FONDATION INTERNATIONALE POUR LA SAUVEGARDE DE LA FAUNE
INTERNATIONAL FOUNDATION FOR THE CONSERVATION OF WILDLIFE

Conservation of the African Lion : Contribution to a Status Survey

September 2002

CONSERVATION FORCE

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Citation : Chardonnet, Ph. (ed.), 2002. Conservation of the African Lion : Contribution to a Status Survey. International Foundation for the Conservation of Wildlife, France & Conservation Force, USA.

Front cover picture : From an original drawing by Roger Reboussin

Back cover picture : Adult male lion paw

Available from : International Foundation for the Conservation of Wildlife
15, rue de Téhéran
75008 Paris - France

This survey and publication were made possible through a generous grant from Mr. Steven CHANCELLOR, with the support of Conservation Force and the International Foundation for the Conservation of Wildlife

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"*From the standpoint of conservation and possible management of the lion no topic has more relevance than population dynamics, yet it was an aspect of the study for which it was difficult to obtain unbiased quantitative information. To estimate accurately the size of the lion population in 25,500 sq. km is a project in itself. Three years of work was clearly not long enough to elucidate such topics as birth patterns and mortality rates, much less to find out general trends in the population. Some of the conclusions in this chapter are therefore tentative rather than final.*"

George Schaller, 1972. The Serengeti Lion.

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ACKNOWLEDGEMENTS

Must be thanked the persons whose names follow, who have either contributed to this survey, by helping to gather and providing data, by activating their field networks, by offering their experience and by enriching the bibliography, or those who have helped review the manuscript.

Rolf Baldus, Dave Balfour, Eulalie Bashige, Yvonne Bastin, Faustin Bateshi Murotsi, Jean-Pierre Bernon, Sylvie Bernon, Vernon Booth, Hubert Boulet, Mathieu Bourgarel, Hiver Boussini, David Brugière, Olivier Buttin, F. Buyeye, Stefan Buys, John Caldwell, Jean Capiod, Alex Caron, James Cavenagh, Solange Chaffard-Sylla, Karen Chapman, Bertrand Chardonnet, Philippe Chardonnet, Marco Ciambelli, Sarah Clegg, Bertrand des Clers, Serge Cogels, Craig Coid, Marianne Courouble, Ian Craig, David Cumming, Serge Darroze, Jock Dawson, Yilma Dellelegn Abebe, Yirmed Demeke, Seydou Diarrassouba, Gustave Doungoube, Daniel Ewur, Tony Ferrar, Hervé Fritz, F. Funston, Paul Funston, Raynald Gilon, Abaka Haizel, Jonathan Harwood, Brian Heath, Kes Hillman-Smith, Francis Hurst, Yaro Iniyé, Albert Iokem, John Jackson, Richard Jeffery, Pierre Jonquères, Gerrie Kamasho, Dennis King, Pierre Koffi Kouamé, André Djaha Koffi, Djaha Kouamé, Johan Kruger, François Lamarque, Richard Lamprey, Francis Lauginie, Sébastien Lebel, José Lobao Tello, Andy Loveridge, Sami Mankoto Ma Mbaelele, N. Masulani, G. Matipano, Thomas Mattanovich, Geoffroy Mauvais, Ataila Mbayma, Djadou Moksia, Norman Monks, Helena Motta, Jean Ngog Nje, Fanny N'Golo, Nkulu Kalala, Jacques Nyambre, George Pangeti, Jean-Michel Pavy, Alfredo Pelizzoli, Alain Pénelon, Hubert Planton, Alistair Pole, Jeremy Pope, Gianetta Purchase, Adrian Radcliffe, Mick Reilly, Hubert Ressaire, Kirsten Roettcher, Didier Roques Rogery, Pascal Rouamba, Pierre-Armand Roulet, Serge Roux, J. Rudge, Ludwig Seige, Angus Shulto-Douglas, Rob Slotow, Martin Seth-Smith, Malte Sommerlatte, Phillip Stander, Russel Taylor, Jean Thal, Marcel Tiran, Jérôme Tubiana, Gus Van Dyk, Suzanne van Hoven, Wouter van Hoven, Wolf Ekkehard Waitkuwait, Stuart Williams, Christiaan Winterbach, Florent Zowoy.

