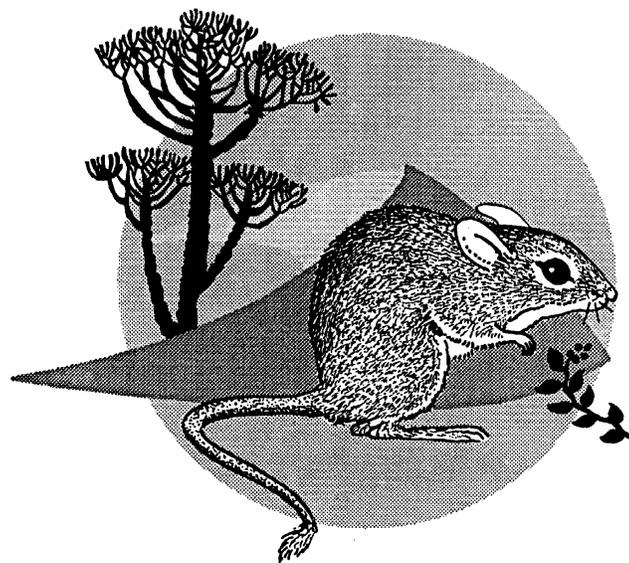


TERRESTRIAL ECOLOGY RESEARCH UNIT

ANNUAL REPORT

2000

University of Port Elizabeth



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Introduction

The Terrestrial Ecology Research Unit (TERU) was established at the University of Port Elizabeth during 1991 in response to a need for terrestrial ecology training opportunities for postgraduate students, and for terrestrial ecological research by conservation and management agencies.

TERU comprises staff and postgraduate students of the Zoology and Botany departments, with Prof. G. Kerley as Director, and an Advisory Board made up of representatives of user agencies and interested parties.

This is the ninth Annual Report and deals with the activities of TERU during 2000.

Mission

"To train ecologists and conduct research on terrestrial environments, thereby contributing to the sustainable utilization of ecosystems, with emphasis on the Eastern Cape."

OBJECTIVES

- 1. To train terrestrial ecologists through the medium of research and in consultation with user agencies;**
- 2. To identify research priorities for terrestrial species and habitats;**
- 3. To initiate appropriate research to provide information which will enable communities to make sound environmental management decisions;**
- 4. To transfer information derived from these programmes to appropriate institutions.**

DIRECTOR'S REPORT

Appropriately, TERU has celebrated the new millennium with a number of major developments in terms of new personnel, facilities and massively increased funding. In addition TERU maintained high levels of productivity, and made major contributions to achieving its goals. During 2000 a total of six scientific articles, one book chapter, two conference proceedings, five reports and one popular article were published, and 19 conference presentations delivered. Three Honours students, five MSc students and eight PhD students participated in TERU research programmes in 2000. Although no MSc or PhD students graduated in 2000, we are expecting at least four graduates in 2001.

Prof. Richard Cowling's appointment was one of the highlights of 2000. Richard is an internationally recognised ecologist and conservation biologist, and is currently the only NRF A-rated scientist in the Eastern Cape. Richard brings with him a wealth of experience, and more importantly, a huge enthusiasm for, and insight into, conservation science and its application to the special problems and opportunities of the Eastern Cape. Richard's botanical perspective also expands the TERU expertise base considerably, while his broader perspectives will strengthen the unit beyond the Eastern Cape.

Rebecca Sims-Castley was appointed as BioMap co-ordinator from the beginning of the year. Her GIS and remote-sensing experience has played a crucial role in a number of projects, and she has also been able to advise students on these aspects of their projects. Rebecca is to be congratulated on her marriage to Guy Castley (PhD 1997).

Two long-awaited Global Environment Facility/World Bank projects were initiated in 2000, indicative of TERU's accessing the international funding opportunities that are now available. The project on conservation planning in the Thicket Biome (Subtropical Thicket Ecosystem Planning – STEP) was initiated in June, and André Boshoff was appointed as project co-ordinator. Sharon Wilson joined TERU in September as STEP project administrator. The other GEF project, "Conservation Farming" is being run in conjunction with the National Botanical Institute, and the research is being conducted by two PhD students, Ayanda Sigwela and Richard Lechmere-Oertel.

The increase in funding during 2000 was massive, with financial support exceeding R2.6 million (excluding contributions in kind), a fivefold increase over the previous year (R525 000). This reflects the funding provided for by the GEF projects, as well as an expansion of our funding base and an increase in funding from our traditional supporters (most notably the University of Port Elizabeth). The Mazda Wildlife Fund continued to provide a sponsored 4X4 twincab, and also assisted TERU in the purchase of two new vehicles (a 4X4 twincab and a 2x4 single cab) through generous discounts.

The University of Port Elizabeth has recognised the increasing contribution being made by TERU, by providing a dedicated suite of offices in the Biological Sciences Building. These offices have allowed us to consolidate our resources, and have been characterised by a buzz of activity and excitement since we moved in May. Our thanks to all those who made this possible, and I look forward to the finalization of these facilities in order to allow TERU to operate optimally.

An associated development has been the establishment of the South African National Parks Scientific Services offices adjacent to the TERU offices. This move, an expression of SANParks' commitment to the Greater Addo National Park concept, provides many opportunities for collaborative interactions between TERU and SANParks.

