

A Survey Report on Zambia as a Range State for Pancake Tortoise (*Malacocherscus tornieri*)

This document has been submitted by Zambia.

Introduction

The Pancake tortoise (*Malacocherscus tornieri*) is endangered and listed on appendix II of the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES). Its documented distribution range is currently known to be restricted to Tanzania and Kenya. Specimens previously exported from Zambia have been suspected to originate from East Africa. Anecdotal reports however, indicate that Pancake tortoises also occur in Uganda and Zambia.

Despite this status the demand for live exports of Pancake tortoises in Zambia has been increasing over the years from 400 in 1996 to 10,000 by 2000. However, lack of scientific verification of the existence of the species in Zambia led to the suspension of international trade in the species by Zambia until such a time when the Zambia Wildlife Authority (ZAWA) scientifically established the existence of the species, its population status and distribution. A survey was therefore, needed to confirm the existence and determine the population status and distribution range of Pancake tortoise in its suspected range in Northern Province for information to CITES in order to facilitate allocation of justifiable capture quota for international trade and local breeding programmes.

Materials and methods

Study area

The study was conducted in the hilly areas of Nakonde district in Northern Zambia, bordering with Tanzania located at 09° 23' – 09° 24' S and 32° 48' -32° -51' E elevation from 1480 to 1560 m. The survey was done during the rainy season between 10th and 23rd December 2003. Figure 1 below shows the location of the study area.

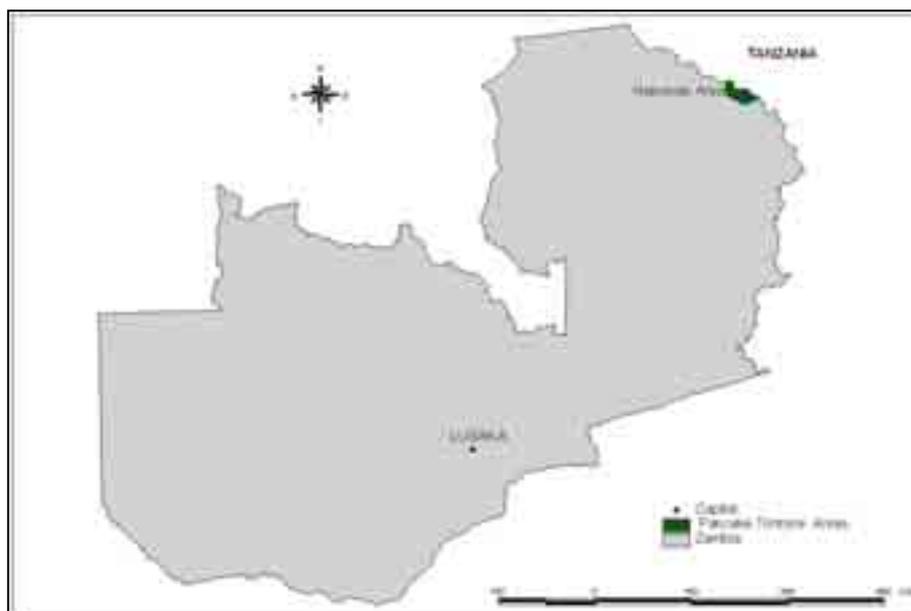


Figure 1. Location of the study area.

Field methods

The mark release recapture method was used. Twenty-three (23) individuals were captured and marked by toe clipping. Global Positioning System (GPS) locations were taken for each specimen to guide the crew during the recapture exercise. Body measurements were taken to determine the size of each specimen. Length was measured on the plastron along the mid line dividing the ventral scales on the plastron from the gular scale to the anal scale. The second measurement for width was taken from the outer edge through the mid point of the abdominal scale in a straight line to the other side of the body. Sex was determined by examining the length of the tail and the depression on the femoral scale (Broadly 1971). The marked individuals were released back into the population. The released individuals were given seven days to mix back with the unmarked ones. A period of one week was considered adequate, as further delay would make identification of marked individuals difficult when the nails have regrown, emigration and mortality would also distort the population estimate. After one week, the field crew revisited the same areas during which time 45 individuals were recaptured out of which two (2) were marked and 43 were unmarked.

Data analysis

The data analysis was based on the Lincoln index; mark, release, recapture method. In this method, several individuals from a population are captured. They are then marked in some way so they can be recognized again and released back into the population. The released organisms are given enough time to mix with the unmarked ones, and then later more are captured (Chapman and Reiss, 2000). The assumption is that hopefully some of the original marked individuals will be recaptured in the new group and the proportion of marked to unmarked individuals can be used to calculate the proportion of individuals in the whole population which were originally marked and hence the population size.

The population size (N) is calculated by the formular:

$$N = \frac{CM}{R},$$

Where N- is the total population size; C- is the number capture; M- is the number marked and R- is the number of recaptured individuals.

Results

The total population of pancakes for the area surveyed is 518 individuals. Samples of some of the individuals captured and the typical habitat are shown in Figures 1 and 2 below. The sex and parity of the individuals captured during the exercise are shown in Table 1 below.



Figure 2. Sample of some of the individuals captured during the survey



Figure 3. Typical habitat for Pancake tortoise

Table 1. Number of marked and unmarked pancake tortoises counted during the survey

Site Number	Total number counted	Sex		Pairs	Single
		Male	Female		
1	7	3	3	3	1
2	8	4	4	4	
3	6	3	3	3	
4	2	1	1	1	
5	10	7	3	1	8
6	2	1	1	1	
7	25	18	7	1	23
8	8	5	3		8
Total	68	43	25	14	40

Discussion

The results of this survey confirm the existence of pancake tortoise in Zambia. Its occurrence in Zambia is being documented for the first time. The population estimate of 518 individuals obtained from this survey is based on the following postulations:

The first assumption was that the marked individuals released after the first capture, mixed in with the first population after release and had the same chance of being recaptured as any unmarked animal. If the marked animals did not mix back with the unmarked individuals, the population would have been underestimated. In this survey, the number of unmarked individuals encountered during the recapture exercise was twice higher than the marked individuals. This is confirmation that the marked individuals successfully mixed back with the rest of the population.

The second assumption was that the population would have been over estimated if the markings were worn off, or destroyed in which case fewer marked animals would have been recaptured than should have been. The recapture exercise was done after seven days. Shortening the recapture period but long enough to allow the marked individuals to remix with the rest of the population prevented this deficiency. So the population estimate was not overestimated.

The third assumption was that it did not matter if individuals died or emigrated from the population between the release and recapture period, as long as the ratio of marked to unmarked animals leaving was the same as the ratio in the population as a whole. In this case, the chance of a marked or unmarked individual emigrating or dying was equal. If this is the case, then the ratio in the remaining population remained constant and an accurate estimate of the size of the population at the time of release of marked animals was obtained (Sensu Chapman and Reiss, 2000).

Problems could have occurred, if both the number of marked individuals decreased and the number of new arrivals increased during the study period. The ratio of marked to unmarked animals would have been decreased both by loss of marked individuals from death and emigration and by the addition of new unmarked individuals. This would have caused the population to be over estimated at the time of recapture (Begon *et al* 1990). In this survey conducting the recapture soon after the first release minimized this effect.

This survey adequately addressed all the concerns. This authenticates that Zambia is a range state for pancake tortoise. The population of Pancake tortoise in Zambia is expected to be higher than was obtained in this survey when the exercise is completed covering the entire suspected range, as only a small area of the suspected range in Nakonde district was surveyed due to financial constraints.

Zambia has gladly invited the United Republic of Tanzania, Kenya and the representative of the CITES Secretariat to visit the study area.

References

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