



grass roots

Newsletter of the Grassland Society of Southern Africa

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Special Issue:

**Proceedings of the National Rangeland Monitoring
Workshop**

Irene

21– 22 February 2007

**National rangeland
monitoring and
improvement programme**

**Rangeland monitoring
in South Africa: a
proposal**

**The savanna ecosystem
dynamics project**

**The Kruger National
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*Call for nominations
for South African
Women in Science
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**What can the GSSA do
for pasture
practitioners?**

Jobs, bursaries and competitions

Editorial

Dear Members

In this issue, we bring you several key papers from a workshop on rangeland monitoring that was hosted by the Agricultural Research Council, ably represented by Luthando Dziba, in Pretoria earlier this year. Rangeland monitoring is conventionally thought to be absolutely crucial to halting rangeland degradation in southern Africa, but there is very little evidence of the results of formal rangeland monitoring exercises being used to make management or policy decisions.

While the ultimate goal of national range monitoring programmes—slowing or reversing land degradation through modifying management practices—often seems to be increasingly elusive, the workshop did highlight some practical tools and potential projects that the rangeland science community can still undertake. However, key to any of these initiatives working is inter-agency collaboration, which itself seems elusive when, in some cases, units within the same agency barely communicate with one another.

If the workshop achieved one thing, it was to get people talking to one another about their programmes, and hopefully the ARC can sustain its momentum and drive this process forward.

Alan Short

The Grassland Society of Southern Africa is dedicated to the advancement of the science and practice of range ecology and pasture management.

We welcome any contributions to the Grassroots, in the form of news, informative articles, reports, short research notes, scientific papers and letters to the Editor. Email Alan.Short@dae.kzntl.gov.za or admin@gssa.co.za or fax 033-3559 605 or 033-390 3113

GSSA Council

President:
Mark Hardy
markh@elsenburg.com

Immediate Past President:
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annelenes@elsenburg.com

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rina@sanparks.org

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Assistant
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Additional Member:
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Additional Member:
Susi Vetter
S.Vetter@ru.ac.za

Administrator:
Freyni du Toit
admin@gssa.co.za

Printed by CPW
49 Langelibalele St
Pietermaritzburg
cpwart@telkomsa.net

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On the cover: —View from Owen Sithole College of Agriculture near Empangeni. Will a national rangeland monitoring programme help to conserve our rangeland resources?

Upcoming events

From www.gssa.co.za

Short Course: Community-Based Natural Resource Management and Adaptive Co-management

Date: 25 - 28 June 2007

Venue: Zuurburg Mountain Inn, Addo Elephant National Park, South Africa

Contact: Karin Prigge

Tel/fax: +27-46-6226242

Email: bigtree@intekom.co.za

21st Annual Conference of the Society for Conservation Biology

Date: 1 – 5 July 2007

Venue: Nelson Mandela Metropolitan University, Port Elizabeth

Website: www.conbio.org/2007

The sixth extinction - conserving zoological biodiversity: 33rd meeting of the Zoological Society of Southern Africa

Date: 8 - 11 July 2007

Venue: North-West University, Potchefstroom

Website: www.natural-events.com/ZSSA/

4th World Environmental Education Congress

Dates: 2—6 Jul 2007

Venue: International Convention Centre, Durban

Early Bird Registration: 15 January 2006

Website: www.weec2007.com/

Joint 42nd Annual GSSA Congress & 3rd Annual Thicket Forum Meeting : 21st Century Challenges: Range, Forage and Thicket

Date: 16 - 20 July 2007

Venue: Eden Grove, Rhodes University, Grahamstown

Contact: Freyni du Toit
admin@gssa.co.za.

Website: www.gssa.co.za/congress2007

RTEP 2007 - ERTEP 2007 - First International Conference on Environmental Research, Technology and Policy: Building Tools and Capacity for Sustainable Production

Date: 17 - 19 July 2007

Venue: La Palm Royal Beach Hotel, Accra, Ghana

Website: www.ertep2007.uwo.ca/

E-mail: ERTEP07@uwo.ca

XXVIIIth International Union of Game Biologists Congress

Date: 13 - 18 August 2007

Venue: Uppsala, Sweden

Deadline for submission of abstracts: 15 February 2007

Early bird registration: 2 June 2007

Website: www-conference.slu.se/iugb2007/

African Association of Agricultural Economists Conference

Date: 20 - 22 August 2007

Venue: Accra, Ghana

Contact: Musa Omare
aaaeghana@yahoo.com

ARID ZONE FORUM 2007 Drought as a driver: Physical, ecological and socio-economic

effects interactions and responses

Date: 10 -13 September 2007

Venue: NG Church Hall, Sutherland, Northern Cape Province, South Africa

Submission of final abstracts: 2 July 2007

Deadline for application for student sponsorship: 18 July 2007

Early bird registration: 3 August 2007

Final registration: 3 September 2007

Website: www.azef.co.za

1st SAEON Student Symposium

Dates: 11-13 September 2007

Venue: University of Cape Town

Deadline for abstracts: 30 June 2007

Email: Musa: mimms001@uct.ac.za

Website: www.saeon.ac.za/students

See page 8 for more details

**African Regional Conference of
Vice Chancellors, Provosts and
Deans of**

**Science, Engineering and
Technology (COVIDSET 2007):
Relevance of Science, Engineering
and Technology Training to
Development Challenges in Africa**

Date: 25 - 27 September 2007

Venue: Johannesburg, South Africa

Submission of final manuscript: 31 July 2007

Website:

www.ansticonference.org/2007/

**CHEMRAWN XII: The role of
chemistry in sustainable
agriculture**

Deadline for abstracts: 29 June 2007

Date: 2-5 December 2007

Venue: Stellenbosch, South Africa

Website:

[www.chemrawn.co.za/
registration.html](http://www.chemrawn.co.za/registration.html)



**Nominate your
Council members
at
Congress 43**

Two posts will become vacant on the GSSA Council in July, and you are encouraged to consider which GSSA members you believe will be best suited to these posts:

Vice-President The post of Vice-President of the GSSA is crucial, as the Vice-President must understudy the President and will usually become the future President of the GSSA.. Duties include: Updating the list of tasks and timeframes for Council members; Promoting farmers days and collaborating with other Council members in this regard; Hosting the next congress..

Additional member

The Additional Member portfolio can be seen as the Council "skivvie", but more importantly, the Additional Member should bring crucial skills and a fresh perspective to Council. The Additional Member should preferably (but not necessarily) be young, and duties will range enormously depending on the projects undertaken by the Council. Usually, the Additional member will gain experience until he or she assumes one of the main portfolios on Council, thus providing continuity in the running of the Society.



News

Funding opportunities for post-graduate research

A number of post-graduate funding opportunities have been advertised at various Universities.

For more information, visit www.gssa.co.za and click on the “funding opportunities” link.

Postgraduate Opportunities in Benthic Ecology and Biodiversity

Institution: University of Cape Town 2007

Topics: Marine invertebrate biodiversity, ecology and/or systematics.

Contact person: Prof Charles Griffiths at UCT (021-6503610)

Email: clgriff@pop.uct.ac.za or Griffith@egs.uct.ac.za.

