Grassroots

Newsletter of the Grassland Society of Southern Africa
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Integrating sheep into crop rotations

New project aims to
Give Wildlife a Brake

Fynbos app launched

ELECTRIC VEHICLES
for wilderness conservation

Advancing Rangeland Ecology and Pasture Management in Southern Africa

IN THIS ISSUE

FROM THE EDITOR

Welcome to the fourth and final edition of Grassroots for 2018. As usual, this publication contains a variety of news articles and a feature article by Chloe Maclaren, one of our members who is currently completing her PhD. Chloe introduces us to a method of integrating sheep into crop rotations – this aids in managing weeds which can save money and protect the environment.

Some of the interesting local news issues covered in this edition include those from Paul Gordijn and Tim O'Connor (SAEON) who have been looking at vegetation change in the Cathedral Peak grasslands and the response to different fire treatments. Wendy Collinson (EWT) introduces the new Brake4Wildlife project to try to reduce roadkill in protected areas, while Erik Verreyne explains the process of mapping the vegetation of Orapa Game Park. More on the global news front, we have a summary of Cromsigt et al's paper on the use of large mammals for a better climate and Jack Durrell has created an awareness on the potential of Africa's rangelands through his recently published article.

As the year draws to an end, the editorial team would like to thank all who have contributed to Grassroots throughout the year and would like to encourage all readers to send articles (both news and feature) to Grassroots in the new year.

Finally, we wish all our readers safe travels, a happy festive season and all the best for a great new year.

Happy reading!

Janet

7 *things to look forward to in this issue:*

- How integrating sheep into crop rotations can save money
- Using electrical vehicles for wilderness conservation
- How ecologists put Orapa vegetation on the map
- Satellite photos show how alien trees are being wiped out
- Realizing the potential of Africa's rangelands
- Fynbos app launched to manage your natural veld
- Floating wetlands: creating habitat and cleaning water

Update on International Year on Rangelands and Pastoralism

Maryam Niamir-Fuller

Vice Chair International Support Group for IYRP
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Dear Colleagues

The Government of Mongolia has stepped up to take leadership in proposing an International Year on Rangelands and Pastoralism (IYRP) at the recent Committee of Agriculture (COAG) of FAO in Rome in October 2018. The COAG subsequently decided to put the issue for formal review/approval at their next meeting in October 2020. The likely date for an IYRP is 2028, but there might be a chance for 2026.

We are pleased that the IYRP is now formally in the UN process. But there is much to do between now and 2020. Most importantly being that the leadership shown by Mongolia now needs to be supported by other countries, partners and civil society, so that, by the time the issue is debated at COAG 2020, it can be approved seamlessly.

Furthermore, COAG rules require that Governments supporting such an IY should provide evidence of budgetary support. While the COAG debate is two years away, in fact there is only about 1.5 years left for all of us to find ways to ensure that governments are ready to support this initiative (because the Mongolian proposal and all other expressions of support should be submitted months before the actual meeting).

With Mongolia now a formally leading country, it is time that we consider restructuring our "international steering committee". Perhaps a more apt title for our partnership would be an "international support group". On behalf of this group, Jim has now sent to the Minister of Food, Agriculture and Light Industry of Mongolia a letter to assure him of our continued support and to seek guidance on how best we can exercise that.

We have also contacted FAO to seek their guidance on how our international partnership can be of help, and to give clarity on next steps in the formal process. It would be good if through your own networks you could contact the different countries and organizations that have shown interest, in order to update them on the steps taken by Mongolia and the progress within the FAO process. Once we hear back from Mongolia and FAO, we can offer more clarity on the next steps.

Also, we should continue to raise awareness as we have done in the past, during upcoming events. In particular, I would like to know who intends to attend the UNEA conference in Nairobi on 11–15 March 2019.

The main theme will be innovative solutions for environmental challenges, and sustainable consumption and production (very close to our themes). It would be good to find a way to raise awareness on the IYRP at UNEA – whether through side events, or through other means.

Do let us know if there are other events coming up that you intend to participate in, and the possibility of raising the profile of the IYRP.

We look forward to hearing from you

Dr. Maryam Niamir-Fuller

11-15 March 2019

Fourth Session of the UN Environment Assembly (UNEA-4)
Location: Nairobi, Kenya
For more information: http://bit.ly/2P7IXK9

2020

Joint International Grassland-International Rangeland Congress to be held in Nairobi in 2020. Information is available here: http://bit.ly/2NY3CQR

22 - 27 Sept 2019

8th World Conference on Ecological Restoration to be held in Cape Town, South Africa. Visit https://ser2019.org/ for more details.

RESTORING LAND, WATER & COMMUNITY RESILIENCE
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UPCOMING EVENTS

28 - 29 Nov 2018

Smart Farming/Precision Agriculture conference. Radisson Blue Le Vendome, Cape Town. Cost: R5,748.85. Contact Ryan on 073 946 9796

10 - 14 Feb 2019

Society for Range Management Annual Meeting Gateway to the Prairie. Minneapolis, Minnesota Visit http://bit.ly/2ONEBYg for more details

3 - 8 March 2019

International Savanna Science Network Meeting. See webpage for more details www.savannascience.com

10 - 15 March 2019

African Conference for Linear Infrastructure and Ecology. Centred on the theme 'Building Partnerships and Investing in Nature: the Linear Way in Africa. For more details, contact Wendy Collinson: wendyc@ewt.org.za

ACLIE
African Conference for Linear Infrastructure & Ecology

If you would like to advertise your upcoming event, please contact us and we will include it in our next edition.

Delegates came together for biodiversity and agriculture at the GSSA congress

SANBI's session on rangeland stewardship in communal farming landscapes: 22-27 July 2018

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The annual congress of the Grassland Society of Southern Africa (GSSA) continues to be a suitable alternative space for engaging the agriculture sector. The 53rd congress was no different - becoming one of the few to formally bring together biodiversity and agriculture sectors through various facilitated parallel sessions. These sessions were part of the ongoing engagement process between the two sectors and included recommendations on how to improve relationships, harnessing of opportunities and addressing challenges biodiversity and agriculture face. These include alignment of methodologies that the two sectors use as part of sustainable natural resource management. These sessions were attended by important stakeholders from government, academia, and private and civil society organisations.

The first session explored innovative models for rangeland stewardship in communal farming landscapes. This included funding opportunities and models that various partnership projects are using to encourage better management of communal rangelands. Amongst others, the session received an inspirational story about a rangeland stewardship model which was shared by Ms Nicky McLeod of the uMzimvubu Catchment Partnership Programme. This model is based on application of tested methodologies for restoration of degraded rangelands and building up of capable governance systems. The model creates an enabling environment for introduction of sustainable practices for rangeland management that guarantee water security, food and are resilient to climate change. The model also supports farming of healthy livestock, which is a minimum requirement for market access which would generate revenue for rural farmers who are participating in this model.

The second session looked at ways of refining the understanding of the concept of ecological infrastructure within the agriculture sector context. Ecological infrastructure refers to the naturally functioning ecosystems that deliver valuable services to the people. This includes wetlands and mountain catchments, amongst others. This took a historical account of how the concept was introduced in South Africa and how it relates to the agriculture sector. This session included stories of how maintenance and restoration of ecological infrastructure sustained the provision of water and forage as well as how it maintains fertile soil and food production while improving livelihood of the local people through job creation. The session also acknowledged the social learning process which is an important participatory approach and encourages taking everyone along in the practice if meaningful response is to be received. The process is particularly important when working with stakeholders from various backgrounds driven by different goals or interest with limited resources and time.

Figure 1: Delegates at the GSSA.

In addition to this, the South African National Biodiversity Institute (SANBI) delegation took a moment to introduce the Ecological Infrastructure for Water Security Project. This is a $7.2 million project, funded by the Global Environment Facility and aims to integrate biodiversity and ecosystem services into planning, finance and development in the water sector to improve water security. This development will be implemented through partnerships with the relevant spheres of government, civil society, academic institutions and the public. This Project, although using water as an entry point, will benefit the agriculture sector, which is one of the biggest users of water in South Africa, according to the published draft version of the Water and Sanitation Master Plan.

As part of the congress field trips, SANBI organised a tour to the Colbyn Wetland to demonstrate the value of restoring and maintenance of the wetlands and the benefits that flows from it. The wetland plays a crucial role in the water provision for Roodeplaat Dam which supplies water for both human consumption and agriculture in and around Pretoria.

