



Dear Earthwatcher,

During 2007 we had three more fantastic groups of volunteers come to enjoy the superb hospitality of Mankwe Wildlife Reserve and help the researchers on Project Phiri. We had two new excellent additions to the research team in Dr Andy Overall, a geneticist and Dr Bryony Tolhurst an ecologist, both from the University of Brighton. They joined the usual suspects Lynne, Dougal and the research assistants Chris and Louis. On the 1<sup>st</sup> February 2007 Dawn gave birth to a lovely lad by the name of Arran and has been on maternity leave this year so unfortunately, couldn't make any trips this year (although she has been working behind the scenes!). I'm sure it will only be a matter of months before Arran is joining us on Earthwatch expeditions. Finally, Rik has found himself a new job, lecturing biodiversity surveys at Nottingham Trent University.

2007 has been a great year in terms of data collection for the brown hyena project. In addition to the continued monitoring of the two populations via latrine, spotlight and call-in surveys, we have also managed to collar two hyena this year, collect several DNA samples and also advance our validation of the various methods that we use.

**Our 2007 volunteers helped us to undertake the following:**

- 576km of night spotlighting encountering 10 hyena at Pilanesberg and 1 at Mankwe (as well as many other nocturnal species).
- 561 km of latrine surveys recording 496 hyena latrines!
- 57 call-ins resulting in sightings of 25 browns, 26 lions, 44 jackals, 1 leopard and 7 wild-dog.
- 64 camera trap nights at Mankwe resulting in photos of caracal, honey badger, jackals and genets, although no browns!

In addition we have at least 5 different samples of DNA that is being worked on in the lab and making good progress to establishing genetic markers for browns for future analysis of further samples we collect. Volunteers also help us with our bait marking pilot survey, VHF radio-tracking and faecal analysis. We have sent the scat samples off to University of Pretoria and have project students there working on scat analysis to help us find out the diet of our browns.

One highlight of the year for the project was on April 17<sup>th</sup> when we finally caught and collared a hyena which Lynne called 'Bryan A.'! He weighed 43kg which is average for an adult, and was male. We estimated that Bryan was fairly old from his tooth wear, and in good condition. The collar we fitted was a Global Positioning System (GPS) collar that automatically records the animals' location via satellites and transmits the location via SMS to the researchers. This collar was donated to the project by the World Wildlife Fund in collaboration with Earthwatch.

Between April and June, Bryan travelled most of the eastern section of Pilanesberg from Kwa Maritane, up to Mankwe dam, to north of Bakgatla and over to Manyane gates which equates to a home range of 15kms<sup>2</sup>. This is much smaller than the ranges of male brown hyena in the Kalahari and Skeleton Coasts which can be as large as 200 to 400 kms<sup>2</sup>. Bryan travelled at an average speed of 4km per hour and on some nights covered more than 10kms in straight line distances. Unfortunately, Bryan died on 2nd of June near Moloto Dam. We do not know the cause of Bryan's death. We know he was old and may have died of natural causes. It is possible that he was injured or killed by lions but, unfortunately we can't prove this theory with the data available. However he

provided us with nearly 1000 fixes of his movements during the time we had him. Since then we have caught another hyena (Tina) in Pilanesberg and fitted a conventional VHS collar and, despite not being as productive as the GPS collars (Tina takes a long time to find) she is providing some useful data.

We will be continuing our monitoring as well as methodological comparisons. This year we hope to collar more individuals and compare their behaviour and habits inside and outside Pilanesberg. We also hope to collect more DNA samples so that we can look at the genetic structure of the two populations.

From Dawn, Lynne and myself, I'd like to thank all of you for your amazing contribution to our project. Without you, none of this important work would be happening. The insights that we gain will have lasting impacts on the future survival of brown hyena in the area.

Best wishes and stay in touch!

A handwritten signature in black ink, appearing to read 'Richard Yarnell', with a stylized, cursive script.

Dr Richard Yarnell



## EARTHWATCH INSTITUTE ANNUAL FIELD REPORT



**Project title:** South Africa's Brown Hyena  
**Date report completed:** 21<sup>st</sup> December 2007  
**Completed by:** Dr Dawn Scott  
**Period covered by this report:** Jan 07 to Aug 07

### Reporting on research objectives

**Objective 1: Evaluate the use of playback recordings to estimate brown hyena densities and provide guidelines for future implementation**

Call-ins (playing back recorded animal distress calls to attract the hyena) are one method of assessing presence and abundance of browns. To date we have conducted enough call-ins to determine their effectiveness in two comparing densities, and through calibrations, the range at which browns come in and also over what distance. This year we have been evaluating the effect of different call types. It is becoming more apparent that this may not be the most effective technique in low density areas and so the objectives have been modified to encompass comparisons with other methods (latrine surveys, spotlighting and camera trapping - all of which has been undertaken by volunteers) with the aim of developing a rapid survey method for application across the region: **'Design a rapid assessment method for surveying brown hyena by comparing and validating a range of different field survey methods used to determine presence (detection), abundance, and monitor population trends'**. We are currently in the process of preparing a scientific publication on this aspect of the project. We will look at applying

these findings to further outside areas and further testing the effect of different call types and whether bait can aid detection.