3 MSc studentships: BIOTA - Southern Africa (Phase III)

Each bursary is worth approximately R40000,

but for the latter two bursaries below there are good opportunities to apply for co-funding to raise this to R65000.

Projects:

- 1) Effects of termites (*Macrotermes* spp.) on soil chemistry in Namibia.
- 2) Effects of fog and dew on soil respiration in Namaqualand.
- 3) Effects of fog and dew on plant physiology in Namaqualand.

Deadlines:

Candidates need to be chosen during 2007. The projects can run 2007-2008 or 2008-2009. However, there will be a 'first come first serve' situation. If a suitable candidate applies, he/she will be given the bursary.

Contact: Dr Charles Musil
musil@sanbi.org

Dr Anthony Mills
mills@sanbi.org

Post doc opportunity

Institution: University of Pretoria, Department of Veterinary Tropical Diseases, Faculty of Veterinary Science

Required expertise:

Mainly bioinformatics but a person with molecular biology background will also be suitable.

Contact: Dr Marinda C Oosthuizen,
Address: Room 2-20.3, Paraclinical Building, Private Bag X04, Onderstepoort, 0110, South Africa;

Phone: +27 12 529 8390 **Fax:** +27 12 529 8312

Email: oosthuizen@up.ac.za



GSSA Award for outstanding academic achievement

Ms Mariska Labuschagne received the GSSA award for outstanding academic achievement, for the best B Sc. Agric final year student in Grassland Science with best continuous performance during all the years of study with an average of at least 70%. She is currently enrolled as a B Sc. Honours student at

the University of the Free State.

H.A. Snyman



Farm managers wanted in Giant's Castle, KZN

1 Farm Manager

Exciting position for an experienced and progressive farmer in the Giants Castle area. The farming operation lies on a 1500 hectare property to be developed as an exclusive wildlife/eco/adventure tourist resort. The responsibilities will be for all aspects of the 250ha presently given to mixed vegetable production and plantation timber. Opportunity to introduce new ideas, crops and systems and potentially to transition the farm to organic

production. The possibility of running a domesticated eland herd also exists. Candidates must have proven track record in arable production techniques, modern management skills and a practical knowledge of English and Zulu. Good salary and package with profit share.

2 Assistant Farm Managers

Assistant Farm manager. Answering to the Farm manager an enthusiastic and intelligent assistant is

required for the above enterprise. Perhaps as a first or second position after leaving college, candidates should be able to demonstrate an understanding and ability in commercial arable, timber farming and wildlife management.

Package dependant on experience and interview.

Please send full CV, including salary and benefits expectations for each position to daniel.duffin@muluja.co.uk



Call for nominations for South African Women in Science Awards: GSSA encourages entries

The Department of Science and Technology wishes to recognise the role of women in the development of science and technology in Africa, through its Women in Science Awards. The awards aim to recognise women who have achieved success the scientific arena, who act as role models for other young women to enter scientific careers, and who have helped contribute to the quality of life of all South Africans.

The awards are generous, and range from cash awards of R50 000 to fellowships for post-doctoral studies.

The awards categories are:

1. Distinguished Woman Scientist Award

This award will be made to a female scientist for her outstanding scientific contribution to the advancement of science and building of the knowl-

edge base within the fields of Natural Sciences or Engineering

2. Distinguished Scientist Award for Contribution to the Improvement of the Quality Of Life of Women: 2007

This award will be made to a scientist (male or female) for his/her outstanding scientific contribution to improvement in the quality of life of women.

3. Best Emerging Young Woman Scientist: 2007

This award will be made to a young female scientist for her outstanding scientific contribution to the advancement of science and building of the knowledge base within the fields of Natural Science and Engineering.

L'Oréal South Africa 2007 Fellowships for Women in Science

Two fellowships shall be awarded in the field of

Natural Sciences or Engineering.

Women Scientist Fellowships: 2007

Three awards will be made to women who are currently involved in full-time post-graduate study or research leading towards a Ph.D and who have two years post masters research experience. These awards will recognise outstanding ability and promise in research.

How can you get involved?

The GSSA would like to encourage all readers to download the nomination forms and nominate an outstanding scientist, who could be a colleague, a student or a friend.

The nomination forms and more details of the awards can be downloaded from www.dst.gov.za/wisa/index.php.



1st SAEON Student Symposium

The SAEON Graduate Student Network (GSN) invites Graduate students (Honours, Masters, PhD and Post-doc) doing research that contributes to long-term environmental understanding to submit abstracts for the 1st SAEON Student Symposium

Venue: University of Cape Town
Dates: 11-13 September 2007

A wide variety of subjects will be presented in three days in one location affording the opportunity to explore multiple topics relating to long-term environmental research. We recruited top experts on several aspects of long-term environmental research to give thought provoking plenary talks, field trips (fynbos and marine) and workshops; this will provide you with opportunities to inter-

act with them.

Twenty students will receive full sponsorship from SAEON to cover all costs. These sponsorships are competitive and will be awarded based on individual merits, judged on the basis of the submitted abstracts. The symposium is aimed at students involved in all fields of research regarding long-term environmental knowledge, and especially encourages participants from “non-traditional” fields such as social studies, economics, public health, environmental education.

For further information and abstract submission email Musa at mllmmus001@uct.ac.za

Please visit our website: www.saeon.ac.za/ students
Deadline for abstract submission is 30 June 2007



Position CREW CFR Project Assistant

Custodians of Rare and Endangered Wildflowers Project - CREW

One Year Contract, renewable depending on funding and performance; Cape Town. CREW is a national SANBI project that involves civil society volunteers in the monitoring and conservation of threatened plants.

This position calls for an self motivated individual who is passionate about the about South Africa's plant species to provide support to the CREW CFR office with admin duties and assisting the Project manager and Co-ordinator to manage the network of CREW volunteers in the CFR.

Responsibilities include:

- Provide civil society groups with project support materials, including species de-

scriptions, flowering times, Red Data book status, photos/pictures etc

- Input data collected by civil society groups (e.g population numbers, locality information, current threats) into the threatened species database
 - Ensure that plant samples are properly accessioned, keep track of plant samples sent of identification, and provide feedback to civil society groups
 - Prepare threatened plant identification guides for CREW special team field trips
 - Identify plants in the herbarium
- Provide support in organising meetings, fieldtrips and workshops

Prerequisite for appointment is a BSc in Botany or two years' relevant experience in the related field. General computer literacy, with proven competency in MS Office, should form part of the candidate's professional profile. Furthermore, applicants must be able to maintain

sound interpersonal relations and have a good spoken and written command of English and one another official language.

SANBI offers an all-inclusive salary of R90 296.70 per annum. This contract can be renewed annually on the basis of available funding and performance.

Please Note: 1) Applications must be accompanied by a letter motivating why the applicant should be favourably considered for the position and confirming that the minimum qualifications are met. 2) A competency test will be conducted as part of the selection process.

All applications will be considered with the understanding that, in terms of the SANBI Employment Equity Plan, preference will currently be given to candidates from the designated groups.

Applications submitted by employment agencies will not be considered.

SANBI reserves the right not to fill these positions.