TERU has matured and expanded considerably since 1992, and it was therefore appropriate that considerable thought be focussed on the status of the unit and its future directions. Thus towards the end of 2000, a strategic planning exercise was initiated, and when completed, this will prove invaluable in guiding the unit into the future. An obvious product of this process was the identification of the need for additional financial support for TERU, and we will be looking at mechanisms to secure our financial security.

Reflecting and reporting on the TERU's progress is always a pleasure due to the fact that that TERU's activities are characterised by enthusiastic support and commitment of the students and staff. I would therefore like to extend my thanks to the students and staff, in particular André Boshoff and Richard Cowling, who I can always rely on for support and stimulation. A special word of thanks to all the funding agencies who support TERU's training and research activities.

Prof. G I H KERLEY
DIRECTOR: TERRESTRIAL ECOLOGY RESEARCH UNIT

AWARDS

TERU staff and students received the following awards during 2000:

- Ayanda Sigwela was awarded a scholarship by the Israeli Government to attend the "Conservation of Desert Biodiversity" course in Israel. This is the second year that TERU students have received this award.
- Graham Kerley was recognised as one of the "Top Ten Conservationist of the Decade" by the Mazda Wildlife Fund.
- Graham Kerley was recognised as one of the top twenty researchers at the University of Port Elizabeth.



RESEARCH ACTIVITIES

Research activities are grouped into themes, and within these are reported on a biome or project specific basis.

ANIMAL / PLANT INTERACTIONS

Thicket: This remained a major focus of TERU's research in the Thicket Biome, as an approach to understand the degradation brought about by domestic herbivores. Sharon Wilson (PhD) has been analysing her data on the foraging behaviour of indigenous and domestic herbivores, writing papers and giving conference presentations, in addition to preparing her thesis for submission in 2001. Nompumelelo Thwala (Hons) continued this comparative theme with her project, showing that various breeds of sheep and goats differed in their foraging behaviour and impacts. Janet Koekemoer (MSc) has shown that the dietary and habitat use overlap of kudu and introduced impala was highest in winter, identifying this season as the time when competition may be occurring. Sarette Slabber (MSc) has developed a model of the relative impact (in energetics and forage offtake terms) of tortoises and mammalian herbivores, and shown that tortoise impacts are in the order of 10 % of that of the mammals, highlighting the importance of tortoises in this system. This is further emphasised by her findings that tortoises are constrained to feeding in the lower vegetation strata, where their foraging impacts would be concentrated. Sarette and Janet submitted their dissertations for examination at the end of the year. Marietjie Landman (Hons) showed that buffalo and zebra in the Thicket Biome do not undergo dietary shifts from grazing to browsing, as suggested by earlier work.

Desert: A further paper arising from the collaboration between Graham Kerley and Walt Whitford was published, and they are continuing their work on the role of small mammals in desertification.

Dunes: A paper by Bridget Elliott (MSc 1996) on the development and characteristics of dune hummocks was published. In addition, both she and Guy Castley (MSc 1992, PhD 1997) have been making considerable progress in preparing their research material on dunes for publication.



CONSERVATION BIOLOGY

Thicket: Anna Whitehouse [née Woodd] (PhD) has made a major contribution to the understanding of conservation biology of the Addo elephants, including a reconstruction of the population's history, modeling population responses,

measuring range use and demonstrating that the population is genetically depauperate. One consequence of this research has been the decision by SA National Parks to introduce elephants from other populations in order to increase genetic variability in this population, a reversal of the previous policy of maintaining the Addo elephants as an isolated population. Anna has submitted her thesis for examination, and has also prepared a number of manuscripts for publication. Steve Henley (PhD) has successfully developed thicket habitat suitability models for kudu, bushbuck and duiker, and is now using this approach to develop a generic habitat model for thicket herbivores. He plans on submitting his dissertation in 2001.

Desert: Cynthia Hunter (PhD) has been unable to make any further progress on her project on the environmental and anthropogenic factors affecting buffalo movements subsequent to her return to the USA.

Forest: The experimental trials on the impact of domestic herbivores on forest habitat structure are being maintained, with the intention of measuring these effects in 2003.

General: André Boshoff continued his collaborative research project with Professor Steven Piper of the University of Natal on the demography of the Cape Griffon *Gyps coprotheres*. A manuscript on a model to estimate adult survival has been prepared.



CONSERVATION PLANNING

Thicket: STEP (Subtropical Thicket Ecosystem Planning)

A three-year project, co-financed by the World Bank, through the Global Environment Facility, and managed by TERU, commenced on 1 July. This project seeks to (a) conduct, together with key stakeholders, a thorough and strategic conservation planning exercise for the Thicket Biome, and (b) work closely with key stakeholders to ensure the implementation of the outcomes of the planning exercise.

More specifically the project aims to: provide a detailed spatial analysis of the various thicket types; assess the extent of transformation; develop a better understanding of the threats; locate and design conservation areas to achieve explicit representation goals; suggest and prioritise explicit conservation actions; provide information for incorporation into regional and national planning frameworks; provide a capacity building service in GIS-based conservation planning, especially in the institutionally weakened Eastern Cape; guide investors from the public and private sectors in the selection of land for commercial enterprises, e.g. game-based ventures; create an awareness of the value and plight of the Thicket Biome.

The main project activities for the period July-December 2000 included the establishment of the project office in TERU, following the appointment of the Project Co-ordinator (André Boshoff) and the Project Administrator (Sharon Wilson). This was followed by the design and implementation of a filing and financial administration system for the project and the initiation and virtual completion of the procurement programme; items procured included computer hardware, a vehicle and trailer, and various field equipment.

