central Africa	**Km²**	651,970	67,555	24,860	247,860	311,695
	%	22	10	4	38	48
Eastern Africa	**Km²**	1,137,205	149,347	139,594	116,730	731,534
	%	39	13	12	10	64
Southern Africa**	**Km²**	1,039,212	289,139	405,404	27,472	317,197
	%	35	28	39	3	31
Sub-Saharan Africa	**Km²**	**2,950,367**	**549,231**	**584,548**	**410,462**	**1,406,126**
	%		**19**	**20**	**14**	**48**

** % of the existing lion range in the sub-region, except for the last line, which is relative to the continent.*
*** excluding fenced Protected Areas.*

- **Lion range and status of Protected Areas**

About half of the lion range falls within Protected Areas, while the remainder is non-gazetted. This is noteworthy because of:

- The remarkable importance of so-called pastoral areas (nearly half of the lion range) to lions appears clearly, while it is often overlooked, and;

- Of Protected Areas, National Parks encompass nearly 20% of the lion range, the same for the Reserves and the remainder comprising of Hunting Areas.

However, these figures must be interpreted with caution since:

- Some of the "Reserves" are in fact Hunting Areas. For instance, in Tanzania Game Reserves are classified as reserves even though they are officially used for hunting;
- Some non-gazetted areas are conservation areas with or without hunting activity. For instance, in Zimbabwe commercial wildlife ranches and wildlife conservancies are classified as non-gazetted even though their main purpose is wildlife conservation with hunting operations, and;
- Non-gazetted areas are always difficult to assess or define in size.

- **Regions**

The lion is present in all four regions of the continent South of the Sahara.

In terms of range size:

- The strongholds of the lion are Eastern and Southern Africa with similar surfaces covering more than 1/3 of the total lion range each (39% and 35% respectively);
- Central Africa contains more than $1/5^{th}$ of the lion range (22%), and;
- Western Africa holds a bit less than $1/20^{th}$ of the lion range (4%).

1.1.2. Absence

- **Long-standing absence**

Historically the lion ranged throughout the entire continent from North to South. However, to the best of available knowledge, it has always been absent from some of the African regions such as what is now the Equatorial Guinea, the rain forest areas of the Gulf of Guinea and in the Congo basin.

- **Extirpations**

"*There is probably no other species whose distribution range has shrunk over historical times to the extent shown by the lion*" (Smithers, 1983). The contraction of the lion range is characterised by regional and local extinctions of the taxon.

- **Ancient extirpations**

  The lion has not always been an endemic African taxon as it has become today (if the relict Indian population is considered as separate from the African one). It used to live in South-eastern Europe, the Near-east, South-central Asia and the Indian sub-continent. Outside Africa now, it only remains in the Gir forest in India with a population ranging between 250 and 300 (Jackson, 1997).

- **Recent extirpations**

In Africa, the lion disappeared more recently from the two tips, North and South, of the continent. North of the Sahara, it was extirpated from Tunisia and Algeria about 1891, from Morocco in 1920; in Southern Africa, it disappeared from most of the Cape Province during the 1860s as well as from the greater part of Natal (Smithers, 1983).

- **Modern extirpations**

Within the recent distribution range of the lion, several countries have witnessed its extinction:

Western Africa:

Gambia

- The lion used to occur along the Gambia River (Bigourdan & Prunier, 1937) within the present borders of Gambia.

Mauritania

- In Mauritania, "*the lion used to be widespread from South to North of the wooded savannah's limit, penetrating even further North during the rainy season*" (Prévost, 1987);
- According to Chudeau (1920 *in* Le Berre, 1990), the lion was present in the Northern Tagant;
- Roure (1956) mentioned the presence of lions and abundant prey species in the Nema region, South-East Mauritania: "*the lion exists about everywhere South of the 17th parallel, in the Trarza, in the Brakna and mainly in the Guidikama, along the Karakoro Oued, and in the Hodh, South of the Timbedra-Nema line";*
- In the late 1980's, about 10 lions were still surviving in Guidimaka Region and South-East of the Affole mountain range where they were causing damage to cattle every year (Prévost, 1987), and;
- The lion may be considered extinct now in Mauritania.

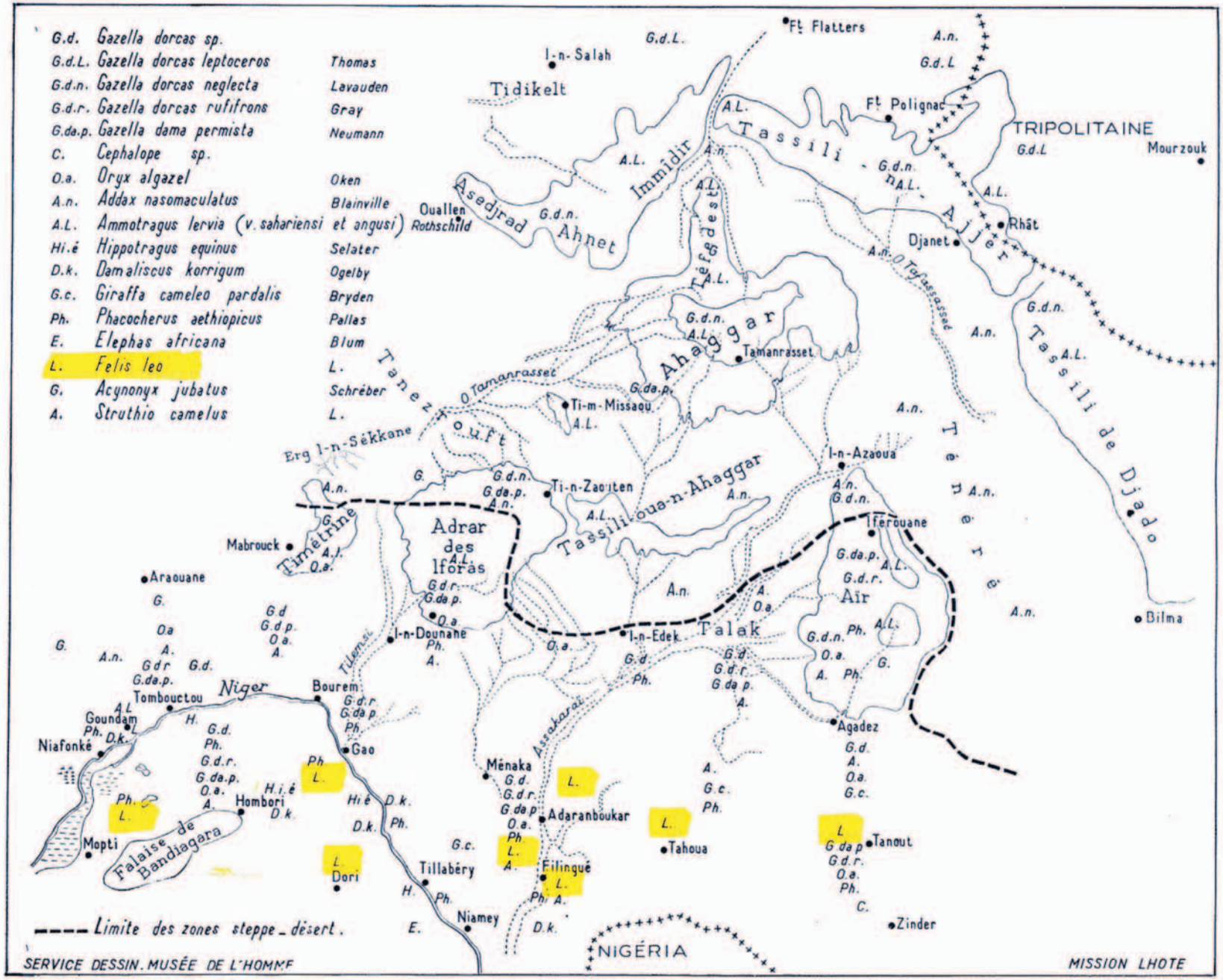
Sierra Leone

- According to Smithers (1983), the lion was found in the Northern parts of Sierra Leone.

Central Africa:

- No country has definitely lost the species in this region, neither in the tropical region of Central Africa, nor in the equatorial region.

Map of lion distribution in Western Africa in 1937 (Bigourdan & Prunier, 1937)



Map of lion distribution in Mali and Niger in 1951 (Lhote, 1951)

Eastern Africa:

Djibouti

- Alain & Danielle Laurent (2002) consider the lion as extinct in Djibouti. However A. Laurent (pers. comm.) does not exclude the possibility of erratic lions coming from Ethiopia following cattle herds along the Awash River.

Eritrea

- The lion was probably present in Eritrea during recent times, from where we have no record now. However, it must be mentioned that some lions remain in Northern Ethiopia, very close to the Eritrea border, precisely in lower Tekeze river valley, Shire region (T. Mattanovich, pers. comm.).

Southern Africa:

- As stated before, the "Cape" lion is definitely extinct;
- Lesotho has lost its lion population, and;
- Swaziland has reintroduced the species after having lost it in recent times.

1.2. PROPOSED RANGE STATES

The information provided here has no political value, since political authorities have not been asked to endorse it officially. The data are only given as guidelines to help decision-makers and other interested stakeholders.

Lions are present in 34 Range States (Table 5):

- They are permanently present in 32 States, and;
- Occasional in the other 2.

To the best of our knowledge at this stage, 8 countries in SSA are not Range States:

- 2 of them historically never had lions, and;
- The 6 others have lost their lions in recent history.

TABLE 5 - LION RANGE STATES (PROPOSED)

Region	Country	Presence of lion		Absence of lion	
		permanent	occasional	never present	recently extirpated
Western Africa (15 countries)	Benin	1			
	Burkina Faso	1			
	Côte d'Ivoire	1			
	Gambia				1
	Ghana	1			
	Guinea	1			
	Guinea Bissau	1			
	Liberia			1	
	Mali	1			
	Mauritania				1
	Niger	1			
	Nigeria	1			
	Senegal	1			
	Sierra Leone				1
	Togo		1		
	Sub-total	**10**	**1**	**1**	**3**
Central Africa (8 countries)	Cameroon	1			
	C.A.R.	1			
	Chad	1			
	Congo	1			
	D.R.C.	1			
	Equatorial Guinea			1	
	Gabon	1			
	Sudan	1			
	Sub-total	**7**	**0**	**1**	**0**
Eastern Africa (9 countries)	Burundi		1		
	Djibouti				1
	Eritrea				1
	Ethiopia	1			
	Kenya	1			
	Rwanda	1			
	Somalia	1			
	Tanzania	1			
	Uganda	1			
	Sub-total	**6**	**1**	**0**	**2**
Southern Africa (10 countries)	Angola	1			
	Botswana	1			
	Lesotho				1
	Malawi	1			
	Mozambique	1			
	Namibia	1			
	South Africa	1			
	Swaziland	1			
	Zambia	1			
	Zimbabwe	1			
	Sub-total	**9**	**0**	**0**	**1**
Continent (SSA)	**42 countries**	**32**	**2**	**2**	**6**

1.3. SUB-POPULATIONS

It may be assumed that the Western African sub-populations were once linked with the Central African sub-populations, the latter being contiguous with the Eastern African sub-populations, and therefore, the Southern African sub-populations. The assumption of a continuum of lions throughout Africa is not improbable, although not proved.

