
The Effects of Poaching Disturbance on Elephant Behaviour

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Elephants and the Central African Republic

The drastic decline in elephant numbers across much of Africa has been well documented. Nowhere on the continent are the effects of ivory poaching more obvious than in the Central African Republic (CAR). A landlocked nation of just under 3,000,000 people, the CAR covers some 620,000 km², ranging from dense equatorial forest in the south, through extensive riverine wooded savanna, to near desert conditions along the Chadian and Sudanese borders to the north.

Despite a favourable habitat and with little pressure on land from the low density human population, the number of elephants has suffered a dramatic decrease over the past ten years. As a result of a decade of uncontrolled poaching and little or no government action, the CAR's estimated population of 63,000 elephants had been reduced to 19,000 by 1989.¹ According to some sources, as few as 10,000 elephants remain now,² about half of which inhabit the forested regions in the southwest of the country. The vast road-less eastern CAR has been virtually un-monitored and surrendered to large bands of poachers while, despite the efforts of a small but dedicated anti-poaching team, the sprawling Gounda-St Floris National Park in the north of the country has seen many animals from its herds fall under a wave of Sudanese horsemen.

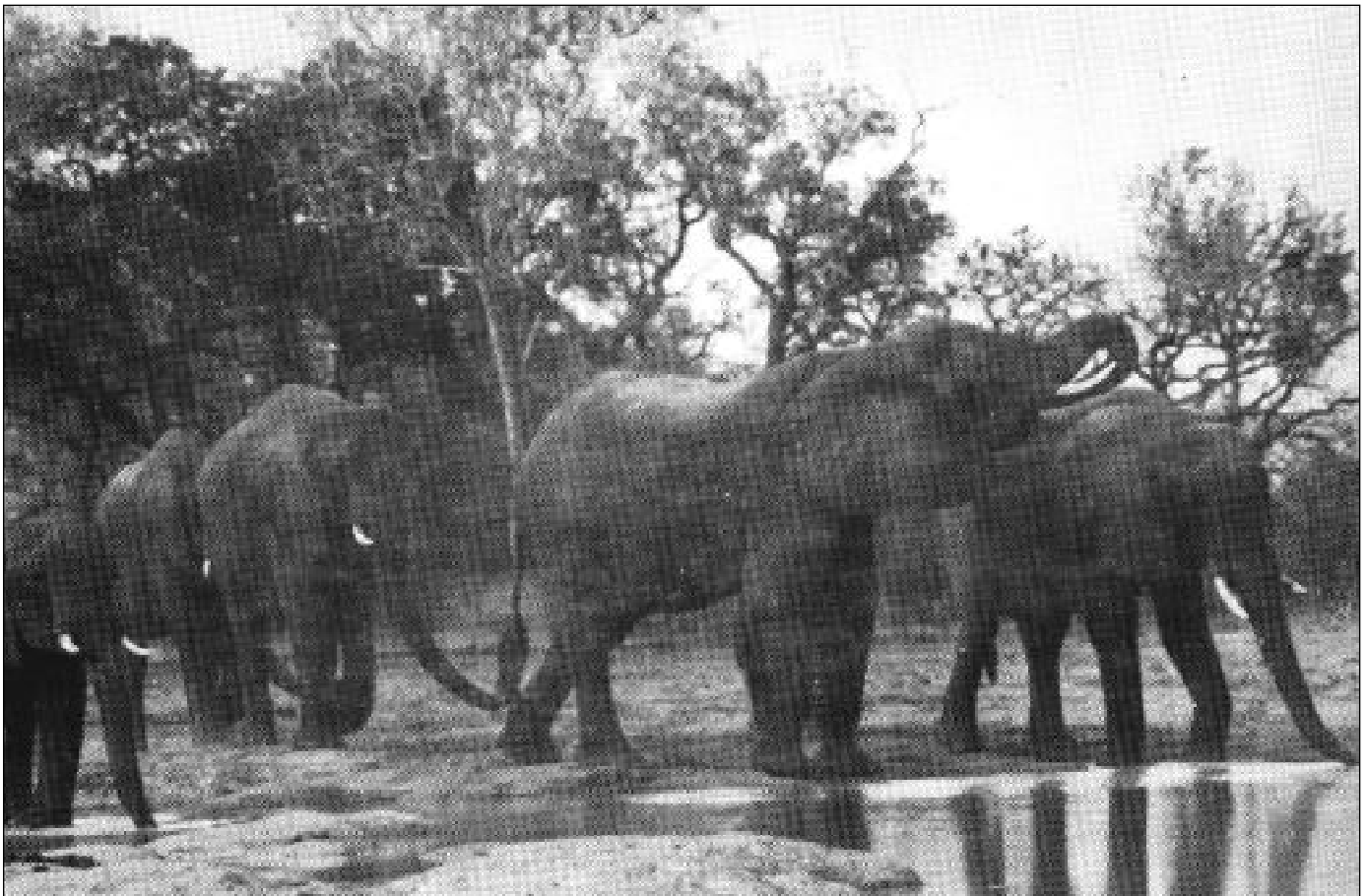
Mounted Hunters

In the Gounda-St Floris National Park poachers never hunt at night. Elephants are killed during day-time attacks by mounted men who use thrusting spears to sever the sciatic nerve of the victim. Working in teams, they repeatedly chase and spear the panicked elephant until it eventually falls from blood loss. The coup-de-grace is usually a thrust through the heart, delivered after the elephant falls. During a single day, as many as ten elephants have been killed and an equal number wounded by one party of horsemen.³ Among these organized marauders professional ivory traders are reported to have set up mobile camps from which they send large numbers of tusks to Khartoum for trans-shipment to the Orient. However, the tradition of hunting elephants by expert horsemen using spears is being replaced by shooting whole herds with automatic weapons.⁴ AK-47 assault rifles have proliferated as a result of the Chadian and Sudanese civil wars: it has become the weapon of choice of elephant poachers across the continent.

The Effects of Hunting

Before the arrival of mounted poachers, elephants were seen frequently throughout the day, feeding and drinking in the Park's many rivers and ponds. Now, however, a WWF-sponsored study

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Thirsty elephants in the Gounda-St. Floris National Park take advantage of the last woodland waterhole left during the long dry season.

has shown that poaching has affected the Park's elephants in ways not reflected in carcass counts (Table I). A profound behavioural change has taken place in reaction to the disturbance caused by poaching, resulting in a reduced ability to efficiently forage during the dry season and to undertake traditional seasonal migrations in response to rainfall and food availability.

Table I
Elephant carcass ratios expressed as a ratio of dead to dead plus live

	Live	Dead	Carcass Ratio
MGSF complex ^a	2701	5840	68.4%