In addition, a Technical Committee (TC) was appointed to address day-to-day scientific and technical matters related to the project; it met as and when required. An important function of the TC during this period was the selection of consultants, according World Bank procedures, to provide key products in the fields of

Conservation Planning, Image Analysis, Biological Survey, GIS Specialist Services and Stakeholder Participation. Richard Cowling of TERU and his team will conduct the Conservation Planning component.

Baviaanskloof Conservation Area (BCA): The BCA is a 175 000 ha reserve 75km NW of Port Elizabeth. It is one of only three areas identified for eventual mega-reserve status (> 500 000 ha) in the Cape Floral Kingdom by the CAPE Project, and the only one where all the processes required for the long-term persistence of biodiversity can be conserved. The BCA also has the potential to realise substantial socio-economic development associated with tourism, conservation and catchment management. TERU successfully sought funding (from WWF-SA) to compile and publish a 52 page colour booklet to highlight the value and plight of the BCA. This document has been widely used and praised by a wide range of BCA stakeholders, ranging from senior politicians to conservationists and local communities.

Greater Addo National Park Initiative (GANP): TERU continued to play a significant role in the GANP Initiative. Apart from continuing to give a number of invited presentations on GANP, TERU staff provided substantial assistance to SA National Parks Scientific Services staff in preparing the basis for compiling an application to the Global Environment Facility for a PDF B grant. The grant, which was subsequently approved by the GEF, will fund an 18-month study of biological and social issues pertinent to a full project proposal to the GEF, to implement the GANP concept.

CAPE Project: TERU staff continued their work on conservation planning for mammals in the Cape Floral Kingdom. The reconstructed pre-transformation distributions, (according to broad habitat units) and estimated spatial requirements (ha/animal in multi-species assemblages) datasets are being prepared for use with C-Plan software to identify priority areas (planning units) for conservation, on the basis of irreplaceability and threat, and according to pre-determined demographic, genetic and evolutionary population targets. Species requiring metapopulation management to achieve these targets will be identified. The approach being followed is an entirely novel one and the project is proving to be both stimulating and challenging. Three manuscripts have been prepared and one (on the approach and methods) has been accepted for publication in *Diversity & Distributions*.

Together with Bob Pressey (New South Wales National Parks and Wildlife Service), Richard Cowling is co-editing a special double issue of *Biological Conservation* on the scientific outcomes of the CAPE Project. Seventeen papers are being prepared. Cowling is an author/co-author of 11 of these papers. One of the papers, referred to in the section above, is a pioneering study on conservation planning for mammals.. All papers will be submitted by November 2002.

Conservation planning in Namaqualand: This project is being undertaken at the University of Cape Town by a PhD student of Richard Cowling's, PG Desmet. Excellent progress is being made. A thesis structure has been finalized and the first of many papers has been submitted to *Systematic Biology*. The thesis will be submitted in early 2002.

The Nelson Mandela Metropolitan Open Space System: A strategic conservation plan: This project, which is a partnership between TERU, Wildlife and Environment Society and the Nelson Mandela Metropole, aims to identify a system

of conservation areas for the Metropole that will achieve explicit targets for the conservation of biodiversity patterns and processes. This will be the first time systematic conservation planning approaches have been used in an urban and peri-urban context. Excellent progress has been made with stakeholder consultation and collaboration. W. Stewart, an employee of the Wildlife and Environmental Society of South Africa, will register for an MSc in 2001.

The design and development of an ecologically, economically and socially sustainable nature reserve system for the Greater Cape St Francis area: This project forms part of a larger project that is being funded by the Table Mountain Fund of WWF: SA. The main focus of the project is the restoration, via removal of alien plants, of the threatened St Francis Fynbos/Thicket Mosaic vegetation on proclaimed protected areas in an adjacent to Cape St Francis and St Francis Bay. TERU's role is to develop a strategic conservation plan for the coastal strip between Aston Bay and Oyster Bay. This plan will guide further interventions in the area. Nicholas Cole will register for an M.Tech in 2001.



TRANSFORMATION AND RESTORATION ECOLOGY

Thicket: A major project on the ecological costs of transformation (veld degradation) was initiated in 2000. This project, in partnership with the National Botanical Institute, is funded by the Global Environment Facility through the World Bank. Richard Lechmere-Oertel (PhD) is addressing the issues of the changes in soil resources and dynamics, and biota as part of this project, while Ayanda Sigwela (PhD) is focusing on the changes in seed dynamics due to transformation. Both these students have completed their literature reviews and initiated their fieldwork.

Justin Watson's (PhD) project on "The natural patterns and regeneration processes of Bontveld and rehabilitation options" is still on track, although he emigrated to Australia during the year. He has submitted a draft thesis, and plans to finalise this during 2001. Wendy Todkill (MSc - experimental rehabilitation of transformed Thicket using brushpiles and remote-sensed assessment of the extent of transformation) and Andrew Hall (MSc - rehabilitation experiments in the PPC Loerie limestone mine) both submitted their dissertations at the end of the year.

Forest: Brian Reeves commenced an Honours project that investigates dietary shifts of the crowned eagle, a large forest-living raptor, in transformed habitat. A project plan was compiled and the year's activities focused on fieldwork to locate nests and collect prey remains to establish prey composition and relative numbers of individuals of prey species at and between nests.