The parallel sessions were proudly supported by SANBI, Endangered Wildlife Trust, Environmental & Rural Solutions, Conservation South Africa, Water Research Commission and the Department of Agriculture, Forestry and Fisheries.

For more information on Ecological Infrastructure programme of work, please contact Mahlodi Tau at m.tau@sanbi.org.za or Dan'sile Cindi at d.cindi@sanbi.org.za and for general inquiries about the story please contact Kennedy Nemutamvuni at k.nemutamvuni@sanbi.org.za.

Integrating sheep into crop rotations can suppress weeds, save money, and protect the environment

Chloe Maclaren

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Integrating sheep into diverse crop rotations is an effective way to manage weeds in conservation agriculture systems, according to recent findings from a long-term trial at Langgewens Research Farm. The trial compared the weed seedbank in eight different crop rotation systems over twelve years, with four systems including legume forage crops grazed by sheep, and four systems containing only cash crops and/or cover crops. The systems containing sheep not only had fewer weed seeds present in the soil, but also used substantially less herbicide and fertiliser than crop-only systems. This indicates that integrating sheep into cropping systems can reduce farm expenses and contribute to environmental protection. Crop diversity in these rotation systems was shown to further improve performance: a higher number of crop types further reduced weed numbers and also promoted higher wheat yields.

Weed management can be a challenge under conservation agriculture due to the loss of tillage as an option to control weeds. With few alternatives available, farmers often become reliant on herbicides. Within a few years, weeds that are tolerant of or resistant to herbicides tend to flourish. In winter cereal crops of the Western Cape, the most problematic weed in this regard is ryegrass. Even the use of multiple herbicides does not always prevent the spread of ryegrass, as ryegrass is well adapted to tolerate herbicides in general. It has a waxy leaf surface that reduces the amount of herbicide that penetrates into the plant, and it also has a variable germination time that allows it to avoid pre-plant herbicide applications. Different species of ryegrass also readily hybridise with one another, and this genetic mixing allows herbicide resistance to rapidly evolve and spread.

Ryegrass is an example that highlights the need for a diversity of tools in weed management that each affect weeds in different ways. In the Langgewens study, rotation systems with a combination of grazing, herbicides and high crop diversity had the fewest weeds. These systems also had the highest diversity of weeds, which can be important to support farmland wildlife (and to add a scatter of colourful flowers to a farm!). A low number of weeds and high weed diversity indicates that the pressures faced by weeds differ each year. Differing impacts from herbicides, crop rotation, fertilisers and livestock reduce the chances that any single weed species encounters favourable conditions to increase its population each year, and so weed numbers are limited. In addition, different impacts also reduce the chance that any species will be knocked back enough each year to become extinct within the farm. Therefore, using different weed management tactics means a diversity of weeds can be maintained at low populations: beneficial to wildlife and with minimal impact on crops.

It is important to note however that crop and management diversity *between years* is more important than diversity *within years* for weed management. For example, many studies have shown that using tillage and herbicides together is often not more effective than using herbicides alone. Ryegrass has shown us that using mixtures of different herbicides can delay resistance for a while, but not forever: it is harder to resist two active ingredients at once, but consistent selection to do so will eventually promote this ability. In contrast, studies where management varies between years have shown much better weed control – such as in the Langgewens study, in systems where high herbicide cash crop years alternate with low herbicide use and grazing. This effect is not limited to conservation agriculture nor to field crop systems. Similar results would be expected for organic farmers alternating tillage and grazing, and alternating vineyard and orchard floor management practices should also lead to better weed management in those systems.

In the Langgewens trial, ryegrass as well as knotweed increased in cash crop phases and reached very high numbers in the seedbanks of crop-only systems. However, both of these species are palatable to sheep and were reduced in the grazing systems. To fully embrace this effect, farmers could view ryegrass and knotweed as forage species promoted by their cash crops, to be exploited during forage phases. Meanwhile, the forage phases are an important tool to manage weeds, whilst also offering economic benefits through reducing herbicide and fertiliser requirements, and diversifying farm products. The lower use of herbicides and fertilisers in the grazed systems also reduces pollution and reduces health risks to farmers and their staff.

Overall, integrating sheep into field cropping systems seems to be a win-win solution for farmers and the environment. However, not everyone can or wants to farm livestock. In that case, crop diversity can still improve weed

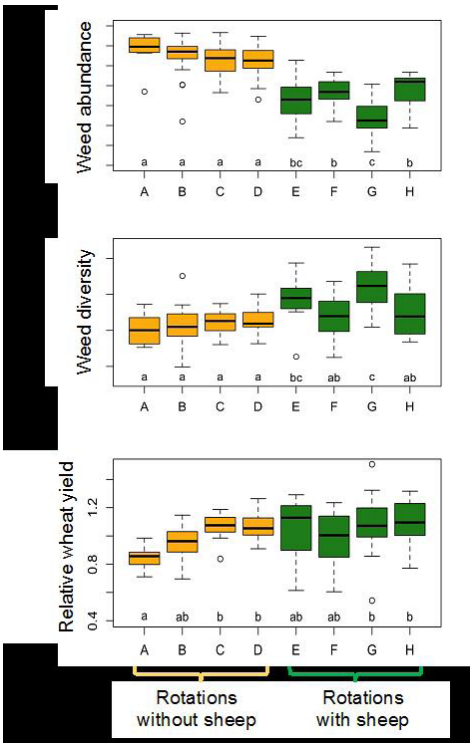

Figure 1: Weed seedbank abundance, diversity and wheat yield in different crop rotations of the Langgewens Long - Term Trial.

Weed abundance and diversity is plotted on a logarithmic scale so units are not shown, but average weed seed density across the twelve years in system A was 151 germinable seeds per square metre in the top 5 cm of soil, and in system G it was less than 5 germinable seeds per square metre.

In terms of diversity, system A was overwhelming dominated by ryegrass (*Lolium spp.*) and knotweed (*Polygonum aviculare*), whilst in systems E - H, gousblom (*Arcotheca calendula*), gansogie (*Cotula spp.*) and turknaal (*Erodium moschatum*) were commonly observed in low numbers. Wheat yield is shown as proportional to the average yield in each year. Throughout the twelve years of this trial, the average yield across all wheat plots was 3721 kg/ha.

The crop rotations in each of the systems are as follows:

A – Wheat - Wheat - Wheat - Wheat
B – Wheat - Wheat - Wheat - Canola
C – Wheat - Canola - Wheat - Lupins
D – Wheat - Wheat - Lupins - Canola
E – Wheat - Medic(*) - Wheat - Medic(*)
F – Wheat - Medic/clover(*) - Wheat - Medic/clover(*)
G – Medic(*) - Wheat - Medic(*) - Canola
H – Wheat - Medic/clover(*) - Wheat - Medic/clover(*)

Crops marked (*) are grazed. Medic/clover = a mix of medic and clover species. System H differs from system F in that sheep are kept aside in separate pastures to graze old man saltbush until the medics are mature.

suppression through changing the competitive pressures experience by weeds each year. Growing forage crops that are cut and baled for hay may play a similar role to grazing by increasing the diversity of management actions between years. i.e. mowing and herbicides, rather than grazing and herbicides. A trial on this is also currently underway at Langgewens. The authors of this article imagine that it may also be possible for livestock and crop farming neighbours to come to mutually beneficial arrangements where crop farmers borrow sheep for weed management in exchange for supplying forage to sheep farmers.

This study was conducted using weed seedbank samples collected from the Langgewens Long-Term Research Trial, and was a collaboration between the Western Cape Department of Agriculture, Stellenbosch University, as well as Coventry University and Rothamsted Research in the UK.

The research was led by Chloe MacLaren, a PhD student at Coventry University, and supported by Drs. Johann Strauss, Pieter Swanepoel, Jonathan Storkey and Katharina Dehnen-Schmutz.

Figure 2: Sheep graze a medic pasture in the Langgewens Long-Term Trial.

Electric vehicles for wilderness conservation and sustainable game viewing

Carolin Giarra

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South Africa currently faces the challenge of managing its rich biodiversity, whilst facing the threat of increased environmental degradation. The threats are varied, complex and multi-faceted, with climate change probably one of the most dangerous.