Contact Ms Glynnis Oosthuizen on 021 799 8635 or, preferably, forward a concise CV via e-mail to recruitmentct@sanbi.org or 021 762 3229. Postal applications are to be addressed to the Deputy Director: Human Resources, South African National Biodiversity Institute, Private Bag X7, Claremont 7735.

Closing Date: 28 May 2007

Visit www.sanbi.org for more information on the South African National Biodiversity Institute. If no response has been received within 21 days of closing date, candidates may assume that their applications did not succeed.



To all members and others with an interest in cultivated pastures and forage production – what can the GSSA do for you?

Dr. Mark Hardy

E-mail: MarkH@elsenburg.com

The GSSA has traditionally been based on the science and practice of rangeland ecology and pasture management. With the demise of Government research institutions in South Africa and a declining interest in agricultural science at our tertiary institutions there has been a dramatic decline in professionals and practitioners with research and scientific expertise in forage production, and pasture science in particular. A consequence of this is a dramatic decline in individuals who could contribute to the development of technology in support of pasture production systems in South Africa.

It is therefore not surprising that contributions on all aspects of pasture production to scientific/technical meetings such as the Annual Congress of the GSSA are now few and far between. A natural result of this is that researchers, practitioners, specialists and advisors who used to attend GSSA congresses, to be exposed to and discuss the latest information in pasture research and management, and network with colleagues from

around the country, are less able to justify attendance of GSSA meetings.

The GSSA recognises that it must change with the times if it is to live up to its stated vision to "Promote rangeland ecology and pasture management in Africa". GSSA Council is therefore making a concerted effort towards providing a forum for promoting this vision. To achieve this we are contacting various role-players who have an interest in pasture and forage production issues. Together we can identify how the forum should be developed within GSSA structures to suit the needs of researchers, advisors, technical experts and practitioners in support of the pasture management industry in Africa. What we need to do, off course, is to ensure that all potential role players are aware of the personal and business benefits that such a forum would provide.

We would encourage members who are involved in pasture production to guide Council in the development of the forum. What must Council do to ensure that those in-

involved in promoting pasture production systems in southern and the rest of Africa have a meaningful and effective forum in which to advance the pasture and forage production industry?

Let us know! Contact the Administrator, the *Grassroots* Editor or the President and send us your views.

Your Society is alive and well. Membership is growing, we are financially sound and well managed, we have a high quality scientific Journal and popular newsletter. A highlight for members is a well-organized and vibrant Annual Congress. All this is essentially due to our strong and enthusiastic membership who are involved in the fields of veld management and ecology, wildlife management, conservation of natural resources, sustain-

able livelihoods from veld, livestock production from veld and pasture, and so on. Council believes that we can use the positive capacity of the Society towards developing a mechanism whereby the GSSA can restore its role in support of the pasture and forage production industry in southern Africa and the African continent.

The GSSA has made a start by allocating a full day on its program for the next Annual Congress in Grahamstown that will deal with scientific, technical and practical aspects of pasture production for the dairy industry. In addition a one-day post-Congress tour has been arranged to visit dairy producers in the Alexandria region of the Eastern Cape.



SASAS (KZN) Research Symposium 2007

University of Zululand

Wednesday, 27th June 2007

Agriculture in Action: Animal production

The University of Zululand and SASAS (KZN Branch) invite you to a research day at the University of Zululand.

Tea and a light lunch will be provided.

Registration: R80 (R60 for students)

Call for Abstracts:

Please would anyone interested in presenting their work or research submit their abstracts to moorem@dae.kzntl.gov.za by the 11th of June 2007.

RSVP : Please RSVP by the 11th of June 2007 to Martina Moore 033 355 9256 or moorem@dae.kzntl.gov.za

Opening Address for Rangeland Monitoring Workshop

Dr. Andrew Magadlela

Research Manager, ARC Animal Production Institute

E-mail: amagadlela@arc.agric.za

Good morning, ladies and gentlemen.

It is indeed a great pleasure for me to welcome you to the ARC and to the National Rangeland Monitoring Workshop that is meant to be a platform for deliberations about the form and shape the much needed rangeland monitoring programme should take. We need some mechanism that enables us to stay in touch with the state of health of our rangelands in order to utilize them judiciously and to make sure they are there for our children's grandchildren and their grandchildren. The landscape is littered with examples of degradation of one form or another of the rangeland resource, owing to our failure to take good care of our natural veld. I think if things continue at this pace of degradation, in less than 100 years Acocks's description of our veld types will have to be redone.

Seeing the diversity of the workshop participants- from the programme we have DoA, SANParks, SAEON (SA Ecological Observation

Network), PDAs and universities- I believe the will to tackle the problem is there. All we need now is to get the collective wisdom of this group to design and develop a programme that we can use to monitor the condition of our rangelands. Many tools which can assist in the monitoring programme are already available and are readily accessible if one knocks on the right doors. I am talking about systems like AGIS (the agricultural information systems) and other databases, vegetation surveys and mappings. I am not even mentioning the wealth of experience and expertise of the grass mechanics who are in this room alone.

Although this time we are coordinating the workshop, this is not an ARC programme- it is much bigger than that- the success of whatever range monitoring strategy the workshop comes up with will depend on the cooperation and contributions of the colleagues who are here at the workshop and those who for one reason or another are not here today. Cooperating and sharing wis-

dom and resources will be the hallmark of this initiative, we hope.

We are also hoping that the monitoring programme will encourage fresh and exciting research on various aspects of grassland science or ecology or livestock and game production systems.

Colleagues, let me wrap up by recognizing a few organisations and individuals who are here today. I have to acknowledge the generous financial and strategic contribution of the Department of Agriculture's Directorate of Animal and Aquaculture Production Systems to making this workshop a reality. I have to acknowledge the sterling work of the organizing team led by Dr Luthando Dziba who had to deal with the logistical arrangements of this workshop. Well done, you guys. I appreciate how difficult the task you had can be. Believe me, it is difficult to even organise a party in a brewery!

Many of you had to come from far to get here. Thank you indeed for making time to attend the workshop. I am sure at the end of the workshop you will deem the workshop worth all your effort.

To each and every one of you, welcome to the workshop and I wish you fruitful deliberations.

At the end of today, you are invited to a braai at the Irene Pig Lapa to unwind and chat the evening away.

I thank you.



GIMS Map Competition

GIMS, the distributor of ESRI GIS software and related products in South Africa, is hosting a Map Competition at its User Conference from the 1-3 October 2007. The Map Competition aims to recognise excellence on cartography and GIS modelling, with prizes in four categories: presentation; content; thematic maps; and natural resources and utilities.

The competition is open to any interested parties, whether individuals, teams or institutions from the private and public sectors. Entrants may only submit any entry in one of the above categories, but there is no limit to the number of entries per Entrant.

Entries are free, and must be submitted to the Midrand offices of GIMS by 1 September 2007, accompanied by a short explanation of the map and all contact details. Both digital and laminated hardcopy maps must be submitted.

The map must be an original map, generated using ESRI software. All entries will remain the property of GIMS unless prior arrangements are made with the judging panel. GIMS will only use the material for display or promotional purposes.