Nama Karoo: Adri Barkhuysen commenced a two year MSc.project (commissioned by Eskom) that investigates avian predator-prey relationships and compares prey abundance between transformed and untransformed habitats. The study area is in a semi-arid Karoo habitat where the contrast between irrigated fields and natural veld is greatest. Through an understanding of these interactions, and by comparing the abundance of prey in the two habitats, the project aims to provide the basis for the demarcation of high priority areas where mitigating actions can be implemented by Eskom to reduce avian electrocutions on, and collisions with, pylons and conductors, respectively.



RESOURCE ECOLOGY

Quail: The study on the hunting and reproduction of common quail has culminated in a paper indicating that the current hunting season overlaps with the quail breeding season. Suggestions on how to reduce the possible impacts include altering the hunting season, as well as encouraging landowners to manage their quail resources in a sustainable fashion.

Angora goat physiology and the risk of abortion: This collaborative project involves Helen Laburn, Duncan Mitchell, Alida Faurie and Graham Mitchell from the University of Witwatersrand Medical School and Graham Kerley of TERU, and seeks to develop an understanding of the factors influencing fetal and maternal body temperatures in Angora goats. This will be used to assess the role of thermoregulatory breakdown in goat abortions. Temperature-recording data loggers were successfully implanted in ten goat fetuses and their mothers in July, and these will be recovered in 2001 and will provide fetal temperature data for the last trimester of pregnancy, birth temperatures and the first six months in the kids' life. This project has significant potential to contribute to the economically important mohair industry, as well as developing the techniques for similar applications to wildlife in order to investigate the physiological costs of habitat transformation.



BIODIVERSITY

National Biodiversity - BIOMAP: During 2000 the UPE/TERU node of BioMAP SA-ISIS, coordinated by Rebecca Sims-Castley, achieved its assigned objective of bringing local EC museums onboard the SA-ISIS as data contributors. Bayworld, Albany, Amathole and East London museum all signed contracts with SA-ISIS, and received mini grants of various amounts (totaling R130 000) to aid them in developing and, in some cases, computerizing their specimens databases. In addition, Rebecca was commissioned to produce the maps for the Baviaanskloof Conservation Area report released by TERU last year. She also played a leading role in bringing onboard the Western Cape Nature Conservation Board as a partner to the SA-ISIS project and successfully secured a R10 000 contract with Mpumalanga Parks Board to produce a landscape classification of the province for conservation planning purposes. She will later apply this landscape classification methodology to the whole of South Africa as a product for SA-ISIS. She presented two posters at the Wildlife Management Association conference in Pretoria, as well as a number of minor seminars at various venues, including a local GIS-user group.

Changes in community structure and composition of monkey beetle (Scarabaeidae: Hopliini) communities along floristic gradients in

Namaqualand: This project is being undertaken at the University of Cape Town. J Colville is a PhD student and Richard Cowling co-supervises his thesis work (MD Picker is the principal supervisor). Good progress is being made; a paper has already been accepted for publication.

Hierarchical floristic structure of abiotically derived land classes in

Namaqualand: Comprising the other major component of PG Desmet's PhD research (based at the University of Cape Town), this project aims to identify the

hierarchical floristic structure in abiotically derived land classes, using point locality data for selected presence-absence plant taxon data sets. We intend using software developed by S Ferrier (NSW National Parks and Wildlife Services) that adapts generalised linear models to produce the desired structure. Desmet spent October with Ferrier in Australia and much of November with Steve Hammer (Sphaeroid Institute, San Diego) compiling a data set.

Biodiversity and rarity in South Africa's south-eastern temperate (upland)

grasslands: The objective of this project is to use the comprehensive phytosociological database that exists for this portion of the grassland biome to develop a predictive understanding of the patterns of independent diversity components. The data will also be used to model the biological and habitat aspects of rarity. In addition the results will also be used to identify land classes as biodiversity entitles for conservation planning. D Hoare, who is currently employed by the Range and Forage Institute of the ARC, will register for a PhD in 2001.

Bayesian modelling of macroecological patterns of Cape Proteaceae: This is a collaborative project involving researchers from the University of Connecticut (A Gelfand, J Silander), University of Cape Town (H Laurie), National Botanical Institute (A Rebelo) and TERU (Richard Cowling). The proposal is currently under review with the Ecology Program of the National Science Foundation¹ and will be led by Dr J Silander of the University of Connecticut. Major key questions are:

- (i) Can we characterize the importance of different ecological variables as they contribute to environmental heterogeneity at different spatial scales?
- (ii) What is the role of species attributes in explaining species occurrences at particular locations?
- (iii) Can we clarify the nature of spatial associations as they contribute to chance of species co-occurrence?
- (iv) What can we infer about species distribution patterns from phylogenetic relationships?
- (v) To what extent can we explain patterns in diversity from a consideration of population dynamic processes alone?
- (vi) What factors significantly explain the geographical patterns in species distributions?
- (vii) What can we learn about the effects of spatial scale with regard to the foregoing questions?

Traditionally used biodiversity conserved in National Parks: This project aims to assess the role of conservation areas in providing refuges for components of biodiversity that are used for traditional purposes. Thokozane Simelane (PhD) is writing up his research findings, preparing manuscripts and plans to submit his thesis in 2001.