However, today the African lion population appears to be fragmented into:

- 36 sub-populations supported by an equivalent number of global distribution areas, and;
- 35 free-ranging sub-populations and 1 sub-population of enclosed lions (the latter in South Africa).

The different sub-populations of lions are distributed in the four regions as follows:

- 3 sub-populations in Western Africa;
- 3 sub-populations in Central Africa;
- 18 sub-populations in Eastern Africa, and;
- 12 sub-populations in Southern Africa.

Within these global distribution areas, the sub-populations are also fragmented in several areas.

Among the 36 different lion sub-populations, 23 of them (nearly 2/3) are positioned on 2 or more contiguous countries and should thus be considered as trans-frontier populations (Table 6):

- All the Western and Central African sub-populations are trans-frontier;
- 8 of the 18 Eastern African sub-populations are trans-frontier, and;
- 9 of the 12 Southern African sub-populations are trans-frontier.

TABLE 6 - TRANS-FRONTIER SUB-POPULATIONS OF LION

Region	Number of sub-populations shared by two or more countries			
	2 countries	3 countries	4 countries	5 countries
Western	1		1	1
Central	1	1	1	
Eastern	6	2		
Southern	3	4	2	
SSA = 23	11	7	4	1

1.4. ABUNDANCE

Densities are expressed in number of individuals per 100 km². Figures originate from the literature and from the present study (Tables 12, 16, 19 and 22).

Quite reliable density figures are sometimes available for some Protected Areas, which have been lucky enough to host lion studies. Unfortunately, this is not the case for most Protected Areas. The assessment of lion density is even worse for non-gazetted areas. As developed in chapter III (Driving forces), pastoral areas are a matter of special concern simply because they are commonly overlooked by conventional conservationists even though it may happen that their lion carrying capacity might sometimes be higher than in some wildlife-depleted Protected Areas.

It is important to stress that lion density figures are produced for a given ecosystem, a given year and a given season.

No density figure is given (calculated) per country or per region because it would not be meaningful, as it would not relate to respective local field situations.

Also, no figure is usually produced for a particular site within a given ecosystem since the variations existing between localities are too great. For instance, within Queen Elizabeth National Park ecosystem, Uganda (Table 7), where:

- In the early 1980's, lion density was 5 times higher in Ishasha area than in Mweya area, corresponding to a prey biomass also 5 times higher in Ishasha (14 tons/km²) than in Mweya (2.8 tons/km²) (Von Ordol, 1982), and;
- In the late 1990's, lion density was 7 times higher in Ishasha than in Kyambura (Dricuru, 1999)

TABLE 7 - LION DENSITIES IN DIFFERENT SITES OF QUEEN ELIZABETH NATIONAL PARK ECOSYSTEM

Source	Lion density (number of lions/100 km²)				
	Ishasha	Mweya	Katwe	Katunguru	Kyambura*
Von Ordol, 1982	52	11			
Dricuru, 1999	23		10	12	3

* *Kyambura Wildlife Reserve is adjacent to Queen Elizabeth National Park*

Similarly, no detailed figure is usually produced for a particular season within a given area since very broad seasonal variations exist during a single year, as shown below (Table 8) in NG 29 Controlled Hunting Areas, Botswana (Winterbach & Winterbach, 1999):

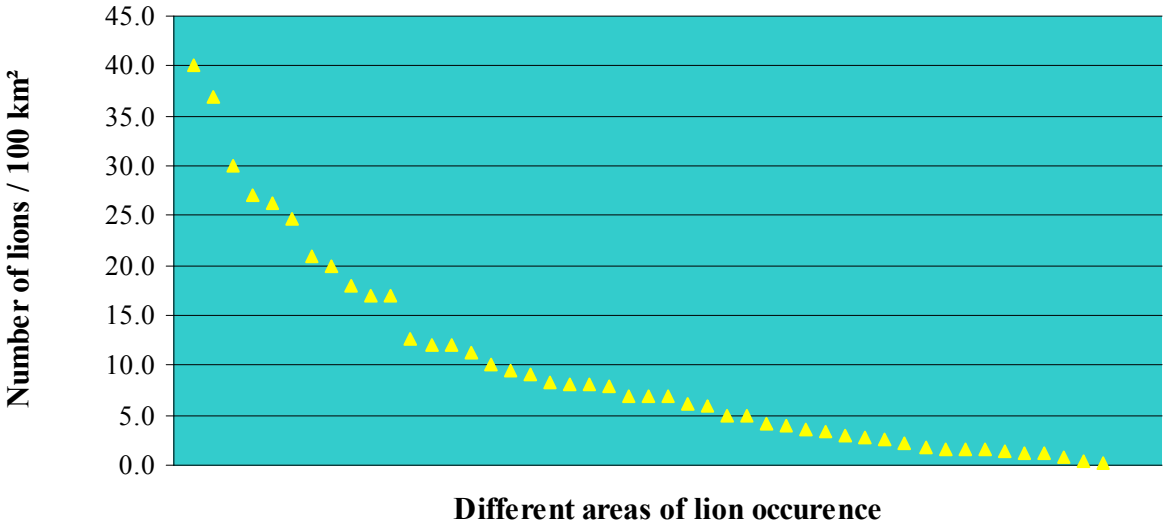
TABLE 8 - SEASONAL VARIATIONS OF DENSITY FOR THE LION POPULATION IN NG29 CONTROLLED HUNTING AREAS, OKAVANGO DELTA, BOTSWANA, (WINTERBACH AND WINTERBACH, 1999)

Season	Density (lions/100 km²)	Home range (km²)
Warm dry (Aug.-Dec. 1997)	38.7	33.6
Warm wet (Jan.-Apr. 1998)	18.8	69.1
Cold dry with floods (May-Aug. 1998)	33.0	39.4
Warm dry (Sept.-Dec. 1998)	24.6	52.8

TABLE 9 - SOME LION DENSITIES IN AFRICA

Category of lion density	Area	Lion density (lions/100 km²)	Source
Very high density	Manyara National Park, Tanzania	40.0	Makacha & Schaller, 1969
	Chobe N.P. (Riverfront, dry season), Botswana	37.0	Neo-Mahupeleng *et al.* , 2001
	Masaï Mara National Park, Kenya	30.0	H. Dublin, *in litt.* 1993 (*in* Nowell & Jackson, 1996)
	Ngorongoro Conservation Area, Tanzania	27.0	Schaller, 1972
	Nairobi N.P. & Kitengela C.U., Kenya	26.3	Rudnai, 1973
	Lupande Game Management Area, Zambia (1990)	24.7	Jachmann, 2001
	Chobe N.P. (Riverfront, wet season), Botswana	21.0	Neo-Mahupeleng *et al.* , 2001
	Ngorongoro Crater, Tanzania	20.0	Elliott & Mc Taggart Cowan, 1978
High density	Okavango delta (higher density), Botswana	18.0	Sechele & Winterbach, 2001
	Chobe N.P. (higher density area), Botswana	17.0	Viljoen, 1993
	Manyeleti Game Reserve, South Africa	16.9	Van Dyk, 1997 adapted from Van Schalkwyk, 1994
	Central District of Kruger N.P., South Africa	12.7	Smuts, 1976
	Queen Elizabeth National Park, Uganda	12.0	Dricuru, 1999
	Kafue National Park, Zambia	12.0	Mitchell, Shenton & Uys, 1965
	Kruger N.P. (higher density area), South Africa	11.2	Van Dyk, 1997 adapted from Van Schalkwyk, 1994
	Kruger National Park, South Africa	10.0	Bothma & Walker, 1999
Medium density	Serengeti N.P. (higher density area), Tanzania	9.4	Schaller, 1972
	Gounda plain, Central African Republic	9.1	Ruggiero, 1991
	Olifants River Game Reserve, South Africa	8.3	Van Dyk, 1997 adapted from Van Schalkwyk, 1994
	Gounda plain, Central African Republic	8.0	present study
	Selous Game Reserve (East), Tanzania	8.0	Rodgers, 1974
	Serengeti N.P. (lower density area), Tanzania	7.9	Schaller, 1972
	Katavi National Park, Tanzania	7.0	Caro, 1999
	Pilanesberg National Park, South Africa	6.9	Van Dyk, 1997 adapted from Van Schalkwyk, 1994
	Chobe N.P. (lower density area), Botswana	6.9	Van Dyk, 1997 adapted from Van Schalkwyk, 1994
	Umfolozi-Hluhluwe Complex, South Africa	6.2	Van Dyk, 1997 adapted from Van Schalkwyk, 1994
	Kruger N.P. (lower density area), South Africa	5.9	Van Dyk, 1997 adapted from Van Schalkwyk, 1994
	Garamba National Park (core area), RDC	5.0	present study
	Arly Total Reserve, Burkina Faso	5.0	Chardonnet, 1999
Low density	Zakouma National Park, Chad	4.2	present study
	Okavango delta (lower density), Botswana	4.0	Sechele & Winterbach, 2001
	Madikwe Game Reserve, South Africa	3.6	Van Dyk, 1997 adapted from Van Schalkwyk, 1994
	Pendjari complex, Benin	3.4	present study
	Gewane-Melka Worer area, Ethiopia	3.0	T. Mattanovich *in* Abebe & Mattanovich, 2002
	Waza National Park, Cameroon	2.7	present study
	Yankari National Park, Nigeria	2.5	present study
	Etosha National Park, Namibia	2.1	Berry, 1981 (year 1974-78)
	Etosha National Park, Namibia	1.8	Van Dyk, 1997 adapted from Van Schalkwyk, 1994
	Aouk Hunting Area, Chad	1.6	present study
	Kalahari Transfontier Park, Botswana & South Africa	1.6	Funston, 2002
	Kalahari Gemsbok N.P., South Africa	1.5	Mills, Wolff, Le Riche & Meyer, 1978
	Niokolo Koba National Park, Senegal	1.3	present study
	Etosha National Park, Namibia	1.2	Berry, 1996 (year 1994)
	Faro-Bubandjida-Benoue Complex, Cameroon	1.1	present study
Very low density	Makgadikgadi, Botswana	0.8	Hemson, 2001
	Masai Steppe, Kenya & Tanzania	0.3	Lamprey, 1964
	Pastoral areas in West & Central Africa	0.2	present study

FIG. 1 - LION DENSITY THROUGHOUT AFRICA (Sources: see Table 9)



1.5. POPULATION SIZE

1.5.1. Total population

The overall number of lions which is found today by the current survey in Sub-Saharan Africa is estimated to be about 40,000 individuals with the following tentative distribution (Tables 11, 15, 18 and 21):

- 10 % of the total population inhabits the Western and Central African regions with respectively 3% and 7%;
- 40% of the total population lives in the Eastern African region, and;
- 50% of the total population is situated in the Southern African region.

