



## Session 11 & 12: HRM Special Session

Chair: Ian Little

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A farmer's perspective

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I bought my farm in 1993. It is situated in the Eastern Cape, near the town of Cedarville. The carrying capacity is 2.5 ha per LSU. The farm is 1 070 ha with 150 ha of ploughed lands, the rest being indigenous grassland comprised mostly of red grass (*Themeda triandra*). I used to burn a third of my farm every year until 1999 and then followed the grazing pattern that was recommended by Cedara. I noticed during that period that the camps that were burnt did not have a similar carrying capacity as the camps that were not burnt.

This piqued my interest. We only used to burn after we had 25 mm of rain and this was sometimes as late as the end of October. The grassland birds had already started nesting and I could not handle burning the eggs, chicks and sometimes the adults.

I now have a 15 camp system, as I started following a high stocking rate and quick rotation form of grazing. I divided my bigger camps along a contour line. The animals remained in a camp for a maximum of 7 days, depending on the size of the camp.

I noticed the following since starting this grazing regime:

- I can carry more stock per hectare;
- More birds and different species of birds on the farm;
- More earthworm castings all over my farm;
- Less algae in my water;
- Legume plants in the veld;
- An increase in plant diversity (palatable and unpalatable);
- Quicker recovery rate after grazing
- More resilience during times of drought/dry spells;
- Grass starts growing quicker after the dormant season;
- Grass remains productive later in the season;
- I only dip my cattle once a year as opposed to several times;
- I use 2/3 less summer licks;
- Clearer/cleaner run-off on my farm;
- Increased number of and different types of dung beetles.



## Conserving Afromontane grasslands through fire and grazing in remnant ecological networks in a timber production mosaic

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Afromontane grasslands have been shaped by fire and grazing. In South Africa, these grasslands occur extensively in protected areas (PAs), but also in large-scale ecological networks (ENs). ENs are landscape-scale, remnant, set-aside tracts of land composed of corridors and nodes of mostly indigenous grassland among exotic timber plantations. Their ability to offset the adverse effect of plantation forestry on biodiversity depends on certain management practices. The aim here is to determine how the plant communities of Afromontane grasslands are affected by time since last fire and grazing intensity.

We identified areas that differed in 1) time since last fire (recently-burned: burned <12 months ago vs. unburned: burned > 12 months ago), and 2) grazing intensity (light grazing in the PA, and moderate or heavy grazing in an adjacent EN). After accounting for the effect of abiotic variables, we found that plant species richness was greater in recently-burned than in unburned areas, which indicates a natural decline in richness with age. We only observed a response in plant species richness to grazing intensity in unburned grassland, not in recently-burned areas. In these unburned areas, plant species richness increased from lightly to moderately-grazed grassland, and decreased from moderately to heavily-grazed grassland. In addition, heavy grazing caused a significant effect on plant species composition.

We recommend that burning and grazing should be part of grassland management, but that grazing intensity should be controlled to prevent permanent loss of plant species due to heavy grazing. Although this study was conducted in Afromontane grassland in South Africa, the findings have far-reaching consequences for the rest of the African continent where overgrazing is a major cause of land degradation.



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Response of vegetation, soil, animals and water cycle to different management regimes:  
Victoria Falls area, Zimbabwe

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The levels of extreme poverty that are endemic to the drylands of Africa are well documented. There is however tremendous potential for development in these drylands. The overall aim of this programme will be to improve livelihoods of and increase opportunities for development for poor people living in the drylands of Eastern and Southern Africa. This will be achieved by reviewing and analysing a selection of successes in land rehabilitation and natural resource management, and using the knowledge obtained to stimulate the significant up-scaling of successful practice.

The holistic resource management (HRM) philosophy has caused controversy in rangeland science circles for over forty years. HRM has had a major influence on governments and ranchers globally, yet with contradictory evidence that some of the theories actually work. The Agricultural Research Council's Animal Production Institute (ARC-API) plan to thoroughly test the claims of the holistic management approach by comparing the state of Dimbangombe (Africa Centre for Holistic Management – ACHM) to neighbouring rangelands with different approaches to management.