As a result of climate change, temperatures have rapidly increased within the Kruger National Park region, which experienced the worst drought season recorded in 2016. Rising temperatures of between 2.5 and 3 degrees Celsius could lead to an approximate loss of 66% of all animal species in the Kruger National Park.

National parks are not able to prevent this phenomenon from happening, and therefore the implementation of mitigation and adaptation strategies is crucial. The field guides and trackers who are working in the environment and with the game viewing product every day are at the frontline of implementing suitable mitigation and adaptation strategies. The work of a field guide has become more diverse and complex overtime, as they have to face new challenges each day and lead the way in conserving South Africa's natural wonders – from battling wildfires and poachers, to playing an important role in rehabilitation of land and habitats, and acting as an educational force in wildlife conservation.

The change in temperature has a significant influence on the behaviour and activity of animals. Generally, it can be said that animal activity is higher during the cooler times of the day as the majority of animals prefer to hide during the heat. This heat factor also impacts on tourism operations, with game viewing mostly occurring during the cooler times of day.

Field guides already adjust the times and lengths of the game drive on a daily basis to cope with changes in temperatures and seasonality. Not only to ensure a more engaging game viewing environment as animal activity will be greater, but also to ensure guest comfort. They further adapt to changes in the environment by restricting the accessibility of certain areas or roads in times of temperature change as the ground, soil and the vegetation is affected. These are all efficient responses to adapt to changes, however field guides should consider campaigning for more future-oriented solutions.

The world has seen a lot of technological development focused on making operations more sustainable. A lot of research is dedicated to the possible use of hybrid or electric vehicles for game drives. This development would bring a number of environmental benefits, ranging from the positive effects on the carbon footprint as vehicle emissions will be reduced, to the positive effect of no engine noise during a drive.

An average car emits 280 % more carbon per mile than an electric vehicle, even if the electric vehicle is charged with electricity that was generated mostly using coal. An electric car charged with renewable energy emits zero carbon per mile. This will have a great impact on a region which already faces a diminished volume of greenhouse gas emissions and would also positively affect the sensitive environment within the conservation areas.

A number of interviewed field guides share the opinion that the technological development is not yet feasible. A game viewing vehicle is required to reach a certain transport distance and at the same time also provide the same 4×4 experience. The field guides mentioned a required distance of up to 100 kilometres per viewing, requiring technology to provide for these demands.

Figure 1: © Mats Ingelborn

Figure 2: © Carolin Giarra

Additional concerns were brought forward regarding the effect of no engine noise. The field guides insist that it would be a positive feature of the game viewing experience as it would reduce the noise pollution caused whilst on drive, which can reduce the serenity of the game reserves. But it would unfortunately also remove the 'alarming' factor of a game vehicle. With no noise coming from the vehicle, animals will not be aware of a vehicle approaching and the sudden intrusion could, according to the field guides, give the animals reason to behave in an aggressive, protective and defensive manner. These opinions contradict each other vastly in how game viewing should be conducted. Nevertheless, electric vehicles are an attractive alternative, specifically for tourism within protected areas.

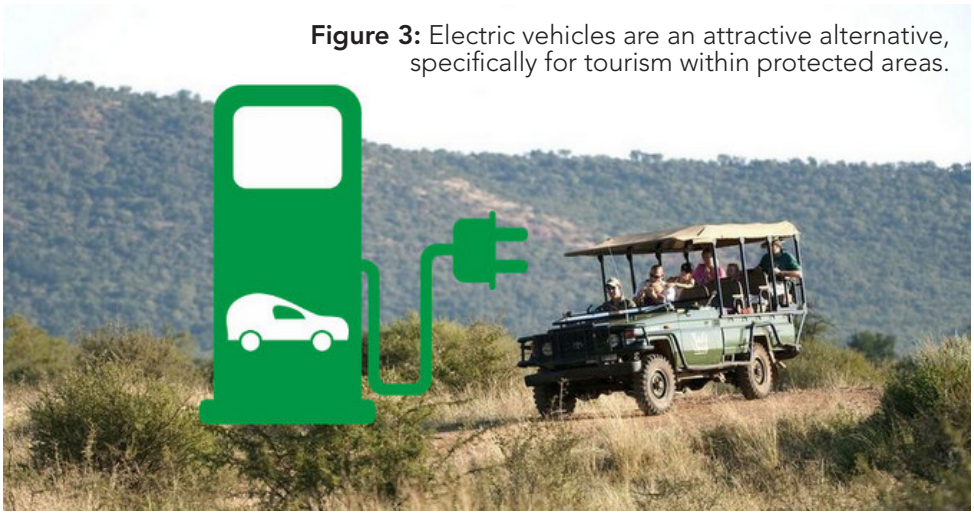

Figure 3: Electric vehicles are an attractive alternative, specifically for tourism within protected areas.

It is no question that climate change is the greatest challenge of our time, and also threatens the steadily growing safari industry in South Africa. Field guides should campaign and create an increased demand for hybrid or electric game viewing vehicles, and push to raise awareness that this development is needed and can be tested in a real-life environment.

Every small step counts and the field guides, trackers and everyone else working in the growing safari industry in South Africa should campaign for more efficient and sustainable development.

More about the article

This article was written based on Carolin's thesis, "*The impact of rising temperatures on the game viewing product: A case study on a private game reserve in the Kruger National Park*".

The aim of her study was to explore possible adaptation and mitigation strategies to manage the impact of rising temperatures on the game viewing product in the Kruger National Park region.

The essential part of her study was to interview experts in the field – namely field guides as well as trackers. The goal was to find out what kind of ideas they had and what they thought were practical solutions.

The article is based on some of the points raised in her research, with a large part of the discussion focusing on electric-powered game viewing vehicles.

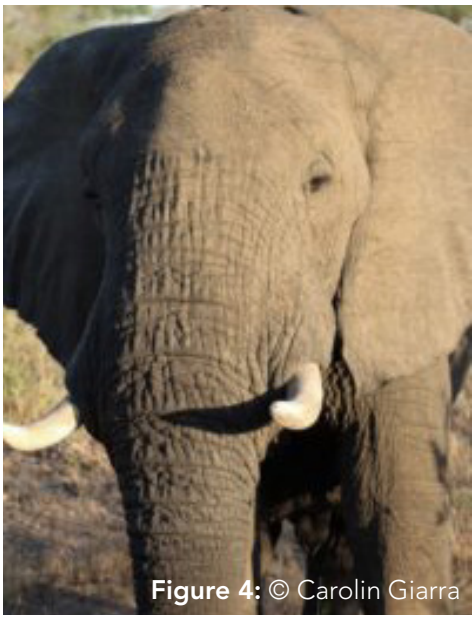

Figure 4: © Carolin Giarra

How ecologists put Orapa vegetation on the map

Erik Verreynne, from Oxbow Investments, reports on how two teams of ecologists undertook the vegetation community classification in Orapa Game Park

Erik Verreynne

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Reprinted From: http://bit.ly/2S0KWBQ

The perimeter fence of the northern extension of the Orapa Game Park has been completed, allowing the vegetation to recover after a few years of erratic rainfall and heavy livestock grazing pressure. Following the revision of the plant community classification and veld condition assessment of the park and buffer zones in 2014, the fieldwork of the vegetation community classification for the northern extension was completed in May 2017.

Two teams of ecologists have spent weeks in the park and the park extension over the past 12 months. They got stuck in mud during thunderstorms, spent hours in the relentless summer sun and walked kilometres every day to reach the outlying points. They needed to avoid small groups of elephants and solitary lions that had recently moved into the area, and endure mosquito and tick bites, as well as bashing their way through thorny thickets. However, the beautiful landscape changing moods every day, crimson sunsets and the starry expanse at night made the fieldwork an enjoyable experience.

In the absence of detailed soil analyses or previous vegetation community assessments for the extension area, recent satellite imagery was used with Normalised Difference Vegetation Index (NDVI) software to differentiate and identify vegetation types within each rangeland type. Based on the NDVI images, 106 plots were identified and surveyed by the teams in May 2017. The landscape in the extension features a sand dune, two large pan systems with one a large calcrete saline pan similar to the pans in the Makgadikgadi system, and a third pan system consisting of small pans with vertic floors fringed by large knobthorn and leadwood trees, towering termitaria and a marula forest.

