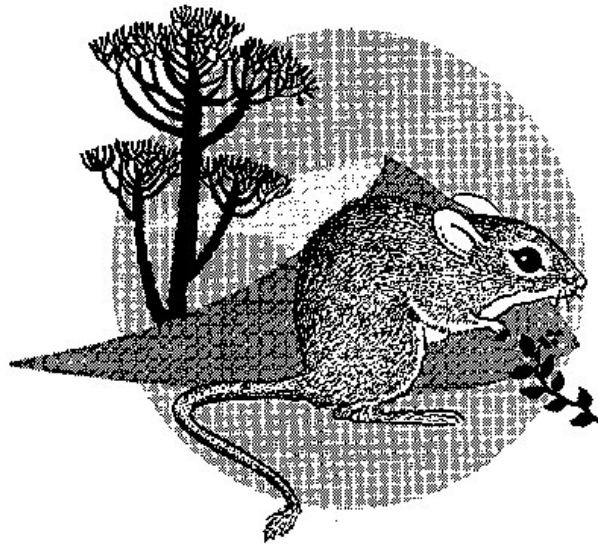


TERRESTRIAL ECOLOGY RESEARCH UNIT

ANNUAL REPORT

1997

University of Port Elizabeth



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DIRECTOR'S REPORT

The Terrestrial Ecology Research has had another very good year, with a strongly improved financial position, and an emerging clarity on the organizational status of the Unit.

Funding during 1997 (R271 000) increased significantly over 1996 (R191 000), and this has allowed the staff and students to get stuck into their research programmes. In addition, the support by the Mazda Wildlife Fund in the form of a 4x4 Twincab pickup represented a massive savings in transport costs of about R40 000. Gentyre played their part in this by donating specialised 4X4 tyres.

Despite the apparently comfortable increase in research funds, TERU relies extensively on the Foundation for Research Development for most of its support, and there is a need to expand this resource base. Obtaining new resources must be a major focus in the next few years.

The status of TERU within the University was the subject of considerable debate during the year, culminating in the decision by the University Executive Management that it should operate as a multidisciplinary research unit. This is a tremendous opportunity for the Unit to be able to achieve its goals by encouraging collaboration with staff from departments other than Zoology. A constitution is being drawn up to allow this to happen, with maximum benefit to the University, its staff and students and the broader community which the University serves.

The scientific productivity and contribution towards postgraduate student training remains high, with 7 refereed scientific publications, 11 refereed book chapters, 11 scientific reports, 6 popular articles and 12 presentations at scientific conferences. In addition, two Honours, three MSc and four PhD students conducted their postgraduate research under the auspices of TERU. Three MSc and a PhD student graduated during 1997, and congratulations are due to Olivia Brazzale, Bev Geach and Mervyn Mason and a special congratulations to Guy Castley who graduated PhD. We wish them well in their future careers. Guy is the second TERU graduate to be appointed to a research position with South African National Parks, indicating the high regard that this organization has for TERU's research and training programme. Richard Paley, an MSc student at the University of London, conducted his research with TERU, and was awarded a distinction for his dissertation.

A highlight of the year was the production of a proposal to establish a Greater Addo National Park. This proposal, which has been endorsed by South African National Parks, has attracted considerable attention from the national media as well as national and international donor agencies. TERU will remain closely associated with the development of this Park, which represents an ideal student training opportunity.

None of the successes during 1997 would have been possible without a considerable amount of input from the TERU Advisory Committee, staff and students. I am particularly indebted to André Boshoff for his support and wise counsel. As usual, the students generated a lot of fun and scientific excitement and this ensured that all their hard work paid off. Many thanks to them.

GRAHAM KERLEY

DIRECTOR: TERRESTRIAL ECOLOGY RESEARCH UNIT

RESEARCH ACTIVITIES

THICKET PROGRAMME

The Thicket (Valley Bushveld) programme is TERU's major focus at the moment, and this is particularly appropriate in the light of the importance and the threatened status of this biome in the Eastern Cape. Although the goals of this programme are the sustainable utilization of the Thicket biome, this research is strongly based on addressing major ecological issues. Bev Geach completed her MSc dissertation on the resource economics of the Addo Elephant National Park, one of her major findings being that the broader economic value of the Park, as estimated by the travel cost method measure of consumer surplus, is in the region of R350 million. Mervyn Mason also completed his MSc dissertation on tortoise ecology in the Thicket biome, showing that tortoises are important herbivores and seed dispersers.