Gounda-koumbala inter-river area ^b	444	823	65.0%
Gounda study area ^c	300	140	31.8%

- a. Manovo-Gounda-St Floris Complex (32,400km²) includes the Gounda-St Floris National Park (17,600km²) and surrounding reserves. These estimates are based on a 4% aerial survey.⁵
- b. Gounda-Koumbalainter-river area (4,800 km²) estimates are based on a 15% aerial survey.⁶
- c. Gounda study area (600 km²) live elephant estimate based on direct counts and photographic analysis of known herds. Carcass estimates are based on ground transects of 6% of the study area.⁷

During the rainy season, disturbance of the Gounda elephants is greatly reduced because mounted poachers are able to operate only with difficulty when tall grass makes movement arduous and tsetse flies endanger the horses. Elephants are occasionally shot at this time of the year, but the herds appear much less disturbed after about a month of heavy rainfall. With water and grass available throughout their range, the elephants can move freely and they quickly recover the condition lost during more stressful times.

In contrast, the seven-month dry season begins with annual grass fires which remove most of the dried grass, some of which exceeds three metres in height. Trees have little or no foliage at this time and fresh forage is limited to the emergent vegetation and grass growing in the low-lying areas along river courses. Most rivers in the Park have extensive, productive flood-plains containing hundreds of grass-filled ponds which gradually shrink as the dry season progresses. Elephants are therefore forced to leave the woodlands, cross several hundred metres of flood-plain and forage in open areas. During more secure times, this posed no problem and elephants could take advantage of the cooling waters of the Gounda River and the shade provided by scattered *Daniellia* trees to help pass the heat of the day. However, after repeated attacks by horsemen taking advantage of the elephants' vulnerability in the open, the herds have learnt to avoid the flood-plains during dry season days and restrict their grazing and watering there to night time.

Data Collection

Over a two-year period, 604 hours of observation were made on adult elephants near the Gounda River in the centre of the Park.⁸ These include examinations made over 24-hour periods and during rainy and dry seasons. Data were examined by analyzing feeding, resting and herd movements in relation to habitat type and the level of poaching activity.

A comparison of the total time within a 24-hour period spent browsing with that occupied in grazing shows no significant difference between seasons. However, when data from dry season nocturnal and diurnal periods are compared, (Table II), daylight browsing time was significantly longer than that in the wet season and more grazing was done by night, a fact which may be attributed to the restriction of the herds to the woodlands by day. In order to obtain sufficient nutrition through the lean months of the dry season, elephants have to spend as long as possible grazing on the flood-plain at night. The inability of elephants to move freely between the riverside and the wooded areas during the daytime in the dry season may compromise their ability to forage in an efficient manner just when their nutritional stress is highest. This situation may be particularly serious during dry years and especially in light of another effect of poaching disturbance.