**Objective 2: Compare the densities of hyena and other large predators in at least three different populations, each of which has different ecological constraints in terms of competitors and protection**

To assess actual densities is very difficult and as we are collecting more data we are finding this more so. We have calculated density estimates from our two primary study sites from call-in methods although the standard errors are large and further calibrations are required to reduce this. We also have the problem of effectiveness of methods under different densities. Hence we have been developing comparative methods to give us reliable abundance estimates. Findings have helped us to suggest methods that can be applied to further sites and an occupancy based analysis has been developed to hopefully give us densities which will feed into objective 3. What we have been expanding on in this objective is the ecological constraints of the different sites and assessing these more along with looking at the ecology of hyena in different areas hence our objectives have been modified to:

**'Assess and compare brown hyena presence, abundance, density, diet and habitat use within areas of different levels of protection and land use.'**

Last year we started looking at habitat use and ranging behaviour with radio-collars and also assessing diet in different areas.

**Objective 3: Generate the first accurate brown hyena density estimates for the region and set up an effective monitoring process**

We are currently developing methods for rapid assessment and monitoring (see objective 1). Accurate density estimates are difficult to achieve and extensive regional work is logistically challenging within the expeditions, however our PhD student is working on regional density estimates, which the Earthwatch data has contributed to.

**Objective 4: Promote human-wildlife coexistence through training, educational support, publicity and promotion via a range of media**

The project has engaged in a wide range of publicity through a range of media. We have had several film makers, photographers and journalists on site with us during expeditions and we were selected for WWF/Nissan Environmental leaders program to host students. See below for some outputs. Educationally we have 6 Masters students working on the project with us (from South Africa and the UK) and currently have 1 PhD student. Undergraduate students from South Africa have also been working on aspects of the project.

**Scientific awareness:**

Poster to be presented at the Mammal Conference in Spain, Easter 2008, audience approx 300.

Oral presentation at the Mammal Society Conference in Easter 2008, audience approx 250

Royal Geographical Society Talk, London Oct 2008. audience approx 800

**International**

Yahoo News – Assignment Earth short film – October 2006

**National UK**

A children's TV programme (Michaela's wild challenge, channel 5 UK TV) came to film call-in protocol – completed –aired November 2006.

**National South Africa**

Article for South African Airways magazine.

## Regional South Africa

'After dark....in Pilanesberg National Park' (northwest parks newsletter article)

'The life of Bryan' (northwest parks newsletter article)

### **Objective 5: Assess natural prey availability to carnivores within these areas**

Spotlighting surveys and land owner questionnaires have enabled us to develop a species list and for some species calculate relative abundance at our focal study sites.

## Project Development

### **1. If you have removed or modified your original objectives please explain why below.**

See report on objectives.

Objectives have been slightly modified from the original proposal in reflection on research findings and ability to achieve objectives in the field. Some of our objectives were not fully achievable due to logistical constraints and considerations, whereas further areas of importance and potential development have opened up and become apparent, which also fit in better with volunteer-based research within an expedition time frame.

### **2. Please list any new objectives below.**

The new modified objectives for the **overall** project are as follows:

- 1) Design a rapid assessment method for surveying brown hyena by comparing and validating a range of different field survey methods used to determine presence (detection), abundance, and monitor population trends.
- 2) Assess and compare brown hyena presence, abundance, density, diet and habitat use within areas of different levels of protection and land use\*
- 3) Determine brown hyena threats to livestock, both actual and those perceived by landowners, and assess the extent of hyena 'control' through socio-economic based questionnaires.
- 4) Attempt to determine brown hyena density in the northwest province by occupancy analysis and undertake GIS analysis to look at spatial patterns in an attempt to determine source and sink areas.
- 5) Through genetic analysis investigate the possible consequences of isolation between populations inside and outside protected areas, to determine their viability\*
- 6) Promote human-wildlife coexistence through training, educational support, publicity and promotion via a range of media

Points 3 and 4 are too regionally wide-scale are currently being undertaken by our PhD student.

Points 1, 2, 5 and 6 are part of the Earthwatch objectives, however some points can only be fulfilled by the Earthwatch teams to a certain extent.

Point 2, due to timeframe and logistics, less accessible sites throughout the region are being surveyed by our PhD student and other members of the field team.

Point 5, Earthwatch volunteers are helping to develop field methods to collect DNA samples for later lab analysis. We currently have several samples which are undergoing lab analysis for markers.