By training people in ecological monitoring activities, the recipients of such training can in turn train others and using the knowledge thus generated to implement effective management regimes the ultimate goal of which is to alleviate poverty in the drylands of Africa.

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(In)compatibility of scientific and holistic resource management

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Scientific research is based on empirical evidence acquired from experimentation, measurement and observation, underpinned by principles of replication, repeatability and statistical robustness. Research outcomes are subjected to peer review and published. Scientific management recommendations are based on credible, published science. Grazing system research at a farm scale is difficult, and as a consequence resource management research is focused on components. The resultant scientific resource management (SRM) recommendations incorporate principles and results from local and international literature. In South Africa, SRM recommendations focus on animal numbers, type and movement, recognizing fire as an important variable. Recommendations vary regionally, and the incidence and role of fire is related to rainfall. Holistic Resource Management (HRM) is an approach focused on animal numbers, and with the main emphasis placed on animal movement. Fire is regarded as undesirable and unnecessary. Scientific results are generally not regarded as important and there is frequently an impatience with the perceived slow pace of science. Scientists usually dispute the claimed advantages of the HRM approach, have difficulty measuring differences in grazing system performance at a farm or landscape scale and raise questions about sustainability. An analysis of similarities and differences between SRM and HRM reveals more similarities than realized, explains some differences, but also highlights some important concerns, including the impacts of soil disturbance in sensitive environments, and the impacts of withholding fire in high rainfall environments.



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## Grass, animals and people: A global dilemma

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The historic (pre-pastoral) and present states South Africa's grasslands are briefly reviewed. These include accounts of massive, migrating herds on grasslands in South Africa in the 19<sup>th</sup> century, elimination by hunting and the ecosystem disruptions caused by livestock farming, fencing, urbanization, roads, mines, dams and cities. The heavy research emphasis over the past six decades on non migratory grazing strategies with light stocking densities and regular use of fire is contrasted with the paucity of research on higher density grazing strategies, higher stocking rates, shorter grazing periods and less use of fire. The necessity for more research investigating a wide variety of different grazing and burning strategies being practiced currently is emphasized. The investigations should include not only productivity and biodiversity issues but also soil erosion dynamics under different management strategies.

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## Managing the ecological role of fire in mesic grasslands

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Fire is a very controversial issue in grassland ecology, primarily due to a shortage of sound long-term data and a high degree of complexity associated with varying responses between ecosystems and management co-variables, especially grazing. However, fire remains one of the major tools and responsibilities for grasslands management. However, misguided application of fire (including the no-burn scenario) has lead to degradation of some grasslands from a biodiversity, ecosystem services and animal production perspective.

The purpose of this talk is to present a brief overview of the ecology of fire in grasslands, aiming to provide a foundation for the discussions on holistic grassland management. This review of published and anecdotal evidence regarding the role of fire in grasslands emerged from the development of the Biodiversity Friendly Grazing and Burning Guidelines (SANBI 2014); and the management guidelines represent the synthesised viewpoints of many experienced grassland ecologists, both scientists and farmers.



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## Holistic management

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Holistic Management is challenging to define. It is part theory, part philosophy, part practice and part way of life. By its very nature Holistic Management successfully attempts to embrace complexity in the non-linear nature of the world; the interwoven fabric of nature and the multi-faceted world of business and the complexity of human relationships. It is much more than a grazing system.

The theory lies in wild herd migrations being the architects and basis for healthy grassland biomes.

The philosophy centres on the realization that all interactions relate to one another – change one thing and everything else changes – holism.

The practice, comprising knowledge of ecosystem processes (theory), understanding the interconnectedness of life and the impact of our management decisions (the philosophy), within planning and monitoring processes, that will lead us towards a life and environments that we aspire to achieve (the practice).

