Elephants of the Dzanga-Sangha Dense Forest of South-western Central African Republic

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INTRODUCTION

The Dzanga-Sangha Dense Forest Reserve in southwestern Central African Republic (CAR), covering an area of approximately 4 000 km^2 in the Sangha Economique Prefecture (Figure 1), contains the highest known population density of elephants remaining in the dense forest zone of Africa (Table 1) (Carroll, 1986a; Western, 1986 a). Elephant density estimates, measured by dropping counts (Wing and Buss, 1970; Short, 1983; Jachmann and Bell, 1979) indicated a range of 0.016 to 2.63 elephants/km^2 in the northern regions surveyed by Carroll (1986a) (Figure 2). The southern region surveyed by Fay (1987) indicated a much lower elephant density of 0.064/km^2. Both **Loxodonta africana africana** and **L. a. cyclotis**, as well as an apparent intergrade between these subspecies, are represented in this area (Carroll and Hulberg, 1982; Carroll, 1986a). This has recently been rereported by Western (1986b). This intergrading of elephant subspecies in CAR is discussed by Blancou (1958) (in Meester and Setzer, 1971). These two subspecies and their intergrades exist sympatrically throughout CAR and were commonly observed in the Manovo-Gounda-Saint Floris National Park, close to the northern Sudanese border (Carroll and Hulberg, 1982). This is likely due to climatic and habitat fluctuations throughout the past 10 000 years as described by Western (1986b). Currently gallery forests extend from the dense forests of the

Congolese basin northward into the Chadian basin, forming a forest-savanna mosaic throughout CAR. These gallery forest corridors are extremely important in the biogeographical distribution of CAR's flora and fauna (Carroll and Hulberg, 1982; Fay, 1987).

The existence of the pygmy elephant (L. a. pumilo) in these forests is discussed by several authorities in Meester and Setzer (1971) and remains entirely without evidence. These alleged pygmy elephants have again recently been doubted by Western's observations (1986a,b) of forest elephants in the Dzanga clearing. He observed what he described as a class pygmy elephant enter the clearing, approach an adult female cyclotis and begin nursing. Due to the poor visibility of the habitat and the large inter-individual distance between fore elephants when travelling and foraging in the dense forest, well as the early tusk development of this subspecies compared with'**africana**, immature individuals of **cyclotis** may have been considered a separate race. Western observations lend support to earlier conjectures (Morrison Scott, 1947; Petter, 1958; Pfeffer, 1960) that the pygmy elephant is a juvenile forest elephant, but do not confirm its non-existence. Although I also doubt the existence of pygmy elephants after nearly six years of ecological work in the CARs savannas and forests, I do not feel that Western single observation at Dzanga ends the debate. Dzanga is saline pan in the middle of non-inundated primary and secondary lowland forests (Carroll, 1986a). The pygmy elephant is reported to be a creature of the inundated swam p forests which exist in abundance in the extreme south of CA and western Congo, but not around Dzanga. Careful observations in these underexplored and almost inaccessible Congolese swamp forests will be necessary to end this controversy.

Table 1. Density of elephants (Loxodonta africana) in forest or partially forested habitats.