The fieldwork resulted in a vegetation map classifying the vegetation communities into three main and six sub-communities. It further resulted in a comprehensive catalogue of plants occurring in the area, recording among others five *Grewia* species, five *Commiphora* species, three *Terminalia* species, three *Combretum* species, 11 *Acacia* species, a *Gardenia* species, two *Albizia* species, and a large variety of grasses, shrubs and forbs.

Figure 1: A magnificent sunset over the salt pan

Figure 2: An unusual Marula forest in the Orapa Game Park northern extension

Earlier this year, the teams consolidated the vegetation maps of the northern extension and Orapa Game Park into one map, merging the different plant communities and allowing the extended park to be managed as a unit.

This was followed by a veld condition assessment of the total unit in April. The teams of ecologists visited 114 plots over the entire park to assess both the woody component (trees and bushes) and the grass sward.

The information collected was processed into management information that will be used to determine the browsing and grazing potentials, tree densities and phytomass, erosion potential, grazing capacity, optimal stocking rates, and fire management requirements of each management unit.

The survey showed the severe impact of the erratic rainfall since 2014 coupled with the protection of a significant population of white rhinos.

The vegetation information paved the way for the utilisation of the northern extension to relieve the pressure on the original Orapa Game Park. This will result in the optimal use of the extended Orapa Game Park as a unit.

Investigating long-term (>35 year) woody vegetation change around watering points in the Kalahari Gemsbok National Park

Dr Helga van der Merwe (SAEON) and Dr Hugo Bezuidenhout (SANParks)

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Reprinted From: http://bit.ly/2zgR8yo

From 1978 onwards, numerous surveys have been conducted in the Kalahari Gemsbok National Park to gain insight into the medium- and long-term changes in the vegetation, in particular within the piosphere surrounding artificial watering points.

The hypothesis is that provision of artificial watering points generally promotes heavy concentrations of wildlife around the watering point, resulting in the degradation of herbaceous vegetation and bush densification.

Woody species most commonly associated with bush densification in the Kalahari environment are *Senegalia mellifera* (*Acacia mellifera*), *Rhigozum trichotomum* and *Grewia flava*. *Vachellia erioloba* (*Acacia erioloba*) is also often mentioned as a plant species that could densify in this region.

Artificial watering points have been provided in the Kalahari Gemsbok National Park since the 1930s and the long-term impact of these watering points on the vegetation is unknown for such a large conservation area (9 600 km²).

Investigating changes in the vegetation

This study aimed to establish whether densification in the park occurred over time at the Dankbaar artificial watering point, opened in 1959, compared to two sites about 5 km from the watering point. Additionally, change in woody species composition and density was investigated to determine whether any directional trends were evident after nearly four decades.

The study found that regardless of distance from the watering point, the density of large *Vachellia erioloba* and *Vachellia luederitzii* (*Acacia luederitzii*) individuals decreased with successive surveys. This long-term study over more than 35 years shows that no evidence of bush densification was found at the artificial watering point for any of the species known to densify in the southern Kalahari.

Vegetation dynamics in this large conservation area therefore differ from those found in agricultural landscapes, where bush densification is common. Additionally, it was determined that after nearly four decades, woody vegetation composition showed only a slight directional trend at one site away from the watering point.

Good collaboration

Figure 1: Piosphere (area denuded of vegetation) around an artificial watering point in the Kalahari Gemsbok National Park (Photo: Helga van der Merwe)

The good collaboration between SANParks and SAEON has enabled the renewal of existing datasets, allowing for the analysis and interpretation of data to better understand vegetation dynamics in the Kalahari environment.

Figure 2: Undisturbed Kalahari vegetation away from an artificial watering point (Photo: Helga van der Merwe)

Biodiversity standard boosts NGOs

The standard sets out global criteria for the identification of key biodiversity areas

Heather Dugmore

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The recent adoption of the key biodiversity areas standard is a major breakthrough for global conservation. It has brought together 12 of the largest conservation nongovernmental organisations (NGOs) worldwide to identify the most important sites for conserving biodiversity while it is rapidly declining. The standard sets out global criteria for the identification of key biodiversity areas — places all around the world where all living organisms in all ecosystems are protected.

"This is the first time the conservation community has come together to develop a set of agreed-upon, standardised criteria to identify sites of global importance for biodiversity," says Daniel Marnewick, manager of the important bird biodiversity areas programme at BirdLife SA.

"Establishing a single measurable for all taxa [taxonomic groups] and ecosystems to identify the most important sites naturally required lengthy negotiation and participation worldwide, but it is the right way to go as it makes it so much easier for policymakers, decision-makers and spatial planners to identify which are the most important sites to conserve."

WWF, the International Union for Conservation of Nature (IUCN), Birdlife International and Conservation International were among the NGOs that signed the key biodiversity areas agreement in September 2016 at the IUCN World Conservation Congress.

Within the next two months Marnewick, in partnership with the SA National Biodiversity Institute and the newly established key biodiversity areas national co-ordination group, will work with a conservation planner to start reassessing and proposing SA's comprehensive list of areas to the agreement's secretariat in Cambridge, UK.

"We will be one of the first countries worldwide to do a complete national assessment of our key biodiversity areas," says Marnewick.

The WWF Nedbank Green Trust is funding his work and playing a regional support role in Africa. The reassessment is co-funded by the SA National Biodiversity Institute.

"The mountain fynbos in the Western Cape is a good example of where we expect to identify many key biodiversity areas, as it has so many threatened and endemic species," says Marnewick.

Another one is the remaining patches of mistbelt grasslands in KwaZulu-Natal, which have been severely fragmented.

These key grasslands form part of SA's strategic water source areas and are home to several threatened species such as the blue swallow and oribi.

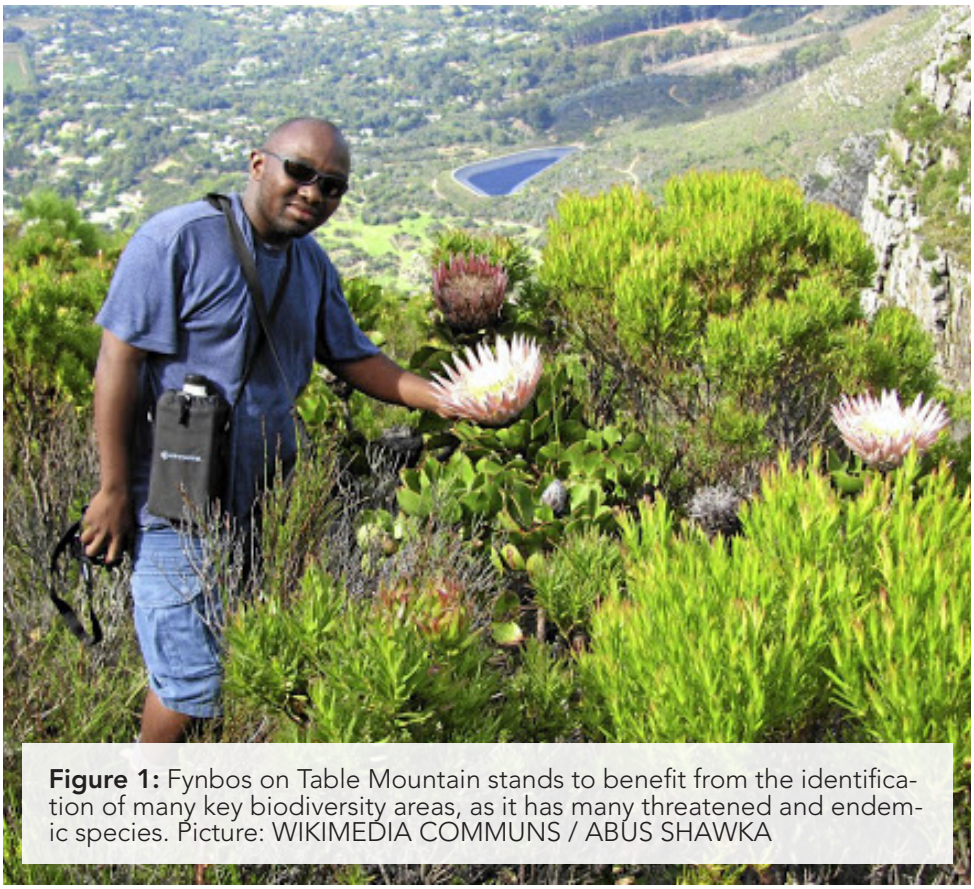


Figure 1: Fynbos on Table Mountain stands to benefit from the identification of many key biodiversity areas, as it has many threatened and endemic species. Picture: WIKIMEDIA COMMUNS / ABUS SHAWKA

SA is working with four African countries to identify red-listed species and ecosystems

The key areas will be identified and proposed by local experts, and driven by national co-ordination groups consisting of scientists, conservation and spatial planning experts, NGOs and government departments and institutes.