The panel discussion proposed is aimed at grass lands. I have 20 years of experience in the practice of holistic management on the Springbok flats. This area was certainly a grass land, although it is no longer classified as such. Holistic management theory has a clear and unconventional explanation for the reasons this change happened. This theory is extremely important in our understanding of ecosystem management. This theory offers explanations for why we are facing ongoing ecological degradation.

Holistic Management offers insights, planning tools and support in changing practices and understanding processes that grasslands need for health and resilience.

I offer ecological data, photographs and knowledge from my many mistakes, to support my talk.



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## Savory or Unsavory: The Application of Holistic Resource Management in Mesic Grasslands of KwaZulu-Natal

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In recent years many farmers in Southern Africa have converted to the doctrine of Holistic Resource Management. This management paradigm has also gained support in the mesic grasslands of KwaZulu-Natal. HRM is sold to land users as a panacea for all problems relating to desertification and rangeland degradation while in truth the main reason for adoption is the hope of escaping the cost-price squeeze that has been hamstringing the red meat industry for a number of years together with the claims made by HRM practitioners of nearly doubling stocking rates while improving the grass sward and simultaneously lowering input costs. It promises a balanced life, through happy and healthy people and country with enough money for all desires. It provides for a decision making framework whereby goals are set and participants are encouraged to manage towards the achievement of these goals by using a set of predetermined tools. The tools are based on the philosophy of Alan Savory where 'herd effects' of concentrated livestock grazing, including the impacts of hooves on soil surface and uniform use of plants are positive tools for restoration, whereas lack of disturbance could constitute 'overrest' that would result in declining soil conditions and undesirable competition among plant species.

The purpose of this study is to evaluate management tools as proposed by proponents of HRM at the hand of conventional sound rangeland and biodiversity management principles for mesic grasslands. Some case studies from the Kokstad and Midlands areas will be presented to illustrate differences between the approaches. It is concluded that while evidence suggests that HRM generally has a deleterious impact on mesic grasslands, its reported improved successes probably stem from better management effectiveness, infrastructural investment and closer attention to detail by the land user.

