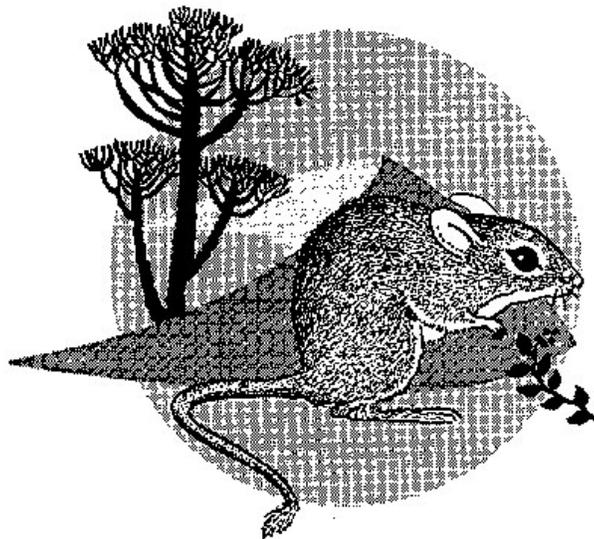


# TERRESTRIAL ECOLOGY RESEARCH UNIT

## ANNUAL REPORT

1998

University of Port Elizabeth



## **DIRECTOR'S REPORT**

The Terrestrial Ecology Research Unit had a somewhat mixed year. There was strong improvement financially, but still no finality on the organizational status of the unit, this process being slowed down by my absence on sabbatical for most of the year. In addition, it was not possible to hold an Advisory Committee meeting in 1998 due to my extended absence.

During 1998 financial support (R467 697) nearly doubled over that of 1997 (R271 000), which is particularly heartening in the light of the current economic climate. Although TERU still relies heavily on the Foundation for Research Development for most of its financial support, there are indications that the World Bank will be contributing significantly in future, and Andre Boshoff is to be congratulated on his efforts in obtaining this support. TERU continues to benefit from the support provided by the Mazda Wildlife Fund, and their loaned 4X4 Twincab pickup has again proved invaluable.

The scientific productivity during 1998 has been relatively disappointing, with only three refereed scientific publications and one popular article being published in this period. In contrast, TERU has done very well in terms of conference presentations, with a total of 14 conference presentations, of which six were at international conferences. Ayanda Sigwela is to be congratulated for being awarded a Poster Prize at the Zoological Society of Southern Africa Annual Symposium. The prospects for scientific output in the future look very good with a total of six articles accepted for publication (but which have yet to appear) and a further 13 manuscripts submitted for publication, by the end of 1998.

Student training remained a strong feature of TERU's activities, with four MSc and five PhD students currently participating in TERU research programmes. Although no students graduated in 1998, Anna Woodd successfully upgraded her status from MSc to that of PhD candidate. Two new MSc candidates initiated their studies in 1998, these being Wendy Todkill (registered in the Botany and Zoology departments) and Janet Koekemoer.

The proposed Greater Addo National Park continues to attract a large amount of attention and was again a major focus of TERU's activities this year (some details are reported later). This proposal has been a highly successful exercise in demonstrating TERU's ability to generate high quality products that are highly relevant to the community which we serve. It has been particularly gratifying to see student research products incorporated into a conservation and development initiative such as this.

A major feature of 1998 was how well TERU continued to operate during my absence on sabbatical, and this is largely due to the efforts of Andre Boshoff, who kept processes on track and developed new initiatives. The postgraduate students continued to inject their enthusiasm and energy into TERU, while having a lot of fun and furthering their studies. They definitely make all the hard work worthwhile. A special word of thanks to all the funding agencies who continue to support TERU's research programme.

**DR G I H KERLEY**

**DIRECTOR: TERRESTRIAL ECOLOGY RESEARCH UNIT**

## RESEARCH ACTIVITIES

Research activities are grouped into functional categories, and within these the activities are reported on a biome specific basis to allow for comparison with previous years' reports.