Sharon Haschick (an FRD Prestige Bursary holder) continues with her work on the allometric implications of body size for forage availability in Thicket browsers for a PhD, while Justin Watson's PhD research on the dynamics and rehabilitation of Bontveld is a strong mixture of theoretical and applied ecology. Steve Henley (ex University of Natal) has initiated an MSc project on habitat models of kudu, bushbuck and duiker, which will be of relevance in both the conservation and the game ranching of these species. Ayanda Sigwela (ex University of Transkei) is investigating potential dietary competition between kudu and domestic goats for an MSc, when not being chased around the Addo park by elephants. Richard Paley, a visiting student from the University of London, completed his MSc dissertation (awarded with distinction) on the foraging behaviour of elephant in the Addo Elephant National park.

Graham Kerley had an opportunity to continue his work on Landscape Functional Analysis when Dave Tongway (CSIRO, Australia) visited TERU, and Graham and Dave were invited to give a presentation on their findings at the Grassland Society of Southern Africa annual congress and lead a field workshop for the conference delegates. Graham and Jayne Belnap (National Biological Service, USA) continued their collaborative work on soil crusting lichens, and initial findings indicate that these organisms are important in terms of nitrogen fixing in these semi-arid ecosystems.

A highlight of the Thicket Programme this year was the proposal by Graham and André Boshoff to extend the current Addo Elephant National Park to nearly 400 000 ha, encompassing six biomes and a marine reserve (see the website at <http://zoo.upe.ac.za/addo/addoprop.htm>). This proposal represents a strong combination of theoretical and applied ecology, which will lead to massive conservation and development opportunities for the Eastern Cape. The concept of the Greater Addo National Park has attracted considerable support from national and provincial government, as well as national and international conservation, tourism and funding agencies. Media interest has also been high, with the concept being featured in a number of newspaper and national television articles, including the evening news, and an article for 50/50 TV is in preparation.

FOREST PROGRAMME

The highlight of the Forest Programme in 1997 was the completion of Guy Castley's PhD on the determinants of vertebrate diversity in indigenous forests of the Eastern Cape. This is an important work as it provides a sound scientific understanding of the major threats to our forest fauna, and this information can now be used by management agencies to reduce these threats. Monitoring of the experimental

grazing exclosures continued, with further support being found for the impact of domestic herbivores on forest habitat structure, including evidence for changes in the lichen communities, which are important in terms of forest nutrient dynamics, due to grazing.

DUNE PROGRAMME

During 1997, the research on succession in coastal dunes, focusing on the prograding dunes in Mtunzini in Natal, saw the completion of Olivia Brazzale's MSc dissertation on dune meiofauna, which was awarded in April. The vast amount of information collected over the last four years on this project is now being synthesized into a monograph.

The project, in collaboration with Ted Avis and Roy Lubke (Rhodes University), on dune resource ecology did not attract any students to UPE, although Roy and Ted have a number of students. Work on the effect of sand dynamics on biodiversity was initiated and this is expected to yield exciting results. Justin Watson continued to publish work from his MSc and was also appointed as the regional coordinator for a national research programme on the threatened African black oystercatcher.

GENERAL PROGRAMME

The research on the sustainable utilization of quail is now in the writing up phase, with a manuscript in preparation on the implications of quail biology for the sustainable use of this species. The findings of this research project have been adopted by Eastern Cape Nature Conservation in their quail management policy.

Cynthia Hunter, a graduate of the University of Florida, joined TERU and her PhD project on the factors influencing buffalo movements in Botswana and Zimbabwe is being run in collaboration with Prof A van Jaarsveld of the University of Pretoria. This project adds a larger geographical perspective to TERU's research activities, but maintains the focus of sustainable use of natural resources.

Graham Kerley maintained his association with Walt Whitford of the US EPA, Las Cruces, New Mexico, and together they published a paper on the role of rodents in desert grass dynamics, and completed a manuscript on the consequences of desertification on desert granivores and seed dynamics.

