FYNBOS FORUM 2024

Rooted Resilience: Navigating the Future of Fynbos Conservation

6-8 August 2024 | Stellenbosch

ABSTRACT BOOKLET

Rooted Resilience: Navigating the Future of Fynbos Conservation

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Restoration

Creating a safe home in the Huis River for the Tradouw Redfin Tradouw Redfin

Aileen Anderson

River Restoration, Alien Clearing, Fish Conservation,

The Huis River is the last safe refuge for an isolated population of critically endangered Pseudobarbus (redfin) that survive in isolated pools above the town of Barrydale in the Western Cape, South Africa. The objective of this project is to create a safe home for the redfin, while creating economic and social benefits to those that rely on the water. Water is needed to sustain the community, with growing pressure on municipal supply systems, agricultural and tourism development. There is also growing tension on land issues as only a privileged few have access to the river, which flows predominately through private land. At a recent workshop with stakeholders, the following 3 impacts were identified as priorities for the project. Firstly, the project will improve water flow in the system by removing invasive alien vegetation that consume large amounts of water and alter the habitat best suited to the redfin. This output will be combined with the implementation of water saving techniques, such as rainwater tanks to reduce direct pumping form the river. Secondly, the project will restore key pockets of riparian vegetation and thereby establishing natural filtration systems that will improve water quality. In partnership with the local municipality, the project will establish a public space to connect people to the river. The space will showcase restoration activities and water conservation measures, including an edible garden of traditional herbs. The project will see 30ha of riparian wetland under restoration, through a combination of active and passive techniques. Finally, the project will build a more informed community that is better equipped to work together to protect their water system. Activities will be sustained by mentoring and training unemployed community members in alien clearing and restoration tasks.

Conservation effectiveness and looking to the future

Frances Balayer

The Revised Provincial Biodiversity Strategy and Action Plan 2020-2030: Beyond Traditional Conservation

Biodiversity, Strategy; Ecological Infrastructure; Partnerships

There is consensus at both the international and national level that current rates of biodiversity loss are unsustainable and will increasingly impact on human well-being. While traditional conservation approaches have achieved significant success, on their own they will not be enough to halt the loss of biodiversity, particularly in extreme resource-constrained countries such as South Africa.
To conserve biodiversity and contribute to international targets, the Western Cape's Provincial Biodiversity Strategy and Action Plan (2015-2025; PBSAP) was reviewed based on targeted stakeholder inputs, recommendations from a gender and human rights gap analysis, latest best practice, as well as alignment with the Kunming-Montreal Global Biodiversity Framework and the White Paper on Conservation and Sustainable Use of South Africa's Biodiversity.
The reviewed 2020-2030 PBSAP takes into account dwindling public resources available for biodiversity management and maintains the expanded focus beyond traditional conservation that was established in the first iteration. Focus areas include:
· Expanding the conservation estate as well as consolidation and effective management of existing conservation areas
· Driving acknowledgement of and investment into Ecological Infrastructure
· Ensuring legal compliance
· Mainstreaming of biodiversity considerations into all sectors
· Biodiversity data and tools
· Expanding the biodiversity economy
· Partnerships for implementation
· Improving inclusivity
· Ongoing skills development and improving resourcing for implementation
The reviewed PBSAP provides strategic guidance to all stakeholders active in biodiversity management in the province and aims to improve resilience by moving beyond conservation towards addressing underlying causes of impacts on biodiversity.

KEYNOTE

Conservation through collaboration: the Power of Partnerships

Rupert Barnard

Partnerships, collaboration, resilience, invasive alien clearing
"Partnering and collaboration are critical to creating resilience in conservation and restoration given the urgency of the challenges facing us, the complexity of the system and the dispersion of capacity and resources across organisations. Both co-founders of Wild Restoration have a long history is partnership facilitation across government, business, civil society and academia. Rupert will present some of Wild Restoration's established and recent partnerships with other non-profits (Greyton Conservation Society and the Helihack Initiative), government entities (Cape Nature and Theewaterskloof municipality), corporates and academia.

Partnering isn't always easy. Different organisations often have diverse interests, ways of working and time horizons. As well as showcasing the collective impact that has been achieved by the various partners, Rupert will also explore the more complex sides of working together and how to build resilience in challenging, yet important, partnerships. This will include some lessons learned from practical experiences and some tips for other organisations embarking on partnering when things get messy and frustrating."