### ANIMAL / PLANT INTERACTIONS

**Thicket:** This aspect focuses on the comparative effects of indigenous and domestic herbivores in order to understand the degradation brought about by domestic herbivores. Sharon Wilson (nee Haschick, PhD) finalised her data collection on herbivore foraging behaviour by collecting her final samples for black rhino and goats. Her research led to invitations to attend two international conferences in the USA, and she also visited a number of research groups during her visit. Graham Kerley has been investigating foraging behaviour of elephants and goats, expanding on Richard Paley's and Sharon's earlier research. He also showed that tortoises have a biomass comparable to other vertebrate herbivores in this biome, thereby emphasizing their possible importance, which has hitherto been ignored. Ayanda Sigwela (MSc) continued his study on trophic competition and seed dispersal efficiency between kudu and goats, demonstrating that kudu and goats do indeed compete for forage, and that kudu are effective seed dispersers, whereas goats are not. His project is scheduled for completion early in 1999. Janet Koekemoer (MSc) has started a project on the potential for competition between indigenous (kudu) and introduced (impala) wildlife, comparing diet and habitat use of these two species.

**Desert:** Graham Kerley used the opportunity of his sabbatical with Walt Whitford in the Chihuahuan Desert in New Mexico to further investigate the role of kangaroo rat herbivory in the persistence of desertified shrublands. He clearly showed that these rodents are capable of inhibiting grass recovery in degraded areas. He also showed that pocket gopher (fossorial rodent) impacts in desert systems are fundamentally different to those in more mesic systems, as these animals alter the vegetation, but apparently do not affect the soils.

### CONSERVATION BIOLOGY

**Thicket:** Anna Woodd has been doing exciting work on the Addo elephant population, and her project was upgraded to PhD status early in 1998. She has developed a population register back to 1931 from photographic records, and has been able to calculate a range of demographic parameters and develop population models. In addition, she has been sampling the herd for DNA material for a genetic analysis of paternity, and investigating aggressive interactions between the adult bulls. Steve Henley's (MSc) project on habitat suitability models of kudu, bushbuck and duiker has been highly successful to date, and this is to be upgraded to a PhD project by extending the models to include goats and investigate the consequences of vegetation degradation on these species' habitat quality.

**Desert:** Cynthia Hunter (PhD) has continued her analyses of the buffalo populations in northern Botswana, generating spatial data sets of resource use to investigate the factors which drive buffalo movement.

**Forest:** The long term experiments on the effects of domestic herbivores on habitat structure are continuing, although activities in 1998 were limited to routine maintenance of the experimental set-up.

**General:** Andre Boshoff continued his collaboration with Steven Piper (University of Natal) on the ecology and conservation of vultures in southern Africa.

## **CONSERVATION PLANNING**

### **Thicket: GREATER ADDO NATIONAL PARK INITIATIVE**

A number of positive developments took place during the year under review. TERU was requested by the World Bank (Washington DC, USA), acting on behalf of the Global Environmental Facility, to facilitate the holding of a Greater Addo National Park (GANP) Stakeholders Meeting early in 1999, with a view to engaging in a process which could see the Bank providing substantial funding towards achieving the vision of a GANP, as set out by a 1997 TERU report. During 1998, GANP was formally included as one of the key components of the government's development strategy for the region, as part of the Fish River Spatial Development Initiative.

A total of seven presentations (mostly by Andre Boshoff), to a wide range of GANP stakeholders, was made by TERU, all by request. Four additional meetings were attended, by invitation, including one to address members of the National Parliamentary Standing Committee on the Environment, at the Houses of Parliament in Cape Town. The GANP initiative was mentioned in, or the subject of, 23 newspaper and magazine articles. Graham Kerley was invited to make an oral presentation at the 12th Session of the Global Biodiversity Forum in Dakar, Senegal: GANP was used as a case study in his talk on sustainable utilisation of biodiversity.

Largely on the strength of his involvement in the GANP Initiative, Graham Kerley received the Port Elizabeth Citizen of the Year Award in the Environmental Conservation Category.