André Boshoff is continuing his work on raptors. He is preparing three manuscripts, co-authored with Prof Steve Piper, University of Natal, on the demography of the Cape griffon in the Western Cape and to date one of these has been accepted for publication. André co-convened an international vulture conservation and research workshop, presented a paper at the workshop and is chief editor of the workshop proceedings. He is also developing a major research proposal which will deal with the relationships between large raptors, their habitats and landuse changes, including the possible effects of global climate change.

CONTRACTS

TERU was involved in a wide range of contract research projects commissioned by various stakeholders, including Eskom, Coega IDZ, Independent Development Trust, CEN Integrated Environmental Management Unit and developers of a number of private game based ventures. These projects included Environmental Impact Assessments, wildlife inventories, conservation and ecotourism development plans and private game reserve management plans. The value of these contracts is

twofold in that they generate income for TERU to use to support staff, students and research projects, and also provide an opportunity for TERU staff and students to gain hands-on experience with current ecological issues and their solutions.

PUBLICATIONS 1997

Scientific Publications

- GAYLARD, A & KERLEY, GIH. 1997. Diet of the tree hyrax *Dendrohyrax arboreus* (Hyracoidea, Procaviidae) in the Eastern Cape, South Africa. *J. Mammal.* 78:213-221
- HASCHICK, S. L. & KERLEY, G.I.H. 1997. Browse intake rates by bushbuck (*Tragelaphus scriptus*) and boergoats (*Capra hircus*). *Afr. J. Ecol.* 35: 146-155
- HASCHICK, S L & KERLEY, GIH. 1997. Factors influencing forage preference of bushbuck and boergoats for Valley Bushveld plant species. *Afr. J. Range & Forage Sci.* 14:49-55.
- KERLEY, GIH, WHITFORD, WG & KAY, FR. 1997. Mechanisms for keystone status of kangaroo rats: graminivory rather than granivory? *Oecologia* 111:422-428.
- SIMELANE, TS & KERLEY, GIH. 1997. Recognition of reptiles by Xhosa and Zulu communities in South Africa, with notes on traditional beliefs and uses. *Afr. J. Herpet.* 46. 49-53.
- WATSON, JJ, KERLEY, GIH & McLACHLAN, A. 1997. Nesting habitat of birds breeding in a coastal dunefield, South Africa, and management implications. *J. Coastal Res.* 13:36-45.
- WHITE, RM, KERLEY, GIH & BERNARD, RTF. Pattern and controls of reproduction of the southern African rodent *Gerbillurus paebe* in the semi-arid Karoo, South Africa. *J. arid Environ.* 37:529-549.

Refereed Book Chapters

- BOSHOFF, A.F. 1997. Martial Eagle *Polemaetus bellicosus*. In: The atlas of southern African birds. Vol. 1: Non-passerines. Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J. Parker, V. & Brown, C.J. (eds), pp. 192-193. BirdLife South Africa, Johannesburg.
- BOSHOFF, A.F. 1997. Crowned Eagle *Stephanoaetus coronatus*. In: The atlas of southern African birds. Vol. 1: Non-passerines. Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J. Parker, V. & Brown, C.J. (eds), pp. 194-195. BirdLife South Africa, Johannesburg.
- BOSHOFF, A.F. 1997. African Fish Eagle *Haliaeetus vocifer*. In: The atlas of southern African birds. Vol. 1: Non-passerines. Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J. Parker, V. & Brown, C.J. (eds), pp. 205-207. BirdLife South Africa, Johannesburg.
- BOSHOFF, A.F. 1997. Blackbreasted Snake Eagle *Circaetus gallicus*. In: The atlas of southern African birds. Vol. 1: Non-passerines. Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J. Parker, V. & Brown, C.J. (eds), pp. 198-199. BirdLife South Africa, Johannesburg.
- BOSHOFF, A.F. 1997. Steppe Buzzard *Buteo buteo*. In: The atlas of southern African birds. Vol. 1: Non-passerines. Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J. Parker, V. & Brown, C.J. (eds), pp. 208-209. BirdLife South Africa, Johannesburg.
- BOSHOFF, A.F. 1997. Forest Buzzard *Buteo oreophilus*. In: The atlas of southern African birds. Vol. 1: Non-passerines. Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J. Parker, V. & Brown, C.J. (eds), pp. 210-211. BirdLife South Africa, Johannesburg.