Data tools and products

Endemic and endangered Fynbos insects

Renier J. Basson1

Insects, endemic, endangered, conservation, ecology, taxonomy
"Endemic and endangered Fynbos insects

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Over 900 000 species of insects have been described worldwide, of which more than 50 000 are known from South Africa. It is estimated that only about a fifth have been described to date, meaning that there are probably over 250 000 species in our country. Unfortunately, South African taxonomists are scarce. Insects from subtropical parts of South Africa are rather well-studied, but much less is known about insects in the Fynbos biome. The Fynbos is home to approximately 9000 plant species, of which nearly 70% are endemic. Insect diversity follows roughly the same pattern. The charismatic groups, such as butterflies and scarab beetles, are taxonomically rather well-studied, although we don't know much about their biology. Many species are endangered, or even extinct in extreme cases, including some of the Lycaenidae (mainly the coppers) butterflies and stag beetles (Lucanidae). We tend to overlook the smaller and inconspicuous species and their role they play in our sensitive ecosystems; therefore, it is important to educate the public about their threats and conservation status. This presentation will focus on the interesting and elusive habits of these species, their main threats, and the conservation of critical taxa in the Fynbos. Through general biodiversity surveys by die EWT (Endangered Wildlife Trust), gaps are being highlighted in our current knowledge when it comes to certain taxonomic groups. Taxa we would like to focus on in the future, from a conservation perspective, includes Mantodea (mantisses), Lepidoptera (specifically Lycaenidae) and Coleoptera (mainly Lucanidae).
"

Drivers and change: climate and fire

Ryan Blanchard

Mapping trends in the burnt area from 2002 to 2024 using MODIS derived data via the Advanced Fire Information System (AFIS) platform

fire regime, fuel load; veldfires, wildfires, fire return interval

The fire ecology ecotypes of South Africa provides an expert derived understanding of the fire return intervals and associated fire risk of vegetation types in South Africa. The fire regimes are fairly well understood in the fynbos biome however these have been decreasing due to a number of factors. Using the Advanced Fire Information System (AFIS) of the CSIR which has recorded data from the Moderate Resolution Imaging Spectroradiometer (MODIS) at a 500 m spatial resolution for the past 22 years from 2002 to 2024, we provide an assessment of the burned area and fire regimes in the western cape. The monthly number and extent of these occurrences have been quantified to determine the overall and seasonal trends over the 22 year record. The monthly data showed strong seasonal signatures with the Fynbos usually peaking during December, January, February and March, burning mainly in the summer months. We also present the results according to an updated Fire-ecology EcoType (FET) map which aligns with the recent National Vegetation Map and National Land cover map. The assessment provides valuable information on natural variation in veldfires, as well as an overview of changing fire risk due to global change.

Invasive species control

Kunzea ericoides in South Africa: current distribution and management implications.

Mosibudi Wendy Cherane

eradication, invasive alien plant species, naturalized.

"Kunzea ericoides in South Africa: current distribution and management implications.

Kunzea ericoides is an evergreen shrub or small tree native to south-eastern Australia and New Zealand previously, belonging to the genus Leptospermum. Likely introduced to South Africa for ornamental or agricultural use, either pathway may have been responsible for the known naturalized population in George, Western Cape of South Africa. This species is currently restricted to only one naturalizing population along the Camfersdrift River in George. Unmanaged Kunzea ericoides poses a significant threat to the local endemic vegetation, due to its ability to limit the regeneration of native young trees and shrubs, and competing with native flowering plants for pollinators. Kunzea ericoides is also host for various arbuscular mycorrhizal and ectomycorrhizal fungi which could lead to multiple plant diseases in the alien range. Kunzea ericoides is currently listed as category 1a in the South African Alien and Invasive Species Regulations of the National Environmental Management: Biodiversity Act (10 of 2004; NEM:BA) and therefore requires compulsory control. Management to control this species started in 2022 where small plants were hand pulled and larger plants treated with 3% Eco-Imazypyr herbicide. Here, we present progress made on K. ericoides control and provide insights about the feasibility of eradicating the species.

"

Pollination

THE INFLUENCE OF NECTAR ROBBERS IN SHAPING FLOWER COLOUR

Anina Coetzee

Erica, plant diversity, pollination

The colourful Erica genus is by far the largest plant genus in the Fynbos biome. It is a good model system for investing the processes that generate and maintain the floristic diversity of the Cape. In particular, Erica flowers display a high diversity of flower colours within and between species. While the influence of pollinators in driving floral signals is relatively well known, the role of flower antagonists is less known. Flowers face a trade-off in attracting effective pollinators but avoiding antagonists such as nectar robbers; flower visitors that take nectar without pollinating the flowers. One solution is to produce signals (e.g. flower colours) that are detectable to pollinators but less detectable to nectar robbers. This is possible if the visual systems of these two flower visitor types differ, which is the case with birds and insects. Bird-pollinated Erica species in the Fynbos are pollinated by sunbirds and predominantly robbed by bees. We applied visual modelling to 62 Erica species to test if bird-pollinated species are less conspicuous to bees than to birds. The results found this to be true for some metrics of colour discrimination and flower conspicuousness, but not all. We also tested the prediction that flower conspicuousness to bees is correlated to other bee-avoidance traits (corolla length and stickiness, and sepal size) and found negative correlations. This study suggests that insect nectar robbers have contributed to shaping flower colour evolution in bird-pollinated Erica species.