Odile Caillot and Andrée Lambert have to be acknowledged for their patience and skill to put together the text, references, tables, maps and pictures.

The contribution of each person does not imply their endorsement of the entire document as it is published.

ACRONYMS

ALWG	African Lion Working Group (IUCN/SSC/Cat Specialist Group)
BTB	Bovine Tuberculosis
CAR	Central African Republic
CDV	Canine Distemper Virus
CITES	Convention on International Trade in Endangered Species of Wild Fauna & Flora (Washington Convention)
CF	Conservation Force
CPUE	Catch-per-unit-effort
CSG	Cat Specialist Group (IUCN/SSC)
CU	Conservation Unit
DC	*Domaine de chasse*
DRC	Democratic Republic of Congo
HA	Hunting Area
FcaV	Feline Calici Virus
FeHV	Feline Herpes Virus
FeLV	Feline Leukaemia Virus
FIP	Feline Infectious Peritonitis and Pleuritis
FIV	Feline Immunodeficiency Virus
FL	Forest Land
FPV	Feline Panleukopenia Virus
GASP	Global Animal Survival Plan
GCA	Game Controlled Area, Game Conservation Area
GMA	Game Management Area
GR	Game Reserve
IGF	International Foundation for the Conservation of Wildlife
IR	Integral Reserve
IUCN	The World Conservation Union
MAB	Man and the Biosphere Program (UNESCO)
NGA	Non Gazetted Area
PAC	Problem Animal Control
PHVA	Population and Habitat Viability Assessment
PR	Partial Reserve
RP	*Réserve partielle*
SA	Safari Area
SSA	Sub-Saharan Africa
SSC	Species Survival Commission (IUCN)
SSP	Species Survival Plan
TB	Tuberculosis
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCMC	World Conservation Monitoring Centre
WMA	Wildlife Management Area
WUA	Wildlife Utilisation Area
WWF	World Wildlife Fund
ZIC	*Zone d'Intérêt Cynégétique*

COMMON NAMES OF LION

***Panthera leo* (Linnaeus, 1758)**

REGION	LANGUAGE	NAME OF LION
Europe	English	*Lion*
	French	*Lion*
	German	*Löwe*
	Italian	*Leone*
	Portuguese	*Leao*
	Spanish	*Leon*
Western Africa	Adja	*Kinikini*
	Adrar, Ioullimmïden, Isekkemaren	*Aouekkas, ioukkâsen (pl.), toauekkast (fem. sing.), tiouekkasîn (fem. pl.)*
	Ahaggar/Rhät	*Ahar, iharren (pl.), tahart (fem. sing.), tihârrîn (fem. pl.)*
	Aïr	*Amekloul, imeklat* (pl.), *ahar*, *aouekkas*
	Bambara	*Ouraba, diara*
	Baoulé	*Guara*
	Bariba	*Gbéroussounon*
	Bassari	*Irane*
	Bobofing	*Wuru, zora*
	Bouzou (Filingué)	*Ahar, wan'tagorass*
	Dindi	*Gounou, moussou-béri*
	Dioula	*Dyra, jaralin*
	Djerma	*Moussou béri*
	Fon	*Kinikini, djanta*
	Fulfulde (Peuhl)	*Biladdè, Rawandu ladde, mbarooga*
	Gurma	*Yambol*
	Gouro	*Guizra*
	Hausa	*Zaki*
	Ibo, Yoruba	*Odun*
	Kassena (Po)	*Nyongo*
	Kissi	*Yarra*
	Koniagui	*Ivissin*
	Koulango	*Diara*
	Lobi	*Siduhu*
	Malinké	*Nian-fin, diara*
	Mandinka	*Diarinté, diato*
	Manga	*N'gam, n'garin*
	Maure	*Sebah*
	Mooré (Mossi)	*Guigemde, bongnega, ouèougo-naba*
	Nagot	*Kinihoun*
	Ngbandi-Yakoma	*Bamara*
	Ouolof	*Gaïndé, gaynde*
	Peul Foula	*Pio-oui, nga-iouri*
	Sarakolé	*Diarinté*
	Sénoufo	*Charao*
	Sérère	*N'diogoy*
	Somba	*Tchirli-tchirli*
	Sonraï	*Gandihaya*
	Soussou	*Yété*
	Tamachek (Touareg)	*Ahard, awakass*
	Toubou (Termit)	*Dogoule*

