Poole, J. 2012. Gorongosa Elephant Study. Section g. Population size. From ElephantVoices field trip report to the Gorongosa Restoration Project

g. Population size

Prior to the civil conflict, Gorongosa was estimated to be home to between 2,000 and 4,000 elephants. Since the civil conflict, aerial sample counts have been carried out in 2000, 2001, 2002, 2004, 2007, 2010 and 2012, and figures for elephants are available for 2000, 2002, 2007, 2010 and 2012 (see Table 5). Since the sample counts in 2007, 2010 and 2012 were based on ~25% coverage over the central part of the park, a rough figure of 400-500 elephants has been estimated as Gorongosa's elephant population size.

For group-living (herd forming) species that are represented by relatively few individuals, sample counts tend to produce rather inaccurate estimates of population size due to the fact that large groups (that may represent a substantial proportion of the population) may fall inside or outside of the strip. For example, elephant groups of over 50 individuals are not infrequent in Gorongosa and their inclusion, or exclusion, will have a major impact on results. Total counts are a more accurate but, more expensive, alternative.

In 2012 an attempt was made to compensate for the inaccuracy of sample surveys by counting elephant groups that were spotted outside the strips. A total of 144 elephants were seen inside the strips while including those spotted outside the strips increased the number to 240 elephants. Although this figure is more accurate, it still represents a minimum population size.

In the combined 2000-2010 counts, a total of 70 elephant groups were counted for a total of 594 individuals. Of these only 6 small groups accounting for 17 elephants were seen outside of the main tourist circuits, these being south of the Urema Road and along the Pungue River. These sightings accounted for less than 10% of groups sighted and only 2.9% of the individuals counted. In 2012, 240 elephants were counted in sixteen groups. Of these six elephants (2.5% of those counted) in four groups (3 in one group and 3 single males) were spotted outside of the regular tourist circuit. The point I want to make (and that others have made before me) is that elephant occupancy in these snapshot views of the population is overwhelmingly concentrated in the central part of the national park and in the very areas that I covered regularly and fairly extensively.

Table 5. a). From Gorongosa NP aerial surveys - Elephants counted within the sampling strips (in parentheses number of groups); b). plus, in 2012, additional individuals counted outside the strip; c). number of elephants spotted more than 500 m beyond limits of the normal tourist circuits defined by the bounds of Urema Rd, and Picadas 11, 4 and 1; d). % of total number of elephants found beyond boundaries of the central tourist area.

	2000	2001	2002	2004	2007	2010	2012
a	163 (5)		79 (6)		187 (37)	165 (22)	144
b							240 (16)
c	0		0		10 (4)	7 (2)	6 (4)
d	0		0		5.3%	4.2%	2.5%

By documenting individual elephants and their offspring we are attempting to improve on the minimum figure of 240 individuals and the extrapolated figure of 400-500. We are still a long way off from being able to do so, but made good headway during this three week visit.

On this field trip I was not able to figure out how many calves belong to each female I identified, and so I have had to do some of my own extrapolation. Using data from Amboseli, I have assumed that the average female produces her first calf by age 14 and that, thereafter, each female produces one calf every 4 years. Taking into account a measure of natural mortality; I (very) roughly estimate that Class 1a (10-14.9) have an average 0.15 calves; Class 1b (15-19.9) females have one calf, Class 2 (20-24.9) females have two calves, and that females 25 years and above have three offspring under the age of 14 (the average age at which females become mothers themselves and males become independent). If anything these estimates represent underestimates as the Gorongosa elephants appear to be in very

good condition at the end of the dry season and therefore may well have lower age at first reproduction and shorter inter-calf intervals and lower mortality than in Amboseli.

Using this as a basis, and using the number of elephants registered, I estimate that I have accounted for some 201 elephants thus far (Table 6). I am aware of photographs of elephants taken by others who I have, as yet, not seen, but by the last week the vast majority of elephants I encountered each day had already been registered and accounted for. Based on the distribution of elephants and this rough “capture-recapture”, it is my opinion that the population of elephants in Gorongosa may be closer to 300 individuals rather than 400-500.

Table 6. Extrapolating the number of elephants accounted for based on the number and putative ages of adults registered.

Registered	Adult males	Immature males	Female Class 1A	Female Class 1B	Female Class 2	Female Class 3-5	Total
Registered	27	6	7	12	4	31	81
Estimated number calves			1.05	12	8	93	114
Total	27	6	8.05	24	12	124	201