

The Ecology and Conservation Biology
of the Endangered African Wild Dog (*Lycaon pictus*),
in the Lower Zambezi, Zambia.



by
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A thesis submitted in fulfillment of the requirements for the degree of
Doctor of Philosophy
Faculty of Veterinary Science,
University of Sydney.
September, 2005

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ABSTRACT

The African wild dog (*Lycaon pictus*) is one of Africa's most endangered carnivores. Previous research into this species has focussed on the largest extant populations in Africa. However, there are a large number of relatively small populations (20 to 50 dogs) distributed across Africa, which represent an important component of the diversity of the species and its remaining habitat. This study investigated the status of a small population of wild dogs in the Lower Zambezi area in Zambia. Objectives focussed on assessing population dynamics and identifying causes of decline. Research was carried out over a broad range of topics in an effort to provide comprehensive information for conservation management of the population.

The scope of the project was divided into five sections:

- 1) Demography and pack dynamics were assessed to identify the structure and status of the population, and the main causes of mortality.
- 2) An assessment of habitat types and related ecological factors was carried out to determine wild dog habitat utilisation in relation to vegetation type, prey densities and hunting success in each area.
- 3) The effects of interpredator competition on wild dog population dynamics was investigated, specifically, the effects of lions (*Panthera leo*) and spotted hyaenas (*Crocuta crocuta*).
- 4) Genetic analyses were carried out to assess the historic and contemporary genetic variability of the population, and to define patterns of geographic structuring and population differentiation.
- 5) Results were combined to assess the viability of the population and recommend conservation management strategies.

Snaring was identified as the most important cause of adult mortality, and a threat to wild dog population persistence. Inbreeding avoidance led to the emigration of adult males and females from the area and appeared to be a substantial contributor to population decline. Limited mate selection corresponded with neither sex displaying philopatry and large dispersal distances effectively removed adults from the

population. This result has important implications for the management of small populations, whereby lack of mate choice may increase dispersal distances and thereby increase edge effects on populations, regardless of home range sizes.

Home range sizes were related to den locations in remote areas of the Zambian Escarpment, which was used as a breeding refuge area. The Zambezi River and Zambian Escarpment appeared to be effective barriers to wild dog home range movements. The study area contained a diversity of habitats on the alluvial terraces of the river valley floor. There was a high density of impala (*Aeypceros melampus*), which formed the main prey base for the wild dog population.

Studies of other populations have found that wild dogs often avoided areas with high competing predator densities, which corresponded with high prey density areas. In contrast to those findings, the Lower Zambezi wild dog population showed a strong preference for high prey density areas. This population also showed only temporal avoidance of high lion density areas. Low lion density areas were preferred during breeding periods, while moderate to high lion density areas were preferred during non-breeding periods. Direct predation of adult wild dogs by lion and spotted hyaenas was rare. Kleptoparasitism of wild dog kills by either competing predator species was also rare. Predator competition was not considered to be an important determinant of population decline.

The Lower Zambezi population suffered from a loss of heterozygosity, low allelic richness, and there was significant evidence of a recent population bottleneck. The population did not contain any new mtDNA haplotypes, nor any unique alleles on the commonly used microsatellite loci, but was differentiated from African wild dog populations in other regions. There was evidence of historical and recent gene flow between the Lower Zambezi and the neighbouring southern African populations of Hwange and Okavango. This was the first study to show a loss of genetic variability in a free-ranging African wild dog population. Although more immediate anthropogenic and demographic factors were the critical determinants of population

decline, the loss of genetic variability has important implications for the conservation of the remaining small and fragmented wild dog populations in Africa.

Results showed that due to its small size the population is likely to have suffered from inverse density dependence and Allee effects on dispersal and reproductive success. Management recommendations focussed on mitigating anthropogenic causes of mortality, and improving connectivity with a larger, potential source population to increase the probability of successful dispersal and to restore genetic diversity. The high density prey base, small home range sizes and low levels of interpredator competition detected in this study suggest that the area has the capacity to support a large and potentially viable population of wild dogs if appropriate management strategies are implemented.