Table II
Mean Percentage of Time spent by Elephants in each of Three Major Habitat Types in the Gounda Study Area

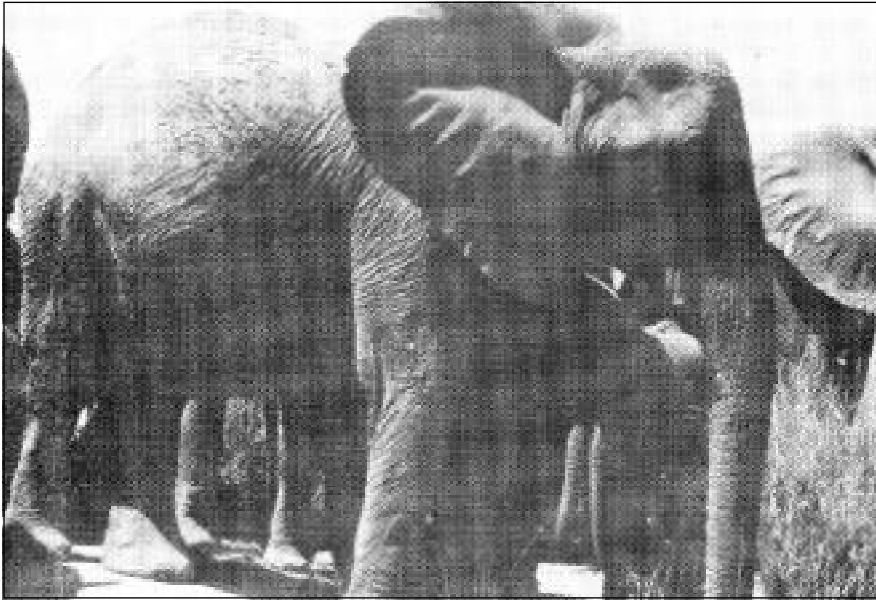
	Dry Season		Rainy Season	
	diurnal	nocturnal	diurnal	nocturnal
Flood-plain	4.0	60.8	5.9	22.4
Woodland	77.9	16.8	85.9	57.2
Ecotone	18.0	22.3	8.2	20.4

The dry season is from November to May, and the rainy season is from June to October.

Undesirable Side Effects

Until relatively recently, the elephants of the area were free to migrate over hundreds of kilometres and thereby maximize feeding efficiency throughout the year. They once could move in a long circuit between the wooded savannas of the northern CAR, where foliage and water are available at the height of the dry season, and the more arid and lightly wooded savannas of southern Chad. The rainy season begins in the south and, as it progresses, gradually moves north. It brings the regrowth of perennial grasses which can be exploited at the optimal stage of growth only by mobile herds. The migrations were an important behavioural adaptation in response to the seasonal demands of this marginal elephant habitat. But today, these migrations are no longer possible due to the resettlement in southern Chad of refugees from the recent civil war.

The concentration of resident and fugitive herds into extremely large aggregations in the Gounda area, sometimes in masses of more than 1,000 individuals, is grim testimony to the disturbance wrought by poaching and the elephants' inability to utilize the full scope of their traditional range.⁹ On more than one occasion, herds that recently experienced attacks were observed acting restlessly and breaking trees in large numbers. Likewise, because of their tendency to congregate in abnormally large herds when disturbed, the Gounda elephants caused considerable habitat degradation around natural salt licks and seasonal water-holes near the flood-plains where they lingered while awaiting nightfall to descend to the river.



'Legs and Trunks'

Social Upheavals

Although hundreds of elephants remained in the Gounda area in 1984, it became uncommon to find a bull over 25 years of age since these were the poachers' first quarry as carrying most ivory. As the killing continued, hunters turned to the adult females, frequently choosing the herd matriarchs. Groups became increasingly composed of sub-adults and young, often led by

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inexperienced cows. It is possible that the social system of elephants evolved in response to the species' need to utilize food and water resources which become vital during periodic droughts. The system gives an advantage to groups containing older individuals that have lived through previous droughts and are able to lead the herd to areas where food and water are available. Evidence of the exploitation of female and younger elephants is seen in the collapse of tusk weights. In March 1982, a sample of 26 tusks confiscated in the Gounda area averaged under 2.5 kg each. This is far below the 15.2 kg mean tusk weight exported from the CAR that year.¹¹

The disruption of population structure due to ivory poaching may also cause a decrease in the rate of reproduction because bulls under 24 years old rarely come into musth.¹² Increased competition may result when older bulls which have already established ranks in a dominance hierarchy are killed, leaving younger males to fight for oestrous females. The observation that bulls are more likely than cows to destroy trees led Douglas-Hamilton to consider some tree breaking as a social display.¹³ The need to establish a bull's place in a disturbed - hierarchy may result in more tree damage. This may contribute to an accelerated rate of tree destruction and the replacement of woodlands by grasslands which are a less favourable dry season elephant habitat.



A young bull elephant, its trunk severed by Sudanese horsemen, lies decomposing under the African sun.