Andre Boshoff was involved in gaining 'in principle' approval from the World Bank for a conservation planning project in the Thicket Biome. This project will be funded by the Global Environmental Facility and will provide a major impetus to the conservation of this poorly conserved biome.

## **REHABILITATION ECOLOGY**

**Thicket:** Justin Watson's (PhD) rehabilitation experiments on the proposed Bontveld mining sites are now into the third year, with clear indications of the most suitable management options to bring about rehabilitation as rapidly as possible, and these methods will be applied by PPC when they initiate mining in 1999. He has also been investigating the natural patterns and regeneration processes in Bontveld, furthering our understanding of this system, and also providing crucial management information for the area to be mined. Graham Kerley has maintained his collaboration with Dave Tongway and John Ludwig (CSIRO, Australia) on landscape functional analysis and soil resources in the Thicket Biome. This material has now all been analysed, and a first manuscript submitted. Wendy Todkill (MSc) is developing experimental tests of the understanding arising from landscape functional analysis and its applicability to rehabilitation of degraded thicket vegetation.

## **CONTRACT RESEARCH**

Five contracts were completed during the year under review. Three of these dealt with the avifaunal components of Environmental Impact Assessments and were conducted in wetlands in Gauteng Province (2) and the area of the Coega port development near Port Elizabeth (1). One contract dealt with the design of a national project for the Endangered Wildlife Trust-Airports Company (SA) for a birdstrike hazard reduction programme at South Africa's main airports. The fifth contract provided the ecological basis for an ecotourism development feasibility

study for land in the Mpofu district which has been restored to its original owners (see list of **Reports**).

## PUBLICATIONS 1998

### SCIENTIFIC ARTICLES

- PALEY, R.G.T. & KERLEY, G.I.H. 1998. The winter diet of elephant in Eastern Cape Subtropical Thicket, Addo Elephant National Park. *Koedoe*. 41: 37-45.
- MILTON, S.J., DEAN, W.R.J., KERLEY, G.I.H., HOFFMAN, M.T. & WHITFORD, W.G. 1998. Dispersal of seeds as nest material by the cactus wren. *Southwestern Natl.* 43:449-452.
- SIMELANE, T.S. & KERLEY, G.I.H. 1998. The conservation implications of the use of indigenous vertebrates by traditional healers in Xhosa communities, South Africa. *S. Afr. J. Wildl. Res.* 28:121-126.

### REPORTS

- McLACHLAN, A. & KERLEY, G.I.H. 1998. Successional patterns across coastal dune chrono-sequences and rehabilitation implications: final report to DEA&T. *Inst. Coastal Res. Rep.* 42 pp.
- BOSHOFF, A.F. 1998. The predicted impacts of a proposed waste-water disposal scheme on the avifauna of the upper Blesbokspruit wetland (including the Ramsar site), Gauteng Province. *Terrestrial Ecology Research Unit Report 20*: 16 pp
- BOSHOFF, A.F., KERLEY, G.I.H. & GEACH, B.H. 1998. A biophysical survey, ecotourism development feasibility study and site assessment for Tamboekiesvlei, Mpofu district, Eastern Cape Province. *Terrestrial Ecology Research Unit Report 21*: 64 pp
- BOSHOFF, A.F. 1998. The Airports Company South Africa-Endangered Wildlife Trust Strategic Partnership : A project plan for a birdstrike hazard reduction programme. *Terrestrial Ecology Research Unit Report 22*: 46 pp
- BOSHOFF, A.F. 1998. The predicted ecological impact of the termination of the water supply to the Rondebult Bird Sanctuary, Germiston district, Gauteng province. *Terrestrial Ecology Research Unit Report 23*:7 pp
- BOSHOFF, A.F. & SIGWELA, A.M. 1998. The predicted impacts of the construction and operation of the proposed Coega Harbour on the birds of the Coega Estuary and Jaheel Island. *Terrestrial Ecology Research Unit Report 24*:11pp

### POPULAR ARTICLES

- DE MOOR, I., KERLEY, G.I.H., BOSHOFF, A.F. 1998. The Greater Addo National Park - an exciting development for the Eastern Cape. *The Naturalist*. 41:52-57.