ACKNOWLEDGEMENTS

I am grateful to the Zambia Wildlife Authority for granting the permits necessary to carry out this research. The research was funded by a wide range of generous donors, who made the project possible. For providing research grants I would like to thank; Mads Sandau-Jensen and the Danish International Development Agency (DANIDA), and The Wallace Research Foundation, USA. Several Zoological Parks provided support for the project, including: Sedgwick County Zoo, Kansas, USA; The Cincinnati Zoo and Botanical Garden, USA; Zoos Victoria, Melbourne, Australia; and the Western Plains Zoo, Dubbo, Australia. I would also like to thank the private individual and corporate donors who provided ongoing support for this project: Yancey Walker Productions USA, Dwight Hibbard, Arthur Vorys, Afrikeye UK, Pamela Riley, Neil Hardie, Elefriends Australia, Old Mondoro Camp Zambia, Kanyemba Lodge Zambia, Chongwe River Lodge Zambia, Conservation Lower Zambezi Zambia, Airwaves Charters Zambia, Philip and Julia Leonard, and particularly Julie McIntosh of the Classic Safari Company in Sydney for introducing me to Zambia and the Lower Zambezi.

Many people provided support for my fieldwork in the remote environment of the Lower Zambezi National Park. Thank you to the managers and guides of the safari camps in the study area that assisted with reporting wild dog sightings, and after much harassment, with the collection of wild dog faecal samples. There was always a race to collect the faeces before the hyaenas or vultures could get them. Conservation Lower Zambezi (CLZ) assisted with numerous field activities, including making their anti-poaching aircraft available for charter for aerial tracking, and donating the use of their darting equipment for wild dog immobilisations. Thanks go to Ian Stevenson and Leanne Edwards of CLZ, for their friendship and company, especially those long nights counting spotted hyaenas, and the den walks through the adrenaline grass. Special thanks to Ian for assisting with snare removals. Thank you to Riccardo Garbaccio of Kanyemba Lodge who generously donated assistance with servicing and

maintaining the project vehicle and equipment, and also provided an oasis of fine Italian food, friendship and mains electricity when it was most needed.

I am grateful to veterinarians Ian and Noeleen Parsons who donated their time to help with wild dog immobilisations and collaring, provided support and encouragement throughout the project, and also raised financial support from the Mazabuka community. Veterinarian Sally Shiel also donated considerable time, assistance and equipment for wild dog immobilisations and pathology tests, and offered logistical support in Lusaka, as well the warm hospitality of her family and home.

Many thanks to John Murphy for those high speed aerial tracking sessions through the window of the Cessna 206, and to Airwaves Charters for transporting everything from veterinarians through to wild dog necropsy samples. I am grateful to the safari operators in the South Luangwa and Kafue National Parks who collected wild dog sightings reports and faecal samples for the project, and to all the camps that agreed to store faecal samples in their kitchen freezers. Thanks also to the many ZAWA Wildlife Police Officers for their interest, enthusiasm and support in reporting sightings, particularly in the more remote areas of the National Park.

There are many people at the University of Sydney whom I would like to thank. My supervisor Tony English, who not only accepted me as a PhD candidate, but also supplied endless encouragement, moral support, and understanding of the difficulties associated with working in a remote environment in Zambia. My co-supervisor Herman Raadsma provided advice on genetic analyses, feedback on the final thesis drafts, a sense of humour and a bar-fridge in the office. Kyall Zenger kindly introduced me to the world of population genetics and the enormous number of statistical programs involved. Imke Tammen provided advice and extensive training to familiarise me with genetic laboratory techniques. To everyone in the Shute Building who offered help and advice in the laboratory, and patiently tolerated me returning from field work in the bush each year to ask the same questions all over again, thank you; Natasha Ellis, Julie Cavanagh, Marilyn Jones, Gina Attard, Marie Wildridge and Luke Chappel. Peter Thomson, Mat Crowther, Scott King and Neil

Hardie all provided helpful comments and advice on the statistical analysis used in this thesis. Thank you also to Eleanor Bruce and David Chapman from Geosciences who provided advice and assistance with GIS mapping techniques. The Faculty of Veterinary Science provided scholarships and grants-in-aid in support of this research, for which I am grateful.

Lastly I would like to thank my family, for encouraging me to follow my dreams, even though those dreams took me far from family and friends. Thank you for appreciating the novelty of having a “canine faecal collector” in the family.

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