### **3. What logistical or scientific challenges have you encountered in the past season and how will you address these during the next field season?**

Not all methods work and so we have to modify and verify them to ensure we are meeting our overall objectives. Applications for further funding outside Earthwatch are being applied for GPS collars for animals and also for assistance with DNA collection and analysis to help support the project.

## Non-technical summary of results

1. Give an account of the data collected and results (inputs and data) for the period covered by this report, mentioning any emerging trends.

### Our 2007 volunteers helped us to undertake the following:

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In addition we have at least 5 different samples of DNA that are being worked on in the lab and making good progress to establishing genetic markers for browns for future analysis of further samples we collect. Volunteers also helped us with our bait marking pilot survey, VHF radio-tracking, and faecal analysis. We have sent the scat samples off to University of Pretoria and have project students there working on scat analysis to help us find out the diet of our browns. Bryan our GPS collared hyena gave us nearly 1000 fixes on his movements during 2007.

### Data Summary 2007

#### Latrine Data

	Km driven	No. brown latrines	Freq/km					
<b>Pilanesberg</b>			Browns	Jackal	Lion	Leopard	Wildcat	Caracal
Jan	51	35	0.686				0	0
Aug 1	198.4	374	1.886	0.958	0.05	0.021	0	0
Aug 2	113.9	58 (new)	0.51	0.25	0.04	0.02	0.01	0
Total	368.3							
<b>Mankwe</b>								
Jan	48.4	0	0	0.021	0	0	0	0
Aug 1	56.7	1	0.017	0.176	0	0.071	0	0.053
Aug 2	55.5	1	0.02	0.5	0	0.02	0	0.05
Total	160.6	469						
<b>Kgaswane</b>								
August	19.5		0.56	0.26				0.21
<b>Amand.</b>								
August	12.9		0.23	0.00				0.00
<b>Overall</b>	<b>561.3</b>							

## Spotlighting data

Month/location	Km driven	Freq/km							
<b>Pilanesberg</b>		Browns	Jackal	Lion	Scrub hare	Steenbok	Spring hare	Duiker	Red rock rabbit
Jan	297.4	0.027	0.024	0.01	0.047	0.024	0.00	0.00	
August	108.6	0.02	0.02	0.01	0.08	0.06	0.00	0.01	
Total	406								
<b>Mankwe</b>									
Jan	91.2	0.011	0.132	0.00	0.154	0.088	0.044	0.022	
Aug 1	30	0.00	0.03	0.00	0.20	0.10	0.03	0.00	
Aug 2	30.3	0.00	0.00	0.00	0.10	0.13	0.00	0.00	
Total	151.5								
<b>Kgaswane</b>									
August	13.1				0.23				0.38
<b>Amand.</b>									
August	5				0.02				0.00
<b>Overall</b>	<b>575.6</b>								

### Camera trapping August 2007:

**Mankwe:** 40 nights = 0 hyena (by Earthwatch) 1 caracal, 1 honey badger, 3 jackal, 1 genet

**Pilanesberg:** 363 nights = 43 temporally independent photos of hyena (0.118 photo rate) (By PhD student)

### Call-ins

Month	Location	Call type	No.	No. brought in				
				Brown	Lion	Jackal	Leopard	Wild dog
January	Pilanesberg	Pig/calibration	5	0				
August	Pilanesberg	Brown	12	8	10	9	0	0
		Wild dog	12	6	7	26	1	3
		Pig	12	5	5	6	0	0
		Spring hare	12	5	4	11	0	4
August	Mankwe		5	0		2		
August	Kgaswane	Brown	3	1		2		
August	Amandebelt	Brown	1					
	Total no.		57	25	26	44	1	7

## 2. How do these data contribute to achieving conservation impacts? (e.g. actions based on results, management plans, site protection)

We are currently in the process of two publications based on the data that is being collected:

1) Evaluation of survey techniques for the brown hyena (*Hyena brunnea*) in South Africa. By R.W. Yarnell, E. Stone, M. Thorn and D.M. Scott.

This will hopefully be useful to other researchers to assess the presence and abundance of brown hyena so that more accurate assessment of their populations and population trends can be monitored.

2) The role of unprotected areas for the conservation of carnivores in Northwest Province, South Africa. D.M. Scott, R.W. Yarnell & M. Thorn due 2009

This paper will hopefully highlight the importance of different areas for future conservation. The genetics will hopefully inform us of the viability of populations inside protected areas and if any action on maintaining this viability is necessary to ensure their long term survival.

All data and publications will be passed on to the IUCN (International Union for Conservation of Nature) and North West parks board.

### **3. What is/ are the significance/ benefits of your research at the following levels?**

- Local (to the area of the research site)

Locally the project is helping to inform landowners of carnivore conservation issues and highlighting the limited economic impact that brown hyena have on livestock in the region. We are also helping Northwest Parks and Tourism board to gain an idea of how many brown hyena and other carnivores exist within their parks in the region.