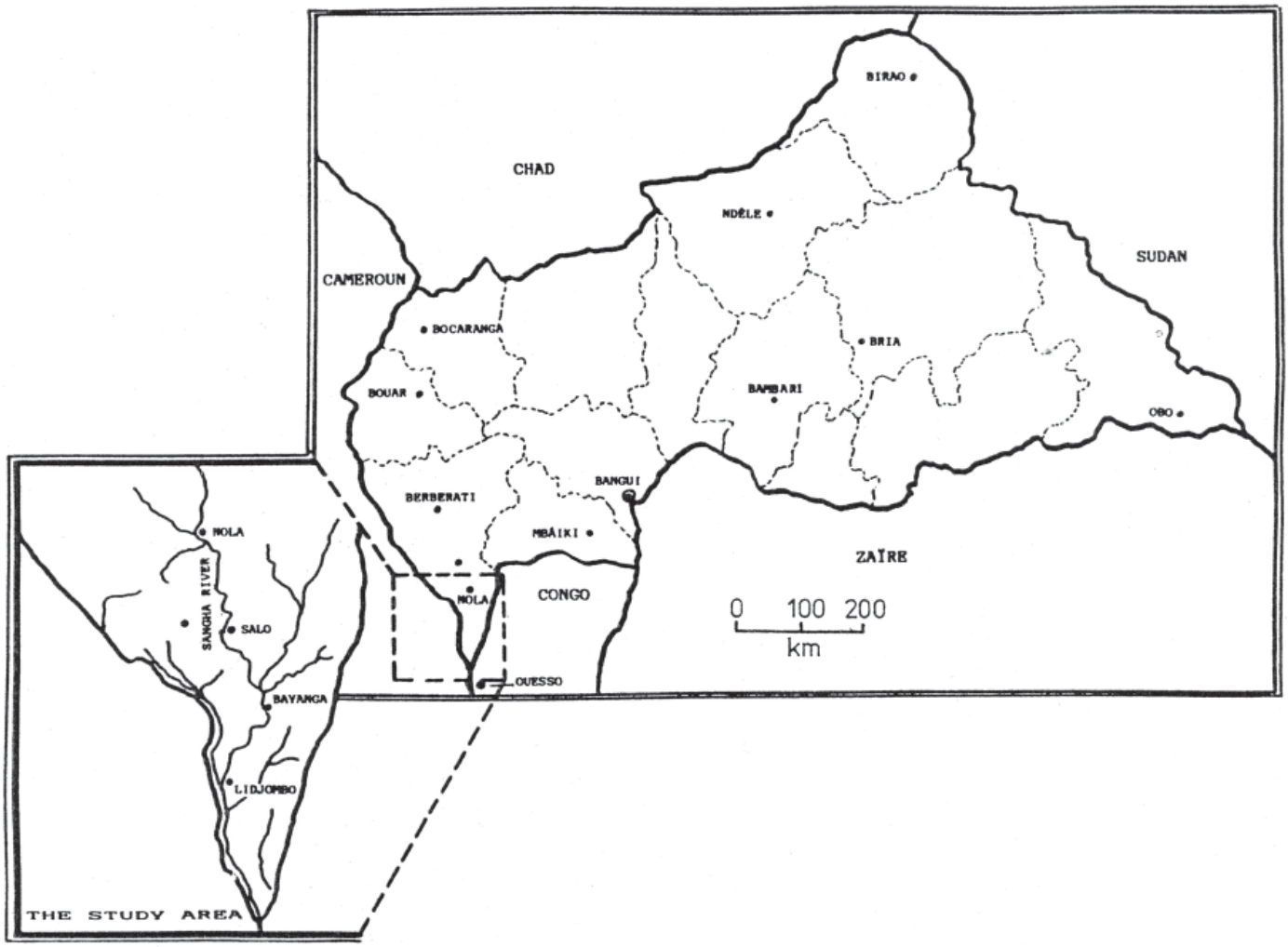
Density km^2	Locality	Habitat	source
0.76	Kibale Forest, Uganda	Rainforest, thicket, grassland	Wing and Buss (1970)
0.53-0.84 (wet season) 2.11-3.16 (dry season)	Budongo Forest	Moist semi-deciduous rainforest	Laws, Parker, Johnstone (1975)
0.67	Kilimanjaro, Tanzania	Rainforest, softwood plantations	Afolsyan (1975)
0.15-0.33 (wet season) 0.29-0.58 (dry season)	Bia National Park, Ghana	Rainforest	short (1983)
0.28-0.68	Kasungu National Park, Malawi	Brachystegia woodland	Jachmann and Bell (1979)
0.16-2.63	Southwestern CAR	Moist semi-Deciduous dense forest	This study

The small body size and straight- to backward-pointing tusk typical of **cyclotis** may be adaptations to facilitate movement in the closed dense forest habitat. Forest elephants observed penetrating dense vine thickets proceed with their heads down, tusks into the body, deflecting the tangled vegetation as they tunnel through. Why the apparently faster tusk development in **cyclotis** than in **africana**? The reason unclear but perhaps Gould (1986) has an explanation in h essay on dwarfism. He states that a decline in body size often far outstrips decrease in many particular features. Dwarf always seem to have some body parts that are proportionate larger than those of related nondwarfed species of the same overall body size. He relates this phenomenon to development in dwarfed hippos and othodontic problems humans —why not elephants?