Central Africa	Apindji, Eviya, Okandais, Awandji, Mitsogo, Adouma	*Nzégo*
	Arab	*Assad, dutou baach, baach/doud*
	Bafia	*Kimondo*
	Bakaningui, Batéké	*Ngô*
	Bakota	*Ngoyi, nzé*
	Baloumbou	*Ikoumbou*
	Bamiléké	*Nopkema*
	Bamoun	*Gbayi*
	Banda	*Bamara*
	Bandjabi	*Ndzèguè, vevi*
	Bapounou	*Maguène, ma-gena*
	Bassa	*Mbondo ndjeé*
	Bavoungou	*Maguène, ma-gena*
	Baya	*Dila*
	Duma	*I-ngungu, bingungu*
	Eschira	*Meguène*
	Ewondo, ntumu	*Embgem*
	Fang	*N'zé, zeh, benze*
	Fulfuldé	*Mbarooga, njagaawu*
	Gambaye	*Tobeuye*
	Goula	*Ndjendjé*
	Goulaye	*Toboi*
	Iwum, ruumbu	*Ng-kosi*
	Kinyarwanda	*Intare, ntaré*
	Lingala	*Ntambu*
	Masa	*Zlona*
	Mpongwe	*Layoni, amale, ndjègo*
	Masango	*Maguiène, m-bungu*
	Mbuno	*M-kwe, le-kaga*
	Ndambomo	*Ngoyi*
	Nzakara	*Ndoulou* (maned lion), *Gbamakanga*or *Kinguilima* (no mane)
	Obamba	*Ngoô*
	Pidgin	*Lion*
	Pove, Simba, Nkomi, Galwa, Oroungou, Tsogo	*Ndjègo*
	Sango	*Bamara, dila*
	Saké	*N'zé, zeh*
	Sara	*Bohol, mbole, bole, basch, n'guessi*
	Shira	*Gi-bungu*
	Teke fumu	*N-kwe, ban-kwe, n-gombulu*
	Via, Kande	*Yé-mbogngo*
	Vouté	*Mbap, nir*
	Yakouma	*Mbatan*
	Zandé	*Ngbanguru, bahu*
Eastern Africa	Afar	*Lubaaka, madu, molta* (female)
	Amharic	*Ambessa*
	Gikuyu	*N-do, no-rothi, merothi* (pl.), *ngatia, mo-nyambo, me-nyambo*
	Luo	*Labwor*
	Maasai	*Olnyatuni*
	Oromo	*Leencha*
	Ruanda	*In-tare*
	Samburu	*Oiugatany*
	Somalia	*Aar, baranbarqo, libaax, gool, Davar*
	Swahili	*Simba*

Southern Africa	Afrikaans	*Leeu*
	Chichewa	*Nkharam*
	Ju/hoan Bushman	*N!hai*
	Nama/Damara	*Xaami*
	Ndebele	*In-gwenyama, i-bhubezi*
	Shangaan	*Nghala, n'shumba*
	Shona	*Shumba* (usual), *mhondoro* (spirit medium)
	Swati	*Si-Iwane, ti-Iwane*
	Sotho, Lozi, Setswana	*Tau*
	Venda	*Ndau*
	Yei	*Undavu*
	Zulu	*Ingonyama*

Chapter I
Introduction

Tanzanian lions, Masailand (Photo : Ph. Chardonnet).

"*The population of lions, like many other carnivores with the exception of the Ethiopian wolf, is a rather mysterious affair in Ethiopia….*"

Yilma Abebe & Thomas Mattanovich, 2002, pers. comm.

1. PURPOSE

The purpose of the survey is to provide interested parties with additional data on the conservation status of the lion in Sub-Saharan Africa (SSA).