**Keywords:** Holistic Resource Management, mesic grasslands, sound principles



## A meta-analysis: Does short duration grazing work in the grasslands?

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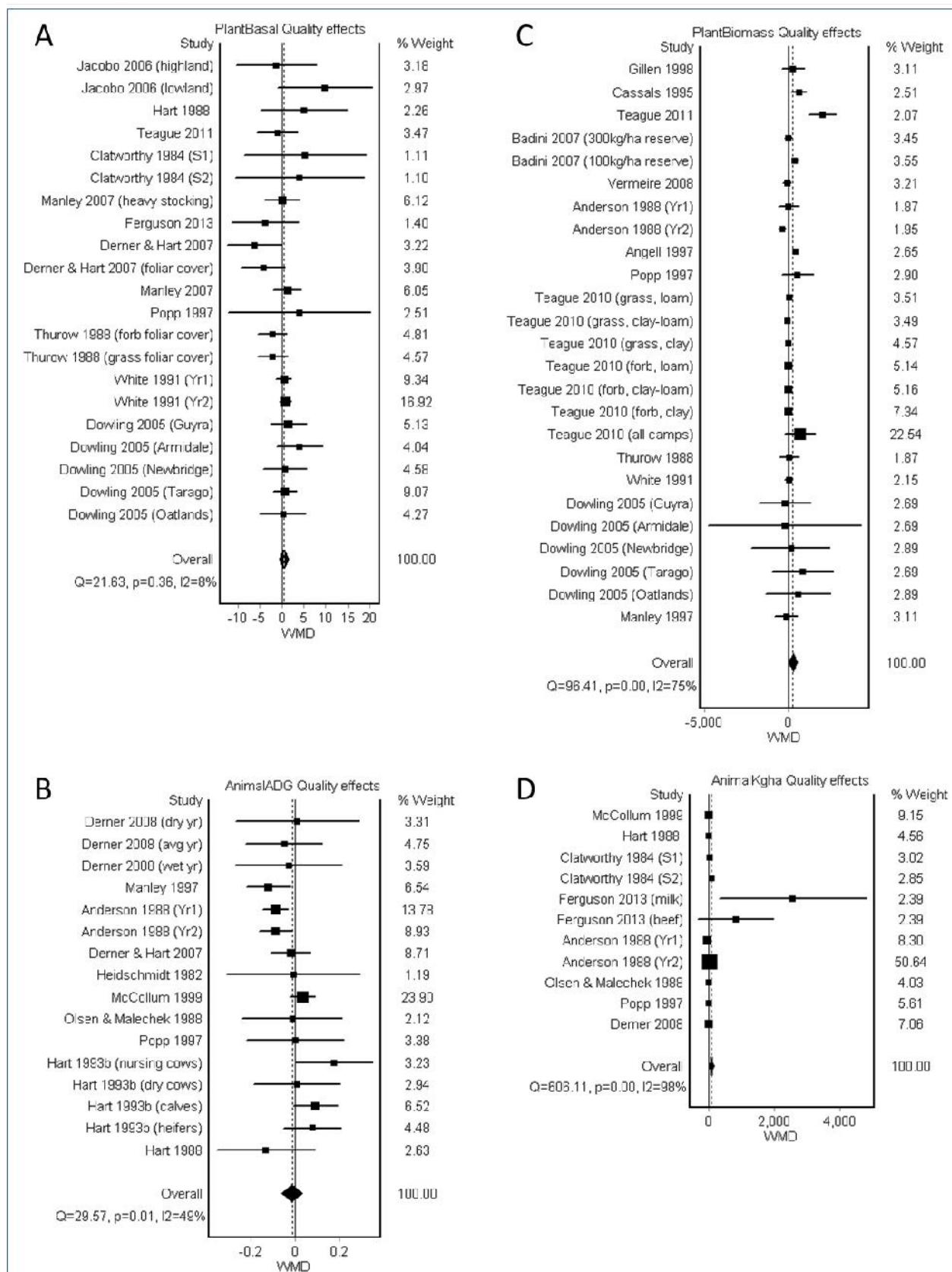
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The time-controlled/forage offtake element of Holistic Management® (called Holistic Planned Grazing (HPG)) is the main feature of the adaptive management within HM, and is testable. Many studies testing short duration grazing are completely synonymous with HPG. Allan Savory claims that most rangelands are desertified, and that to reverse desertification and climate change, our main tool is livestock as a proxy for the apparently non-selective grazing/browsing of former herds bunched by predators. Animals contribute nutrients while trampling apparently promotes grass germination, biological decay of grasses and increased soil infiltration.

Here we conduct a meta-analysis using a quality effects model to determine whether short duration grazing (SDG) results in increased production, profit, biodiversity, and soil 'health' compared to other grazing systems at the same stocking rate. On balance studies indicated that SDG had a neutral effect on plant and animal production. Forest plots of actual data showed that there were no differences between continuous and SDG in terms of plant basal cover ( $p=0.36$ ) but animal condition was reduced ( $\text{kg.head}^{-1}.\text{d}^{-1}$ ,  $p=.01$ , Fig. 1A, B). There was however, a relative increase in plant biomass production ( $\text{kg}.\text{ha}^{-1}$ ;  $p=.0001$ ) and animal production ( $\text{kg}.\text{ha}^{-1}$ ;  $p=.0001$ , Fig. 1C, D). Stocking rate emerged as the most important factor determining plant and animal production, regardless of grazing system. Short duration grazing resulted in increased animal production to the detriment of animal condition with no improvement in plant basal cover. There were too few studies on biodiversity, soil aspects or profit to conduct analyses. These aspects as well as trampling and grazing selection within SDG remain areas for research.