ELEPHANTS AND FORESTS IN CAR

Elephants play, the role of a keystone species having profound effect on forest ecology (Wing and Buss, 1970 Short, 1983; Kortland, 1984; Calvert, 1985). The "bulldozer" actions of elephants may truncate succession in secondary patches in lowland African forests (Wing and Buss, 1970 Kortland, 1984; Calvert, 1985; Carroll, 1986b; Western, 1986a Fay, 1987), resulting in a multi (dis)-climax community, the stability of which depends on several factors, including grazing pressure (Belsky, 1986a,b,c and references therein Elephants create tree fall gaps (Brokaw, 1985; Carroll, 1986a,b Fay, 1987), thus increasing the number of gaps. They may also play a significant role in maintaining stands of particular species (Laws et al., 1975). particularly members of the families marantaceae (Guillaumet, 1967) and Zingiberaceae (Calvert, 1985), many of which are of

Figure 1. The Central African Republic and study area.



paramount importance to the gorilla for food and nesting material, as well as to other forest wildlife (Carroll, 1986a,b; Fay, 1987). Elephants in southwestern CAR maintain, enlarge and possibly create marshy clearings within the forest in their search for minerals, forage and water. These herbaceous marshy clearings are of major importance for bongo, buffalo, sitatunga, bush pig, giant forest hog and a host of forest wildlife and bird species. The highest density of elephants in the study area was ng the region of these marshy clearings. Many of the major elephant trails simply connect these clearings. The vast network of elephant trails are the major thoroughfares of the Aka Pygmies inhabiting these forests. The combined effects of high winds, lightning, landslides, honey gathering, agriculture, logging and elephant activities maintain the forest in a state of dynamic dis-equilibrium and are likely partially responsible for the great diversity of the floral and faunal communities of the African dense forests. Although no detailed analysis of herd structure and population dynamics has yet been made, observations at Dzanga and other marshy clearings show all age and sex categories represented, many 'gros porteurs' as well as young. Forest elephants seem to travel ng small family groups or individually, forming larger aggregations at these open clearings. In one such aggregation of 60 elephants at the Dzanga clearing, 12 young elephants one year" old or younger were noted. indicating significant reproduction.

DENSITY ESTIMATES

During the course of ape nest count transects, elephant droppings were counted in a 5m wide strip in an effort to estimate elephant density in the study area. Descriptions of elephant dropping count sampling techniques are detailed in Wing and Buss (1970), Short (1983) and Jachmann and Bell (1979). In this study, no estimates of dropping deterioration or accumulation rates for the CAR forests were made. Data for elephant dropping deterioration and elephant defaecation rate were taken from Wing and Buss (1970). Dropping density was simply divided by 1360 (deterioration = 80 days x defaecation rate = 17 droppings/elephant/day). Estimates of dropping deterioration vary considerably in the studies mentioned, and from rainy season to dry. It is assumed that conditions affecting dung deterioration in Kibale Forest, Uganda (Wing and Buss, 1970) are similar to those of the study area. The raw data on dropping densities can be easily adjusted if refined factors are determined.

Table 2 indicates the overall elephant density estimated from the regions sampled by Carroll (1986a) was 0.86 elephants/km^2 with a range of densities of 0.016 to 2.63. Including the lower density figures in the areas sampled by Fay (1987), the overall density is reduced to 0.60 elephants/km^2. Several factors may account for the lower densities estimated for these southern regions. One may be methodological. Fay's sample was taken during the rainy season, in July and August, while those taken by myself were

Figure 2. Sample blocks in study area.