As advanced conservation and spatial planning programmes do not exist in many other African countries, key areas

that could qualify have not been identified.

"SA is working with four African countries to identify red-listed species and ecosystems, which they can then use to identify their key biodiversity areas," Marnewick says. "Part of the objective is also to work with local NGOs and experts in these countries to develop the local human capacity and skills to identify and manage these areas."

Marnewick says there are about 15,000 such areas globally, including important bird and biodiversity areas, zero-extinction sites, and key biodiversity areas identified under an older set of criteria. The network will be expanded for other taxa and ecosystems across terrestrial, marine and freshwater habitats.

SA needs a robust network of key biodiversity areas, as pressure on its natural resources is immense from development for humans and the escalating threats of mining.

"How well the country's biodiversity will be protected will be the measure by which the rest of the world assesses our success, as it will be the case study for other countries that are signatories to the Convention on Biological Diversity," says Marnewick.

"A robust network of key biodiversity areas gives us traction to lobby for the protection of these sites on a global scale and to be able to apply for support from global funders who require that initiatives they support subscribe to the standard.

"Such funders include the Global Environmental Facility and the Critical Ecosystem Partnership Fund.

"Key biodiversity areas are a global indicator for where countries should place their protected areas and conservation areas. If countries can begin protecting the most important biodiversity areas globally, this process has the ability to start tipping the scales away from species decline."

Amazing satellite photos show how alien trees are being wiped out in Cape Town

Jay Caboz

Reprinted From: http://bit.ly/2ToWvEr

Using satellite images, Glenn Moncrieff, a data scientist at the South African Environmental Observation Network (SAEON), captured this mind-blowing 10-year transformation as alien trees were removed to make way for critically endangered sand fynbos.

The images come from project Fynbos Node, which monitors fynbos rehabilitation in the Western Cape.

The Cape Floral Region, one of six declared floral kingdoms in the world, contains almost 9,000 plant species, and of these, two-thirds are found nowhere else.

See also: This map of South Africa's rivers is captivating – and now its creator is trying to figure out why: http://bit.ly/2TIcao6

Using a programme called Planet, Moncrieff can access satellite imagery going as far back as 2009 to give scientists reliable long- term data for their research. "Planet's satellite data has a great way of helping people visualise the impact of humans on the environment. It goes deeper for scientists. The satellites capture information we can't see, like infrared, which as a scientist can help us tell how healthily a forest is, or unhealthy," he says.

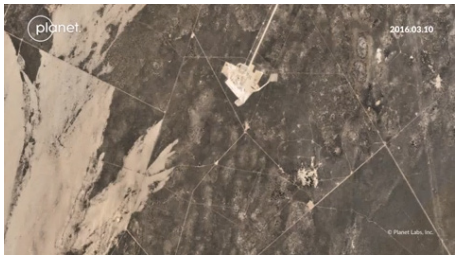
SAEON is a body established by the Department of Science and Technology to conduct long-term observation and promote an informed and timely response to global change.

"Science has been grappling for years with translating information into something the public can relate to," says Moncrieff. But now we have the tools to get people interested in our work.

Once you have the interest, you can get people to start listening to the insights, and then get people to know about your research. That's what we are trying to do here."

Here are some more incredible environmental transformations Moncrieff has captured:

The Elandsfontein phosphate mine next door to the West Coast National Park, within a critical biodiversity area: https://gph.is/2Q1VMKf



Mining has stalled since 2017 following a court challenge. The mine hopes to restart operations in 2019.

Dune forest clearing, near Richards Bay, for titanium mining: https://gph.is/2PznPl3

Richards Bay Minerals (RBM) clears dune forests to mine titanium in a global biodiversity hotspot. While intensive restoration of deforested areas is undertaken, many species will never return.

The Kareedam, which supplies Calvinia, running dry and filling up again: https://gph.is/2RX9Q5i

Two years of illegal sand mining on the banks of the Umgeni River, KwaZulu-Natal: https://gph.is/2FrW3SC

Communities downstream face increasing flood risk due to the removal of sand. Hundreds of these mines can be spotted along rivers in rural KZN.

The evolution of the MeerKAT satellite project in the Karoo: https://gph.is/2PAsLG8

The MeerKAT is a precursor to the Square Kilometre Array (SKA).

Large mammals for a better climate

Joris Cromsigt

E-mail Address: j.p.g.m.cromsigt@uu.nl
Reprinted From: http://bit.ly/2KeO8qM

Restoring populations of large mammals in the wild does not only revitalise the flora and fauna. It can also help in mitigating climate change, for example by increasing the capture of carbon by ecosystems. This is the conclusion of ecologists representing several universities, including Utrecht University, in a synthesis of existing studies. The researchers published their results in *Philosophical Transactions of the Royal Society B*.

During the first half of the twentieth century, the number of wildebeest in the Serengeti plummeted to an all-time low as a result of widespread rinderpest. From 1960 the wildebeest population began to increase once more, and their grazing and trampling led to increased soil productivity and a reduced incidence of savanna wildfires.

An American study showed that the effect of this was so strong that the return of the wildebeest resulted in the area turning into a CO_2 sink. Where the vast plains had once been a source of CO_2 emissions, the area now absorbs more CO_2 than it emits, so much so that it offsets a great deal of East Africa's annual fossil fuel carbon emissions.

Restoration of mammal populations

The loss of historical megafauna – mammals weighing more than 40 kg – is being increasingly connected with large-scale changes in how the Earth functions. 'Rewilding' is the restoration of ecological functions in an area by reintroducing recently lost or restoring strongly reduced populations of these large mammals.

In this synthesis, ecologists from Utrecht University, the Swedish University of Agricultural Sciences (SLU), Nelson Mandela University and the University of New Mexico present several strong examples that show a positive connection between rewilding and climate change mitigation, such as the capture of large amounts of CO_2 by ecosystems.

Large animals disperse large seeds

"Another striking example is the role of megafauna in the dispersal of seeds from tropical hardwoods", explains Associate Prof Joris Cromsigt, ecologist at Utrecht University and SLU and first author of the publication. "The harder the wood of a tree, the more carbon the tree captures. But the harder the wood, the larger the seed, and the greater the tree's dependence on megafauna for seed dispersal. Recent research shows that the loss of large mammals could be responsible for a 10% reduction in carbon capture in tropical forests in certain parts of the world. The restoration and conservation of tropical forests is one of the frequently mentioned strategies for combating global warming, and it seems that rewilding of the tropical forests can significantly increase the effectiveness of this restoration."

Reindeer counteract thawing of permafrost

Cromsigt mentions a third example: "In the northern latitudes a great deal of carbon is stored in permafrost. Under global warming the permafrost is thawing, which releases a substantial amount of greenhouse gases.

One of the effects of warming is that shrubs are increasingly encroaching on the tundra, and these darker shrubs absorb more solar heat than grass, which is leading to accelerated thawing of the permafrost and more warming.

Northern megafauna, such as the reindeer, musk ox and Przewalski's horse can inhibit this shrubification of the tundra. So reintroducing these mammals here can also contribute to fighting global warming."

Figure 1: Grazing wildebeest on the Serengeti Savannah

Publication

Trophic rewilding as a climate change mitigation strategy?

Joris P. G. M. Cromsigt*, Mariska te Beest*, Graham I. H. Kerley, Marietjie Landman, Elizabeth le Roux, Felisa A. Smith

Philosophical Transactions of the Royal Society B, 2018 * from Utrecht University

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Solutions for the Growing World

Realizing the potential of Africa's rangelands

Jack Durrell

Reprinted From: http://bit.ly/2KbxCaX

NAIROBI (Lansdcape News) — Rangelands cover some 43 percent of Africa's land area – approximately 5.1 million square miles. These vast shrub and grass lands are an important source of income for local pastoral communities and play a critical role in climate change mitigation as carbon sinks.