**Key words:** time-controlled, animal production, plant production, biodiversity, soil health

**See Figure 1 on the next page.**



**Figure 1:** Forest plots of weighted mean differences (WMD) in plant basal cover (A), animal average daily gain (B), plant biomass (C) and animal production (D) using the quality effects model. Studies >0 and <0 showed a positive or negative effect of short duration grazing compared to continuous grazing, respectively. Weight shows the percentage weight that the study was given based on the quality score.



## Session 13 & 14: WWF workshop

Chair: Augustine Morkel

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### Conservation Fundraising Workshop

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#### **Introduction**

WWF is one of the leading environmental conservation organisations globally.

WWF South Africa has positioned itself to contribute to the South Africa Sustainable Development agenda through its mission of securing priority ecological assets, working to ensure ecological systems and process underpin social and economic well-being and address the risks and opportunities posed by climate change. WWF SA has a long history of being a reactive conservation funding organisation that rose funding and funded other conservation organisations work.

In 2012, WWF repositioned itself to be a proactive environmental conservation organisation, which through a broad but focussed strategy, co creates environmental outcomes solutions that are catalytic and have impact at scale. However, there are remnants of the reactive nature of the WWF business model. This takes the form of the Associated Trusts (WWF Nedbank Green Trust, Table Mountain Fund, Leslie Hill Succulent Karoo Trust, National Parks Trust, and the Southern African Wildlife College Trust) where WWF acts as the Management Agency for these Trusts. The oldest Trust started in 1986 (NPT) and to date the Associated Trust are estimated to have invested >R400 million, over 29 years, for conservation in South Africa.

In recent years, WWF has noted that the quality of the applications for funding has deteriorated, for various reasons. This deterioration has resulted in either a poor quality of applications being considered (and therefore rejected on the basis of process not being followed or superiority of the few well written projects) which results in the Trusts having a poor pool to choose from. Further, possibly very good projects that can catalyse real change are often not considered as they are poorly written.

This workshop is the first of an annual campaign to build the capacity of applicants to Trusts to write better proposals providing the Trust with great project gems to pick from to ensure that funding is directed to well thought through and planned projects to be invested in. In so doing, the project portfolios of the Trusts then become robust as a portfolio of projects that are having impact at scale...rather than just impact.

#### **Workshop Programme**

1. Introduction to the world of fundraising (15 min):
  - a) Funding sources
  - b) Funding strategy
  - c) Impact at scale
  - d) Proposition development
  - e) Applying
2. Workshop Exercise (35 min): We will review a few projects looking at the quality of the projects and why they were successful through Q&A.
3. Reflection (10 min): The workshop will be closed out with a round of reflection and closing comments.

The workshop is open to all participants at the GSSA 2015 Conference.



## Session 10: General poster viewing

### The effect of high density livestock grazing on a mesic grassland in South Africa

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Short duration high density stocking is currently gaining popularity amongst farmers in the South African mesic grasslands, but little is known about its potential impact on these grasslands. The aim of this study was to assess the effect of short duration, high density stocking of cattle on the plant species composition and soil physical and chemical properties of a mesic grassland near Kokstad, KwaZulu-Natal. This study was conducted on a fence line contrast between two properties. One that has been stocked with cattle in a short duration rotational system at a high density (HDG) and the other rotational grazing system at a much lower density (LDG) for >17 years. Veld condition assessment was conducted by means of 100 paired points along the fence to determine plant species composition. Basal cover was calculated using the distance to the nearest tuft and tuft diameter measures. Ten 10 x 10 m paired plots were located along the fence. Soil compaction was measured inside each plot using a dynamic cone. Soil samples were collected from the plots and analysed for chemical properties. The veld condition of HDG (61.6%) was lower than that of LDG (87.8%) because of fewer palatable, grazing sensitive grasses (e.g. *Themeda triandra*, 24% vs 47%) and more increaser II species (e.g. *Eragrostis curvula*, 9% vs 0%) in the former. Basal cover was also markedly lower under HDG (22%) than LDG (33%). Soils were 44.4% more compacted ( $p=0.014$ ) under HDG than LDG, but did not differ in any of their chemical properties (total nitrogen, total carbon, total phosphorus and pH). These results indicate that short duration high density stocking has a negative impact on mesic grassland swards, and an examination of their forb populations will reveal whether HDG is also inimical to plant species diversity.

