

Title: First confirmed record of a Cape fox, *Vulpes chama*, in Zimbabwe

Short title: First confirmed record of a Cape fox in Zimbabwe

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Acknowledgements

We thank Zimbabwe Parks and Wildlife Authority for permission to undertake this work in Hwange National Park (research permit number: 23(1)(c)(II)12/2018), Wilderness Safaris, Zimbabwe for provision of logistical support and R. Rees, L. Mpofu, J. Hunt and HNP research staff for field support. This research was funded by the Robertson Foundation.

Key words: Cape fox, *Vulpes chama*, range expansion

Introduction

The Cape fox (A. Smith 1933), with a body mass between 2 and 3 kg, is the smallest canid and the only vulpine canid occurring in Southern Africa. Its range is largely restricted to the arid Karoo, Kalahari and Namib, approximating the distribution of the South-West Arid and Highveld Biotic Zones. These areas typically receive an annual precipitation range of 100-

500mm, except in the easternmost portion of its range where rainfall is higher (Happold and Lock, 2013). The species habitat preference is for open scrub, lightly wooded areas, rocky outcrops and occasionally agricultural land (Nel et al., 2013). In Botswana they occur in short grassland, *Acacia* scrubland and appear to favour open areas surrounding shallow seasonal pans (Smithers, 1971). Populations may be limited by intraspecific conflict with black-backed jackals (*Canis mesomelas*) and individuals are preyed upon by other large carnivores (Kamler et al., 2013; Nel et al., 2013).

Shortridge (1934) and Roberts (1951) include Western Zimbabwe and Mozambique within the species range. However, due to the lack of material evidence or credible sighting records, more recent assessments considered the inclusion of these countries in the species range to be invalid (Smithers, 1971; Smithers and Lobao-Tello, 1976; Smithers and Wilson, 1979).

Range expansion of Cape foxes has been documented in the South West and South East of its range (Coetzee, 1979; Stuart, 1981). Visual records by Smithers (1971) were recently confirmed by Rich et al. (2016) on the eastern margin of the Okavango Delta (-19.4028S, 23.7685E), approximately 86km North of the recognised species range.

Methods

A camera trap survey was deployed in the Eastern Wild Area management zone of Hwange National Park, Zimbabwe (centre point of survey -19.106S; 27.3334E, Datum WGS84) between 16th May 2018 and 17th July 2018, consisting of paired trail cameras (Cuddeback models 1125, 1149 and C1 [Cuddeback, WI, USA], Panthera V4 [Panthera, NY, USA]) set in a grid of 41 camera trap stations spaced ~ 4km apart. Trap stations were sited on game trails and sandy tracks to optimise the chances of detecting carnivores, which are known to utilise roads and tracks for travel. Camera stations were deployed for a mean of 51.3 days for a total

of 2103 trap days. Camera SD cards were downloaded at the end of the survey and images identified to species.

Results and Discussion

Adult Cape foxes were detected on five occasions at the same location (-19.1437S; 27.3642E). It was not possible to determine if this was a single or several different individuals. Due to a malfunction, only one camera (Panthera V4) of the pair deployed at the site was operational. The camera trap station in question was situated on a dirt track, in habitat dominated by Zambezi teak *Baikiaea plurijuga*, Silver Terminalia *Terminalia sericea*, and Ordeal tree, *Erythrophleum africanum* bushland and scrubland on deep Kalahari sand (Rogers, 1993; Fig. 1). The closest open grassland, the habitat preferred by the species in other parts of its range, was 1.2 km North at an artificially supplied waterhole, Wexcau Pan. Based on reported habitat use, the closed bushland/ scrubland habitat matrix does not appear optimal, especially because intraguild competitors including black-backed jackals were relatively common. A previous survey in the same area in October 2014, using the same survey design and camera trap station locations did not detect the species.

The location at which the Cape fox was detected was a straight line distance of 244km northeast of the currently accepted distribution of the species (Hoffmann, 2014; Fig. 2). This is the northeastern most record for the species and the first ever verified occurrence within Zimbabwe. Our overall camera trapping records suggest that Cape foxes are extremely rare in western Zimbabwe having been recorded at only one of 536 camera trap sites deployed between 2013 and 2018, and detected on only five of a total of 24 175, 24-hour trapping days. The paucity of records within the Zimbabwean surveys is unlikely to be due to poor detection of the species by camera traps as Cape foxes were commonly detected (in 37 out of 100 camera stations) in Makgadikgadi Pans National Park, Botswana, a site on the northern

boundary of the accepted species range, using the same cameras and methodology (AJL unpublished data). Similarly, Rich et al. (2016), recorded Cape foxes at 19 of 220 camera stations in northern Botswana with an overall occupancy probability of 0.31. The rarity of foxes within western Zimbabwe and seemingly unfavourable habitat in which they were found suggests the individual or individuals detected in our survey were either recent pioneering colonists or vagrant dispersers. The occurrence of Cape foxes outside the northern margins of the accepted species range (Rich et al. 2016, this study) may be evidence of colonisation of formerly mesic areas by an arid adapted species as a result of increasing aridification in the region (Davis-Reddy and Vincent, 2017).

Cape fox range expansion is not unique amongst canids. In contrast to the global decline in range and population size of many medium to large sized carnivores (Ripple et al., 2014), there are several examples of canids expanding their ranges as a result of environmental change or more favourable conservation policies (Somsen and Trouwborst, In Press). Golden jackals (*C. aureus*) have expanded westwards into Europe (Krystufek et al., 1997; Rutkowski et al., 2015), coyotes (*C. latrans*) have expanded South into Central America (Hody and Kays, 2018) and crab-eating foxes (*Cerdocyon thous*) northwards into northern South America (Lucherini, 2015). Northward extension of the Cape fox distribution may be another example of range expansion by an adaptable and opportunistic canid in the face of changing environmental conditions.

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Figure legends

Figure 1a) Habitat at camera trap station (-19.1437S; 27.3642E) in eastern Hwange National Park, Zimbabwe. b) Image of Cape fox captured at this site.

Figure 2: Current Cape Fox record in relation to accepted IUCN range (Hoffmann, 2014) for *V. chama*.