TABLE 10 - ESTIMATED LION POPULATION SIZE IN SUB-SAHARAN AFRICA

Regions	Estimated lion population size			% of estimated lions per region
	Minimum	Estimated	Maximum	
Western Africa	968	1,163	1,358	3
Central Africa	2,092	2,815	3,538	7.2
Eastern Africa	11,268	15,744	18,811	40
Southern Africa	14,526	19,651	23,425	49.9
Sub-Saharan Africa	**28,854**	**39,373**	**47,132**	

1.5.2. Trend

It appears extremely hard to objectively assess the global trend of the total population of lions as well as of the regional populations: "*population trends of low-density large predators like lions are difficult to monitor…*" (Funston, 2002). Trends may be locally assessed per site as it is proposed in the following chapters of the regional overviews. More precise surveys are needed to provide a general trend.

The most recent estimation of the lion population size was made in 1996 by the Wild Cats Status Survey and Conservation Action Plan (Nowell & Jackson, 1996; Jackson, 1997) with a figure of between 30,000 and 100,000 animals. If an estimated average of 65,000 lions was taken, a decrease of 25,000 lions could be speculated in 6-year time (between 1996 and 2002). Such an assumption is hardly credible since both estimations (1996 and 2002) remain very rough and the 1996 figure was more of a guesstimate.

A general trend cannot be assessed for the time being in view of very heterogeneous rates and tendencies in different subpopulations throughout the distribution area. What is apparent is that there have been local extirpations, as indicated above, but also populations that have remained stable over the last decade, and also some populations that have seen increases as well as a few reintroductions.

1.6. HABITAT

1.6.1. Habitat suitability

Too often the lion is inappropriately considered as being restricted to savannah habitats, probably because:

- It is more easily seen in this type of open landscape;
- Most of the lion studies have been, and are, conducted in savannahs, and;
- Non-savannah regions are not as frequently visited by people interested in lions and visitors in general.

"*Lions have a wide habitat tolerance*" (Smithers, 1983). As a matter of fact they occur in a large range of habitats from desert regions to rain forest, including woodland, dry forest, steppe, etc.

- **Lions in forests**

The lion may penetrate deep into the forest. In Central Africa, "*one of them was killed in April 1942 in a leopard trap, at M'fubenzork village, between Booué and Makokou, i.e. deep inside the rain forest…about 300 km away from the savannah area…they also quite often penetrate into the Etoumbi forest…and in the forest borders East of Zanaga district*" (Malbrant & Maclatchy, 1947).

Sub-population n°6 (see maps) lives in the equatorial part of Central Africa. These lions inhabit either the rain forest itself, or a mosaic of rain forest, clearings of savannah grassland and forest galleries. These lions are not vagrant individuals; they are permanent and constitute true sub-populations. In Odzala National Park (Congo), they are present but largely unknown

(C. Aveling, pers. comm.), while on the Batéké plateau (Gabon and Congo), they are present but remain totally ignored by most researchers.

Similarly, the lions of Aberdare National Park (Kenya) prey on rain forest dependent taxa such as bongo.

- **Lions in deserts**

"*The lions will penetrate deep into desert, where there are avenues of watercourses, and are common in semi-desert areas such as in parts of the sahelian zone of West Africa or the Kalahari in Botswana. Where water is available they will drink regularly, especially after feeding, but they are by no means dependent on this and they can subsist for long periods without it, getting their moisture requirements from their prey*" (Smithers, 1983).

- *In the Southern hemisphere:*

In Botswana "*lions have been observed going without drinking water for a period of nine months during a drought in the Kalahari*" (Owens & Owens, 1984 *in* de Waal *et al.*, 2001), where they are known to eat juicy tsama melon (*Citrullus lanatus*) and gemsbok cucumber (*Acanthosicyos naudinianus*) which contain respectively 94% and 91% of water (de Waal *et al.*, 2001).

- *In the Northern hemisphere:*

Lions were still roaming a few decades ago in remote Northern latitudes, apparently mainly in mountain ranges of the Sahara desert such as the Aïr Ténéré in Northern Niger, the Adrar des Ifhoras in Northern Mali, the Ennedi in Northern Chad, etc. In the Sahelo-Saharan region, the Touaregs used to traditionally hunt lions on a regular basis (Lhote, 1951).

1.6.2. Habitat availability

- **Habitats available**

In some regions, large tracts of suitable habitat for lions sustain very low or even zero density of lions. Two main reasons for this, both of human origin:

(i) Directly, through predation of lion by man, and;
(ii) Indirectly, through the depletion of lion prey species by man.

- **Habitats unavailable**

The degradation of wildlife habitat, even to the point of total desertification or transformation, is extensively described in the literature.

1.6.3. Habitat trends

In very extensive Protected Areas, the natural habitat of lion is still largely maintained. However, with a few exceptions, in smaller Protected Areas and in non-gazetted areas, wildlife habitats are generally decreasing on the continent due to three main causes, which are documented in the survey:

(i) Human population growth;
(ii) Agricultural encroachment, and;
(iii) Increase in domestic livestock numbers.

1.6.4. Legal status of habitats

Most of the lion sub-populations cover geographical ranges that include a mosaic of areas with different conservation status:

- Protected Areas, such as National Parks, Wildlife Reserves, Hunting and Game Management Areas, and;
- Non-gazetted areas, the latter being often pastoral rangeland utilised by cattle-herders for livestock grazing.

The management scheme applied to each one of these areas of course varies according to their respective legal status. Consequently the same applies to lion management: e.g. theoretically (on paper):

- Full protection is granted in National Parks;
- A quota of trophies is allocated to Hunting Areas, and;
- No management measures, except for problem animal control in some countries, are taken in non-gazetted areas, etc.

2. WESTERN AFRICA

2.1. LION RANGE

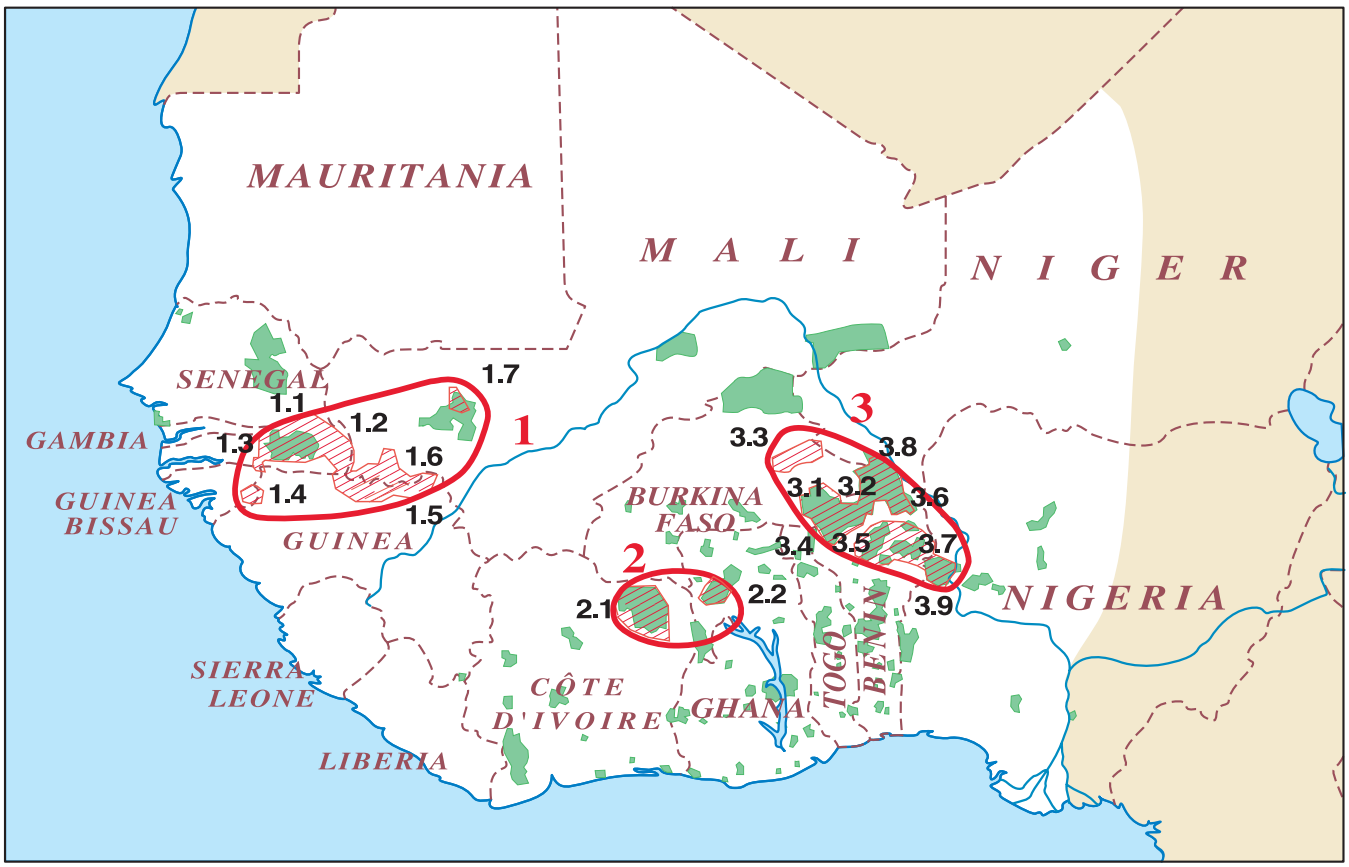
While the lion has been widely studied in Eastern and Southern Africa, very little has been published on its current status in the Western and Central Regions of the continent.

In Western Africa, the lion range probably covers an area of more than 12 million hectares (Table 11):

- About two thirds of the range are gazetted as Protected Areas including:
  . National Parks: about one third;
  . Reserves: 12%, and;
  . Hunting Areas: 15%.

- Even though the lion range outside Protected Areas is very difficult to evaluate, non-gazetted areas probably cover more than a third of the lion range.