This survey is considered as a contribution to the issue, which is already addressed by a number of scientists, managers and authorities, etc. The intention of the survey is to be much more a "food for thought" than a conclusive statement. The survey is attempting, not to be competitive with other surveys, but rather to be a source of complementary input. It is hopefully expected that some new sources of information and some innovative approaches will be provided and will help to improve the knowledge in this matter. A variety of views should stimulate the discussion on this important topic and, hopefully, better progress will be achieved by the entire conservation community.

It is understood that the present survey is limited to a general review of the global status of the lion. Therefore, the survey should not be regarded as a planning exercise, i.e. the study does not comprise any action plan or conservation strategy. The elaboration of a proper strategy for the long-term conservation of the lion would require a slightly different exercise with another methodology and involvement of appropriate authorities, etc. For this reason, no conservation measures are proposed, nor ranked priorities suggested or management plans recommended.

2. METHODOLOGY

2.1. CONTRIBUTORS

The survey has been carried out by a team of experts under the auspices of the *International Foundation for the Conservation of Wildlife* (IGF) since, given the magnitude of the scope, it could not be the product of a single author. So far, more than 40 persons have been directly involved to gather and analyse the data. In addition to the core group of direct authors, several members of the team have activated and consulted their own networks of African contacts, involving people with many years of field experience in wildlife conservation and management.

2.2. TIME AND DELAY

The survey began at the end of February 2002 and the final report was completed by the end of July. Within such a short period of time (5 months) it cannot be expected to provide an exhaustive survey with an entirely complete set of details and systematic cross-checking of all data. However, the output of the survey may hopefully be considered as a comprehensive review of the current situation as possible within the limits set by the available and accessible information.

2.3. SCOPE

- **Geographical scope**

The survey covers the entire continental Sub-Saharan Africa, i.e. a total of 42 countries, excluding islands where the lion does not occur.

The report includes maps of the 4 African Regions (Western, Central, Eastern and Southern) where sub-populations are delineated and defined by reference numbers corresponding to the figures produced in tables included in the text.

- **Thematic scope**

The survey includes *inter alia* the definition of the different lion sub-populations, and as much information as possible for each sub-population, including:

- The protection status and size of lion habitats;
- An estimate of lion population sizes, population densities and population trends;
- Lion habitat quality, main prey for lions (wildlife and/or livestock) and major constraints to lion conservation, and;
- The use of lion resources (whether consumptive or non-consumptive), as well as management and regulatory measures, problem animal control and poaching.

The trade in live lions and lion products has tentatively been analysed.

Relevant bibliographical references are given at the end of the report.

2.4. DEFINITIONS

- **Regions**

To remain consistent with the methodology used for the survey, the demarcation of the regions is based on ecological criteria, not on political boundaries. As a matter of fact, a given lion sub-population cannot be split in two simply because it is spread on both sides of a political border. It is not only a matter of definition, but it also addresses conservation issues; sub-populations should be considered as relevant entities for appropriate management purposes. For example, the lion populations of Virunga National Park in DRC and Queen Elisabeth National Park in Uganda should be considered as belonging to the same sub-population; consequently, both should belong to the same biological region in terms of lion conservation issues.

The definition of the regional demarcations could be discussed extensively, however some decisions had to be taken based on the available information, for instance:

- The Southern limit of the Eastern Africa region could have been set on the Rufiji river for biological reasons; nevertheless Mikumi National Park and both banks of Kilombero river were preferred to be included in the Selous Ecosystem within the Southern Africa region, and;
- A country such as the DRC has been split into 3 different "lion regions" (Central, Eastern and Southern) since it appears that they form distinctly different lion areas, each of them linked to those respective regions.

The definitions of the "lion regions" are given in Table 1.

It must be stressed that regional demarcations, which are convenient or appropriate for the lion, may not be relevant for other taxa.

For obvious reasons, political criteria (boundaries etc.) must be kept when it comes to addressing legal issues and to proposing the definition of lion Range States.

