

Panthera leo

(Linnaeus, 1758)

(Eng) Lion
(Fre) Lion

Taxonomic notes

Seven subspecies were commonly recognised for Africa, but their validity is debated as they could probably be grouped into a single African race (Nowell & Jackson, 1990); in fact, the African lion is often considered as monotypic (e.g. Kingdon, 1997; Skinner & Smithers, 1990).

IUCN threat category

Vulnerable (VU: criteria A1cd).

Available information

The species has been widely studied in East and Southern Africa; little is known on its ecology in the northern, central, and western part of the continent. Authors have focused mainly on aspects of its ecology such as population dynamics, behaviour and feeding strategies; no specific studies on habitat use and requirements have been conducted.

East Africa: A study on the foraging behaviour and hunting strategies was carried out in the Queen Elisabeth National Park (Uganda) by van Orsdol (1984a). Several studies have been carried out on population dynamics and reproductive behaviour in the Serengeti-Ngorongoro ecosystem (Tanzania) (Hanby, 1987; Packer & Pusey, 1983; Pusey & Packer, 1987); a study on the reproductive biology of the species was also conducted in the Nairobi National Park (Kenya) by Rudnai (1973). Some data on the population density in the Nechisar National Park are reported by Duckworth (1992). The relation between feeding strategies and social organisation is analysed in Rautenbach & Nel (1978); the authors compared data from several protected areas in East Africa (Lake Manyara National Park, Tanzania; Queen Elisabeth National Park, Uganda; Serengeti National Park, Tanzania and Southern Africa (Kruger National Park, South Africa). Data on the species' presence are available for Ethiopia and Eritrea (Yalden et al., 1980, 1996), Rwanda (Monfort, 1992) and Somalia Funaioli (1971); most of the references mentioned above include some information on the species' ecology.

Southern Africa: Authors have mainly focused on population dynamics, reproduction, and social behaviour. Data on the matter are available from the Kruger National Park (South Africa) (Starfield et al., 1981; Ventner & Hopkins, 1988), Kalahari Gemsbok National Park (South Africa) (Mills et al., 1978), and from Etosha National Park (Namibia) (Oxford et al., 1988). Dependence on water and patterns of movements in relation to drought are discussed in Clarke & Berry (1992), Mills (1995) and Dunham (1994). Some information on its feeding habits is found in Mills (1992), who reports data from the Kruger National Park (South Africa). Predation on livestock in northern Namibia is discussed in Stander (1990). Data on the species' presence are available for most of South Africa (Gelderblom et al., 1995; Lynch, 1989; Pringle, 1977; Rowe-Rowe, 1992; Stuart et al., 1985), Botswana (Anonymous, 1994a), Angola (Crawford-Cabral & Paías Simoes, 1990), and northern Namibia (Viljoen, 1982). A detailed account of the species' ecology in the subregion is found in Mills & Hes (1997) and in Skinner & Smithers (1990).

Northern, Central and West Africa: No ecological studies have been conducted. Information on status and presence in the past in Morocco is found in Anonymous (1994b) and in Aulagnier & Thévenot (1986). Some data on the species' presence are available for former Zaire (Verschuren, 1975). Conservation issues and the species' status in Nigeria are analysed in Osemeebo (1988).

General information on the species' ecology is reported by several authors (Estes, 1991; Kingdon, 1997; Kitchener, 1991; Richardson, 1992; Stuart & Stuart, 1997; van Orsdol, 1984b). Status, distribution and ecology are discussed in Nowell & Jackson (1996). Conservation issues are also discussed in Myers (1986).