FUNDAMENTAL RESEARCH

Temperature-induced petal movements in Namaqualand wildflowers protects pollen from moisture damage: This project investigates patterns of petal movement (upright and reflexed), and sensitivity of pollen to moisture, in a winter-flowering flora from the desert coast of Namaqualand. Specifically, we tested the hypothesis that flower closure associated with upright petal movement affords protection to pollen from winter precipitation. Our preliminary results indicate that

flower opening is entirely temperature-induced, and that upright petal movement and associated flower closure, found among more than 3 500 species in the Cape fynbos and succulent karoo floras, has evolved to protect this predominantly winter- and spring-flowering flora from pollen damage that may result from exposure to rain, dew and fog. Final analyses are currently being carried out.

The role of rainfall variability in explaining post-fire regeneration traits and diversification processes in Mediterranean-climate ecosystems: The focus of this collaborative project (TERU, University of Seville, Curtin University – Perth, University of California Los Angeles) is a comparison of indices of rainfall reliability and plant regeneration traits across all five Mediterranean-climate rainfall regions. Rainfall statistics have now been compiled for all regions. Preliminary analyses show the following hierarchy in reliability of winter rainfall: SW Australia > SW Cape >> Spain/California > Chile. The abundance in local floras of traits linked to obligate post-fire reproduction (serotiny, fire-stimulated germination, non-sprouting etc.) appears to show a similar hierarchy, although analyses must still be carried out. This suggest that the incidence of obligate post-fire reproductive traits may be a consequence of the interactions between fire regime and the reliability of post-fire soil moisture conditions, rather than of fire regime per se.

The incidence of biological traits in floras from the western and eastern fynbos biome: This project comprises Richard Cowling's contribution to the Fire Network of GCTE-IGBP. The objective is to compare the incidence of fire response traits and other reproductive attributes at the stand and landscape level for two regions in the fynbos biome – one in the winter-rainfall western part, and the other non-seasonal-rainfall, eastern part. Both sites have similar mean rainfalls, soil types and vegetation (proteoid fynbos) but differ in terms of rainfall seasonality (and hence productivity) and fire regime.



CONTRACT RESEARCH

Six contracts, to the total value of R101 480-00, were undertaken by TERU staff and students. These includes two conservation planning contracts, two game ranch development contracts and four specialist reports.



SCIENCE MANAGEMENT

- Graham Kerley served as President of the Zoological Society of Southern Africa, on the editorial boards of the *Journal of Arid Environments* and *African Zoology* (Associate Editor), and reviewed manuscripts for *Journal of the National Museum*, *Plant Ecology*, *Biological Conservation*, *Animal Conservation*, *Diversity & Distribution*, evaluated project proposals and personnel for the National Research Foundation, and served on the Advisory Board of the Mammal Research Institute (University of Pretoria). He acted as external examiner for Rhodes University (BSc and BSc(Hons)), University of Fort Hare (MSc) and the University of Cape Town (2 x MSc).

- Richard Cowling served as President of the International Society of Mediterranean Ecologists and as an elected member: Academy of Science of South Africa. He also served on several committees for the CAPE Project as well as on the IUCN-WCPTA Management Effectiveness Task Group, Forest Advisory Group: World Wide Fund International and Fire Network: GCTE-IGBP. He is a member of the editorial boards of *South African Journal of Environmental Law and Policy*, *Global Ecology & Biogeography Letters*, *Ecological Economics*, *Plant Ecology* (Associate Editor), *South African Journal of Botany* (Associate Editor), and was engaged in co-editing special issues of *Biological Conservation* and *Journal of Mediterranean Ecology*. He reviewed papers for *Development South Africa* (1), *Ecography* (1), *Ecological Economics* (2), and *Journal of Ecology* (1); evaluated project proposals for the Australian Research Council (2), International Biodiversity Observation Year; Joint France/RSA Science and Technology Agreement, KwaZulu-Natal Wildlife, and National Environmental Research Council (UK); evaluated personnel for National Research Foundation (2), New South Wales National Parks and Wildlife Services, University of Otago, University of Plymouth, and Whitley Awards (UK). He evaluated theses for University of Pretoria (PhD) and Rhodes University (PhD). Finally, he served on the Scientific Organizing Committee: MEDECOS 2000 (9th International Conference of the International Society of Mediterranean Ecologists) (Stellenbosch: 11-15 September) and acted as a Workshop Facilitator (with RL Pressey): Conservation Planning for a Representative Reserve Network in the Cape Floral Kingdom (George: 13-14 November)
- André Boshoff reviewed projects for WWF-SA and the Table Mountain Fund.
- Sharon Wilson reviewed papers for *Journal of Arid Environments*, and *African Journal of Ecology*.
- Steve Henley reviewed a paper for *Journal of Arid Environments*.
- Richard Lechmere-Oertel reviewed a paper for *African Zoology*.
- TERU staff played a major role on the organising committee of the Zoological Society of Southern Africa's symposium, ZSSA 2001, to be held in July 2001, which is being convened by Graham Kerley.



COMMUNITY SERVICE

- Graham Kerley continued to act as manager of the Grysbok Environmental Education Trail on the UPE Campus,
- André Boshoff and Graham gave a number of presentations on the Greater Addo National Park Initiative, addressing a broad range of stakeholders and specialist groups. This included a presentation by André to Masters students registered at Rhodes University for the International Diploma in Environmental Education.
- Public presentations included talks to the Bathurst Conservation Committee (GK), Graaff Reinet Forum (AFB), Kenton Chamber of Business (GK), Prestige Grazing Symposium, Adelaide (GK), Wildlife & Environment Society of Southern Africa (AFB, RMC), Joubertina Honeybush tea harvesters (RMC), Friends of St Francis Nature Areas (RMC).
- Advice was provided to Glenlyon Farm, Nieuwoudtville, St Francis Coastal Open Space System, Rebels Rus Private Nature Reserve, Walker Bay Conservancy by

Richard Cowling, and King Karoo Game Ranch and Jasmin Films by André Boshoff and Graham Kerley.