TABLE 1 - THE "LION REGIONS" USED FOR THE SURVEY

Regional breakdown	Demarcations			
	North	**South**	**West**	**East**
Western Africa	Sahara	Coast	Coast	Niger river estuary & Jos plateau
Central Africa	Sahara	Congo river lower course & extension North-eastward	Niger river estuary & Jos plateau	Nile river & DRC rain forest
Eastern Africa	Sahara	Lake Malawi & Northern limit of Selous ecosystem	Nile river, DRC rain forest & Lake Tanganyika	Coast
Southern Africa	Congo river estuary, DRC rain forest & Northern limit of Selous ecosystem	Coast	Coast	Coast

- **Protected Areas**

Protected Areas mentioned in the report are according to the IUCN criteria.

For the French and Portuguese speaking countries, the French and Portuguese word is used when it defines a specific status of protected area, for example:

- *Zone d'Intérêt Cynégétique* (French) and *Coutada* (Portuguese) may be slightly different concepts than that of a "Hunting Block", and;
- *Forêt classée* (French) has no real synonym in English.

A number of acronyms are utilized and their meaning is explained in the "List of acronyms".

- **Areas**

Distribution and size of ranges are given in km² (square kilometres).

The sizes of the Protected Areas are taken from two main sources:

- The IUCN Directory of Afrotropical Protected Areas (IUCN, 1987), and;
- The African Antelope Database 1998 (East, 1999).

The sizes of the non-gazetted areas are sourced from either literature or experts' opinions.

- **Sub-populations**

In this study, two lion sub-populations are considered as two separate lion populations with very few or without any exchanges. Sub-populations are defined here as distinct populations separated by:

- Natural barriers such as large rivers or mountain ranges, and/or;
- Extensive areas of human settlements, and/or;
- Very large distances.

The fact is acknowledged that this definition of sub-population reflects the situation at a particular time in the historical trends of the lion in the continent. This situation is likely to evolve further, hence needs modification to the classification proposed in the present study, and is open to discussion. Nevertheless, this geographical definition will help in the assessment of the lion status in the various regions.

- **Unit of measure**

The following rules have been applied:

- Range figures are given in km² with no decimal;
- Density figures are given in lions/100 km² with one decimal only;
- Population figures are given with no decimal, and;
- Percentages are given to break down the lion range and the lion population size. Given the low level of global accuracy, there would be no point in giving a precise %, which explains the reason why tables show % figures without a decimal.

- **Terms**

The words "lion" and "lions" are used as generic terms, unless lioness, sub-adult lion, lion cub or male lion are mentioned.

Various words are used to define non-sedentary lions: erratic, migrant, nomad, nomadic, occasional, temporary, transient, vagrant, wanderer, have been considered similar.

2.5. DATA COLLECTION

- **Difficulty**

As expected, collecting reliable information proved to be a complex exercise. One of the main difficulties appears to be the variable quality of information, some of it being more precise, more detailed, more reliable, etc. than others.

The lion belongs to a group of taxa that is difficult to study for a number of reasons. The densities of large predators are usually much lower than the densities of their prey species, in the rough order of 1 to 100, making them obviously less prone to be observed, either directly or indirectly. Furthermore, lions quickly become secretive and nocturnal as soon as they are subject to hunting pressure and even more so when and where they suffer from harassment. The counting methods by direct observation (with or without calling) provide results which

must be considered as minimum numbers with these shy and nocturnal lions. Under such conditions, the behaviour of the lion becomes similar to the one of leopard, a species which is rarely observed, although omnipresent in SSA. Furthermore, a particular counting method may be valid for a given case-study and not for another, e.g. (Loveridge, A.J., T. Lynam & D.W. Macdonald, 2001):

- the calling station technique is suitable for lion surveys in medium to high lion density areas, while the spoor frequency technique is more suitable and more cost/effort effective than calling station in low density areas;
- the level of interaction between lions and hyaenas may influence response to calling: (i) in areas with high-density hyaenas and low-density lions, the lions may not respond to calling with hyaena sounds, (ii) in areas with no hyaenas, the lions may not respond to calling with hyaena sounds.