Lion subpopulations in Western Africa



Legend

- International border
- GHANA Name of Country
- Main river
- Protected Areas (National Parks, Wildlife Reserves, Hunting Areas, etc.)
- Lion subpopulation
- 2 Lion subpopulation reference number
- Lion distribution
- 2.1 Subpopulation component, reference number

TABLE 11 - STATUS OF LION DISTRIBUTION AREAS IN WESTERN AFRICA

N° of sub-population	Country	Area	Conservation status & surface (km²)			
			Protected areas			Non gazetted areas
			Nat. Parks	Reserves	Hunting areas	
1	Senegal	1.1. Niokolo Koba National Park	9,500			
		1.2. Falémé Zone d'Intérêt Cynégétique			13,080	
	Guinea Bissau	1.3. Buruntuma region				550
		1.4. Boe & Beli regions				1,580
	Guinea	1.5. Sigirini & Fello Koundoua regions				10,400
	Mali	1.6. Haut-Bafing & Haut-Bakoy regions				8,950
		1.7. Kongosambougou Block (within Boucle du Baoule National Park)	1,500			
	Sub-total 1		**11,000**	**0**	**13,080**	**21,480**
2	Cote d'Ivoire	2.1. Comoé National Park	11,500			5,000
	Ghana	2.2. Mole National Park	4,560			
	Sub-total 2		**16,060**	**0**	**0**	**5,000**
3	Burkina Faso	3.1. Arly-Singou complex (National Parks, Faunal Reserves & Hunting Areas)		8,080		
		3.2. W National Park	2,250			
		3.3. Sirba valley				6,590
	Togo	3.4. Oti-Mandouri Faunal Total Reserve		370		
	Benin	3.5. Pendjari complex (National Park & Hunting Areas)	2,750		3,750	850
		3.6. W complex (National Park & Hunting Areas)	5,020		1,190	720
		3.7. Alibori supérieur & Trois rivières complex (Forêts classées)		6,240		11,060
	Niger	3.8. W National Park complex & South of Tamou Faunal Partial Reserve	2,250		380	
	Nigeria	3.9. Kainji Lake National Park	3,860			
	Sub-total 3		**16,130**	**14,690**	**5,320**	**19,220**
Total	**km²**	**121,980**	**43,190**	**14,690**	**18,400**	**45,700**
	%		**35**	**12**	**15**	**37**

2.2. LION POPULATION SIZE

The evaluation of the lion population in this region relies more on first hand information from managers and users, rather than on proper census methodology by scientists. Reasons for this are almost certainly mainly due to:

- The relative low number of Protected Areas, and;
- The few lion studies conducted in these regions.

However, it is estimated that the current lion population size in this region probably stands higher than one thousand individuals (Table 12).

TABLE 12 - LION POPULATION STATUS IN WESTERN AFRICA

N° sub-population	Country	Area	Lion range surface (km²)	Density of lions/100km²	Population size			Assessment mode
					minimum	estimated	maximum	
1	Mauritania					0		C
	Gambia					0		C
	Senegal	1.1. Niokolo Koba National Park	9,500	1.3	100	125	150	B
		1.2. Falémé Zone d'Intérêt Cynégétique	13,080	0.2	25	31	37	C
	Guinea Bissau	1.3. Buruntuma region	550					C
		1.4. Boe & Beli regions	1,580	0.6	7	10	13	C
	Guinea	1.5. Sigirini & Fello Koundoua regions	10,400	0.2	17	21	25	C
	Mali	1.6. Haut-Bafing & Haut-Bakoy regions	8,950	0.2	14	18	21	C
		1.7. Kongosambougou Block (in Boucle du Baoule National Park)	1,500	0.2	2	3	4	C
	Sierra Leone					0		C
	Liberia					0		C
	Sub-total 1		**45,560**		**165**	**208**	**251**	
2	Cote d'Ivoire	2.1. Comoé National Park	16,500	0.6	80	100	120	B
	Ghana	2.2. Mole National Park	4,560	0.3	12	15	18	B
	Sub-total 2		**21,060**		**92**	**115**	**138**	
3	Burkina Faso	3.1. Arly-Singou complex (NPs, FRs & HAs)	8,080	5.0	364	404	444	A
		3.2. W National Park	2,250	1.2	22	27	32	B
		3.3. Sirba valley	6,590	0.2	9	13	17	C
	Togo	3.4. Oti-Mandouri Faunal Total Reserve	370					C
	Benin	3.5. Pendjari complex (National Park & Hunting Areas)	7,350	3.4	198	248	297	B
		3.6. W complex (National Park & Hunting Areas)	6,930	0.6	33	42	50	B
		3.7. Alibori supérieur & Trois rivières complex (Forêts classées)	17,300	0.2	28	35	42	B
	Niger	3.8. W National Park complex & South of Tamou FPR	2,630	1.8	38	47	57	B
	Nigeria	3.9. Kainji Lake National Park	3,860	0.6	20	25	30	B
	Sub-total 3		**55,360**		711	**840**	969	
3 sub-pop.	**11 countries**	**Total**	**121,980**		**968**	**1163**	**1358**	

SUB-POPULATION N° 1

The sub-population n° 1 used to occur throughout the Western African region and was certainly historically linked with the sub-populations n° 2 and 3 as shown on the maps by Bigourdan & Prunier (1937) and Lhote (1951).

This sub-population is extremely important in terms of conservation:

- It is located far from any other lion stronghold;
- There is no realistic eventuality of any natural linkage between this sub-population and any other stronghold;
- It is not very large in terms of population size, maybe 200 individuals, and;
- It is spread over a large area, maybe close to 5 million hectares.

To be positive, it may be that small pockets of lions have been overlooked and that the global population size has been underestimated, since this region has not been studied extensively and accurately.

- **Senegal**

The lion used to be widespread in Senegal, occurring notably in the Senegal River valley (Bigourdan & Prunier, 1937; Roure, 1956).

After Independence in the early 1960s, the Niokolo Koba National Park (sub-population n° 1.1) was considered to host about 100 lions (Dupuy, 1972) with an estimated carrying capacity of 300 lions (Dupuy, 1971). Today, G. Mauvais (pers. comm.) who has been working in Niokolo Koba N.P. for a number of years estimates the lion population to number between 100 and 150 in the Park and about a similar number in the hunting area of Falémé *Zone d'Intérêt Cynégétique* (sub-population n° 1.2). According to him:

- The lions are more abundant around the periphery of the Park where they are used to preying on livestock, especially during the rainy season, and;
- The usual size of lion groups observed is 1 to 2 with a maximum of 6 animals seen together.

Therefore, for Niokolo Koba N.P., this report has retained the conservative figure of 100.

For Falémé Z.I.C., the survey has made its own estimation based on hunting efforts and cross-referencing, adopting a very conservative figure of about 30 individuals.

- **Guinea Bissau**

The lion is present in very small numbers in the North-eastern and South-eastern part of the country:

- In the North-east, according to Ph. Chardonnet (pers. comm.) who worked two years with cattle-herders in the Regiaõ de Leste, the lion is most probably erratic from Niokolo Koba complex (sub-population n° 1.3), and;

- In the South-east, according to A. Baldé (pers. comm.), a very small population of lion (maybe 10 individuals) is permanently present in Boé and Beli regions (sub-population n° 1.4).

Incidents of livestock killed by large carnivores are numerous and frequent, but mostly they are due to spotted hyenas, and sometime even to other ethnic groups disguising cattle robbery as cattle predation by carnivores (Ph. Chardonnet, pers. comm.).

- **Guinea**

During their time spent in Guinea, Bigourdan and Prunier (1937) considered the lion as very abundant and widespread along the Bafing and Tinkisso rivers.

Today, lions are definitely present in the Northern part of the country (sub-population n° 1.5), although with regional differences (S. Darroze, pers. comm.):
- lions (and hyaenas) seem to be more abundant in the North-western region, which is the Northern part of the Fouta Djalon massif, on the West bank of the Bafing river, and;
- lions are more scattered in the North-eastern region, which is the Siguiri *Préfecture*, on the East bank of the Bafing river.

A preliminary evaluation of the lion population size has been carried out in 2001 by the Bafing-Falémé transfontier project in a 1.5 million ha area of Northern Guinea (S. Darroze, pers. comm.). The method used is probably questionable since it transposed East African procedures with little ajustment to West Africa, e.g. it looks like the average lion group size set was 6 individuals, a figure much over the observed situation of less than 2 in West Africa. The results give a country-wide population size of 200-300 lions which is considered as probably over-estimated (S. Darroze, pers. comm.). Until further data are produced, a more conservative figure is given by this study.

Predation on livestock is regularly reported and attributed to the lion, although many local persons appear to mix up the three large predators: lion, leopard and spotted hyaena. Some ethnic groups do not hunt lions for mystic reasons while others do, and poison is widely used by cattle breeders. Lions find suitable refuge sites in the "*woula*" which are uninhabited dense bush areas also used by prey species including western giant eland (S. Darroze, pers. comm.).

In the the newly established *Parc National du* Haut Niger (PNHN), in Central Guinea, the lion is with no doubt present in the Mafou Forest (Brugière *et al.*, 2002) which is rapidly being colonised by lions after 20 years of absence (Hunter, 2001). According to D. Brugière (pers. comm.), who works in the PNHN, "*the lion is incorrectly listed by Ziegler* et al. *(2002) as "*a species formerly present [in the PNHN] but now disappeared*". Lions were only occasionally seen in the Park area in the 1980's but they returned in 1997-1998, probably from an area located about 100 km to the North of the Park, along the Tinkisso river where this species has always been present. We suspect that this return is a consequence of the Park creation in January 1997 and the consequent reduction in hunting pressure on the Mafou forest, which is one of park's core areas (554 km²). A population of resident lions is now well established in the Northern part of the Park. The number of specimens occurring in the Mafou forest is unclear but based on field observations a figure of 5-8 individuals seems reasonably reliable*". The same author reports increasing problems with damages by lions to livestock in the PNHN's buffer zone, especially since the settlement of cattle-herders from Sierra Leone. As the spotted hyena has been wiped out from the PNHN by farmers over the last ten years,

there is no competition for food to lions. Interestingly, the lion here is located in a transition area where savannah and forest species coexist, e.g. the giant forest hog, the yellow-backed duiker and the water chevrotain are present together with the western hartebeest, the common waterbuck and the Buffon's kob.

Some lions occur along the Tominé River (J. Capiod, pers. comm.), the upstream of the Corubal River in neighbouring Guinea-Bissau where lions are present as well.

In the Mount Nimba Biosphere Reserve, in South-eastern Guinea, the lion used to be encountered, but is no longer seen there (S. Chaffard-Sylla, pers. comm.).

The Mafou Forest, the Northern core area of PNHN in Central Guinea, is probably the current Southern limit of the lion's distribution range in the country; the lion does not exist in the Kouya Forest, the Southern core area of PNHN (D. Brugière, pers. comm.).

- **Mali**

Few lions are left in Mali where they used to be numerous. They disappeared from most of their former range, such as along the Niger River in the Gao area and the Gourma region where they were responsible of frequent losses of livestock (B. des Clers, pers. comm.). Lions even occurred in the Southern Ifhoras massif as far North as Bou Ghessa at the border with Algeria (Chudeau, 1920), which would mean that they also occurred in Southern Algeria. According to Lhote (1951), the presence of lions in the massif of Adrar des Ifhoras happened during the rainy season. The same author observed at that time that the lion was especially widespread in Meneka (Menaka) region (South-East Mali) and Goundam region (just South-West of Tombouctou, North-Central Mali). In 1937, Bigourdan and Prunier mentioned the abundance of lions in the interior delta of the Niger river, upstream of Tombouctou. These now extirpated lion populations were closer to the present sub-population n° 3 of this study in neighbouring countries, than to the Malian sub-population n° 1. In 1991 Jachmann (1991) was still considering that the lion had become rare in the Gourma but was still surviving there in parts of this vast ecosystem.