- BOSHOFF, A.F. 1997. Gabar Goshawk *Micronisus gabar*. In: The atlas of southern African birds. Vol. 1: Non-passerines. Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J. Parker, V. & Brown, C.J. (eds), pp. 230-231. BirdLife South Africa, Johannesburg.
- BOSHOFF, A.F. 1997. Gymnogene *Polyboroides typus*. In: The atlas of southern African birds. Vol. 1: Non-passerines. Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J. Parker, V. & Brown, C.J. (eds), pp. 244-245. BirdLife South Africa, Johannesburg.
- BOSHOFF, A.F. 1997. Osprey *Pandion haliaetus*. In: The atlas of southern African birds. Vol. 1: Non-passerines. Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J. Parker, V. & Brown, C.J. (eds), p. 246. BirdLife South Africa, Johannesburg.
- BOSHOFF, A.F. & ALLAN, D.G. 1997. Booted Eagle *Hieraaetus pennatus*. In: The atlas of southern African birds. Vol. 1: Non-passerines. Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J. Parker, V. & Brown, C.J. (eds), pp. 184-186. BirdLife South Africa, Johannesburg.
- BOSHOFF, A.F. & ALLAN, D.G. 1997. Secretary Bird *Sagittarius serpentarius*. In: The atlas of southern African birds. Vol. 1: Non-passerines. Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J. Parker, V. & Brown, C.J. (eds), pp. 152-153. BirdLife South Africa, Johannesburg.

Reports

- BOSHOFF, AF 1997. A survey of the birds of the farm "New Bradford" and surrounding areas, with notes on the medium to large mammal fauna. *Terrestrial Ecology Research Unit Report* 9:1-25.
- BOSHOFF, AF & KERLEY, GIH. 1997. Towards a conservation policy for the Eastern Cape: the function and management of protected areas. *Terrestrial Ecology Research Unit Report* 10:1-8.
- BOSHOFF, AF & KERLEY, GIH. 1997. A habitat suitability assessment for the introduction of elephant to the Sante Sana Game Reserve, Graaff-Reinet District. *Terrestrial Ecology Research Unit Report* 11:1-15.
- KERLEY, GIH & BOSHOFF, AF. 1997. A habitat suitability assessment for the introduction of rhinoceros to the Sante Sana Game Reserve, Graaff-Reinet District. *Terrestrial Ecology Research Unit Report* 12:1-16.
- BOSHOFF, AF & KERLEY, GIH. 1997. Apieskloof Wildlife Area: habitats, species and land-use options. *Terrestrial Ecology Research Unit Report* 13:1-17.
- KERLEY, GIH & BOSHOFF, AF. 1997. A habitat suitability assessment for the introduction of African Buffalo to the Sante Sana Game Reserve, Graaff-Reinet District. *Terrestrial Ecology Research Unit Report* 14:1-15.
- KERLEY, GIH & BOSHOFF, AF. 1997. Proceedings of a strategic planning workshop for Sante Sana Game Reserve. *Terrestrial Ecology Research Unit Report* 15:1- 21.
- HENLEY, S. 1997. On the proposed reintroduction of serval (*Felis serval*) into the Great Fish River Reserve, Eastern Cape. *Terrestrial Ecology Research Unit Report* 16: 1-9.
- KERLEY, GIH & BOSHOFF, AF. 1997. A proposal for a Greater Addo National Park - a regional and national conservation and development opportunity. *Terrestrial Ecology Research Unit Report* 17:1- 61.
- BOSHOFF, AF & KERLEY, GIH. 1997. Comparison of alternative Eskom 400 kV Transmission line routes from Wolwefontein to Grassridge: potential effects on the birds and mammals. *Terrestrial Ecology Research Unit Report* 18:1-14.

BOSHOFF, AF & KERLEY, GIH. 1997. Breeding and production options for a founder herd of African buffalo in the Apieskloof Wildlife Area. *Terrestrial Ecology Research Unit Report* 19:1-16.