**Keywords:** mesic grassland, grazing systems, veld condition assessment



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## Vegetation cover is critical for faunal diversity in moist highland grasslands

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The South African highland grassland system is second only to Fynbos in species diversity. In these grasslands fire and grazing interplay at the landscape level, directly influencing biodiversity. Fire and grazing can be managed to influence ecosystem health. Moist highland grassland (MHG) systems in South Africa are naturally maintained by winter and spring fires (naturally every four years or more) and by summer grazing by small migratory herds of small to medium-sized antelope. Currently, the majority of the system is managed by livestock farmers who burn annually at the onset of the rainy season, coinciding with the beginning of the breeding season for grassland-nesting birds and the emergence of arthropods. In order to assess faunal and floral responses we selected eight management treatments for comparison. We collected data describing ten vegetation structural indices; plant species richness and abundance were quantified (for 114 species); >32 000 arthropods were collected and sorted to order level; 160 km of transects were walked to assess bird species abundance (for 127 species); and 404 grassland bird nests of 12 species were located and monitored to completion. Both nest success and nest-site selection are driven by vegetation structure, which itself is driven by habitat management. Nesting success and abundance of Yellow-breasted Pipits *Anthus chloris* suggest that unconserved areas may house sink populations of this regionally and globally Vulnerable species. Overall Field Metabolic Rate and Biodiversity Intactness Index values both confirm the importance of conserved areas (and specifically the availability of vegetation cover) for plants, insects and birds in MHG systems and support the need for further conservation efforts in grassland systems as a whole by both private landowners and reserve managers.

**Keywords:** grasslands, birds, fire, grazing, arthropods, vegetation cover.



## Degraded communal rangelands compromised by alien infestation: Is restoration possible?

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Land degradation in communal landscapes in the grassland biome is notorious, and often attributed to overstocking, lack of knowledge and poor management. Excessive pressure on the herbaceous component leads to the uncontrolled spread of opportunistic invasive alien woody species in these degraded areas, resulting in enormous loss of ecosystem service capacity, along with soil and land productivity. The erosion of landscapes leads to the erosion of livelihood opportunities. Interventions in the upper Umzimvubu catchment near Matatiele, Eastern Cape Province are showing a different understanding of the attributes and opportunities for effective restoration of grassland to improve ecosystem services. The focus is on enabling land users to restore basal cover for effective rainfall infiltration, erosion protection and stock productivity. Livestock production is viewed as an incentive for participation and buy-in by land users, especially in areas cleared of wattle infestation. The experience of a group of NGOs is showing encouraging results for community-based natural resource management initiatives which are set to work beyond the project stage. Community mobilization and packages of appropriate incentives for stock owners are showing tangible results for both landscapes and livelihoods. Cattle and small stock, which were formerly viewed as grassland destroyers through overgrazing, are now being tested as a tool for rangeland restoration through agreed grazing management systems. Managed use of stock for trampling coupled with exclusion and other techniques to catalyse the rejuvenation of natural plant succession in degraded post-alien cleared areas, is suggesting that inputs don't have to be expensive or high-tech. Livestock management may become a viable and essential part of the follow up strategy for management of alien infestation where restored basal cover in the first season provides a niche for local grassland species to recolonize. Managed grazing across the entire landscape may allow for succession and species composition improvement, which can eventually lead to productive natural grassland. This poster presentation provides a practical explanation of the observations from several sites, as well as recommendations for potential replication on a wider scale.

**Keywords:** communal grazing, rotational resting