Today, lions only occur in the South-western part of the country. The main remaining sub-population lies on the Guinean border in the Haut-Bafing and Haut-Bakoy regions (sub-population n° 1.6).

It is said that very few individuals may still inhabit the *Parc National & Réserve de la Biosphère* de la Boucle du Baoulé (UNESCO/UNDP, 2000) where they remain in the North, within the Block I Kongosambougou (sub-population n° 1.7), even though they used to be abundant in the Park (Roure, 1956). 5 lions in 1991 and 4 lions in 1992 have been observed in the Park (Traoré, 1993).

SUB-POPULATION N° 2

The sub-population n° 2 is now fragmented in two areas (2.1 & 2.2) which are most probably not connected anymore, despite the existing suitable natural habitat, due to:

- The high incursion of fulani cattle in the corridor area between the two parks during the dry season, and;

- The Volta Noire (Borongo) river marking the border between the two countries.

This sub-population appears to be the weakest of the Western African region in terms of global population size.

- **Côte d'Ivoire**

The lion was formerly widespread in the Northern half of the country, including the so-called "Baoulé V" at the interface between savannah and forest, where it used to occur in the Lamto research station. Today, the lion of Côte d'Ivoire (sub-population n° 2.1) currently seems to be only restricted to the North-eastern savannahs in and around Comoé National Park.

In Comoé NP frequent lion spoor demonstrate a regular presence of the species in the different ecosystems (Poilecot, 1991). According to Lauginie (1990), most of the lion range lies in the valleys of the Comoé and the Iringou rivers; it is frequently spoted on the Kongo plateau, North of Kapkin and at the confluent of the two rivers Comoé and Iringou. In 2002, lions are regularly observed in the Gawi area and spoors are noticed nearly everywhere in the park (R. Gilon, pers. comm.). This year, lions have been heard roaring in the Kongo scientific camp where they had not been heard for years (F. Lauginie, pers. comm.). The population of the park is estimated at around 100 individuals (J-M. Pavy, pers. comm.).

Few observations of lions have been noted outside Comoé NP:

- in 1994, tracks of a lioness have been seen in the upper Kinkene basin in what is named the "desert of Kong" west of the park (H. Ressaire, pers. comm.);
- roars and tracks of lions are said to be regularly noticed by villagers in the Monts Tingui area, South-west of Comoé NP, nearby the formerly mentioned location; a lion pride is considered as permanent there (S. Diarrassouba, pers. comm.), and;
- a lioness and a cub have been observed in 1999 in the Warigue area, North of Comoé NP; roaring and footprints of lions are regularly noticed there, and the wildlife in general is recovering slowly due to better protection (D. Koffi, pers. comm.).

Interestingly, 3 lions have been seen in 1990 in the Odienné region, in North-West Côte d'Ivoire, close to the border with Guinea and the guinean *Réserve Partielle de Faune de* Kankan (S. Roux, pers. comm.; F. N'Golo, pers. comm.). As these lions were much too far from the Comoé NP lion sub-population n° 2.1, they may have been connected with the sub-population n° 1.5.

- **Ghana**

In Ghana (sub-population n° 2.2) the lion is now restricted to the North-western savannahs in and around Mole National Park.

In early 1990's, the lion population of Mole NP was considered "*certainly not high but at least sufficient to maintain a breeding population. […] It is suggested that the main lion population in the Mole N.P. is centred around Lovi and Nyanga camps extending towards the Mole River in the East and South to Brugbani camp and Samole River. There is no doubt that lions, perhaps in smaller numbers also occur around Gbanwele and Konkori and in the vicinity of Kwomwoghlugu. As lions are known to be great wanderers they will often travel great distances and no doubt some individuals also leave the Park from time to time. This*

Lions of Burkina Faso, Singou Faunal Reserve
(Photo : © DR)

Senegal lion, Faleme Hunting Area
(Photo : © DR).

Lions of Niger
(Photo : Ph. Chardonnet).

movement of lions out of the Park has already been reported by the staff in the Kanato, Gbanwele and Gbantala camps" (Wilson, 1993). According to the same source, at that time the largest prides observed were of 8 including 3 cubs, and 7 including 2 cubs.

Today, the lion population size in Mole N.P. is estimated between 15 (B. Chardonnet, pers. comm., 01.1999) and 50 (Abaka Haizel, pers. comm., 07.2002). The lions are actually rarely observed but they are heard roaring on a regular basis during surveillance patrols. They rarely venture outside the limits of the park, however it may eventually happen that some individuals wander:

- Northwards, close to the border with Burkina Faso: the Northern boundary of Mole NP is only 80 km away from the Southern boundary of the Nazinga game ranch in Burkina Faso, and;
- Westards, towards the Côte d'Ivoire border: the Western boundary of Mole NP is only 80 km away from Bouna, the head-quarters of Comoé NP in Côte d'Ivoire.

SUB-POPULATION N° 3

Sub-population n° 3 is the strongest of the West African region with:

- A population size of more than 800 individuals, and;
- A relatively good conservation status.

This sub-population is centred on the Arly-Pendjari-Niger ecosystem, which benefits from a large complex of Protected Areas. The lion density is locally quite high and may even be classified in the medium density category (Table 12).

- **Burkina Faso**

The lion used to be present everywhere in Burkina Faso (Roure, 1956). Today, the lions have been extirpated from Western and Central Burkina Faso even though some areas such as Comoé-Leraba or Nazinga reach prey availability levels which could probably sustain lion populations. The lion population of Burkina Faso is now restricted to the Eastern region, except for a very small population which remains in the upper basin of the Mouhoun river in North-western Burkina Faso, close to the border with Mali (Y. Iniyé, pers. comm.). Whether these few lions are linked to the sub-population n° 1 or n° 2 (or even n° 3) remains doubtful.

The lion population of Eastern Burkina Faso is the most important of the whole Western Africa region, with possibly as many as 450 individuals.

Lions are quite easy to observe in the Singou-Arly complex (sub-population n° 3.1) where they reach remarkable densities of about 5 animals per 100 km². This abundance is supported by a correlated biomass of prey species, for instance roan antelope (*Hippotragus equinus*), the second most important prey species of the lion, after buffalo. The correlation between lion density and roan antelope density is an interesting one: in fact the roan antelope density in the Singou valley appears to be the highest in Africa (Chardonnet *et al.*, 1999) (Table 13) and the lion density there is correspondingly the highest in the region. The Protected Areas of the Pendjari Basin (1.4 million ha) in Burkina Faso and Benin with their abundance of buffalo,

roan, hartebeest, etc. are often overlooked but, with the quite high lion densities, they are both continentally and regionally important.

TABLE 13 - DENSITY OF ROAN ANTELOPE IN AFRICA BY ORDER OF DENSITY (Sources: East, 1998; Chardonnet *et al.*, 1999)

Region	Country	Area	Density (n° of roan/km²)
Western Africa	Burkina Faso	Lower valley of Singou	1.5
		Eastern Burkina Faso	0.77
	Benin	Pendjari complex	0.61
Central Africa	Cameroon	Bénoué N.P.	0.56
Western Africa	Senegal	Niokolo Koba N.P.	0.26
Central Africa	Chad	Zakouma N.P.	0.23
Southern Africa	Zambia	South Luangwa N.P.	0.20
		North Luangwa N.P.	0.11
Central Africa	C.A.R.	Manovo Gounda St Floris N.P.	0.09
Southern Africa	Zambia	Kafue N.P.	0.03
	Botswana	Northern Botswana	0.02
Eastern Africa	Tanzania	Ruhaha N.P.	0.01
Southern Africa	South Africa	Kruger N.P.	0.002
	Zimbabwe	Hwange N.P.	0.005

In W National Park (sub-population n° 3.2), the density of lions is much lower than in Arly, as is the biomass of prey species.

In the hunting areas surrounding the National Parks (Ougarou, Singou, Pama, Tapoa Djerma, etc.), the abundance of lions is pretty high. "*The tourist hunting quota for lion is set at 20 individuals per year and the offtake averages 12 per year on a repeatable basis; there is no point to reduce the quota, otherwise the cattle-herders will poison and finish the lions*" (Y. Iniyé, pers. comm.).

The Sirba valley (sub-population n° 3.3) is a little-known non-gazetted area where a small sub-population of lions remains; these animals are probably connected with the population of Singou (B. Chardonnet, pers. comm.).

- **Benin**

In Benin today, lions are only found in the Northern part of the country.

The highest concentration of Benin lions is in the Pendjari ecosystem (sub-population n° 3.5) with local noticeable densities in Pendjari National Park and surrounding Hunting Areas such as Porga, Batia and Konkombri.

As with the W National Park in Burkina Faso, the W National Park in Benin faces conflicts between wildlife and livestock at the expense of taxa such as lions whose population is small (sub-population n° 3.6).

The *Forêts Classées* (gazetted forests) of Alibori Supérieur and Trois Rivières maybe also support a small lion population (sub-population n° 3.7). Covering more than half a million hectares, at least on paper, these Protected Areas probably share their lions with the Kainji Lake National Park in the neighbouring Nigeria, a National Park which is also more than half a million hectares in size.

- **Niger**

The lion was once spread throughout Southern Niger and used to be present as far North as the Aïr region on a permanent basis (Chudeau, 1920). It used to be common in the Aïr massif (Bigourdan & Prunier, 1937). *"The lion was especially widespread in Adamboukar (Anderamboukane) region at the border with Mali […]; in Adamboukar in 1939 there were still a lot of lions"* (Lhote, 1951). It was still present some years ago in the Termit massif, Eastern Niger, from where it has probably been extirpated by local hunters since wildlife is currently abundant there, not only prey species but also large predators like cheetah (J. Tubiana, pers. comm.).

Nowadays the lion in Niger is only found in W National Park and surrounding areas (mainly South of Tamou Partial Faunal Reserve) and its population size is assessed to about 50 (sub-population n° 3.8) even though some observers mention a population of 80 in W NP (O. Buttin, pers. comm.). According to Tiega & Price (1995), the lion population size in Niger reaches a bit less than 100 individuals in the areas of W, Tamou and Sirba.

It must be mentioned that this sub-population n° 3 used to be also present in neighbouring Mali, in the Gourma region and even as far as Southern Ifhoras Massif (Chudeau, 1920 *in* Le Berre, 1990).

- **Nigeria**

In terms of biodiversity, the Western bank of the Niger river is considered here to belong to the Western Africa region.