Maps will be judged by a panel of expert GIS users. Judging criteria include: the degree to which sound principles of cartographic design have been used; the user-friendliness of the final product; the cost-effectiveness of the product; the degree to which the product exhibits an innovative solution to a problem.

For further information and competition details, contact Antionette McMaster : +27 11 238 6300 or email amcmaster@gims.com



Role of the national rangeland monitoring and improvement programme on the enhancement of animal production in South Africa

M. Hlatshwayo, K. Chueu and V. Musetha

Directorate: Animal and Aquaculture Production. Department of Agriculture.

E-mail: daap@nda.agric.za

Natural resources utilization

South Africa covers an area of 121.9 million ha, and 81% of the total area is utilized as agricultural land. The natural agricultural resources of the country are finite; and the most important factor that limits agricultural production is availability of water as a result of prevailing low, erratic and uneven rainfall patterns across country. The net result is therefore the utilization of marginal areas of land and more intensive utilization of existing agricultural land in order to provide for the basic needs of the human population.

About 13% of the agricultural land is used for crop production (arable land), while 87% of the land is used by the animal production sector. The sector is largely natural resource based, with rangelands as its primary source of fodder. This implies that the animal production sector contributes a greater proportion towards food security through

herbivores' conversion of rangeland resources to food for human consumption.

Challenges faced by animal production sector

South Africa's rangelands remain the cheapest source of feed for the animal production sector; however, the condition of many of the rangeland resources has been seriously degraded by a number of management factors (Hoffmann and Ashwell 2001). There is a concern that overutilization (mainly by overgrazing) of these resources might not only degrade the natural resource base, but will also compromise people's livelihoods. Furthermore, the constraints imposed by climatic condition and soil dictate that the animal production sector should play a primary responsibility on the sustainable management of the rangeland resources.

The animal production development programmes usually emphasise animal improvement and eco-

nomics (marketing); but a total animal production enterprise is an integrated system that includes animal husbandry, animal health, marketing, animal nutrition and rangeland management.

Therefore, a good understanding of the dynamics and interaction between rangeland, pastures, climate and animals is essential for sustainable animal agriculture (Engelbrecht *et al.* 2004).

Department of Agriculture's framework for rangeland management

One of the eight DoA strategic goals (mission statement) is to "Enhance sustainable management of agricultural natural resources and ecological systems" (Anon 2006a), and Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA) is used as an instrument to govern this goal. In addition to the various ordinances and interventions that foster management of natural resources, the DoA has put the sustainable management of rangeland resources on a high

agenda through the following initiatives:

- LandCare Programme for South Africa
- Livestock Development Strategy for South Africa (LDS) (Anon 2006b)
- Draft Policy for the development of a sustainable Wildlife Ranching Sector in South Africa
- Draft Policy for the sustainable management of Veld (Range) and Forage Resources in South Africa (Anon 2006c)

These initiatives are in support of effective administration of the CARA.

National Rangeland Monitoring and Improvement Programme (NRMIP)

The LDS and the Draft Veld and Forage policy recommends the establishment of a

NRMIP as an important step towards sustainable animal production, and this will be based on the evaluation of rangeland condition in order to understand the impact of rangeland management practices (various grazing/browsing regimes). This knowledge will provide a plat-

South Africa's rangelands remain the cheapest source of feed for the animal production sector but the condition of many of the rangelands has been seri-

form to identify and document changes in the resource over time; providing information upon which to evaluate management practices in relation to natural influences such as weather as well as to map out rangeland degradation.

NRIMP will be used to relate rangeland condition to animal productivity and efficiency as well as risk management. Implementation of NRIMP will be done through a range assessment and monitoring system at national level, whereby the following will be quantified and monitored for the different ecological regions:

- Degree of degradation in relation to rangeland potential
- Seasonal changes in forage productivity, quality and acceptability to livestock
- Impact of water stress (drought) on the productivity of the vegetation
- Impact of animal numbers, animal type and distribution on the productivity of the vegetation and different degrees of degradation.

NRMIP will enhance the animal production by achieving the following objectives:

- Assisting in on-farm decision making process such as evaluating the farming system, forage availability, expected animal production, number of animals, and type of animals
- Evaluating the effects of current management practices on

rangeland condition and to monitor change over time

- Evaluating the degree of rangeland degradation and assessing the status of vulnerability of rangelands.

These objectives are aimed at providing a disaster management pro-active response for sustainable animal production.

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The savanna ecosystem dynamics project and its role in the national rangeland monitoring programme

Mike Peel, John Peel, Andre Jacobs, Thabile Mokgakane and Colleen Rabothata

ARC-Livestock Business Division (Range and Forage Unit Nelspruit).

E-mail: mikep@arc.agric.za

The Savanna Ecosystem Dynamics project (Lowveld) was set up in Nelspruit in 1989. This project is currently housed in the ARC-Livestock Business Division (Range and Forage). The motivation for the project was based on the fact that the Savanna Biome makes up some 20% of the land surface area of the world and 40% of the land surface area of Africa. Savannas are in fact second only to tropical forests in their contribution to primary production. In South Africa 35% of the land surface comprises savannas. The ARC-LBD project covers an area of some 450 000ha of the eastern Lowveld between the Sabi and Letaba Rivers and includes some 800 vegetation-sampling sites, as well as an ongoing monitoring programme which is aimed at detecting vegetation change over time (Figure 1). The database also includes environmental (e.g. rainfall) and management (e.g. stocking rate) data (Figure 2). The extensive database is used to provide a user friendly decision support system to the land

user irrespective of their objectives (from commercial, through communal livestock systems to protected area systems) (Figure 3). Models describing a range of different "states" and "transitions" (paths to follow to reach them) of the resource are being continually refined in terms of the objectives of the land user. These models facilitate management that will promote optimal veld condition. This brings into consideration the setting of realistic goals and objectives for the different areas. The result is a flexible management style option in which hazards are avoided and opportunities grasped, to the benefit of the reserve. The work to date culminated in the awarding of a PhD 'Towards a predictive understanding of savanna vegetation dynamics in the eastern lowveld of South Africa: with implications for effective management' in 2005.

The study area currently covers some 24 conservation areas ranging in size from 3 000ha to 65 000ha and includes sites in the adjacent communal rangelands and