However, they are being degraded at a rapid rate and are host to rising conflicts, which put pastoralists against agriculture, mining, and other extractive industries. The result: instability, increasing poverty and more degradation.

The solution is an integrated landscape approach to rangeland management that brings together multiple stakeholders to balance competing needs and interests and implement sustainable management strategies.

Implementing integrated approaches

But, awareness of integrated landscape approaches in Africa remains limited. How to reverse this was the subject of a side-event held at the Global Landscapes Forum (GLF) Nairobi 2018 – an initiative to connect, learn about, and share successful restoration stories in Africa in an effort to foster political and community commitments to land rehabilitation.

The event – "Bringing Rangelands into the Sustainable Landscapes Agenda" – shared successes from Africa and beyond to provide a framework and lessons learned that could inspire similar initiatives across the continent.

The examples offered informative insights into participatory approaches that placed local communities and pastoralists at the very center of decision-making and program design. "Participatory approaches enable pastoralists to become custodians of rangelands," argued Stewart Maginnis of Nature-based Solutions at the International Union for Conservation of Nature (IUCN). "They recognize their rights, empower their agency, and strengthen their voice."

Initiatives in Mongolia and Iran, for instance, involved pastoral communities in the definition of challenges, rangeland boundaries, and solutions. They also established local and national pastoralist institutions to support effective dialogues with government agencies and other stakeholders. In Kenya and Tanzania, pastoralists contributed to the development of zonal grazing systems, and in the latter, pastoralists also led the development of village-based land use plans.

Addressing knowledge gaps

As African countries seek to learn from these initiatives, however, and shift from sectoral to multi-sectoral and integrated approaches, they will encounter a significant obstacle: the lack of reliable evidence to scale-up successes.

While there have been some recent efforts to raise the importance of rangelands and their restoration – most notably by Kenya and Uganda who have pushed for an International Year of Rangelands at the U.N. level – the challenges facing these marginal areas continue to be neglected in policy and research forums.

This was largely attributed to the fact that rangelands are home to mostly poor and marginalized populations, but it means that degradation will continue, and the economic and climate change mitigation potential of these vast lands will remain unrealized.

There continues to be insufficient information on the technical support and strategies needed to reverse degradation in rangeland areas. "What we have at the minute, generally around land use and particularly around rangeland management, is piecemeal information," Maginnis complained. "And with piecemeal information we can only have disjointed solutions."

However, there are encouraging moves to address this knowledge gap. Abdelkader Bensader, programme management officer at UN Environment, spoke about an assessment near finalization, for instance, which will provide a more thorough and detailed knowledge base on rangelands. "We are trying to focus on what has already been done and what needs to be done to address knowledge gaps," he said.

Again, it is pastoralist communities themselves who can play a decisive role in the collection and dissemination of new knowledge: "One of the options for closing knowledge gaps is the application of bottom-up planning processes which can draw on local and indigenous knowledge and then feed this knowledge upwards," concluded Maginnis.

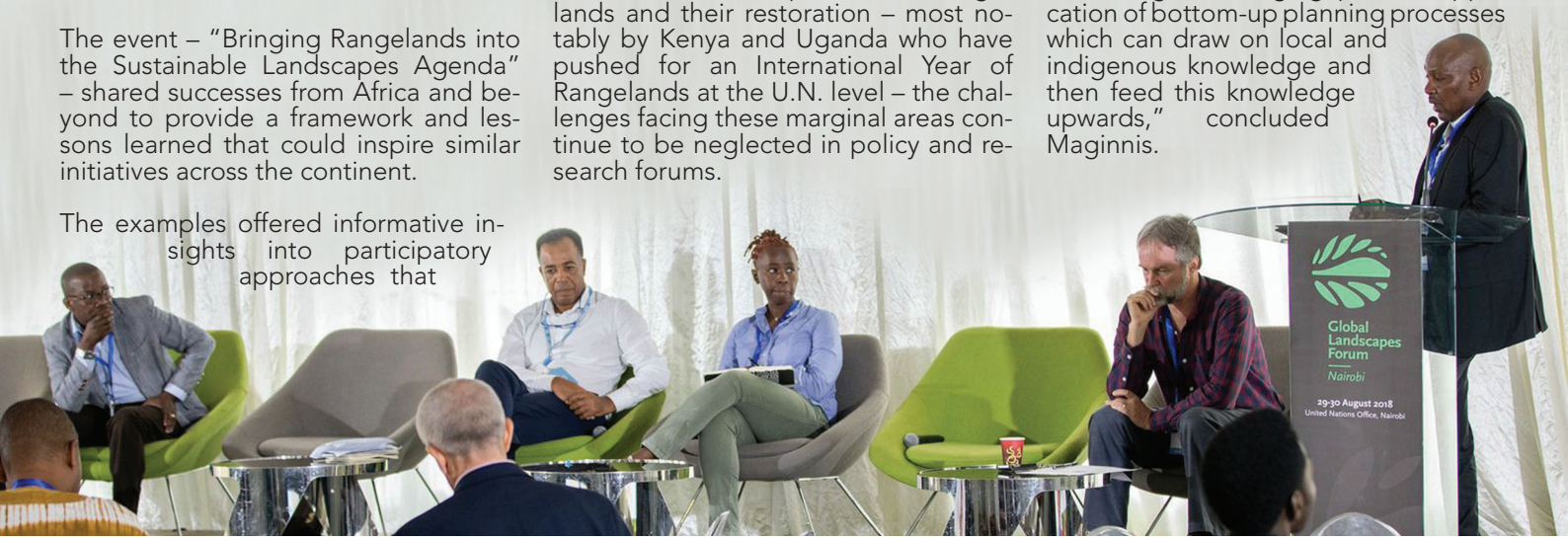

Figure 1: Bringing Rangelands into the Sustainable Landscapes Agenda panel. Global Landscapes Forum in Nairobi. GLF photo

New project aims to give wildlife a brake

How the Brake4Wildlife project is looking for ways to reduce roadkill in protected areas in South Africa

Wendy Collinson

Reprinted From: http://bit.ly/2S0KWBQ

The Endangered Wildlife Trust's (EWT) Wildlife and Roads Project has embarked on a new five-year project called Brake4Wildlife to find ways to reduce roadkill in six protected areas of South Africa, including the Kruger National Park. The project is supported by the De Beers Group.

The primary goal is to reduce the rates of roadkill in the protected areas. The objectives are to:

- Obtain preliminary roadkill rates in the Kruger National Park, Pilanesberg National Park, Addo Elephant National Park, Table Mountain National Park, Dinokeng Game Reserve and Hluhluwe-iMfolozi Park.
- Raise public awareness of roadkill as a threat to biodiversity in protected areas.
- Identify roadkill hotspot areas in each protected area.
- Examine driver behaviour and how this can be influenced to reduce the likelihood of roadkill.

Roads, and their users, are the cause of many negative impacts on wildlife, such as landscape fragmentation and pollution, creating barriers for migration and gene flow. A further impact is wildlife-vehicle collisions, resulting in an animal being injured or killed (roadkill).

South Africa has 23 national parks, protecting only 6.3 per cent of the country's area but generating significant revenue through tourism. However, with large numbers of visitors, wildlife-vehicle collisions commonly occur. Tourism is expected to grow significantly in South Africa by 2020, leading to more vehicles in protected areas and the potential for more wildlife-vehicle collisions.

The EWT's Wildlife and Roads Project has been gathering data about wildlife road deaths on regional and national roads since 2010.

Preliminary surveys were undertaken in both the Pilanesberg National Park and the Addo Elephant National Park in 2014 and 2015, where some 450 vehicles were monitored. It was found that nearly 70 per cent of drivers aren't looking at the roads but rather scanning the bush for wildlife, and that many roadkills in national parks happen as a result of drivers expecting animals to be found in the vegetation alongside the road, rather than on the road itself.

Figure 1: Members of the team arrive at EWT's Development Week in Johannesburg. Rear, from left: Brilliant Mashao, an MSc student at the University of Venda and Innocent Buthelezi, an EWT fieldworker for the project and a BTech student at Tshwane University of Technology (TUT). Front, from left: Wendy Collinson from the Wildlife and Roads Project and Siboniso Thela, a BTech student at TUT

Wendy's a winning researcher

Wendy Collinson picked up the prestigious TW Kambule-NSTF Award for her work in establishing and running the Endangered Wildlife Trust's Wildlife and Roads Project (see above) which aims to reduce the negative impacts of transport infrastructure on wildlife, and ultimately improve driver safety through a reduction in wildlife-vehicle-collisions. The award was presented by the Minister of Science and Technology, Ms Mmamoloko Kubayi-Ngubane, who is the event's patron. The National Science and Technology Forum (NSTF) annually celebrates the most outstanding contributions to science, engineering, technology and innovation. De Beers Group is one of the core supporters of the Wildlife and Roads Project.