Known extent of occurrence

According to Nowell & Jackson (1996) the lion, formerly occurring from northern Africa (Algeria, Egypt, Libya, Morocco and Tunisia) to southern Africa and through south-western Asia, is now widespread only in Botswana, C.A.R., Ethiopia, Kenya, Tanzania, former Zaire and Zambia. Its status in Angola, Mozambique, Sudan and Somalia must be clarified (Nowell & Jackson, 1996), while it is thought to be more or less sparsely distributed in Benin, Burkina Faso, northern Cameroon, southern Chad, southern Congo, northern Ivory Coast, northern Ghana, northern Guinea, eastern Guinea Bissau, southern Mali, northern Nigeria and Uganda. On the contrary in Burundi, Malawi, Niger, Rwanda, Senegal and South Africa populations are believed to be confined to protected areas. It is virtually extinct in Djibouti, Gabon, Lesotho, Mauritania, Swaziland and Togo. The distribution map (Fig. 3.2.9.a) was obtained from the Nowell & Jackson (1996), and was subsequently revised by Dr. P. Jackson (28 April '97).

Categorical-discrete (CD) distribution model

Found in a wide variety of environments, the species appears to be absent only from rain forest and the interior of the Sahara desert. Optimal habitat types are represented by woodlands and thick bush, scrub and grass complexes; also found in montane moorland (Nowell & Jackson, 1996; Yalden et al., 1980). Based on these environmental preferences, the following scores were assigned (Fig. 3.2.9.b) (3.2.9.a):

Score

- 1 Savanna.
- 2 Mosaics of savanna with forest and cropland; desert vegetation.
- 3 Croplands; forests.

suitable		moderately suitable		unsuitable		Total	
km ²	%	km ²	%	km ²	%	km ²	%
6 740 189	62	2 731 568	25	1 467 818	13	10 939 575	100

Tab 3.2.9.a: Cumulative size (km²) of areas pertaining to each environmental suitability class within the Extent of Occurrence.