Conservation effectiveness and looking to the future

Identifying conservation champions: what can we learn from the divided brain hypothesis

Richard M Cowling

Leadership, personality traits, brain science

Biodiversity is under unprecedented pressure. Much of the world is in turmoil politically and socially, and the prospects of a looming eco-dystopia are real. In such times, conservation requires outstanding leadership. Yet the literature on leadership in conservation focuses on efficacy of task achievement and not on the emotional traits that underpin leadership. Here I ask: what are the emotional intelligences required to lead projects seeking to conserve biodiversity in contexts where much power is vested in those sectors that require its destruction? As a first step to answering this question, I explore what we can learn about leadership from McGilchrist' Divided Brain Theory. I also provide a typology of conservation leadership based on expressions of efficacy and empathy.

Pollination

ALIEN PLANT INVASIONS IMPACT NECTAR ROBBING OF ERICAS WITHIN THE CAPE FYNBOS

Ruby Davies

Nectar robbing, invasion, pollination, bees, land degradation.

Nectar robbing, when floral visitors bypass the reproductive structures of flowers to accessing nectar, has the potential to drive ecosystem functioning, through varied effects on plant reproduction and species coexistence. Within the fynbos of the Cape Floristic Region, nectar robbing and the rate at which it occurs is poorly understood, despite being observed frequently in bird-pollinated Erica species, a dominant genus in the fynbos. This study investigates the effects of invasive alien trees on nectar robbing insect communities, and how this, in turn, impacts the occurrence and frequency of nectar robbing in bird-pollinated E. discolor and E. unicolor georgensis. Floral-visitor observations were recorded in situ at a total of 58 plots, within pristine and invaded fynbos sites, along the southern Cape coastal mountains. Data collection was done during the 2023 flowering season (April – June). This study assessed (1) what impacts the rate of nectar robbing, (2) what impacts nectar robber insect abundance, and (3) the effect of nectar robbing on pollination. Invasions were found to have a negative impact on robbing insect communities, with insect abundance playing a pivotal role in the occurrence and rate of nectar robbing. Invasions also appear to impact the interaction between nectar robbers and legitimate pollinators. Further, this study identified two bee species, Apis mellifera capensis and an Allodape sp., as prominent nectar robbers of bird pollinated ericas. Overall, these findings emphasise the critical role of insect communities in shaping plant-animal interactions, and help better understand the effects of plant invasions on threatened fynbos ecosystems.

KEYNOTE

A collaborative action network for invasive clearing groups in the Greater Cape Floristic Region

Michelle de Bruyn

Invasive clearing; biodiversity restoration, citizen action; collaboration; network

"Invasive species are one of the main threats to our fynbos ecosystems, and existing efforts are not overcoming their exponential growth. New ways of working collaboratively are needed that can bring in citizen action and tap into wider resources. We are prototyping an action network for local and voluntary invasive clearing groups across the Greater Cape Floristic Region with support from the Table Mountain Fund.

A map and baseline of groups across the greater cape floristic region is now available publicly for the first time. Lessons around collaboration and network building can inform new ways of working to enable adaptation and resilience. Results from collaborative prototyping include improving clearing prioritisation and planning, information sharing, innovation of clearing practices and technologies, collaborative impact tracking, sharing resources, building and motivating volunteers and paid community teams, re-energising and acknowledging efforts, access to land to clear, and collaborative funding. The network demonstrates significant potential for ongoing collaboration, and to extend collaborative citizen action into other forms of fynbos restoration.
"

Drivers and change: climate and fire

Fog regimes and hydration of an endangered species in the hyper diverse Fynbos biome

Abri de Buys

Fog, sap flow, foliar uptake, climate change

Fog eco-hydrology has been studied in the hyper diverse Fynbos biome at the Southern tip of Africa for more than a century, yet implications for plant hydration remain poorly understood. Predicted changes in fog bearing weather systems and evidence of local wind stilling has raised questions about implications for fog eco-hydrology. We quantified fog interception, described potential implications for water stress relief and demonstrated seasonal changes in fog origins at three sites. Fog inputs are less seasonal than rainfall, relatively stable during major droughts and significantly reduce consecutive dry day periods during hot dry summer months in comparison to rainfall. We present evidence of improved hydration through foliar uptake in an endangered, high altitude restricted, Protea species by long term, in situ, sap flow measurements and confirm this with experimental manipulation. Our findings highlight the vulnerability of globally unique plant communities in fog prone ecosystems and the urgency with which we need to understand drivers of alternative moisture regimes.