- Richard Cowling served on the following statutory and civil committees: *Flora Conservation Committee: Botanical Society of South Africa* (1993-2000 disbanded), *Leslie Hill Succulent Karoo Trust: Trustee* (1995 -), *Cape Conservation Unit* (Botanical Society of South Africa): Strategic Advisor (2000-), *Cape Conservation Unit* (Botanical Society of South Africa): Chair of Advisory Committee (2000-), *Conservation Advisory Group: Flower Valley Farm*
- TERU staff and students contributing to furthering public awareness of science (particularly conservation and environmental issues) through a number of TV and radio appearances, and public seminars (University of Witwatersrand Medical School, Amy Jacot Guillarmod Memorial Lecture).



2000 PRODUCTS

SCIENTIFIC ARTICLES

1. ELLIOTT, B., KERLEY, G.I.H., & MCLACHLAN, A. 2000. Patterns of development and succession of vegetated hummocks in slacks of the Alexandria coastal dunefield, South Africa. *J. Coastal Cons.* 6:79-88.
2. KERLEY, G.I.H., ALLEN, B.R. & BESTER, M.N. 2000. Skull morphometrics of Subantarctic fur seals (*Arctocephalus tropicalis*) from Marion and Gough Islands. *Afr. Zool.* 35:165-171.
3. KERLEY, G.I.H., WATSON, J.J. & BOSHOFF, A.F. 2000. Seasonal abundance, reproduction and hunting of common quail *Coturnix coturnix* in the Eastern Cape Province, South Africa. *Afr. J. Ecol.* 38:303-311.
4. KERLEY, G.I.H. & WHITFORD, W.G. 2000. Impact of grazing and desertification in the Chihuahuan Desert: plant communities, granivores and granivory. *Amer. Midl. Natl.* 144:78-91.
5. MASON, M.C., KERLEY, G.I.H., WEATHERBY, C.A., BRANCH, W.R. 2000. Angulate and leopard tortoises in Thicket Biome, Eastern Cape, South Africa: population and biomass estimates. *Afr. J. Ecol.* 38:147-153.
6. WHITEHOUSE, A.M., & HALL-MARTIN, A.J. 2000. Elephants in Addo Elephant National Park, South Africa: reconstruction of the population's history. *Oryx* 34:46-55.

BOOK CHAPTERS

- SCOTT, H.A., SCOTT, R.M. & BOSHOFF, A.F. 2000. The farming community and the conservation of the Cape griffon vulture *Gyps coprotheres* in the Western Cape, South Africa. In: Raptors at Risk. Chancellor, R.D. & Meyburgs, B.-U. (eds). pp.231-238, Hancock House.

PUBLISHED CONFERENCE PROCEEDINGS

1. CASTLEY, J.G., KERLEY, G.I.H. & SIMELANE, T.S. 2000. Forest vertebrate diversity: status, threats and priorities in the Eastern Cape. In: SEYDACK, A.H.W., VERMEULEN, W.J. & VERMEULEN, C. (Eds). Proc. Natural Forests and Savana Woodlands Symposium II [1999]. Knysna: Department of Water Affairs and Forestry. pp 124-136.
2. SIMELANE, T.S., KNIGHT, M.H., KERLEY, G.I.H. 2000. Impact of fuelwood harvesting on conservation of invertebrate diversity. In: SEYDACK, A.H.W., VERMEULEN, W.J. & VERMEULEN, C. (Eds). Proc. Natural Forests and Savana Woodlands Symposium II [1999]. Knysna: Department of Water Affairs and Forestry. pp 348-354.

REPORTS

1. BOSHOFF, A.F. 2000. The potential impacts of a proposed Eskom powerline, between Poseidon and Grassridge sub-stations, on the terrestrial fauna (excluding the avifauna). . *Terrestrial Ecology Research Unit Report* 31: 31pp.
2. BOSHOFF, A.F. 2000. The suitability of the Keurbooms River Mouth area as a possible site for the construction of a small boat harbour at Plettenberg Bay. *Terrestrial Ecology Research Unit Report* 31: 8pp.
3. BOSHOFF, A.F., COWLING R.M. & KERLEY, G.I.H. 2000. The Baviaanskloof Conservation Area: a conservation and tourism development priority. *Terrestrial Ecology Research Unit Report.* 27:35 pp.
4. COWLING, R.M., HEIJNIS, C.E. 2000. Assessment of the conservation value of proposed World Heritage Sites for the Cape Floral Kingdom. *Terrestrial Ecology Research Unit Report.* 29:48 pp.

5. HENLEY, S.R. 2000. The Baviaanskloof Conservation Area: opportunities for the conservation of Cape mountain zebra and leopard. *Terrestrial Ecology Research Unit Report*. 28:13 pp.

POPULAR ARTICLES

- BOSHOFF, A.F., COWLING, R.M. & KERLEY, G.H.K. 2000. The Baviaanskloof Conservation Area: A question of expansion. *Africa – Environment & Wildlife*. 8 (7): 92-93.