In Western Nigeria, the lion is present in Kainji Lake National Park (sub-population n° 3.9), mainly in the Borgu sector (the former Borgu Game Reserve established as a Native Authority Forest reserve in 1961). The remaining population is small in size.

A second population which was not recorded during the map production seems to exist in Kamuku National Park in North-central Nigeria (J. Rudge, pers. comm.; F. Hurst, pers. comm.). The area available, although the exact size is not known, is extensive, comprising the National Park and Kwiambana Game Reserve to the North-west and surrounding Forest Reserves and grazing reserves. It is said that cattle predation has been reported. According to J. Rudge (pers. comm.), the population may tentatively consist of 10 individuals and may even be higher. These have not been included in the population estimate for the country.

TABLE 14 - TRENDS AND CONSTRAINTS OF LION CONSERVATION IN WESTERN AFRICA

N° sub-population	Country	Area	Lion population trend		Lion habitat quality trend	Main prey for lions		Conservation efficiency (rate 0 to 3)	Lion conservation constraints
			Past	Present		Wildlife	Livestock		
1	Senegal	1.1. Niokolo Koba N.P.	D	S	S	X	X	2	tarmac road
		1.2. Falémé Z.I.C.	D	D	D	X		0	cotton, mining
	Guinea Bissau	1.3. Buruntuma region	S	S	S		X	0	livestock competition
		1.4. Boe & Beli regions	D	S	D	X	X	0	mining, road
	Guinea	1.5. Sigirini & Fello Koundoua regions	D	S	D		X	0	agriculture, livestock, poaching
	Mali	1.6. Haut-Bafing & Haut-Bakoy regions	D	S	D		X	0	agriculture, livestock, poaching
		1.7. Kongosambougou Block (Boucle du Baoule N.P.)	D	D	D	X	X	1	agriculture, livestock, poaching
2	Cote d'Ivoire	2.1. Comoé N.P.	D	S?	S	X		2	livestock, poaching
	Ghana	2.2. Mole N.P.	D	I	S	X		3	
3	Burkina Faso	3.1. Arly-Singou complex (N.P., F.R. & H.A.)	D	D?	S	X		2	poaching
		3.2. W N.P.	D	D	S	X	X	0	livestock
		3.3. Sirba valley	D	D	D		X	0	livestock
	Togo	3.4. Oti-Mandouri F.T.R.	S	S	S			1	
	Benin	3.5. Pendjari complex (N.P. & H.A.)	D	S	S	X		3	poaching
		3.6. W complex (N.P. & H.A.)	D	D	S	X	X	1	livestock, poaching
		3.7. Alibori supérieur & Trois rivières complex	D	S	S/D		X	0	livestock, poaching
	Niger	3.8. W N.P. complex & South of Tamou F.P.R.	D	S	S	X		2	poaching
	Nigeria	3.9. Kainji Lake N.P.	D	D	S	X		2	poaching

I = increasing
S = stable
D = decreasing
Rate 0 to 3: 0 =low; 3=high

3. CENTRAL AFRICA

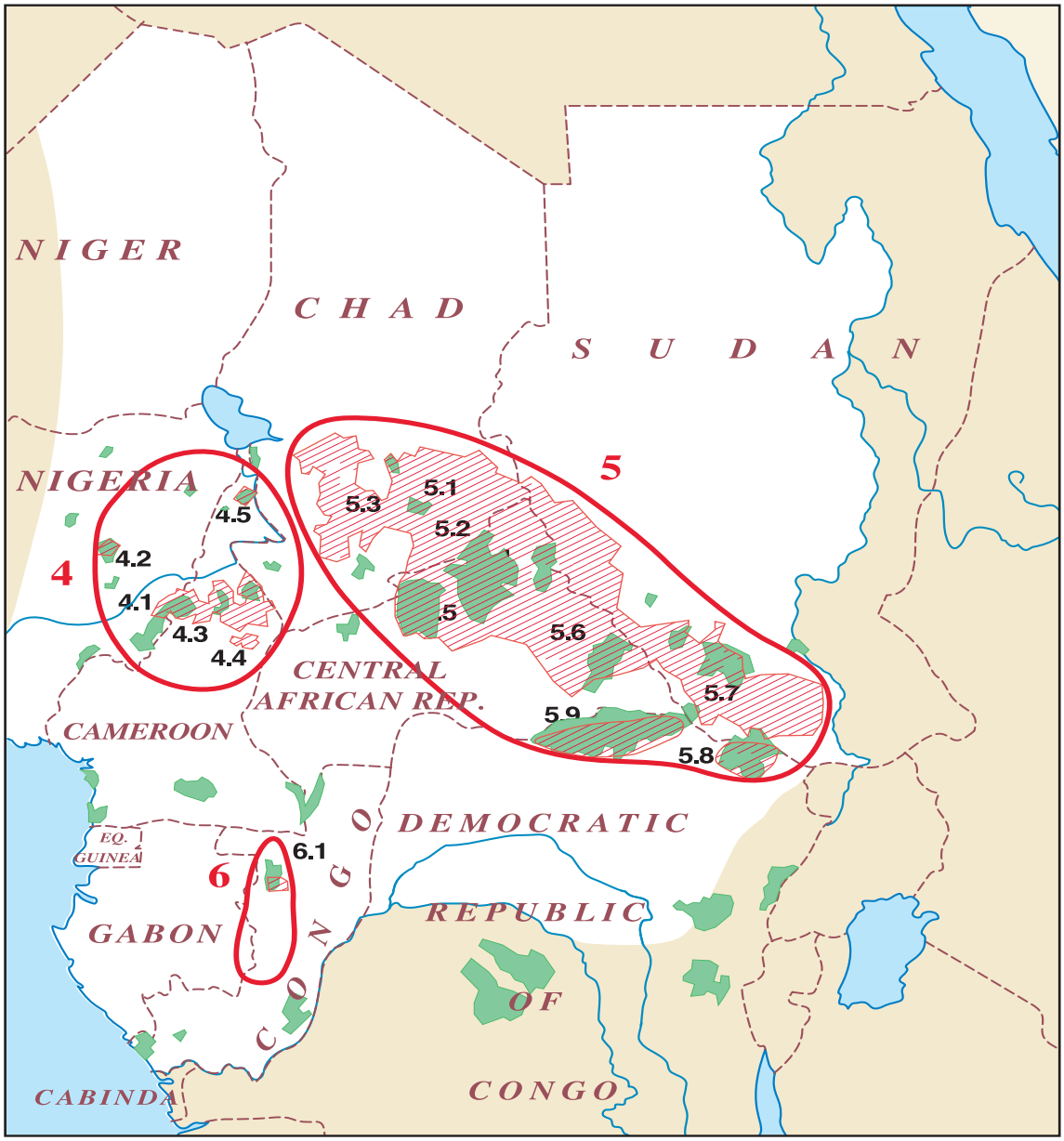
3.1. LION RANGE

In the Central Africa Region, the lion range probably covers an area of more than 65 million hectares (Table 15):

- About half of the lion range is gazetted as Protected Areas including:
  . National Parks: about 10%;
  . Reserves: about 4%, and;
  . Hunting Areas: approximately more than one third.

- Even though the lion range outside Protected Areas is very difficult to evaluate, non-gazetted areas probably cover nearly half of the lion range, which appears to be one of the most characteristic features of the region as far as lion (and large wildlife including prey species) is concerned.

Lion subpopulations in Central Africa



Legend

- International border
- GHANA — Name of Country
- Main river
- Protected Areas (National Parks, Wildlife Reserves, Hunting Areas, etc.)
- Lion subpopulation
- 2 — Lion subpopulation reference number
- Lion distribution
- 2.1 — Subpopulation component, reference number

TABLE 15 - STATUS OF LION DISTRIBUTION AREAS IN CENTRAL AFRICA

N° of sub-population	Country	Area	Conservation status and surface (km²)			
			Protected areas			Non gazetted areas
			Nat. Parks	Reserves	Hunting areas	
4	Nigeria	4.1. Gashaka-Gumti N.P. (Northern sector only)	1,860			
		4.2. Yankari N.P.	1,960			
	Cameroon	4.3. Faro-Bubandjida-Bénoué complex (N.P. & H.A.)	7,300		22,700	
		4.4. Vogzoum & Djivorke H.A.			3,820	
		4.5. Waza N.P.	1,880			
	Sub-total 4		**13,000**	**0**	**26,520**	**0**
5	Chad	5.1. Zakouma N.P.	2,400			
		5.2. Aouk H. A.			6,000	
		5.3. Guerra & Salamat regions		24,860		138,140
	C.A.R.	5.4. Gounda plain (within Manovo-Gounda-St Floris N.P.)	830			
		5.5. Manovo-Gounda-St Floris NP, Bamingui-Bangoran NP, Sangba P.Z.	28960		52,540	
		5.6. Zone d'Intérêt Cynégétique (Eastern CAR)			107,800	
	Sudan	5.7. Bahr el Gazal region including Southern N.P.	15,000			167,000
	R.D.C.	5.8. Garamba N.P.; Azande, Gangala na Bodio & Mondo Missa D.C.	4,920		10,000	
		5.9. Bomu & Bili-Uere D.C.			45,000	
	Sub-total 5		**52,110**	**24,860**	**221,340**	**305,140**
6	Gabon	Bateke plateau				2,500
	Congo	Bateke plateau				2,500
		6.1. Odzala N.P.	2,445			1,555
	Sub-total 6		**2,445**	**0**	**0**	**6,555**
Total	**km²**	**651,970**	**67,555**	**24,860**	**247,860**	**311,695**
	%		**10**	**4**	**38**	**48**

3.2. LION POPULATION SIZE

For very similar reasons to Western Africa, the evaluation of the lion population size in Central Africa relies more on first hand information from managers and users than on systematic counting by scientists. It is considered that the present lion population size in this region probably reaches a figure of just under 3,000 individuals (Table 16).