Huge tracts of lion habitat are indeed remote wilderness regions, which are often difficult to access. The attention of conservationists inevitably focuses on the areas with easiest access, roads, and infrastructure etc., particularly those Protected Areas, which are well suited for tourism purposes. As a matter of fact, data on lion are available for these locations, while they are scarce or absent for the others. Pastoral rangelands with presence of lions are generally overlooked since they are (i) rarely studied, (ii) extensive areas with low lion densities and (iii) of difficult access. Also, due to the habit of the lions to walk on dirt tracks, the observation (and the counting) of lions is much more difficult in areas with a sparse road network, e.g. Protected Areas such as Faro National Park in Cameroon or Pendjari National Park in Benin.

Civil unrest, mass movement, settlement of refugees and any political turmoil represent other reasons for the difficult access to some lion distribution areas, which makes it necessary to base estimates of current status of lion populations on “educated guesses”.

During the rainy season, the situation of lion in terms of distribution and behaviour is not well known since access to many areas becomes very difficult, and often even impossible, at this particular time of the year.

- **Presence/absence**

On the one hand, a single observation of lion means presence of the species, either permanent or occasional. Conversely, no physical observation of lion does not necessarily confirm the absence of the species from an area.

However, "*as lions are great wanderers, they may be expected to turn up from time to time in areas where for many years they were unknown, often far from their present limits of distribution; there are many examples of this*" (Smithers, 1983). A considerable number of cases could be quoted in this regard. To mention only a single and recent example, a solitary adult male lion has settled down early 2002 in a ranch nearby Chinhoyi close to Harare, Zimbabwe, where the taxon had not occurred for decades (C. Coid, pers. comm.).

- **Abundance**

Information on density, pride size, hunting success, eventually hyena/lion ratio etc. provide data to estimate the abundance of a given lion population.

The concept of density (number of lions/100 km²) is difficult to use for a number of reasons:

- As censuses and indices of abundance are never fully accurate, a single figure of density is always appropriately subject to relevant criticisms;
- Uninformed persons are prone to make use of a single figure of density, even sometimes for an entire country, and;
- Lion density figures are not to be regarded as fixed in time, since lion populations are subject to significant fluctuations due to a number of factors such as:
    - Natural factors: *inter alia*, all predators adjust their population dynamics to the population dynamics of their prey basis;
    - Human factors: direct (predation and disturbance by humans) or indirect (decrease in prey availability and/or habitat quality), and;
    - Epidemic diseases, which can cause drastic reductions in lion numbers every so often.

Despite these limitations, it appears useful to present available figures of lion density with the intention of providing an indicator for comparing sites. But it must be borne in mind that:

- Some of these density figures originate from field studies;
- Others are calculated from the estimated population size and surface of habitat, and;
- The rest is evaluated from comparisons with available population assessments from either neighbouring or similar situations.

Admittedly, the density figures given are more often issued from experts' opinions than from precise field observations. Nevertheless, they provide useful benchmarks to avoid wild guesses of global population sizes.

Obviously, lion density figures always correspond to a given area. However, they are usually not calculated by country or by region, as densities in those broad geographic entities would not have much significance.

2.6. DATA ANALYSIS

- **Presence/absence**

Using the data of lion presence/absence it is possible to define:

- Distribution range;
- Sub-populations, and;
- Proposed Range States (countries where lion occurs, either permanently or occasionally).

This information is usually very reliable, as it is quite easy to collect.

- **Sub-populations**

The different sub-populations have been designated on the basis of the following criteria:

- Information on presence/absence (not abundance);

- The recent continuity of local populations with current or recently interrupted flows of animals;
- Some sub-populations have been considered as separate sub-populations even though they used to be linked historically, e.g. sub-population n° 4 in Cameroon and sub-population n° 5 in Chad and CAR used to make a single sub-population before they were fragmented to the point of having no more linkages;
- Some local populations very recently isolated (currently no more exchange of animals) have been considered belonging to the same sub-population, for example:
    - In Mali, sub-population n° 1.6 in the South-West used to be linked with sub-population n° 1.7 in Boucle du Baoulé National Park;
    - Sub-population n° 4.2 in Yankari National Park, Nigeria, used to be linked with sub-population n° 4.1 in Faro National Park, Cameroon, and;
- Some doubts remain for certain sub-populations, e.g. in Mozambique it is uncertain whether sub-population n° 27 is linked with sub-population n° 31; if it is the case, then they should be considered as a single sub-population.