CONFERENCE PRESENTATIONS

1. HENLEY, SR. & KERLEY, G.I.H. A conceptual model of ungulate habitat change in Eastern Cape thicket. Congress 35, Grassland Soc of Southern Africa/Grassland Soc of Zimbabwe, Triangle, Zimbabwe, Jan/Feb.
2. SIGWELA, A.M. & KERLEY, G.I.H. Potential for dietary competition: kudu and goats in Thicket Biome. Congress 35, Grassland Soc of Southern Africa/Grassland Soc of Zimbabwe, Triangle, Zimbabwe, Jan/Feb.
3. HASCHICK-WILSON, S.L. & KERLEY, G.I.H. Factors influencing forage preference of East Cape Subtropical Thicket browsers. Oral presentation, Wildlife Management Association of Southern Africa Symposium, Pretoria, July.
4. HENLEY, S.R. & KERLEY, G.I.H. Bushbuck habitat suitability modelling: a tool for conservationists and wildlife managers? Oral presentation, Wildlife Management Association of Southern Africa Symposium, Pretoria, July.
5. KOEKEMOER, J., KERLEY, G.I.H. & BOSHOFF, A.F. Dietary resource use of indigenous kudu (*Tragelaphus strepsiceros*) and introduced impala (*Aepyceros melampus*) in Thicket vegetation, Eastern Cape. Oral presentation, Wildlife Management Association of Southern Africa, Pretoria Symposium, July.
6. SIGWELA, A.M. & KERLEY, G.I.H. Seed dispersal efficiencies: a comparison between kudu and goats in the Thicket Biome. Oral presentation, Wildlife Management Association of Southern Africa Symposium, Pretoria, July.
7. WHITEHOUSE, A.M. Growth and recovery of the Addo elephant population – consequences of management. Oral presentation, Wildlife Management Association of Southern Africa Symposium, Pretoria, July.
8. BOSHOFF, A.F., COWLING, R.M. & KERLEY, G.I.H. Conservation planning in the Thicket Biome: taking the guesswork out of land-use decisions. Poster, Wildlife Management Association of Southern Africa Symposium, Pretoria, July.
9. LECHMERE-OERTEL, R & KERLEY, G.I.H. The ecological services of plants and the edaphic fauna in Subtropical Thicket, Eastern Cape – a conceptual model. Poster, Wildlife Management Association of Southern Africa Symposium, Pretoria, July.
10. SIMS-CASTLEY, R. & FAIRBANKS, D.H.K. SA-ISIS: BioMap: developing data partnerships in conservation. Poster, Wildlife Management Association of Southern Africa Symposium, Pretoria, July.
11. SIMS-CASTLEY, R., & KERLEY, G.I.H. From anecdote to terabytes: the emerging importance of information management in conservation science. Poster, Wildlife Management Association of Southern Africa Symposium, Pretoria, July.
12. SLABBER, S. & KERLEY, G.I.H. Tortoises as important mesoherbivores in the Thicket Biome, Eastern Cape: the importance of feeding height. Poster, Wildlife Management Association of Southern Africa Symposium, Pretoria, July.
13. LECHMERE-OERTEL, R., KERLEY, G.I.H & COWLING, R.M. The ecological services of biodiversity in semi-arid landscapes. Oral presentation, Arid Zone Ecology Forum, Kakamas, August.

14. COWLING, R.M. "Defying Nature's End. A Practical Agenda for Saving the Planet", IUCN, Los Angeles, USA.
15. COWLING, R.M. The Cape hotspot. Workshop participant, Defying Nature's End. A Practical Agenda for Saving the Planet Conference (CI & IUCN), Los Angeles, USA, August.
16. COWLING R.M. A framework for a strategic and systematic conservation plan for the Cape Floral Kingdom: an assessment of the projects. Invited oral presentation, Fynbos Forum, Ganzekraal, June.
17. COWLING R.M. Integrating biosystematic data in conservation planning: a case study from southern Africa's succulent karoo. Society for Systematic Biology Symposium: Biodiversity: The Interface Between Systematics and Conservation. Evolution 2000 Conference, University of Indianapolis, June.
18. COWLING R.M. Conservation planning in the fynbos ecoregion: protocol and outcomes. Invited oral presentation Ecoregion Based Conservation: Integrating Socio-Economic Data. Workshop at World Wide Fund: USA, Washington DC, June.
19. COWLING R.M. Towards a strategic conservation plan for the Cape Floristic Region. Keynote (Presidential) Address. MEDECOS 2000 (9th Conference of the International Society of Mediterranean Ecologists), Stellenbosch, September.