TABLE 16 - LION POPULATION STATUS IN CENTRAL AFRICA

N° sub-population	Country	Area	Lion range surface (km²)	Density of lions/100km²	Population size			Assessment mode
					minimum	estimated	maximum	
4	Nigeria	4.1. Gashaka-Gumti National Park (Northern sector only)	1,860					C
		4.2. Yankari National Park	1,960	2.6	40	50	60	B
	Cameroon	4.3. Faro-Bubandjida-Bénoué complex (National Parks & Hunting Areas)	30,000	1.2	276	345	414	B
		4.4. Vogzoum & Djivorke Hunting Areas	3,820					B
		4.5. Waza National Park	1,880	3.7	56	70	84	B
	Sub-total 4		**39,520**		**372**	**465**	**558**	
5	Chad	5.1. Zakouma National Park	2,400	4.2	80	100	120	B
		5.2. Aouk Hunting Areas	6,000	1.6	75	94	113	B
		5.3. Guerra & Salamat regions	163,000	0.2	228	326	424	C
	C.A.R.	5.4. Gounda plain (within Manovo-Gounda-St Floris National Park)	830	8.0	53	66	79	B
		5.5. Manovo-Gounda-St Floris NP, Bamingui-Bangoran NP & Sangba PZ	81,500	0.6	391	489	587	B
		5.6. Zone d'Intérêt Cynégétique (Eastern CAR)	107,800	0.4	302	431	560	C
	Sudan	5.7. Bahr el Gazal region including Southern National Park	182,000	0.2	255	364	473	C
	R.D.C.	5.8. Garamba N.P.; Azande, Gangala na Bodio & Mondo Missa D. de Chasse	14,920	1.2	126	180	234	C
		5.9. Bomu & Bili-Uere Domaines de Chasse	45,000	0.5	154	220	286	C
	Sub-total 5		**603,450**		**1664**	**2,270**	**2,876**	
6	Equatorial Guinea					0		C
	Gabon	Bateke plateau	2,500	0.8	14	20	26	C
	Congo	Bateke plateau	2,500	0.8	14	20	26	C
		6.1. Odzala National Park & surrounds	4,000	1.0	28	40	52	C
	Sub-total 6		**9,000**		**56**	**80**	**104**	
3 sub-pop.	**8 countries**	**Total**	**651,970**		**2,092**	**2,815**	**3,538**	

SUB-POPULATION N° 4

- **Nigeria**

In terms of biodiversity, the Eastern bank of the Niger river estuary and the Eastern side of Jos plateau are considered here to belong to the Central African region.

The Northern sector of Gashaka-Gumti National Park may still contain a small population of lion (sub-population n° 4.1).

A permanent population of lions lives in Yankari National Park (sub-population n° 4.2). Although the population is small in size, its conservation status is quite good (B. Chardonnet, pers. comm.).

Maybe a few lions still enter Sambisa Game Reserve in North-eastern Nigeria, coming from the Faro National Park in the neighbouring Cameroon.

- **Cameroon**

In Cameroon, the distribution area of the lion has been reduced to the Northern part of the country, while it used to cover some locations in Southern Cameroon (Vivien, 1991):

- Lion were present in 1935 in the Yaoundé region;
- In the 1970's lion were still present in the Yoko region, and;
- Lions have become rare in 1990 on the Adamaoua Plateau.

Today three areas are identified as having lion in Cameroon, all of them located in the Northern Province. The species has disappeared from the Far-North Province. The lion is not present anymore in the Kalamaloue National Park where the last individual was seen in 1979 (J. Thal, pers. comm.). To the South, it has also disappeared from the Adamaoua Plateau.

In the Faro-Bénoué-Bubandjida complex (sub-population n° 4.3.) there is still suitable and available lion habitat. This 3 million hectares region made of 3 National Parks, numerous Hunting Blocks and extensive surrounding non-gazetted areas, contains a large number of suitable prey species such as buffalo, giant eland, roan antelope, hartebeest, 3 kob species, bushbuck, small size antelopes, wild suids, without forgetting abundant livestock. According to Dr Jean Ngog Nje (pers. comm.), the former long-standing Director of the Wildlife School of Garoua, the lion population of the Faro-Bénoué-Bubandjida complex was on the increase during the years preceding 1997 when he left his position. In the *Parc National de la* Bénoué, wildlife censuses have been carried out (Planton, 1999): the population size was 30 lions in 1997 according to Planton (1997) and 22 lions in 1998 according to the WWF-FAC project (1998), giving densities of 1.7 and 1.2 lions per 100 km² respectively.

The lion population of Waza National Park (sub-population n° 4.5.) has been larger in the past, about 200 individuals in the 1960's (Flizot, 1971). Varying estimates are given for the current Waza lion population of 40 (J. Thal, pers. comm.), 50 (J. Ngog Nje, pers. comm.), 70 (H. Planton, pers. comm.), between 50 and 150 (F. Lamarque, pers. comm.), etc. These lions regularly move out of the park although staying in its vicinity. The lion has been persecuted to such an extent that, in the basin, it is now found mainly in the heart of the Protected Areas,

including in gazetted Hunting Blocks where they benefit from the protection of safari operators (J. Thal, pers. comm.).

- **Chad**

The lion used to cover the entire Southern part of Chad to the point that the present distinct sub-populations n° 4 and 5 were previously forming a single sub-population.

As far as the sub-population n°4 is concerned, very few lions remain on the Chadian side of the border. Today, a few lions sometimes cross the Chad border from Cameroon where they are abundant, notably from Boubandjida National Park and surrounding hunting areas.

The only Protected Area of the region concerned, the *Réserve de Faune de* Binder-Léré, used to contain lions. The taxon seems to have been extirpated in 1973 when Thal and M'Baissekim undertook their preliminary survey before the Reserve was gazetted in 1974 (Féron, 1995).

According to Thal (1973) the inhabitants of Binder Nairi would see lion footprints from time to time during the rainy season although the animals never settled in the area because, according to him, prey densities were too low.

SUB-POPULATION N° 5

- **Chad**

- **Northern Chad**

The long-standing desertification process and the recurrent cyclical drought phenomena at the end of the 20th Century have certainly contributed to the disappearance of lions from areas of Northern Chad where they used to be established.

According to Jérôme Tubiana (pers. comm.), an ethno-zoologist expert in North-eastern Chad:

- Until the 1950-60's, lion population was inhabiting the Zaghawa country, especially in the Kapka mountain range, as well as the South-eastern part of the Ennedi mountain range (Biltine *Préfecture*), and;
- Today, the lion has disappeared from the Ennedi, however it is said by local communities to be still present in small numbers in the Kapka massif around 15° North. Hoinathy Honimadji (pers. comm.) believes that in Chad, lions still occur as far North as the 15th parallel and he has seen lions hunting greater Kudus between Biltine and Guéréda, which is the Southern Kapka massif.

Otherwise, lions may still be present in the Ouaddaï *Préfecture* where wild prey species are locally abundant, such as warthog, roan, greater kudu, red-fronted gazelle, korrigum, ostrich, etc. In 2000, there were numerous official complaints by pastoralists of stock-raiding lions in the Lake Fitri area, around 13° North, in the Batha *Préfecture* (Ph. Chardonnet, pers. comm.).

- **Southern Chad**

Today, the distribution range of lion in Chad still remains huge, although lion density is low, except in a few Protected Areas (Chardonnet & Lamarque, 1997).

In the Lake Chad Basin, the lion used to be very common and was found even at the edge of the desert as far North as Nguigmi. They used to be common along the rivers Chari, Logone, Ba-Ili, Bahr Erguig and on the shores of Lake Chad (Jeannin, 1951). Lions are scattered in the vast pastoral areas, especially in the regions of the Chari, the Logone, the Ba-Illi and the Mayo Kebbi (Tinan Reouyo, pers. comm.). They prey on both the large herds of livestock and the remaining wildlife, notably the still abundant warthog populations.

The Salamat *Préfecture* is certainly the major region for lions in Chad today, mainly in the two Protected Areas (*Parc National de* Zakouma and *Domaine de Chasse de l'*Aouk), but also outside Protected Areas where difficult access especially during the rainy season helps protect the lions.

In Zakouma National Park the lion has always been quite easy to see (sub-population n° 5.1). There has not been any proper lion census there, although several large wildlife counting operations have been conducted in the last few years, all of them showing a positive trend in terms of wildlife conservation with increasing populations of lion prey species, within the limits of Zakouma NP but also outside with a re-colonisation of new territories (MEE *et al.*, 2001). For instance:

- In ten year period between June 1986 and February 1995, the lelwel hartebeest may have increased from 600 to 1,700 and the giraffe from 300 to 800 (Dejace *et al.*, 2000), and;
- Buffalo numbers may have increased from 200 in 1986 to 1,000 in 1995 (Dejace *et al.*, 2000) and 1,500 in 2000 (Planton, 2000 *in* MEE *et al.*, 2001).

In Zakouma NP, during the dry season, about 60 lions seem to concentrate in the Eastern part of the park (roughly 1,000 km² for a density of 6 lions/100km²) where most of wildlife preys reside nearby the *bahr* water sources (Djadou Moksia, pers. comm.).

In Aouk *Domaine de Chasse* (17 Hunting Blocks), there are still noticeable numbers of lion that are not very hard to spot (sub-population n° 5.2). Tourist hunters hunt a few individuals here. Prey species are locally in good numbers, some buffalo, a few giant eland, numerous roan and lelwel hartebeest, three species of kob, some korrigum and red-fronted gazelle, many bushbuck and warthog, etc.

In Central Chad (Guera and Moyen-Chari *Préfectures*) the lion is definitely present, notably in the large Siniaka-Minia *Réserve de Faune*, but also in pastoral rangelands and mountain ranges outside any Protected Area (sub-population n° 5.3). In *Parc National de* Manda, the lion was present on a permanent basis when the prey availability was high twenty years ago. Formerly created as a *Réserve de Faune Régionale* in 1951 for the conservation of the giant eland, then gazetted as a National Park in 1965, the Park was still containing a large population of giant eland in the 1970's. Today, the giant eland has been virtually extirpated from the park, just as the lion. Individual lions may appear there temporarily and their numbers do not exceed 3-5 (Chai, 1996).

Lion of Cameroon, Waza National Park (Photo : H. Planton).

Lions of Cameroon, Waza National Park (Photo : H. Planton).

Lions of Cameroon, Hunting area N°4 (Photo : F. Vannier).

Lion of CAR, Bamingui Hunting Area (Photo : M. Fusy).

Lion of CAR, Gounda valley (Photo : Club Faune).

- **Central African Republic (CAR)**

The distribution of lion in CAR used to be widespread and a few decades ago the taxon was represented everywhere except in the South Western rain forest area. It used to be abundant in regions were it is now excinct or rare such as the *Réserve de Faune de la* Nana Barya or even the surroundings of the capital Bangui, in the regions of Damara, Bossembélé and Boda (Gauze, 1958).

Very few lion studies have been carried out in this country. One exception must be mentioned for the Gounda Plain (sub-population n° 5.4) within *Parc National de* Manovo-Gounda-St Floris (PNMGSF), where the local lion density is high and probably the highest of the whole Western and Central African regions (Ruggerio, 1991; B. Chardonnet, pers. comm.; Ph. Chardonnet, pers. comm.). Consequently, in this study this particular area has been set apart from the rest of PNMGSF.

In the rest of PNMGSF and in the *Parc National de* Bamingui-Bangoran as well as in the *Zone Pilote de* Sangba and surrounding non-gazetted areas (sub-population n° 5.5), the lion population size has apparently shown a decline during recent years along with a decreasing average pride size (J. Lobao Tello, pers. comm.). Possible reasons may be:

(i) The poor conservation status of the formerly abundant prey such as the three taxa of kob;
(ii) The harassment by nomadic cattle-herders entering the region, including some of the Protected Areas, during the dry season, and;
(iii) The apparently poor ability of these lions to tackle buffalo as prey (J. Lobao Tello, pers. comm.); a noticeable number of live buffalo are observed by Professional Hunters with lion wounds, tending to support a high level of hunting failure (P. Roulet, pers. comm.);
(iv) The current bush encroachment phenomena may for lions make hunting more difficult than in formerly more open lanscape (P. Roulet, pers. comm.);
(v) There may be a reproduction problem in lion in this region and an evaluation study is about to be conducted in this field (A. Iokem, pers. comm.).