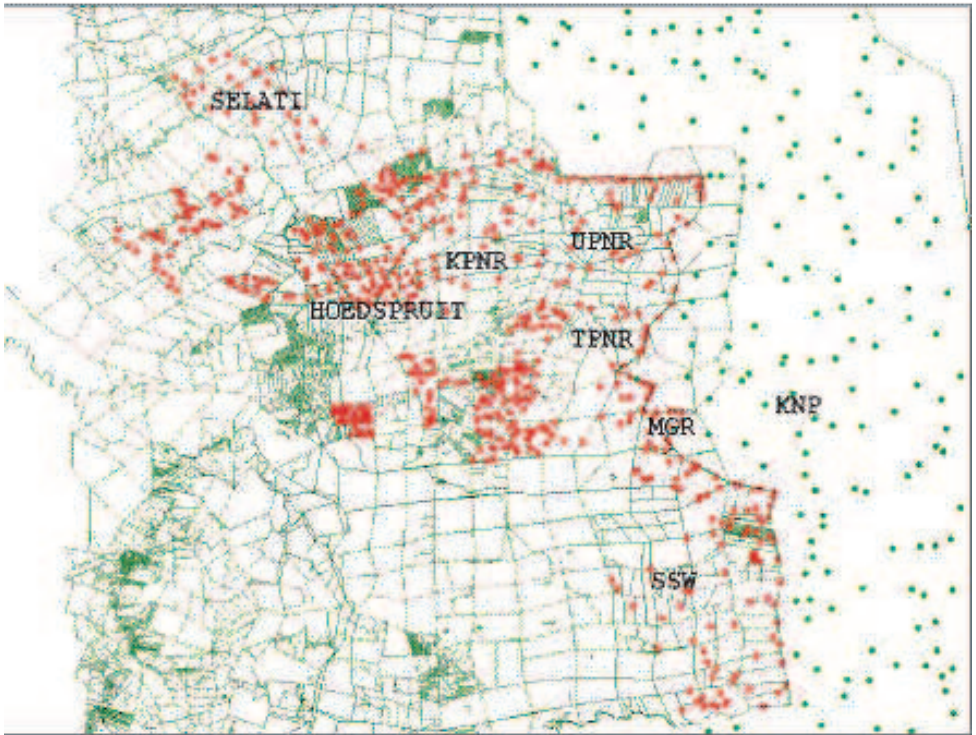


Figure 1: Veld monitoring sites in the eastern Lowveld: RFU ecological monitoring sites and KNP veld condition assessment sites – both since 1989.

the western part of the Kruger National Park (Figure 1). Specific project work relating to among others, communal rangelands, water provision, bush thinning, game counting and mine rehabilitation has been undertaken (Figure 4). The group has been involved in a number of projects outside of the eastern Lowveld. These include: an assessment of the carrying capacity and habitat suitability for the Greater St Lucia Wetland Park, review of the stock-

ing of the Mthethomusha Game Reserve, an assessment of the carrying capacity and habitat suitability Kudu Ranch (Lydenburg South Africa), re-monitoring of the Madikwe Game Reserve, planning of Lomshiyo community project, a first game count of the Banhine National Park in Moçambique (Figure 5), Range condition and carrying capacity in the Vilanculos Coastal Wildlife Sanctuary Moçambique – with guidelines and recommenda-

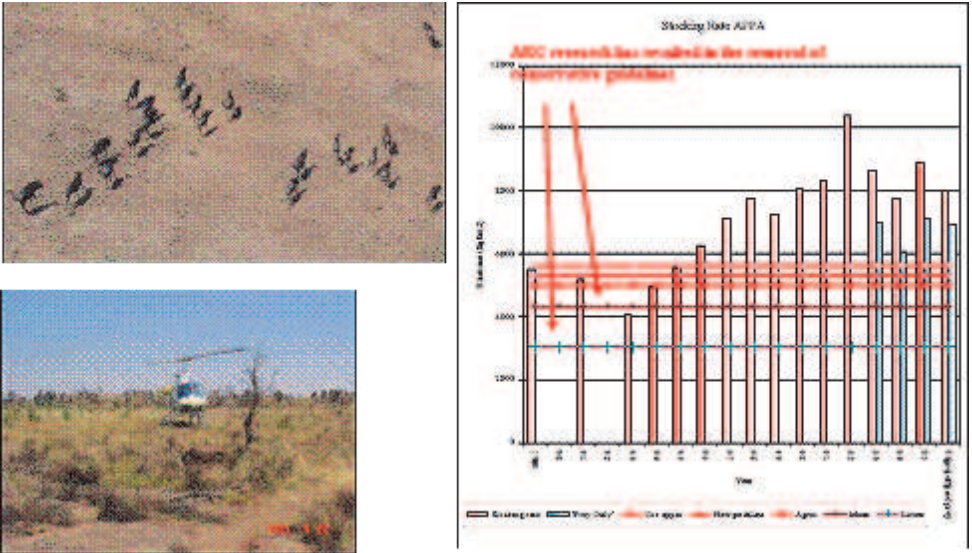


Figure 2 Animal number and type data collected from annual aerial counts.

tions for large herbivores, assistance with the biodiversity management plan: sub-activity expansion action plan, ecosystem restoration plan, wildlife re-introduction plan and controlled burning plan for Vilanculos Coastal Wildlife Sanctuary Mozambique and an assessment of habitat suitability and carrying capacity for herbivores - The 'Sanctuary', Limpopo National Park, Mozambique. The results of studies such as those described above and which reflect the contribution of the work to the farmer/manager/section of the natural resource industry are contained in reports, presentations and documents (the duration of many of the studies indicates that this project is one of the few in

Southern Africa that can be called medium-long term and over a spatially very large area).

Within South Africa the group has ties with a number of South African universities (WITS and UKZN in particular) as well as with Remote Sensing Institute in Enschede (ITC), the University of Wageningen in Holland and the National Center for Ecological Analysis and Synthesis (NCEAS) based at the University of California. The group has been one of the driving forces behind the UNESCO approved Kruger to Canyons Biosphere Reserve as well as playing a crucial role in the setting up of the Long Term Ecological Research Network (LTER) site in the form of

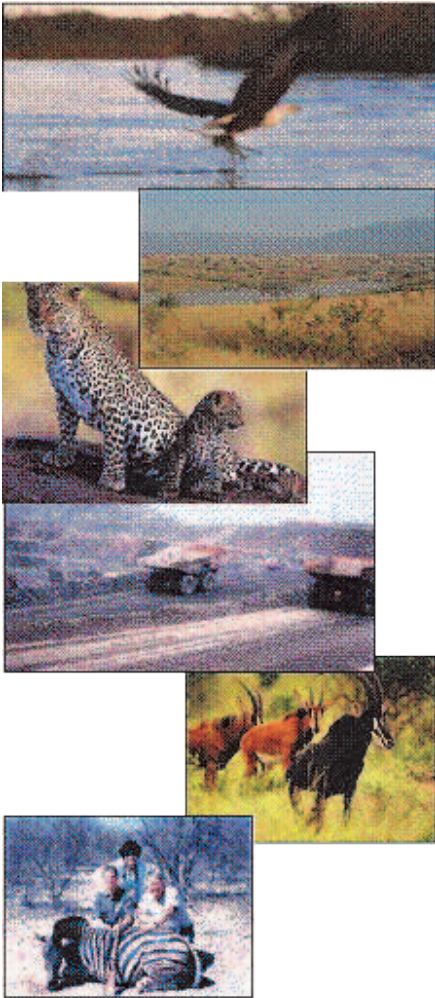


Figure 3 Illustrating the multiple land-uses practiced in the study area.

the South African Environmental Observation Network (SAEON) in the Lowveld of South Africa.