### CONFERENCE PRESENTATIONS

- WATSON, J.J., CAMPBELL, E.E. & KERLEY, G.I.H. Bontveld in the Eastern Cape. Poster presentation, South African Association of Botanists Annual Symposium, January.
- KERLEY, G.I.H., MASON, M.C. & WEATHERBY, C.A. The role of tortoises in the Thicket Biome, South Africa: ranging behaviour, diet and seed dispersal. **Invited speaker**, Desert Tortoise Council 23rd Annual Symposium, Tuscon, Arizona, April.
- CASTLEY, J.G. & KERLEY, G.I.H. The paradox of forest conservation in South Africa. Oral presentation, Zoological Society of Southern Africa Annual Symposium, Durban, July.
- CASTLEY, J.G. & KERLEY, G.I.H. Vertebrate diversity of forest fragments: landscape and habitat effects. Oral presentation, Zoological Society of Southern Africa Annual Symposium, Durban, July.
- HENLEY, S.R., & KERLEY, G.I.H. Vegetation density and kudu abundance. Poster presentation, Zoological Society of Southern Africa Annual Symposium, Durban, July.
- HUNTER, C.G., VAN JAARSVELD, A.S. & KERLEY, G.I.H. A GIS-based analysis of resource preference at various scales. Oral presentation, Zoological Society of Southern Africa Annual Symposium, Durban, July.

- SIGWELA, A.M., KERLEY, G.I.H. & HENLEY, S.R. Comparison of diet of kudu and goats in Subtropical Thicket. Poster presentation, Zoological Society of Southern Africa Annual Symposium, Durban, July (**awarded Poster Prize**).
- WATSON, J.J., KERLEY, G.I.H. & CAMPBELL, E.E. Avifaunal utilization of Bontveld, Eastern Cape. Poster presentation, Zoological Society of Southern Africa Annual Symposium, Durban, July.
- WOODD, A.M. & HALL-MARTIN, A.J. A comparison of methods used to count the Addo elephant population. Oral presentation, Zoological Society of Southern Africa Annual Symposium, Durban, July.
- HASCHICK, S.L. & KERLEY, G.I.H. The effect of plant spinescence on the foraging abilities of African Subtropical Thicket Browsers. Poster presentation, Intl. Soc. Behav. Ecol. 7th Biennial Congress, Monterey, California, USA, July.
- HASCHICK, S.L. & KERLEY, G.I.H. The influence of allometry on the foraging abilities of African Subtropical Thicket Browsers. Oral presentation, Foraging/98. Santa Cruz, California, USA, July.
- PIPER, S.E., BOSHOFF, A.F. & MUNDY, P.J. A model of the distribution of the Bearded Vulture *Gypaetus barbatus* in KwaZulu-Natal Province, South Africa. Poster presentation, 5th World Conference on Birds of Prey and Owls, Midrand, August.
- SCOTT, H.A., SCOTT, R.M. & BOSHOFF, A.F. The farming community and the conservation of the Cape Griffon *Gyps coprotheres* in southern Africa: the Western Cape experience. Oral presentation, 5th World Conference on Birds of Prey and Owls, Midrand, August.
- KERLEY, G.I.H. Sustainable utilization of indigenous biodiversity as an alternative to desertification: landuse options in Valley Thicket, South Africa. **Invited speaker**, oral presentation, Global Biodiversity Forum, Dakar, Senegal, December.