- National / Regional

The data will be used by the IUCN hyena specialist group to enhance their population estimates for the region and help them more accurately gauge the threat to this species throughout its range.

- International

The project will be publishing a report on the use of South African commercial lands for carnivore conservation. The results of this study will be applicable throughout the world across a range of habitats and environments where carnivores are in conflict with landowners.

## **Communication of Results**

In line with our mission, the Earthwatch Institute is committed to research and results that will be disseminated to local, national, and international audiences.

### **Printed:**

Scientific Paper:

Evaluation of survey techniques for the brown hyena (*Hyena brunnea*) in South Africa. By R.W. Yarnell, E. Stone, M. Thorn and D.M. Scott due for submission early 2008 – Earthwatch acknowledged

'The life of Bryan' (northwest parks newsletter article) - Earthwatch mentioned

Academic dissertations -

MSc dissertation, University of Pretoria SA by Nick (Nick was trained in methods by us before applying techniques at another NP). Earthwatch acknowledged

MSc dissertation, University of Napier UK by Sarah Ryan (Sarah was present during August 2007 with Earthwatch teams and collected data as part of the project. Earthwatch acknowledged

Newsletter – in progress

### **Visual:**

Poster to be presented at the Mammal Conference in Spain, Easter 2008, audience approx 300 - Earthwatch acknowledged

### **Digital:**

Website in development

**Mass media:**

Journalist visit Jan 2008

**Meetings and conferences:**

Oral presentation at the Mammal Society Conference in Easter 2008, audience approx 250 by R. Yarnell

Royal Geographical Society Talk, London Oct 2008. audience approx 800 by D.Scott

## **Educational Opportunities**

### **1. Does your project directly or indirectly involve the following groups in your research topic?**

- Local communities – Yes

The project engages with local farmers, land owners, parks authority and conservationists in the region.

- Students – Yes

We have had one student from the University of Pretoria doing parallel surveys at Madikwe NP in 2006 and currently have two other Masters students from University of Pretoria. We also currently have one PhD student and a Masters students working with the project, one on widening survey area and investigating landowner perceptions and the second looking at DNA and the impact of isolation on population viability. We have also helped students from the local technical college to be involved with the survey work and complete study reports on our methodologies.

- Early career scientists - Yes

The project has helped PI Richard Yarnell establish himself as a conservation ecologist, in what is his first project as a PI since completing his PhD. We are also involved with scientists at University of Pretoria's Mammal Research Institute.

- Other groups Yes – conservation NGO's

We also collaborate with conservationist in local government and NGOs.

### **2. How does your research help these groups better understand and act towards the conservation of a sustainable environment?**

In the future the project hopes to show that hyena cause very little economic loss to landowners, and by using the brown hyena as an example, show that complete ecosystems with a full compliment of species function best within a sustainable framework that benefits all.

Northwest parks and tourism board will receive the first estimates of brown hyena on their reserve and use the data for monitoring and management purposes.

University of Pretoria is keen to establish joint students and to be involved with the joint publication of results. They are assisting us with training students and hopefully future conservationists.

DeWildt cheetah sanctuary is keen to get access to the landowner questionnaires for their own monitoring purposes and have access to the use of survey equipment to expand the study into areas of conservation concern directly relating to their own on-going projects and are keen for collaborative projects in future.

Anglo-American mines will receive the first estimates of brown hyena on their land and use the data for monitoring purposes. By being involved we hope that they will see the interest and importance of their land towards maintaining ecosystems.

Mankwe Wildlife Reserve will receive the first estimates of brown hyena on their land and use the data for monitoring purposes.

### **3. Has your project contributed to the completion of Masters' or PhD theses or degrees, or other educational research findings?**

This project has led to the completion of three Masters' theses so far, one from Manchester University, UK, One from Napier University, UK and the other from University of Pretoria South Africa.

We currently have two Masters students from University of Pretoria, one Masters student for University of Brighton and one PhD student who is joint with University of Pretoria and University of Brighton.

### **Other**

Our PhD student Michelle has secured her PhD funding from the Leverhulme Trust. This will help us achieve our overall aims and also reflects the increasing profile of the project as a whole.

## **8. Acknowledgements**

We would like to thank Lynne Levitt, Dougal McTavish, Ro, Pete, Louis and Chris as well as all the support staff at Mankwe Wildlife Reserve; Stephen Dell, Mike Crowther and Peiter Leitner at Pilanesberg National Park, and all other park wardens and landowners who have granted us permission to conduct surveys on their land. We would like to thank our collaborators at the University of Pretoria, and De Wildt cheetah sanctuary. Finally, we would like to thank Earthwatch and all Earthwatch volunteers for their efforts throughout the last year.