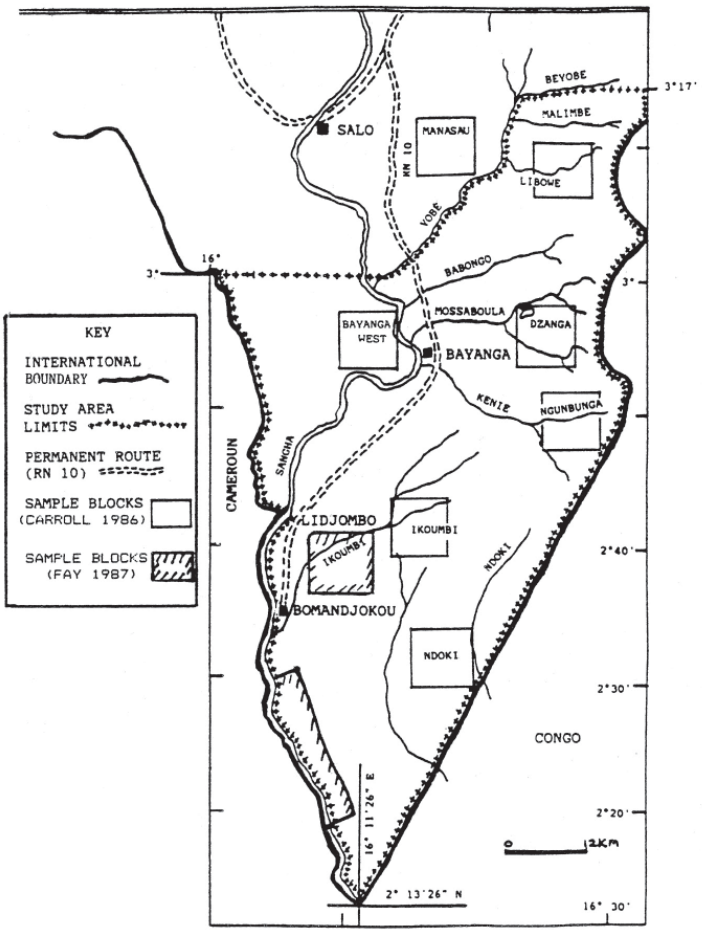


FIgure 3. Dzanga-Sangha Dense Forest Reserve (proposed).

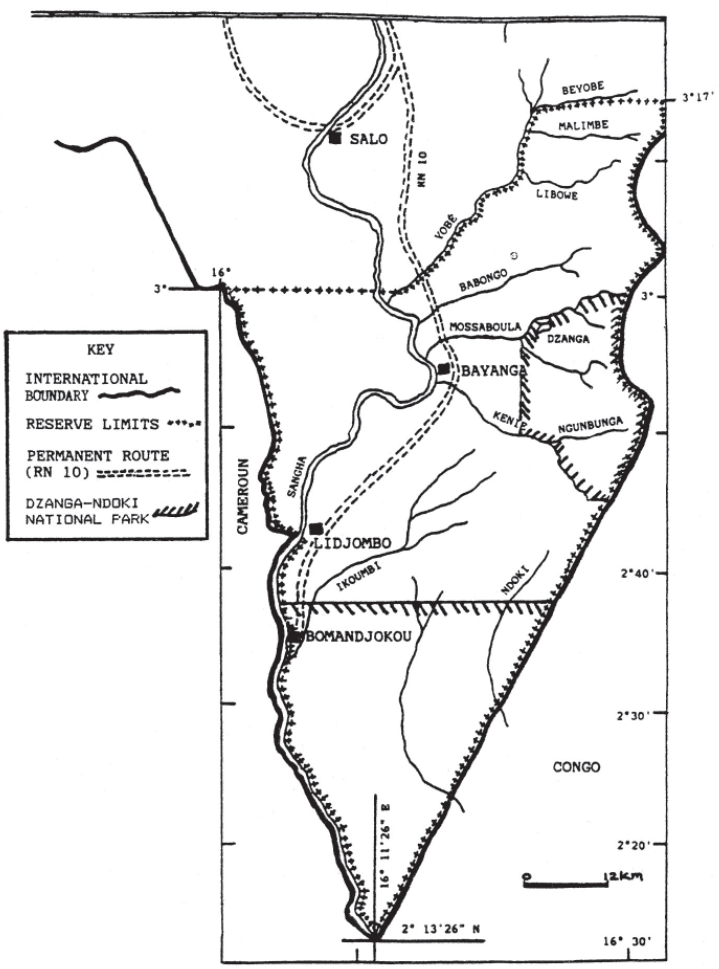


Table 2. Elephant density from dropping counts (transect width 5 m, dropping duration = 80 days, droppings/elephant/day = 17)