## POST-GRADUATE TRAINING

### Postgraduate students in training

- HASCHICK, S.L. Resource partitioning by herbivores in Valley Bushveld. PhD thesis, Univ. Port Elizabeth.
- HENLEY, S.R. The predictive value of habitat models: comparing subtropical thicket herbivores. MSc thesis, Univ. Port Elizabeth
- HUNTER, C.G. Environmental and human influences on movement by buffalo herds in Botswana and Zimbabwe. PhD thesis, Univ. Port Elizabeth.
- KOEKEMOER, J. Potential dietary and space use competition between impala and kudu. MSc thesis, University of Port Elizabeth.
- SIGWELA, A.M. Goats and kudu in Valley Thicket: dietary competition and seed dispersal efficiency. MSc thesis, Univ. Port Elizabeth
- SIMELANE, T.S. The role of National Parks in conserving traditional natural resources. PhD thesis, Univ. Port Elizabeth.
- TODKILL, W.B. Rehabilitation of Valley Bushveld in the Addo Elephant National Park. MSc thesis, University of Port Elizabeth.
- WATSON, J.J. Dynamics of Bontveld and rehabilitation implications. PhD thesis, Univ. Port Elizabeth.
- WOODD, A.M. The Addo Elephants: population structure of a small closed elephant population. PhD thesis, Univ. Port Elizabeth



## FINANCIAL SUPPORT 1998

<b>Research Grants</b>	<b>Programme</b>	<b>Amount</b>
South African National Parks	Thicket	R 25 000
Foundation for Research Development (Sustainable use)	Thicket	R177 244
(Support for SL Haschick)	Thicket	R 10 000
PPC Cement	Thicket	R 25 000
(Mine rehabilitation - joint project with EE Campbell)		
Ernest Oppenheimer Memorial Trust	Sabbatical	R 40 000
University of Port Elizabeth	Sabbatical	R 30 000
(Overseas Travel Bursary)		
University of Port Elizabeth	General	
(Research Committee Grant)		R 9 500
Publications output 1997	General	
(Research Committee Grant)		R 14 375
<b>Contracts</b>		<b>R 82 128</b>
<b>Bursaries*</b>		
Foundation for Research Development Haschick, S.L. R45 000		
University of Port Elizabeth		
Hunter, C.G.	R3 950	
Sigwela, M.A.	R2 750	
Henley, S.R.	R2 750	
Bursary subtotal		R 54 450
	<b>Total</b>	<b>R467 697</b>

### **In Kind Contributions**

The loan and maintenance of the 4x4 pickup by Mazda Wildlife Fund represents a saving of about R20 000 on transport expenses.

South African National Parks Board provides access and accommodation for TERU research in the Addo Elephant National Park.

\*Note that Foundation for Research Development Grant-Holder Bursaries are included within the Programme amounts listed above.



## **ADVISORY COMMITTEE, STAFF AND STUDENTS 1998**

### **Advisory Committee**

Dr M. H. Knight, South African National Parks (Chairman)  
Dr E. E. Campbell, Botany Department, University of Port Elizabeth  
Mr P. W. Coetzee, Western District Council  
Mr L. Els, Ministry for Economic Affairs, Environment & Tourism (Eastern Cape Province)  
Mr P. Niven, Amanzi Estates  
Dr P. M. Norton,  
Dr A.R. Palmer, Agricultural Research Council  
Mr J. Pauw, Foundation for Research Development  
Dr B. Ras, Department of Agriculture (Eastern Cape)

### **Staff**

Dr G. I. H. Kerley, Director  
Dr A. F. Boshoff

### **Postgraduate students**

Mr S. R. Henley (MSc)  
Ms J. Koekemoer (MSc)  
Mr A. M. Sigwela (MSc)  
Ms W. B. Todkill (MSc)  
Ms C. G. Hunter (PhD)  
Mr T. S. Simelane (PhD)  
Mr J. J. Watson (PhD)  
Mrs S. L. Wilson (PhD)  
Ms A. M. Woodd (PhD)

### **Function of the Advisory Committee**

The function of this committee is to review and advise on the activities of the Terrestrial Ecology Research Unit, and to report back to the Council of the University of Port Elizabeth via the Zoology Department.