POST-GRADUATE TRAINING

Honours Projects

1. LANDMAN, M. 2000. Diet of buffalo and zebra in the Addo Elephant National Park: competition between grazers in a browse dominated landscape. Unpubl. BSc(Hons) project, University of Port Elizabeth.
2. THWALA, N. 2000. Foraging behaviour of domestic herbivores. Unpubl. BSc(Hons) project, University of Port Elizabeth.
3. REEVES, B. In progress. An investigation of dietary shifts by crowned eagles in transformed habitats. BSc(Hons) project, Univ. Port Elizabeth

Postgraduate degrees in progress

1. HASCHICK, S.L. Resource partitioning by herbivores in Valley Bushveld. PhD student, Univ. Port Elizabeth.
2. HENLEY, S.R. The predictive value of habitat models: comparing subtropical thicket herbivores. PhD student, Univ. Port Elizabeth
3. HUNTER, C.G. Environmental and human influences on movement by buffalo herds in Botswana and Zimbabwe. PhD student, Univ. Port Elizabeth.
4. KOEKEMOER, J. Potential dietary and space use competition between impala and kudu. MSc student, University of Port Elizabeth.
5. LECHMERE-OERTEL, R. Biodiversity and ecosystem services in the Thicket Biome. PhD student, Univ. Port Elizabeth
6. SIGWELA, A.M. The value of vertebrate diversity in maintaining ecosystem processes in the Thicket Biome. PhD student, Univ. Port Elizabeth
7. SIMELANE, T.S. The role of National Parks in conserving traditional natural resources. PhD student, Univ. Port Elizabeth.
8. TODKILL, W.B. Rehabilitation of Valley Bushveld in the Addo Elephant National Park. MSc student, University of Port Elizabeth.
9. WATSON, J.J. Dynamics of Bontveld and rehabilitation implications. PhD student, Univ. Port Elizabeth.
10. WOODD, A.M. The Addo Elephants: conservation biology of a small closed population. PhD student, Univ. Port Elizabeth.

11. HALL, AV. Revegetation and alien plant control of a limestone quarry. MSc student, University of Port Elizabeth.
12. SLABBER, S.S. Impacts of tortoises on the Thicket Biome, Eastern Cape. MSc student, University of Port Elizabeth.
13. BARKHUYSEN, A. The effects of landscape transformation on prey availability for large birds. MSc student, University of Port Elizabeth.



FINANCIAL SUPPORT 2000

Research Grants	Amount
National Research Foundation	
(Sustainable use – G Kerley)	R 134 000
(Biodiversity and Conservation – R Cowling)	R 40
000 ¹	
Global Environment Facility (STEP Conservation Planning)	R1 595 926
National Botanical Institute	R 256 000
Conservation Farming	
SAISIS	R 170 000
BioMap	
WorldWide Fund for Nature	R 55 000
Baviaanskloof	
Eskom	R 100 000
Birds & Powerlines	
Table Mountain Fund	R 76 100
CAPE Special Issue	
University of Port Elizabeth	
General	
(Research Committee - R Cowling)	R 30 000
(Research Committee - G Kerley)	R 47 500
General	
¹ Transferred from UCT June 2000	
Awards	
Israeli Government Scholarship (A. M. Sigwela)	R 20 000
Sponsorship	
Total SA (vehicle sponsorship)	R 10 000
Contracts	R 116194
Bursaries*	
University of Port Elizabeth	
Henley, SR.	R4224
Landman, M	R2640
Sigwela, AM	R2112
Slabber, S.	R2640
Thwala, N.	R2640
Bursary subtotal	R 14 256
TOTAL	R2 664 976

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. Mazda Wildlife Fund's discount on the purchase of vehicles is worth about R51 000.

Gentyre donated a set of Continental tyres for the vehicle, valued at R5000.

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

*Note that National Research Foundation Grant-Holder Bursaries are included within the NRF Programme amounts listed above.

ADVISORY BOARD, STAFF AND STUDENTS 2000

Advisory Board

Dr M. H. Knight, South African National Parks (Chairman)
Prof. D. Baird, Head: Zoology Department, University of Port Elizabeth
Dr E. E. Campbell, Botany Department, University of Port Elizabeth
Mr P. W. Coetzee, Western District Council
Dr D. du Preez, Head: Botany Department, University of Port Elizabeth
Mr L. Els, Ministry for Economic Affairs, Environment & Tourism (Eastern Cape Province)
Dr R. Little, WorldWide Fund for Nature-South Africa
Mr P. Niven, Amanzi Estates
Dr A.R. Palmer, Agricultural Research Council
Mr J. Pauw, Foundation for Research Development

Staff

Prof. G. I. H. Kerley, Director
Dr A. F. Boshoff
Prof. R. M. Cowling (from June 2000)
Ms R. Sims-Castley
Ms S. Wilson (from September 2000)

Visiting Scientists

Dr F. Tiver, Department of Botany, University of Adelaide
Dr R. L. Pressey, New South Wales National Parks and Wildlife Services
Prof M. Hunter, University of Maine
Dr K. McKinnon, World Bank: GEF
Dr V. Funk, Smithsonian Institute.
Prof B. Lamont, Curtin University, Perth,
Dr R. Bradstock, New South Wales National Parks and Wildlife Services
Dr P. Groom, Edith Cowan University
Prof P. Rundel, University of California, Los Angeles

Postgraduate students (their degrees) and their academic departments

Mr. A. Barkhuysen (MSc)	Zoology
Ms J. Koekemoer (MSc)	Zoology
Ms W. B. Todkill (MSc)	Zoology and Botany
Mr A.V. Hall (MSc)	Botany
Ms S. Slabber (MSc)	Zoology
Mr S. R. Henley (PhD)	Zoology
Ms C. G. Hunter (PhD)	Zoology
Mr R. Lechmere-Oertel (PhD)	Zoology
Mr A.M Sigwela (PhD)	Zoology
Mr T. S. Simelane (PhD)	Zoology
Mr J. J. Watson (PhD)	Botany and Zoology
Mrs S. L. Wilson (PhD)	Zoology
Ms A. M. Whitehouse (PhD)	Zoology

Function of the Advisory Board

The function of this Board 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 Faculty of Science.