Popular Articles

- GAYLARD, A. 1997. Species account for *Dendrohyrax arboreus*, in The Complete Book of Southern African Mammals, Eds: Mills, MGL & Hes, AD. Struik Press, Cape Town.
- KERLEY, GIH & WOODD, A. 1997. A jumbo research project. *Fokus*, Nov: 13 & 16.
- KERLEY, GIH. 1997. Species accounts for *Otomys unisulcatus*, *O. irroratus*, *O. karoensis*, *O. laminatus*, *O. angoniensis*, *O. sloggetti*, *Parotomys brantsii* and *P. littledalei*, in The Complete Book of Southern African Mammals, Eds: Mills, MGL & Hes, AD. Struik Press, Cape Town.
- KERLEY, GIH. 1997. The Winning Game. *African Wildlife*. 51: 27-28.
- WATSON, JJ. 1997. Diet of the grass owl: analysis of pellets from Port Elizabeth, Eastern Cape. *The Bee-eater* 48:6-7.
- WATSON, JJ. 1997. Bontveld in the Eastern Cape: the impact of mining. *The Naturalist* 41:24-25.

Conference Presentations

- WATSON, JJ, CAMPBELL, EE & KERLEY, GIH. Rehabilitation of opencast mined Bontveld. Oral presentation. Grassland Society of Southern Africa Congress 32, Port Elizabeth, January.
- CASTLEY, JG, KERLEY, GIH. Vegetation recovery of insular forest fragments in the Eastern Cape following release from grazing pressure. Oral presentation. Grassland Society of Southern Africa Congress 32, Port Elizabeth, January.
- KERLEY, GIH, TONGWAY, D & LUDWIG, J. Applying Landscape Functional Analysis to Valley Bushveld. Oral presentation. Grassland Society of Southern Africa Congress 32, Port Elizabeth, January.
- HASCHICK, SL & KERLEY, GIH. Body size related resource use by vertebrate browsers in Valley Bushveld. Poster presentation. Grassland Society of Southern Africa Congress 32, Port Elizabeth, January.
- KERLEY, GIH, NEL, S. & GEACH, B. Jumbos or bust: do tourists undervalue biodiversity? Oral presentation, Zoological Society of Southern Africa Annual Symposium, Cape Town, July.
- WATSON, JJ, KERLEY, GIH & CAMPBELL, EE. Seed harvesting in Bontveld and implications for rehabilitation. Poster presentation, Zoological Society of Southern Africa Annual Symposium, Cape Town, July.
- HUNTER, CG & VAN JAARSVELD, AS. Herd movements in semi-arid southern Africa I: scale depends on aridity. Poster presentation, Ecological Society of America Annual Conference, Albuquerque, USA, August.
- BOSHOFF, AF, KERLEY, GIH & CASTLEY, JG. Who's who in the open air zoo? Poster presentation, Arid Zone Ecology Forum, Prince Albert, September.
- SIGWELA, AM, KERLEY, GIH & HENLEY, SR. What, if anything, is the Eastern Cape Thicket Vegetation? Poster presentation, Arid Zone Ecology Forum, Prince Albert, September.
- HENLEY, SR & KERLEY, GIH. Habitat suitability models: what is your opinion? Poster presentation, Arid Zone Ecology Forum, Prince Albert, September.
- VERNON, CJ & BOSHOFF, AF. A review of the status of vultures in the Eastern Cape. Oral presentation, Vultures in the 21st Century Workshop, Kimberley, October.

POST-GRADUATE TRAINING

Honours Projects

- ALLEN, B 1997. Geographic variation in the skull morphology of the subantarctic fur seal (*Arctocephalus tropicalis*). Unpubl. BSc(Hons) project, University of Port Elizabeth.
- VAN DER HORST, M. 1997. Radiotracking of African elephant bulls in the Addo Elephant National Park. Unpubl. BSc(Hons) project, University of Port Elizabeth.