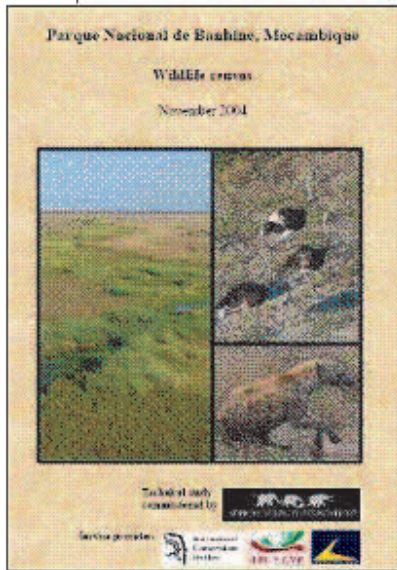
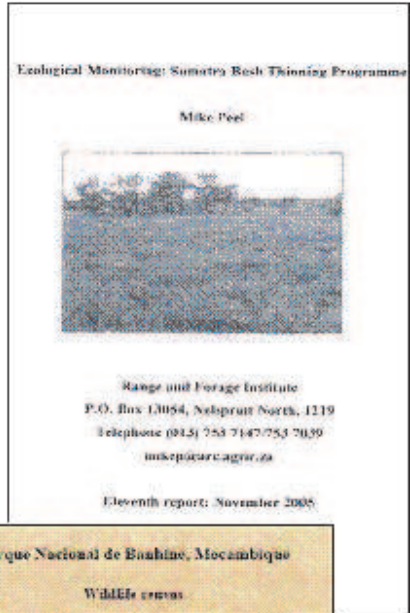


Figure 4 (top) Example of work relating to bush control and **Figure 5** (bottom) showing work relating to game counts in neighbouring Mocambique.



Rangeland monitoring in South Africa: a proposal

Tim O'Connor

South African Ecological Observation Network.

E-mail: timoconnor@xsinet.co.za

Six good reasons why we should care about what's happening to the country's rangelands:

1. They constitute by far the single most important land cover of the country and therefore have an overriding effect on a number of critical ecosystem goods and services of the country.
2. Foremost among these is the sustainable provision of high quality water, considered by many to be the single most important commodity underpinning our economic development.
3. They function as the largest terrestrial means of carbon sequestration simply on account of their scale.
4. The importance of rangelands to the agricultural economy cannot be reliably estimated because a substantial number of beneficiaries are informal.
5. Rangelands provide a national matrix for the conservation of biodiversity that cannot be

achieved by protected areas alone, especially in the face of anticipated species and biome shifts in response to climate change.

Medicinal plants are worth R270 million per annum on the informal market, many of which are harvested from rangelands (Mander 1999).

Society cannot afford deterioration of these services over time, and is therefore concerned about degradation of rangelands. The immediate users of rangelands, be they commercial ranchers or communal pastoralists, have an obvious dependency on their rangelands, but the pressures of meeting immediate demands has often resulted in undue pressure being placed on rangeland resources. Rangeland degradation rarely occurs as a sudden, cataclysmic event, but occurs rather as a slow decline in resource quality over decades in which the original condition is most commonly not clearly remembered by land users or managers. Recognition of the original condition is confounded in our country by the pronounced

variability in rainfall we experience from year to year. Rainfall cycles occur over a periodicity of approximately 18 years in southern Africa, so that a gradual decline in rangeland quality is likely to be considered simply part of inter-annual variation. The only means whereby we may ascertain if resources are degrading is through monitoring.

Rangeland monitoring has a strong tradition in South African rangelands, and has been pursued for achieving three main objectives:

1. To serve decision-making of a land user through providing information required for amending management actions in order to improve production goals or other management objectives. In other words, monitoring is conducted for contributing to adaptive management. By necessity, such monitoring has to occur on an annual (or nearly so) time scale if it is to be of any relevance. I term this *tactical monitoring*.
2. *Strategic monitoring*, by contrast, is to serve decision-

making of regulatory bodies and policy makers. It occurs therefore, by definition, at a substantially larger spatial scale than tactical monitoring but may not require a similarly intense temporal resolution.

3. Monitoring has often been conducted for scientific purposes, motivated by a desire to understand variability occurring at a time scale beyond accurate recall of human personnel. It is also the only means of recording the impact of rare events, such as floods, which often have a disproportionate influence on subsequent ecosystem functioning. Monitoring for this purpose has traditionally been most widely practiced on conservation proper-

ties, but its relevance for livestock production has become increasingly recognized with the development of 'state-and-transition' thinking (Westoby *et al.* 1989).

Rangeland monitoring seems to offer such obvious benefits at a number of levels that one would expect to find it firmly entrenched within resource management de-

A plethora of monitoring efforts were initiated across the country, but few examples can be found of those which persisted for longer than ten years.

partments such as agriculture, water affairs and forestry, and conservation, and to be widely practiced by individual land owners concerned about the sustainability of their operation. Is or has this ever been the case? My own informal review of range monitoring in this country leads to the conclusion of 'Plenty ventured, very little gained'. A plethora of monitoring efforts were initiated across the country, mainly in the 1970s and early 1980s, but few examples can be found of those which persisted for longer than ten years. Considerable thought was invested in the design and execution of monitoring programmes, and sound principles were developed (e.g. Mentis 1984). Many of the monitoring programmes initiated during this era were notable for their intensity of sampling and high quality of data concerning mainly botanical composition.

Few extant examples of these efforts can be uncovered today, begging the question of whether they were intrinsically unsuited for their original intention or whether circumstances conspired against their continuation. Perhaps the answer is best revealed by some of the more successful cases. The Game Farming section of the Agricultural Research Council in the lowveld adjacent to Kruger National Park has maintained veld monitoring on a large number of properties for over fifteen years. Some self-apparent reasons for the success of this exercise has been the contin-

ued presence of a 'champion of the cause', a team of staff dedicated to the function of monitoring, the complexity of the product was commensurate with the client's needs, and an 'economy of scale' was created by a single group serving a large number of users, thereby ensuring cost-effectiveness of the operation.

Any number of conservation areas can be identified in which excellent monitoring programmes were initiated and maintained for a few years until an inevitable turnover in staff occurred, following which collapse of monitoring occurred. Exceptions support the generality – some reserves have amassed exemplary data sets owing to the single-mindedness of certain individuals. Smaller reserves were also soon faced with the time demand of collecting and processing data. The additional time required in collecting a second year of monitoring data lies not in the field sampling, which may even possibly become more efficient, but in the exponentially increasing amount of time required for accurate matching of data and analysis. Numerous examples exist throughout the country of a sound, well designed baseline having been established with one or two follow up surveys, thereafter ending with not even a whimper. Similarly, a number of private land owners had veld monitoring programmes laid out during farm planning exercises but soon found that the demands of maintaining these increased over time be-

yond their capacity. Monitoring programmes do not usually yield quick returns, which brought into question their value. The costs for a private land owner are proportionately far higher than for an organization, which further eroded continuance of monitoring on private land of livestock producers.

Examples in which monitoring has been maintained also generally serve to highlight that few have ever served their original function of tactical decision making. The value of these data sets for scientific research has, however, been increasingly recognized (e.g. Short *et al.* 2003, Knapp *et al.* 2004). Even efforts which became defunct a long time ago may be resurrected for addressing questions concerning the extent and amplitude of change (e.g Short *et al.* 2003). Considering the small number of formal products which ever emerged from monitoring efforts, this would seem a research opportunity waiting to be realised.