- **Abundance**

Population size figures are given by several assessment modes (Table 2), which are ranked according to their reliability as follows:

- Assessment mode A:

The estimated population size is produced by total census or abundance index or density or intimate knowledge of an area including lions, prey availability, use, etc. Minimum and maximum figures are calculated with a 10% error on the estimate.

- Assessment mode B:

The estimated population size is produced by comparison of the given population with known population in a similar ecosystem, usually in a neighbouring area. Using hunting results following a calculation of ratio may also make this comparison. Minimum and maximum figures are calculated with a 20% error on the estimate.

- Assessment mode C:

The estimated population figures are produced by experts' opinions usually based upon first hand information, sometimes on "guesstimates" drawn from available information. Minimum and maximum figures are calculated with a 30% error on the estimate.

TABLE 2 - THE DIFFERENT ASSESSMENT MODES USED TO ESTIMATE LION POPULATION SIZES

Assessment mode	Population size		
	Minimum	Estimated	Maximum
A	- 10 %	Figure	+ 10 %
B	- 20 %	Figure	+ 20 %
C	- 30 %	Figure	+ 30 %

- **Complementary note on the assessment mode B**

Assessment mode B may consist of a comparison of the hunting results. The given lion population is assessed by comparison with an already assessed lion population using ratio of hunting results/efforts/sucess as measurements of catch-per-unit-effort (CPUE). The ratio of the number of lion obtained per hunter and per hunting day is considered as representative of the sampling effort made by an average hunter in a given area, thus it may be regarded as an interesting indicator of the lion population for this particular area. "*An advantage of CPUE estimates is that the rquired data can be collected by hunters* [and other local stakeholders]… *In cases of sustained-yield harvesting, CPUE estimates are probably sufficiently accurate because underestimates would lead to conservative management decisions*" (Lancia *et al.*, 1996).

For instance, the density of lions has been assessed in the hunting areas of Burkina Faso. In countries of the same region, the lion density in the hunting areas of a given country is estimated by multiplying the already assessed lion density in Burkina Faso hunting areas by the ratio of the hunting result in the hunting areas of the given country (number of hunted lions per 100 km²) divided by the hunting result in Burkina Faso hunting areas (Table 3). Such an approach might be of some validity if the hunting effort is constant year after year. In the present case study of Burkina Faso, the number of big game hunting permits was fairly constant for the last 5 years (roughly 180 per year), as well as the average period of a big game hunting trip (about 6 days of operational hunting in the field per hunter).

TABLE 3 - ESTIMATION OF LION DENSITIES BY COMPARISON OF THE HUNTING RESULTS: AN EXAMPLE FROM WEST AND CENTRAL AFRICA

Country	Lions hunted per 100 km²	Lion density (lions/100 km²)		
		Already assessed*	Estimated in the area hunted for lion**	Extended to the total hunting area***
Burkina Faso	0.16	5	5	5
Senegal	0.05		1.6	0.2
Benin	0.12		3.8	3.4
Cameroon	0.05		1.5	1.3
CAR	0.05		1.6	0.5
Chad	0.08		2.3	1.6

** Chardonnet, 1999*

*** The estimated lion density in the hunting areas of a given country is the already assessed lion density in Burkina Faso hunting areas, multiplied by the ratio of the number of hunted lions per 100 km² in the hunting areas of the given country by the number of hunted lions per 100 km² in Burkina Faso hunting areas, given that time factors remain constant*

**** The distribution area of lions does not match the surface of hunting areas*

- **Figures**

Since all efforts have been made to be as accurate and consistent as possible, careful precautions are taken in producing figures. Conservative estimates are given systematic preference. Averages are calculated when discrepancies appear between two or more sources for a given site. For instance, in the case of Ethiopia, discrepancies appear very high between

sources, with estimates differing by a factor of 5 for lion population numbers. In this particular instance, reasonable conservative decisions had to be taken upon basis of experts' opinions.

- **Trends and Constraints**

A summary of the trends and constraints facing the various populations by region are given in Tables 14, 17, 20 and 23.

- **Precision**

Tentatively, the minimum-maximum range assesses an indication of the precision level for the population size.