Postgraduate students in training

- HASCHICK, SL. Resource partitioning by herbivores in Valley Bushveld. PhD thesis, Univ. Port Elizabeth.
- HENLEY, SR. The predictive value of habitat models: comparing subtropical thicket herbivores. M.Sc. thesis, Univ. Port Elizabeth
- HUNTER, CG. Environmental and human influences on movement by buffalo herds in Botswana and Zimbabwe. PhD thesis, Univ. Port Elizabeth.
- SIGWELA, AM. Goats and kudu in Valley Thicket: dietary competition and seed dispersal efficiency. M.Sc. thesis, Univ. Port Elizabeth
- SIMELANE, TS. The role of National Parks in conserving traditional natural resources. PhD thesis, Univ. Port Elizabeth.
- WATSON, JJ. Dynamics of Bontveld and rehabilitation implications. PhD thesis, Univ. Port Elizabeth.
- WOODD, A. The Addo Elephants: population structure of a small closed elephant population. M.Sc. thesis, Univ. Port Elizabeth

Postgraduate degrees completed

- CASTLEY, JG. Vertebrate diversity in Afromontane forests. PhD thesis, Univ. Port Elizabeth.
- BRAZZALE, OV. Meiofauna communities in Natal dune successional sequences. M.Sc. thesis, Univ. Port Elizabeth.
- GEACH, B. Ecological and economic implications of land use in Valley Bushveld. M.Sc. thesis, Univ. Port Elizabeth.
- MASON, M. Ecology of sympatric tortoises in Valley Bushveld. M.Sc. thesis, Univ. Port Elizabeth
- PALEY, RGT. The feeding ecology of elephants in Eastern Cape Subtropical Thicket. MSc thesis, Univ. London.

FINANCIAL SUPPORT 1997

Funding agency	Programme	Amount
WorldWide Fund for Nature	Forests	R 2 600
Foundation for Research Development (with T Avis & R Lubke, Rhodes)	Dunes	R 22 500
National Parks Board	Valley Bushveld	R 36 000
Foundation for Research Development (Sustainable use)	Valley Bushveld	R106 000
(Support for SL Haschick)	Valley Bushveld	R 5 000
PPC Cement	Valley Bushveld	R 25 000
(Mine rehabilitation - joint project with EE Campbell)		
University of Port Elizabeth	General	
Research Committee Grant to G. Kerley		R 8 750
Publications output 1996		R 9 500
 Bursaries		
Foundation for Research Development Haschick. S.L. R45 000		
University of Port Elizabeth		
Hunter, C.G.	R 3 000	
Woodd, AM	R 2 700	
Sigwela, M.A.	R 2 700	
Henley, S.R.	R 2 700	
Bursary subtotal	R56 100	
	Total	R271 450

Capital Contributions

Mazda Wildlife Fund continued to provide and service a 4x4 Twincab pickup for research purposes, valued at R140 000, as well as the short term loan of another 4x4 Twincab.

In Kind Contributions

The loan and maintenance of the 4x4 pickups by Mazda Wildlife Fund represents a saving of about R40 000 on transport expenses.

Gentyre donated specialist off-road Conti Trac tyres to the value of R5000.

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

ADVISORY COMMITTEE, STAFF AND STUDENTS 1997

Advisory Committee

Dr P M Norton, Director, Southern African Wildlife College
Dr E E Campbell, Botany Department, University of Port Elizabeth
Dr M H Knight, National Parks Board (Chairman)
Dr B Ras, Department of Agriculture (Eastern Cape)
Dr A R Palmer, Agricultural Research Council
Mr P W Coetzee, Algoa Regional Services Council
Mr J Pauw, Foundation for Research Development
Mr P Niven, Amanzi Estates
Prof T H Wooldridge, Acting Head, Zoology Department, University of Port Elizabeth

Staff

Dr G I H Kerley, Director
Dr A F Boshoff

Postgraduate students

Mr A M Sigwela
Mr J J Watson
Mr T S Simelane
Mr SR Henley
Ms CG Hunter
Ms S L Haschick
Ms AM Woodd

Visiting Scientists

Dr J Belnap, US National Biological Service, Utah, USA
Mr D Tongway, Division of Wildlife and Ecology, CSIRO, Australia

Visiting Students

Mr RGT Paley (University of London)

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.