Figure 2: Wendy Collinson (left) receives her award from Ms Kubayi-Ngubane

Lightning, biodiversity, global change and Smarties in the mountains – say what?

Paul Gordijn and Professor Tim O'Connor

Current Address: SAEON
Reprinted From: http://bit.ly/2OPhQDg

With intrigue, researchers have noted the co-occurrence of grasslands and areas with frequent lightning storms.

Lightning has played a key role in the evolution of these grassland ecosystems specifically, by influencing how often and when fires move through landscape.

Fire limits tree growth; without it, grasslands in tropical and subtropical regions would transform into shrublands and forest. Before humans became dominant drivers in the grassland landscape, fire regimes were driven by patterns in lightning ignition. Although we may predict that a lightning-driven fire regime may be more variable than a rigorous anthropogenic or human-driven management regime, the particulars of historic lightning-driven fire regimes remain elusive.

What's with the fascination in historic fire regimes anyway?

Well, the reasoning goes that since grassland flora and fauna have evolved under these 'natural' fire regimes, if we were able to reproduce a 'natural' regime, ecosystems would flourish.

Perhaps we may expect optimal functioning of ecosystems and maximal diversity in these grasslands? Maybe under these regimes, grasslands would be best suited to the extremes of climate change associated with global change? These are important questions to ask under current global change pressures and also realising that grasslands are one of the most transformed biomes on earth.

Drakensberg grasslands

Of southern African grasslands, Drakensberg grasslands stand out for their high levels of endemism and for being a biodiversity hotspot (that is, the area hosts numerous species and many of them are found nowhere else), plus the important ecosystem services they provide. Also, these grasslands are known as the 'water tower' of southern Africa, for from these mountains our great rivers such as the Orange and uThugela find their source.

In these grasslands, charcoal deposits and palynological (i.e. 'pollen archaeology') evidence from cores suggest that with the arrival of farmers and pastoralists, fire has intensified over the last thousand years or so. In particular, fire use may be expected to have become more finely managed or rigorous over the last century as settlement in the region increased.

The contrast of the presumed 'natural' fire regime versus the recent rigorous fire regimes begs a question of the effect of different fire regimes on these grasslands. If we were able to answer this question we are on track to promoting ecosystem functioning and biodiversity in the face of global change.

Cathedral Peak sentinel site

The SAEON Cathedral Peak research platform provides a unique opportunity to assess grassland vegetation change over time in response to different fire regimes or treatments. The platform is a world-class research site with a long history of research.

Importantly, the fire treatments at the Cathedral Peak research catchments have been running for over half a century. The fire treatments include both frequent (burnt every one to three years)

Figure 1: Lightning has played a key role in the evolution of our grassland ecosystems by influencing how often, when and how fires move through the landscape (Photo: Sue Janse van Rensburg)

and infrequent burn regimes (burnt every five to eight years).

We sampled an historic grass species monitoring project in the research catchments. We were confident that after at least two decades of fire treatments, an impact on grass communities would be clear (Gordijn *et al.*, 2018). To our surprise, the influence of the fire regime on vegetation was only evident after more than half a century of fire treatments. This is a very interesting find, specifically in the face of global change.

Comparison with other nearby savanna ecosystems highlights these grasslands' unique resistance. In nearby savannas, within a decade, vegetation composition has changed dramatically, with bush encroachment.

What about changes in trends in species abundance across all the fire treatments?

If global change was driving some of these, we may expect to find a few grass species to win and others to lose across the fire treatments?

Well, over more than three decades, the largest change observed across the fire treatments was less than six percent. This is a really small change and illustrates the 'resistance' of these grasslands to global climate change (at least so far).

So, the grasses may be 'resistant' to change, but what about the other flowering plants in the grass layer that make up 78 percent of the species richness of the area?

The answer to this question is not clear-cut - some comparisons with the work of other ecologists on the isolated indigenous forest patches in the Drakensberg are useful (Adie *et al.*, 2017). These forest patches are restricted to the cooler slopes or aspects of this montane environment and to areas protected from fire (for example, rivers, cliffs and rocky outcrops).

'Life is like a box of Smarties'

Since we're thinking about forests, we'll take a lead from the movie Forrest Gump, 'Life is like a box of Smarties'. Imagine a box of Smarties being shared out in a family where each different colour Smartie represents a different species. Now, Dad shares out a strict three Smarties to each family member paying no attention to who gets what colour, being distracted by the Soccer finals.

In this round, everyone's small handful only represents a small subset of all the different colours in the Smartie box.

Next round, little Jordan the sweet-tooth gets hold of the Smartie box. With eagerness Jordan hands out the Smarties until the box is empty and everyone's hands are filled with differently coloured Smarties. Jordan's preference for different colours (and her bias for who should receive these) has affected who has what colours. So now even though everyone can say, 'what a lot I got' - everyone has a different set of coloured Smarties.

The forest patches are like the first round where everyone only had a few differently coloured Smarties due to Dad's diligence, also in this process no one ended up with a unique set of Smartie colours. In contrast, grassland species assemblages are like Jordan's eager dishing out of Smarties – everyone had many different colours (or species), plus, Jordan's colour bias led to everyone having unique sets or assemblages of species.

In our grassland study, fire acted similarly to Jordan's preferences for colours. That is, after more than half a century of different fire treatment applications, we found that the legacy of these treatments was important in shaping unique species assemblages. So, although these grasslands species assemblages

Figure 2: Grassland fauna and flora have evolved under 'natural' fire regimes (Photo: Paul Gordijn)

were initially resistant to fire, over a long time period variation in the fire regime influenced the uniqueness of species assemblages over the landscape.

So how does this relate to interest in historic, variable lightning-driven fire regimes?

Well, this relation between unique species assemblages and variation in the fire regime is something that one would expect if species were adapted to a variable fire regime. This fits well with the hypothesis that the historic fire regime was variable, as one may expect a lightning-driven fire regime to be.

What's more is that the highest number of species was found in areas with intermediate fire regimes. This provides further evidence that grassland flora is well adapted to a variable fire regime.

Does this mean that we should stop burning our grasslands and let lightning do the job?

The short answer is no, because we cannot impose a 'natural' fire regime on a human-dominated landscape - this has been tried before. What are the take homes then for managing our grasslands in the face of global change? Well, yes, these grasslands appear to be resistant to rapid changes under global change and variable fire regimes. However, in the long term we would need to promote a variable fire regime over the landscape to maintain diversity.

Apart from influencing fire regimes, humans have also altered grazing regimes and are transforming the 'natural' functioning of these grasslands that are important reservoirs of biodiversity which provide our dams with clean water. So, what about the impacts of different grazing practices and other land uses (associated with different types of land tenure or ownership) around Cathedral Peak?

That's for another time and another box of chocolates. For now, we appreciate the sheer biodiversity and associated clean water provided from the uKhahlamba Drakensberg mountains and, importantly, our collective responsibility in retaining the observed resistance, for our own good. SAEON's responsibility in the future is to continue observation programmes in these grasslands and evaluate response strategies to projected change.

Acknowledgements

SAEON's Grasslands-Forests-Wetlands Node would like to thank its host organisation, Ezemvelo KwaZulu-Natal Wildlife, for allowing node scientists to do this research in the Drakensberg and for providing excellent support.

Further reading

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Fynbos app launched to manage your natural veld

Heather D'Alton

Reprinted From: http://bit.ly/2FpS21b

Landowners and harvesters who harvest wild fynbos can now better manage their fynbos populations through a new cell phone application.

The app, called i-Fynbos, collects information on fynbos harvested from the wild, and allows effective monitoring over time. Landowners and harvesters will be able to check that their harvesting is sustainable in the long term.

Around 60% of fynbos used in the bouquet market is harvested from natural landscapes, because it is cheaper than the focal flowers picked in cultivated flower orchards. That amounts to millions of stems that are picked every year and sold. But very little is known about how fynbos landscapes change, due to insufficient monitoring.