Sector	No. ofdroppings	kmsampled	km²	Dropping/ km	Density/ km²	No. of Elephants
Libowe	972	76.4	0.38	2557.8	1.88	188
Ikoumbi	100	61.5	0.31	322.6	0.24	24
Manasau	8	71.4	0.38	22.2	0.016	1.6
Ndoki	70	65.1	0.33	212.12	0.156	15.6
Kenie	250	14	0.07	3571.4	2.63	263
Dzanga	879	77.9	0.39	2253.85	1.66	166
Baywest	293	75	0.38	771.1	0.57	57
Mean				1387.31	1.02	715.2
Total	2571	441.3	2.21	1163.35	0.36Z	
Reserve estimate			4000.00			3440 + /- 928
Section 1 (Fay)	51		0.55			0.068
Section 2 (Fay)	42		0.52			0.059
TOTAL	2665		3.29	810	0.60	2382 + /- 643

between the months of November and May, in the dry season. There may be considerable differences in dung deterioration between the dry and wet seasons. A very strong influence on these density figures is the differential poaching pressure throughout the area. Elephants in the far south of CAR and along the southern Sangha river suffer from extreme poaching pressure mostly at the hands of armed Congolese hunters and Hausa merchants. Fay (1987) reports several poaching camps along the Sangha and on its islands as well as around the village of Bolongodi. Carroll (1986a) also reports several tonnes of ivory imported into CAR at Lidjombo. False papers of origin were freely given by the former Police Commissioner of Lidjombo. In the north, considerable poaching pressure along the Yobe river and its tributaries, as well as development and agricultural projects have all but eliminated elephants between the Yobe river and the Salo plateau. Much of this poaching activity is undertaken by highly-placed regional and national authorities or those operating under their protection. This heavy pressure from the north and south may be causing a compression effect of elephants into the interior of the region and may be partly responsible for the extremely high densities in the Libowe area.

The Dzanga clearing is known to the local pygmies as 'the village of elephants'. Oral history and early European visitors indicate that this has long been a major concentration point for elephants. Dzanga, approximately 400 m long and 200 m wide with mineral rich soils, is like the hub of a wheel with elephant trails radiating out in all directions.

Along the Kenie stream, with seven large herbaceous marshy clearings and several saline areas, the highest elephant density in the region was recorded.

In the proposed conservation plan for the region, the area between the Mossaboula and Kenie streams, containing the Dzanga and Ngubunga clearings, will be part of the Dzanga-Ndoki National Park (Figure 3). This sector is approximately 320 km². The primary forest region south of 2 degrees 38 minutes north (approximately 960 km²) will also be given

national park status. The remaining area will be classified as a wildlife sanctuary, with an integrated, multiple-use management programme. Current logging activities, traditional hunting and gathering, sport hunting and diamond searching will be allowed on a controlled basis. Through this integrated management plan we hope not only to provide protection for the elephants, gorilla and other wildlife populations, but also ensure the cultural continuation of the Aka Pygmies and maintain a sustainable resource base for the area.

Elephant populations in the CAR have declined from an estimated 60000 in 1979 (Douglas-Hamilton, 1980) to approximately 15 — 20 000 in 1985 (Douglas..Hamilton *et al.,* 1985). This precipitous decline has been due to very heavy armed poaching, especially in the north and east of the country. This is likely in response to the sharp increase in ivory prices. Poachers from Tchad and Sudan, now armed with automatic weapons from the Tchadian war, have replaced the spear-bearing horsemen in these areas and are systematically emptying the country of elephants. These poachers, up to one year ago, had been complemented by the 'Ivory Collectors', people licensed to buy and retrieve 'found' ivory. The major method in which ivory was 'found' was by supplying local Africans with firearms to 'find' ivory on the hoof. These ivory collectors are largely responsible for the elimination of elephants in the east of CAR in the region of Bangassou. Since supplies have dwindled in the north and east, the collectors began turning to the forests of the southwest for their supplies.

Approximately one year ago, CAR President Kolingba outlawed ivory collection and the hunting of elephants. This action has been greatly applauded by conservationists in the country and we recommend at least a 10-year moratorium on these activities. The elephant populations have been so decimated that they can no longer support hunting, and the re-opening of ivory collection will rapidly re-establish the system of illegal overkill and trafficking of ivory. I urge that in spite of the extreme economic hardship facing this country and the rest of Africa, that the moratorium on elephant hunting and ivory collection in CAR be respected for 10-20 years to ensure the re-establishment of the species and the institution of a rational, workable wildlife policy. I also urge international conservation and development organizations to view these issues not as species-specific, but as broad economic, attitudinal and cultural issues that can only be solved through integrated, culturally consistent and ecologically sound conservation and economic development policies.

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