A way forward

There is every need for decision makers in this country to have a

Even efforts which became defunct a long time ago may be resurrected for addressing questions concerning the extent and amplitude of change

clear and accurate strategic understanding of the state and direction of change of rangelands on account of the many essential services they contribute. A chief concern is whether our rangelands continue to degrade. The current benchmark for the country is the recent analysis by Timm Hoffman and colleagues (1999), but this analysis was based primarily on expert opinion and considered a time-frame of only the ten years prior to expert interviews (approximately the 1990s). The profound insights of this groundbreaking work need to be supported by ground-based information covering a more appropriate time interval for the degradation process if we are not to base

our efforts for the future on a false foundation.

This paper proposes that the legacy of earlier work could form a basis for a contribution toward such a goal. We need to know not only if rangelands are being degraded, but the rate and extent to which they are (have) being degraded, which environmental milieus or geographic areas are most vulnerable, and, if

possible, to identify the most appropriate management actions by their long-term consequences. The most obvious approach for achieving such a goal would be to monitor trend at a national scale using remote-sensing technology, in conjunction with ground-truthing. Ground-based methods also offer a resolution of insight that cannot be achieved with remote-sensing methods.

Setting up ground-based monitoring of rangelands *de novo* may prove to be a task too daunting to contemplate, but using efforts of the past offers an opportunity for a cost-effective assessment of trend in rangeland condition over the past 30 or so years. Key attributes of such an effort are the following.

- A substantial number of monitoring efforts were established in the 1970s and 1980s, and some even before then. Most became defunct within ten years.
- Phytosociological studies have been conducted extensively throughout all the main rangeland areas of the country, the majority of which were undertaken during the same time period as monitoring was widely established.
- Collectively, this set of studies covers all the main influences

on the organization of natural vegetation, including climate gradients, edaphic variation, land uses and management.

- This data set is not restricted to former white-owned, livestock-producing properties. A number of the former 'homelands' and 'independent states' were extensively surveyed during approximately the same period of time (e.g. the work of the Agricultural and Rural Development Research Institute [ARDRI], based at the University of Fort Hare, Alice, Eastern Cape)
- Sample size is exceptionally large, imparting confidence that sound conclusions could be realised through such an effort.
- In general, plots on these studies were adequately geo-referenced (despite being placed prior to Global Positioning Systems), such that meaningful follow-up studies can be conducted. In addition, the majority of key personnel involved in establishing these efforts are still accessible, but this will undoubtedly change with every passing year.
- This intended project does not have to buckle under the anticipated bureaucratic strain of a national effort because it is easily implemented on a pro-

vincial or regional basis.

- Individual products will have substantial value in their own right, but the collective value of a number of products should far exceed the sum of individual values.

The project is eminently suitable for the training of a number of postgraduate students and of technicians, which would do well to offset the decline in human resources concerned with rangelands and vegetation management that has occurred over the past decade.

We are conducting some preliminary pilot investigations in order to examine the feasibility of pursuing this programme in KwaZulu-Natal. We therefore invite any interested parties in KZN to contact Alan Short at Alan.Short@dae.kzntl.gov.za. Should anyone else be interested in initiating a similar activity elsewhere in the country. Please contact Tim O'Connor in order to discuss how SAEON might assist with implementation of the project.

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The Kruger National Park Data Repository

Judith Kruger

Programme Integrator: Science Support

E-mail: judithk@sanparks.org

The Kruger National Park (KNP) data repository is an innovative and user-friendly way for people to access the vast sets of data that have accumulated from the many years of research that has been done in the Kruger National Park. The data repository is still in the development phase and as new datasets are added, the system will be upgraded to suit user and supplier needs.

Scientific Services has been involved with research on various topics in the Kruger Park, since the 1950's. With each completed research project has come the data collected in the field or generated in the lab, on subjects ranging from geology to tree population dynamics. This collection of data, particularly the long term census datasets for elephants and plains game, are infinitely valuable for researchers and managers. Making this information available to people was the driving motivation in developing the KNP data repository.

The compilation of this useful data access system has been developed over the last 5 years with the accent being on the ease of access to various data sets. The data repository has been structured to work on a uni-

versal system such as Yahoo! Or Google search engines, so a user can simply type in the keyword of the dataset they are looking for and, if it is available, they will find it.

The system that was developed especially for ecological data by NCEAS (National Centre for Ecological Analysis and Synthesis) in Santa Barbara, USA, was selected as the platform to use for the KNP data repository. The scientists at NCEAS have considerable experience in managing, developing and storing long term data sets in the USA and this expertise was essential in constructing a similar access system for the Kruger Park. The NCEAS staff have been working with Scientific Services to fine tune the system, over the last three years, so that it can accommodate all the SANParks and Kruger data requirements.

This system has been adopted by the Long Term Ecological Research Network in the USA and other Ecological bodies. Members of the International Long Term Ecological Research network (ILTER), like China and Taiwan, have also started using this system. This means is that a person will be able to do inter-continental



searches by searching only one of these data catalogues and obtaining all the data from the different continents. This system is going to be expanded in South Africa to also include data from the SAEON (South African Environmental Observatory Network) sites.

The data repository has been constructed to protect sensitive data by using a login/ password system. This means that data can be restricted to a few users who are working with that particular dataset. Data that has not been published will be lead-time protected with only the metadata made available until the data is clear for public circulation. This data access system has helped to reduce the workload of staff who are being asked for data, as the requestors can now go directly to the website and obtain the data and the metadata themselves.

The advantages of this repository does not stop with data use and sharing but will be broadened to automation of analyses to determine whether certain ecological thresholds have been exceeded. A scientific workflow

program called Kepler will access the data directly from this data repository, perform the necessary analyses and provide output to managers via a web based system, indicating whether the ecological threshold of interest has been exceeded or not.

The data repository can be accessed at <http://dataknp.sanparks.org>. The data is freely available and can be downloaded.

The data is accompanied by metadata, which is the information that describes the data and is needed to be able to interpret and use the data. This provides the user with more background information on how, when and where the data was collected. This includes:

- Abstract for the dataset. This describes the project that collected the data.
- Geographic coverage. Area of the study e.g: Entire KNP or where transects were laid, with the beginning and end point GPS co-ordinates. If points are used then a GPS point for each will be given.