- **Accuracy**

At this stage, there is no way to know exact numbers of free-ranging lion population size. Excellent accuracy is to be expected for enclosed populations of lion in Southern Africa.

3. LIMITATIONS

3.1. GENERAL COMMENTS

This survey does not pretend to be:

- Exhaustive: some lion populations have certainly been forgotten, ignored, overlooked, etc;
- Perfect: most probably knowledgeable experts may notice some errors;
- Definitive/conclusive: improvements are hoped for, from better observation and fluctuations from future monitoring, and;
- Exclusive: other contributions are expected to complete this survey.

This survey is claiming to be:

- Based on honest assumptions to the best of available knowledge;
- As comprehensive as possible within the limits of the available capacity;
- Conservative in the way that cautious figures and prudent assumptions have been used, and;
- Valid only at the time of its publication. It should be considered as a snapshot in time, acknowledging that status, situations, figures, etc. may change over time. Nevertheless, it may be regarded as a bench mark of the 2002 situation for future studies.

It must be emphasised that exact data on the status of lions, as it is for most African mammals, is extremely difficult to secure, especially for those of the lion populations which are exclusively nocturnally active. Published data has been referred to where available, however, in many instances this report has had to rely on the "informed opinion" of local experts, resource managers and scientists based in the respective countries, or with long field experience of working with wildlife.

Numbers given in this report, in all other cases, are based on experts opinion, with cross-referencing whenever possible.

The present report aims at providing a picture of the conservation status of the species *Panthera leo* in Sub-Saharan Africa. It is not intended to represent an exact count of lions continent-wide.

Lion populations have fluctuated widely in the past, but show a remarkable degree of resilience and capacity to bounce back after a rapid decline, therefore the figures indicated for a given population/sub-population may be smaller or larger in a few months time.

3.2. MAPS

5 original maps are produced in this survey:

- 1 general map of the global distribution area of the African lion in SSA, and;
- 4 regional maps, 1 for each of the 4 identified regions, giving a more precise picture of the lion distribution in each region.

The maps are tentatively proposing the limits of the lion sub-populations identified in this study. The delineation of the different sub-populations tries to sketch out the lion distribution to the best of the available knowledge. These maps are indeed subject to discussion considering that:

- Some of the sub-populations are obvious and most probably will not be challenged, and;
- Others are more than questionable and open to interpretation.

It is certainly expected that these maps will be improved. Some of these improvements are already known, for instance:

- In Mozambique: a new National Park under creation, *Parque Nacional* das Quirimbas, on the Northern coast of the country, in Cabo Delgado Province, appears to host a quite large population of lions (H. Motta, pers. comm.);
- In Ethiopia: a small isolated area not mentioned on the map contains some lions in lower Tekeze river valley, Shire region, as far North as the Eritrea border (T. Mattanovich, pers. comm.), and;
- North-central Nigeria may apparently contain a small population centred on Kamuku National Park (about 1,500 km² but part of a much larger area of forest reserve, grazing reserve) which is contiguous with Kwiambana Game Reserve (J. Rudge, pers. comm.).

The positioning of frontiers on the maps in no way implies official recognition or acceptance by the editor or by the respective countries.

3.3. OFFICIAL VALUE

The information provided here has no political value, as it is not meant to appear endorsed by political authorities. It is only given as technical support to help decision-makers and other interested stakeholders.

4. PROSPECTS

It is not the primary intention of this survey to make recommendations. However, by conducting such a study, obvious prospects became apparent.

The first and main prospect to come out is the urgent need to conduct a planning exercise such as an action plan or similar guidance document. This action plan should be drafted by all appropriate and consensual means, involving every responsible and interested stakeholders, i.e. political authorities, specialised scientists, local communities living with lions, the private sector involved, development and conservation NGO's, etc.

Since the African continent carries by itself the burden of conserving this outstanding and charismatic species, Africans should be the primary stakeholders to design lion action plans and to take the strategic decisions.

The next prospect to come to light is the necessity to discuss the implementation of the designed action plan. This discussion should take place in the same framework as the planning exercise, since too many action plans are left without being implemented and adapted to changes over time.