Where does harvested fynbos originate?

According to Kirsten Watson, Flower Valley Conservation Trust's Conservation Manager, "There is a need to know where the harvested fynbos comes from and how it's harvested."

Collects information on fynbos

She says that monitoring fynbos is difficult, because of the vast landscapes across which harvesting takes place. "Where does one even start to evaluate a property? Where do I go to look at harvested veld?"

The i-Fynbos app provides a solution to landowners. Kirsten says, "The app gives you a landscape view of the property you work on - where you've harvested, what you've harvested and the quality of the harvesting. This is something we never had before. So, it's to empower suppliers and harvesters to take responsibility for their monitoring."

It's downloaded from the Google Play-store to a smartphone - making it accessible to fynbos harvesters.

A citizen science project

She says, "This is as much a monitoring effort as a citizen science project. The i-Fynbos app makes citizen scientists out of harvesters, who are responsible for capturing the data. However, we recommend that all information collected is verified by a third party like Flower Valley Conservation Trust."

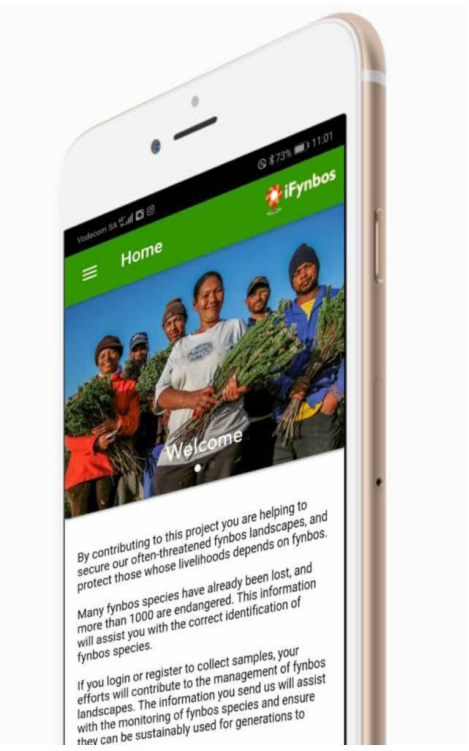


Figure 1: iFynbos app on smartphone

The fynbos app came about through funding support from the Universities of Durham and Newcastle in the United Kingdom, who have been working in collaboration with Flower Valley Conservation Trust and its Sustainable Harvesting Programme since 2010. The Sustainable Harvesting Programme works with harvesters and suppliers to pick fynbos responsibly, and to meet social and labour compliance. During the following six months, the app will be tested by teams of harvesters. After this, the app could be made available to other harvesting sectors, such as the honey bush industry and the medicinal plants sector. For more information, visit: www.flowervalley. org.za.

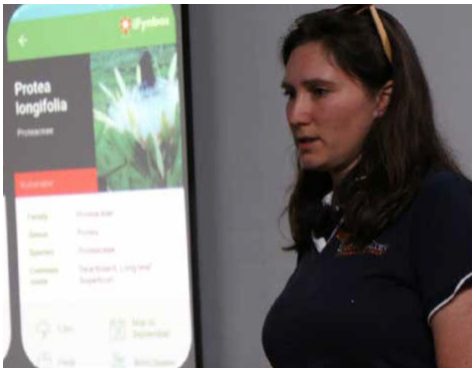


Figure 2 - 4: Field days and workshops are used to show landowners and harvesters how to use the new i-Fynbos app.

Floating wetlands: creating habitat and cleaning water

Small steps to making a big difference

Dale Wright

Current Address: IBA Conservation Implementation Manager, BirdLife South Africa

Reprinted From: http://bit.ly/2FpS21b

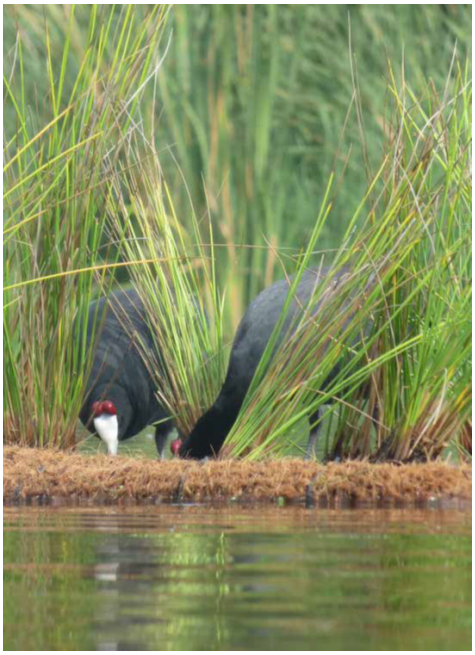
The term "floating wetlands" might at first conjure up an image of large swathes of dense papyrus reeds bobbing up and down in the Okavango Delta. However, these are floating wetlands of a different, slightly smaller kind, popping up on farm dams in the Western Cape. In early 2015, BirdLife South Africa and NCC Environmental Services, with funding from the Table Mountain Fund, initiated a pilot project to develop mechanisms for improving water bird habitat on farm dams. After spending much time traversing the backroads of the region we noticed that very often these dams appeared sterile, providing very little refuge for birds and biodiversity. But did it need to be that way? Or was it possible to turn these isolated, artificial water bodies into havens for biodiversity?

Our initial investigations revealed the obvious fact that these are working dams, whose water levels fluctuate annually as they are filled and subsequently drained for irrigation. The changes in water level prevent vegetation from establishing and surviving. So, the habitat we envisaged would need to rise and fall with the water levels…and thus were born the floating wetlands.

The project set about identifying willing partners who would assist in testing the various designs for these floating wetlands. The structures needed to be sturdy enough to carry wetland plants and substrate, but easy to assemble from materials which you might find around the farm. The other critical issue we thought to address is the excess nutrients which often accumulate in water bodies in agricultural landscapes, because of fertilizers and other chemicals. Wetlands are known to act as water purification plants, extracting excess nutrients and ultimately cleaning water. We realised this would be difficult to test in the landscape, and fortunately a Stellenbosch University student joined the project, studying the ability of different wetland plants to absorb nutrients from polluted water. The results were encouraging, suggesting that those species which we might encourage farmers to plant on the floating wetlands, could perform this task.

After much trial and error an optimal design for the floating wetland was developed, and the project team has written up a guideline for their construction. This guideline document also includes information on the common groups of water birds a farmer might encounter and their basic ecology. Additional approaches to creating habitat for water birds and other biodiversity are also included. Allowing rank vegetation reed beds to develop in areas, perhaps creating shallow mud flats in others, or adding some large tree branches as roosting structures, can all enhance a dam for water birds. The guideline is filled with useful information for landowners interested in turning their dam into a haven for biodiversity. It can be freely downloaded from our website (http://bit.ly/2FsKWci and http://bit.ly/2OOEdss), and we encourage readers to share the guideline far and wide.

Watching Red-knobbed Coots begin to build their nests on the mini-wetlands, and various species of dragon flies and frogs returning to a dam, otherwise devoid of life, was very encouraging. Ultimately, by providing nature with even the smallest of homes, biodiversity can be given a chance to flourish. We would like to thank the Table Mountain Fund for supporting this project, and all our project partners and landowners who helped gather the information necessary to compile the "Floating Wetlands" Guideline



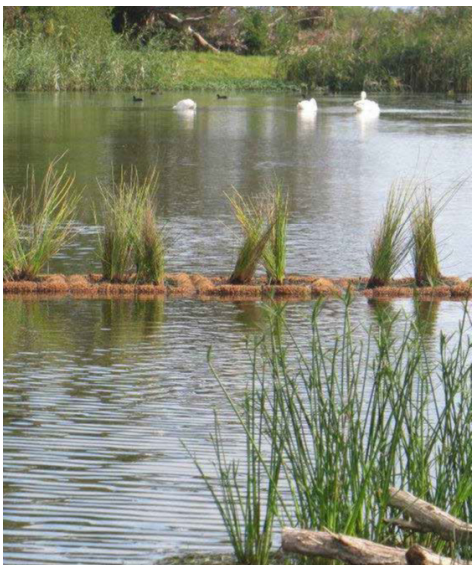


Figure 1 - 3: Examples of floating wetlands that landowners can use to turn their dams into a haven for biodiversity.

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