According to J. Lobao Tello (PDRN, 2000), the reduction in number of lions would be more due to ecological factors than to poaching: "*there has been an artificial increase of lion during the former period of heavy poaching (elephant, black rhinoceros and other species), which was responsible for an outstanding abundance of carcasses with the consequence of an "explosion" of the lion population and a very high cub survival rate. The reduction of prey and carcasses left by poaching has directly regulated the lion population as observed today with an exceptionnaly low cub survival rate and a rarefaction of old lions. One can consider that the lion population is returning to its natural level, in balance with the environment and the quite low prey abundance.*"

The Western limit of sub-population n° 5.5 seems to be located today around the river Gribingui, the Western border of the *Réserve de Faune du* Gribingui-Bamingui, while the Eastern limit may be nearby the *Forêt Classée de la* Zizi, North of Ouadda, both areas where lion tracks were spotted in January 2001 (P. Roulet, pers. comm.).

In the huge *Zone d'Intérêt Cynégétique* or ZIC, which covers the entire Eastern part of the country, the current lion population remains poorly known but is probably declining following

the negative trend of prey populations which are subject to heavy poaching pressure despite a very low human settlement (sub-population n° 5.6). As far as lion protection is concerned, there is probably not much difference between Protected Areas (e.g. *Réserve de Faune de* Zémongo) and non-gazetted areas. Cattle-herders established in the *Communes d'élevages* in the region of Mingala or Pombolo (G. Doungoube, pers. comm.), as well as cattle-herders penetrating more deeply within the ZIC in areas such as Derbissaka (F. Zowoy, pers. comm.), actually complain on a recurrent basis about lion predation on livestock. The Western limit of sub-population n°5.6 is most probably located on the Western side of the Bangassou rain forest (which is not that obvious on the map "Lion subpopulations in Central Africa) where lions are known to occur (J.-P. Leroux, pers. comm.; M. Tiran, pers. comm.), notably in Lipia Ngebe plateau, South of Bakouma (G. Doungoube, pers. comm.).

Interesting situations must be underlined regarding the CAR lion populations inhabiting the fringe of rain forest ecosystems:

- In the Bangassou rain forest and surrounding forest-savannah mosaic, South-center of CAR, lions are well established in some areas such as Mourou-Fadama and Ndanda (F. Zowoy, pers. comm.);
- In the Haut-Mbomou, the South-eastern corner of the country, lions inhabit areas of forest-savannah mosaic and may prey on both forest wildlife and savannah wildlife (P. Chardonnet, pers. comm.);
- In the Lobaye region, in the South-west of the country, lions were known to occur, at least until recently, under truly Guinean climate (A. Pénelon, pers. comm.; G. Doungoube, pers. comm.; Gauze, 1958).

- **Sudan**

The area situated on the left (Western) bank of the Nile is considered as belonging to the Central Africa region.

Very little is known on the status of the lion in Sudan. The overall figures of the lion population in this country have to be taken as highly speculative.

The lion presence and sub-populations in Sudan are indicated based on reasonable estimates according to geographical indicators using the following methodology:

- Physical constraints:

  River separation and suitable habitat have been considered when identifying the shape of the potential distribution area and subpopulations of lions. The lion is present in all the ecological zones of Sudan, including the arid zone but excluding the desert (Hillman, 1985). The wooded savannah is the most suitable habitat for lions on the West bank of the Nile River; it encompasses an immense area of 398,100 km² i.e. 17.1% of the country (Hillman, 1985). The savannah grassland also contains lions and is nearly twice the size of the former ecological zone. Lions also occur in the Sudd swamps and floodplain grasslands.

- Human constraints:

> Assuming that lions tend to avoid people, the location and density of villages (documented on published maps) have been superimposed on the suitable lion habitat obtained from the above-mentioned exercise. The output provides a rough estimate of the potential lion range, which still needs to be ascertained and improved. A similar method has been used by R. Martin (R. Taylor, pers. comm.) to map the leopard habitat in Sub-Saharan Africa.

According to Hillman (1985), the conservation status of the lion in Sudan is "satisfactory" (at the time of his publication), which means "reasonable numbers" in his mind. The same author mentions the presence of lions in all Protected Areas of the country.

Figures have been published of the numbers of wildlife in Sudan, based on a national census of wild animals including lions conducted from August 1975 to January 1977 on behalf of the National Livestock Census (Watson *et al.*, 1977 *in* C. de Jong-Boon & S. Babiker Tabidi, 1985). Watson's estimated the national lion population at 1,610 individuals; however, J. Hillman suggested that the population is actually more than twice as high as Watson's estimate (C. de Jong-Boon & S. Babiker Tabidi, 1985).

To the best of the available knowledge, there is no area with high density of lions in the country. In this survey, all the estimated densities for Sudan have been set below 1 lion/100 km². An average density of 0.2 lion/100 km² has been considered for the entire area of the sub-population n° 5, even in Protected Areas such as Radom and Southern National Parks. However, outside villages, huge tracts of suitable habitats for lion exist in the South-western part of the country with a large proportion of pastoral rangeland.

Lions are reported in the following regions of Southern Kordofan and Southern Darfur Provinces (El Rayah O. Hassaballa & Mutasim B. Nimir, 1985): Jebel Ed Dair in Central Kordofan, Radom area, the Garsila and South of Rehied el Bardi area and the areas South of Abu Matarik, the Jebel Marra area.

According to Sommerlatte (pers. comm.), there may be a few lions (3-5?) in Shambe Game Reserve, which lies on the west shore of the Nile. These have not been included in the population size figures.

Bar el Gazal region (sub-population n° 5.7) constitutes a large area of 182,000 km² of which 15,000 km² are gazetted as the Southern National Park. As with much of the information from Sudan, details are sketchy and this report puts lion densities in this area at a cautious 0.2 per 100 km² with an estimated total population of 364 animals.

- **Democratic Republic of Congo**

The situation has recently changed in Northern DRC as a result of:

- The collapse of the former large commercial livestock ranches and the newly established Fulani cattle herders who come from the North and cross the Mbomou river to graze in the Azande region, and;
- The civil unrest and consequent turmoil of the situation in respect to wildlife conservation in and around Garamba National Park.

According to B. Chardonnet and R. Kock (pers. comm.) who conducted buffalo captures in April 2002 in the Garamba region, the lion population there is concentrated in the core area of Garamba National Park of about 2,000 km² where the population size would not exceed a total of 100 individuals for a local density of 5 lions/100 km² (sub-population n° 5.8). Outside this range, the lion prey population drops to low levels and the lion density consequently diminishes (Muhindo Lessi & Nigilima, pers. comm.).

Bomu and Bili-Uéré *Domaines de Chasses* (sub-population n° 5.9) constitute a hunting area of 45,000 km². Thirty years ago there were a number of lions in this area, which also had large numbers of prey species such as giant eland (B. des Clers, pers. comm.). It consists of an extensive mosaic of forest patches and grassland, which previously contained some cattle ranches. Combined with some nearby refugee camps from the DRC there has been heavy poaching and the status of this subpopulation is estimated at 220 lions (E. Bashige, pers. comm., 2002)

SUB-POPULATION N° 6

The equatorial region of Central Africa used to host an abundant and widespread population of lion. In 1949, Malbrant & Maclatchy stated: "*In the South of the* [former] *A.E.F. (Afrique Equatoriale Française,* French Equatorial Africa*), the lion was restricted to the Congolese savannah* [ecosystem]*…It is more common in Moyen-Congo than in Gabon where it occurs only occasionally…Despite being widespread everywhere in this area, the lions are nowhere common…The largest numbers in this region are probably the quasi-desert area of the Bateke plateau…".*

- **Congo**

In Odzala National Park and surrounding areas, Congo, the lion is well known to occur (sub-population n° 6.1), even though the population size remains uncertain given the little information collected on this particular taxon (C. Aveling, pers. comm.).

- **Gabon**

Lions have always occurred in Gabon on the Batéké Plateaux, in the Haut-Ogooué Province. P. Rouquet (pers. comm.), a wildlife veterinarian posted in Franceville, witnessed the shooting of an adult male in 1995, South of Lekoni. The same person mentions the observation in 1996, also South of Lekoni, of a lioness with two lion cubs at the edge of a primary forest tract where they disappeared when approached.

TABLE 17 - TRENDS AND CONSTRAINTS OF LION CONSERVATION IN CENTRAL AFRICA

N° sub-population	Country	Area	Lion pop. trend		Lion habitat quality trend	Main prey for lions		Conservation efficiency (rating 0 to 3)	Lion conservation constraints
			past	present		wildlife	livestock		
	Nigeria	4.1. Gashaka-Gumti N.P. (Northern sector only)	S	S	S	X		1	
		4.2. Yankari N.P.	D	S	S	X		3	
4	Cameroon	4.3. Faro-Bubandjida-Bénoué complex (N.P. & H.A.)	D	D?	S/D	X		2	poaching, livestock
		4.4. Vogzoum & Djivorke H.A.	D	D	S	X		2	poaching
		4.5. Waza N.P.	D	D	S	X	X	2	poaching
	Chad	5.1. Zakouma N.P.	S	I	S	X		2	
		5.2. Aouk H. A.	D	S	S	X	X	1	livestock
		5.3. Guerra & Salamat regions	D	S	D	X	X	0	agriculture, livestock
	C.A.R.	5.4. Gounda plain (within Manovo-Gounda-St Floris N.P.)	D	D	S	X		2	poaching
5		5.5. Manovo-Gounda-St Floris NP, Bamingui-Bangoran NP, Sangba P.Z.	D	D	S	X		1&2	poaching, mining
		5.6. Zone d'Intérêt Cynégétique (Eastern CAR)	D	S	S	X		0	mining
	Sudan	5.7. Bahr el Gazal region including Southern N.P.	D	D	D	X	X	0&1	civil unrest
	R.D.C.	5.8. Garamba N.P.; Azande, Gangala na Bodio & Mondo Missa D.C.	S	S	S	X		0,1&2	civil unrest
		5.9. Bomu & Bili-Uere D.C.	S	D	S	X		0	civil unrest
	Gabon	Bateke plateau	D	D	S	X		0	poaching
6	Congo	Bateke plateau	D	D	S	X		0	poaching
		6.1. Odzala N.P.	S	S	S	X		2	

I = increasing
S = stable
D = decreasing
Rate 0 to 3: 0=low; 3=high