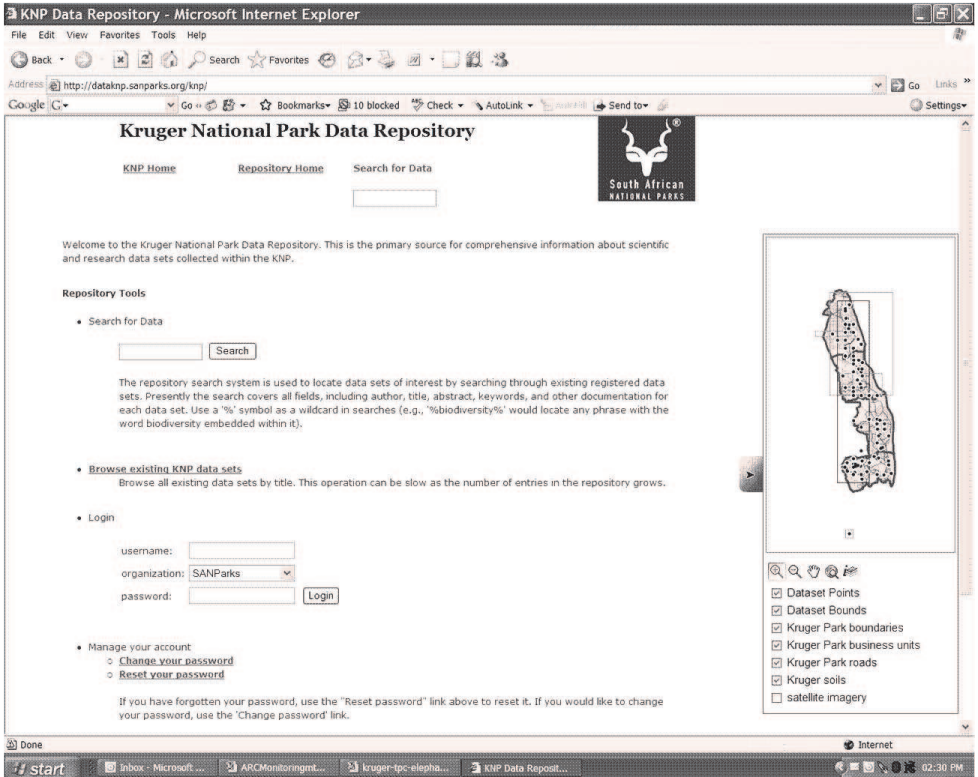


Figure1: Example to webpage for the KNP Data repository. Users will be able to search for data or browse through existing datasets. The interactive KNP map will also allow users to search for data linked to specific areas in the park.

- Temporal coverage. The dates that the data was collected.
- Keywords. words that characterize the database
- Taxonomic coverage of the dataset. Information on the genus and species name of the individuals that were sampled in the dataset. This is often provided in a table format.
- Data Usage rights. A paragraph that describes the intended usage rights of the data. Specifically including any restrictions (scientific, technical, ethical) to sharing data within the public scientific domain.
- Access control. Restricted datasets that have certain people that are able to access this data.
- Methods. The methods that were used in the study are listed here.
- People and organizations. Contact details of people associated

with the dataset and also the role that they played e.g: meta-data provider, principal investigator

Figure 1 is what users can expect to find once they log on to the webpage.

Figure 2 provides an example of the webpage following a search for a specific data set in the data repository. Once the list has been generated of available datasets, these can be opened and the page will display

as in figure 2.

The KNP data repository will continue to provide data to the people who need it. Managing and archiving data correctly as it accumulates is essential to maintaining the integrity and validity of the data. Making it easily accessible assists researchers in streamlining their work, while also providing scope for the development of comparative work and related datasets and will also avoid potential duplication of research efforts.

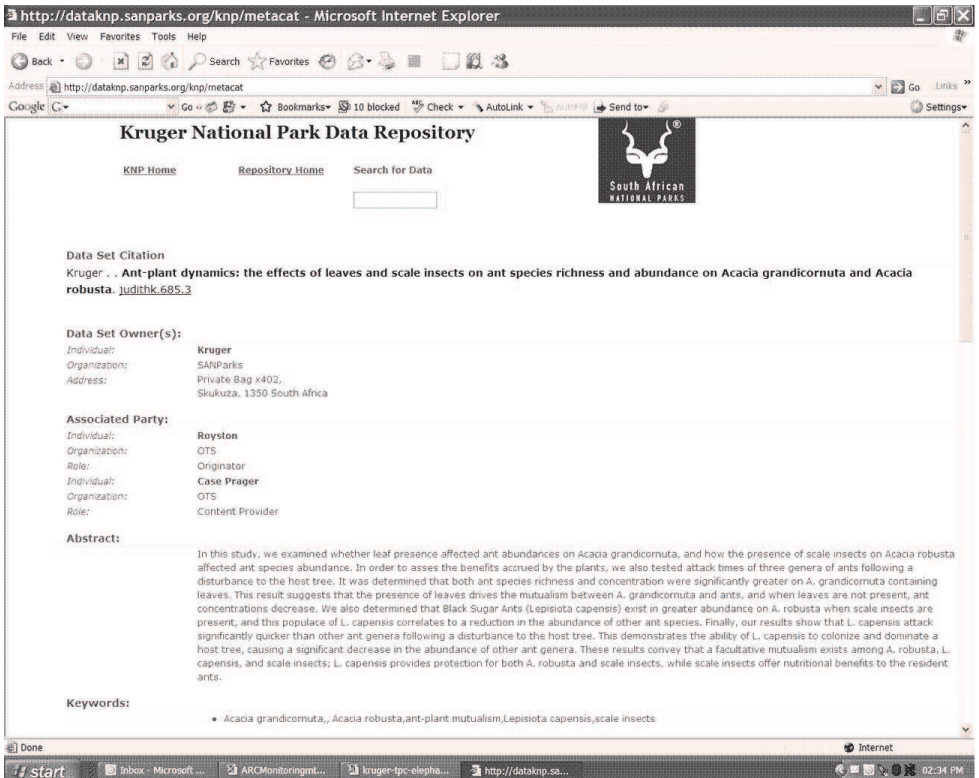


Figure 2: An example of a data set citation following a search of the data repository, showing the associated metadata details including the abstract.



Vote of thanks

Prof. Peter Mbat

Group Executive, ARC Livestock Business Division

E-mail: pmbati@arc.agric.za

Good afternoon colleagues

I am a parasitologist and being with top class rangeland scientists for these two days has taken special courage from me.

It has been two busy days characterized by collegial yet intense and robust engagements around an important and critical natural resource – the South African rangelands. The list of names of stakeholders from government and various organizations and institutions, including universities, research organizations to SOE' who attended the workshop bears testimony to the importance that you all attached to this meeting and your obvious intentions to use your time, skills and expertise in order to make a difference in the effective management of the national rangelands.

I wish to thank the DoA (Directorate Animal and Aquaculture Production) and the organizing committee under the leadership of Dr Luthando Dziba for their foresight in recognizing the importance of establishing a national forum with a dedicated mandate on national rangelands.

As scientists I probably need not overemphasize this fact – but the success and sustainability of this initiative is strongly dependent

on good partnerships and strong collaboration between all of us in this room, including skills transfer and capacity building of younger professionals.

I listened very carefully to the lively discussions, and I heard interesting words of wisdom, that we need to learn from history, that we need to collaborate and support each other and to avoid unhealthy competition etc with a view to developing a healthy rangeland system in South Africa.

The Agricultural Research Council, and specifically our Range and Forage Unit within the Livestock Business Division is willing to continue to provide all the necessary support in ensuring your success in the execution of the recommendations as given by the various task teams for a National Rangeland Monitoring Program.

Could I please ask you to give a warm hand of applause to Dr Dziba and his organizing committee, Prof. Kevin Kirkman for facilitating the program, the presenters and other facilitators who have ensured the success of this workshop.

Once again I wish to thank all of you for making time to attend this two day National Rangeland Monitoring Workshop. Have a safe trip home and God bless!