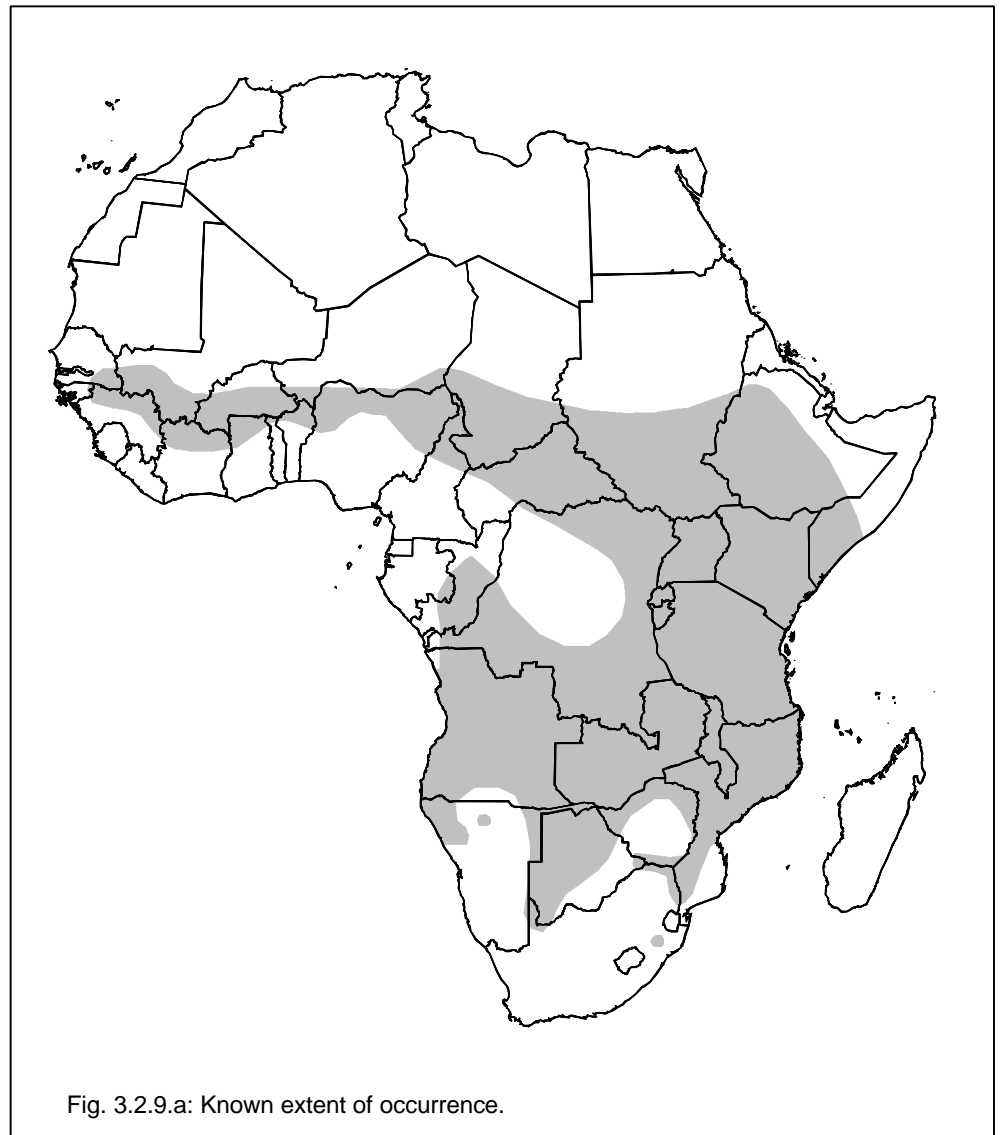


Fig. 3.2.9.a: Known extent of occurrence.

	Number Patches (NP)	Mean Patch Size (MPS) km ²	Patch Size SD (PSSD) km ²	Largest Patch Index (LPI) %	Mean Shape Index (MSI)	Area-Weighted Mean Shape Index (AWMSI)
Suitable	3 207	2 101	110 475	66.04	1.27	51.04
Moderately suitable	6 649	412	11 698	8.64	1.28	21.16
Total AO	869	10 902	317 780	98.94	1.25	30.28

Tab 3.2.9.b: Area of Occupancy fragmentation indexes.

Probabilistic-continuous (PC) distribution model

The output of the probabilistic-continuous (PC) distribution model is shown in Fig. 3.2.9.c.

Validation

% of EO in sample areas	Number of valid plots	Index of Accordance (%)
6.67	196	53.57

Tab 3.2.9.c: Categorical-discrete (CD) distribution model validation parameters.

Comments and conservation issues

Suitable areas occupy 62% of the total EO and moderately suitable areas occupy 25% of it (confidence in this figures is given by the validation parameters). As for all large predators, direct human hunting is far more important than habitat suitability, and the species is often restricted only to the protected areas. These account for about 10% of the total AO of the lion: given the natural low density of the species, the limited size of the protected areas and their uneven distribution over the species' AO, the existing network of protected areas may not be able to ensure the conservation of the species. A more detailed analyses of these spatial patterns may provide further data to work on. Considering the total AO, suitable areas are very fragmented (NP=3 207), but fragmentation is significantly reduced (NP=869) when the moderately suitable areas join to form the expected AO. The shape of these patches is also significantly uneven, as shown by the comparison of the two shape indexes. The known EO shows some large unsuitable areas especially in the forests of the Zaire basin (particularly in the eastern ranges). Moreover, the shape of the western portion of the EO seems very narrow: not only is the EO there small but it may also be broken easily into separate patches. In southern Africa, the EO excludes most of Namibia and Zimbabwe with a pattern that clearly reveals the active elimination of the lion from agricultural/livestock areas.

SUITABILITY CLASS	inside	outside	Total
suitable	7.63	53.98	61.61
moderately suitable	2.20	22.77	24.97
unsuitable	1.22	12.20	13.42
Total	11.06	88.94	100

Tab 3.2.9.d: Percent of environmental suitability classes within EO (as obtained from the categorical-discrete distribution model) inside and outside the protected areas.

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