Restoration

Global ambitions and local nuances in landscape restoration: Case studies exploring opportunities and challenges in cross-scale interactions of policies, funding, and values of fynbos stewardship

Ancois C de Villiers

Plural valuation; Landscape sustainability; Biodiversity economy

The stewardship of biodiversity and ecosystem services (BES) is undergoing several changes in research, policy, and practice. These paradigm shifts include: i) innovation in the financing of restoration and conservation; ii) recognition of the multidimensional value of BES; and iii) reframing initiatives from short-term discrete interventions to ongoing relational processes. There are growing and competing demands to achieve extensive large-scale impacts to meet global targets while simultaneously being sensitive to the nuances of the local context. This Dilemma of Scale (as described by Sigman 2021) could inhibit action and meaningful change. These opportunities and challenges are reflected in past and current initiatives to support socio-economic development based on the stewardship of fynbos. Examples include the commodification of indigenous plant species, clearing invasive alien plants, and ecotourism. However, these initiates have been hampered by challenges related to actualising viable business development plans, and conflicting positions on how BES should be managed. The presentation aims to unpack these challenges by summarising the main findings of a qualitative PhD study that explored the implementation challenges of facilitating transformative processes for landscape sustainability. The presentation will also introduce a proposed case study to follow up on the findings of the PhD to: i) explore the cross-scale interactions and flows of policies, funding, trade, and discourses on the value, use, and stewardship of BES in South Africa; and ii) unpack the emerging opportunities and challenges associated with a biodiversity economy based on the experiences of landscape actors within the Cape Floristic Region. This case study is part of the BridgingVALUES project, which aims to unpack and compare the impacts of the European Union's biodiversity policies on the governance of BES within Europe and the Global South.

Data tools and products

National Vegetation Map 2024: A summary of updates

Philip Desmet

VEGMAP, updates, version 2024, vegetation

There have been three updates to the National Vegetation Map under the VEGMAP Project since the first release in 2006. We continue to collaborate with valued partners from across the country to update areas as new information becomes available. We have just completed a beta version of the fourth update, NVM 2024, and we will share the changes to the map and classification system, invite you to implement the beta version and provide feedback. We will also share some new thinking in terms of the mapping and invite you to contribute data as we continue to collate information for the next iteration.

Drivers and change: climate and fire

Determinants of individual native tree fern (Gymnosphaera capensis) health status in the southern Cape Afrotemperate forests after reports of severe dieback.

Anneke Elliott

Tree fern, Afrotemperate forests, Dieback, Drought

Indigenous forest tree ferns (Gymnosphaera capensis), which are found deep within natural Afrotemperate forests, have shown alarming signs of declining health in the southern Cape region. Forest tree ferns play an important role in ecosystem functioning and biodiversity conservation. This study investigated the health status and potential causal factors of the decline of twenty G. capensis populations in the Knysna Afrotemperate forest complex. We assessed tree fern health by measuring individual tree ferns' physical appearance in relation to biotic, environmental, and pathogenic factors, the latter including soil samples to test for the presence of Phytophthora species and assessing potential clumping effects. We used generalized linear mixed effect models to determine the influence of measured factors on the individual fern frond health index, wilting index and sori index. We inspected a total of 900 individual tree fern trunks, of which 543 (60,33%) were completely defoliated. The percentage of defoliated trunks per population ranged from 20% - 88%. Larger trunks had a higher rate of defoliation and lower overall frond health, indicating a decline in tree fern health with age. Yet, larger trunks that did have healthy fronds, had the highest sori count. Tree ferns growing closer to streams had better frond health and higher sori counts. This suggests that proximity to stream has a positive influence on sori production and overall fern health. We did not find clumping of defoliated plants nor a conclusive correlation between the presence of Phytophthora species and the health of tree ferns. In conclusion, our results suggest that a combination of biotic and environmental factors may explain the significant decline in tree fern health. Further research with more in-depth work on the effect of prolonged droughts on tree fern vitality, to better understand the mechanisms and interactions that are driving the decline, is recommended.

Conservation effectiveness and looking to the future

A park with a Purpose: Boland Park's urban renosterveld revival.

Bruce Esau

Restoration, Urban Conservation, Renosterveld, Community Engagement, Environmental Education

"Urban conservation presents unique challenges and opportunities, particularly in fragmented green spaces that must balance ecological preservation with recreational use. Boland Park in Durbanville, exemplifies a hybrid ecosystem where we aim to make these dual purposes coexist. As a remnant of the critically endangered Swartland Silcrete Renosterveld, Boland Park is a vital urban sanctuary for biodiversity. Our collaborative approach, developed in partnership with the City of Cape Town, focuses on the eradication of invasive species, habitat rehabilitation, and the potential establishment of a repository for local plant species at risk.

In partnership with the residents, conservation groups, and local educational institutions, we engage the community through environmental education and hands-on conservation activities, fostering a sense of stewardship among residents. Our efforts include the propagation and, in time, reintroduction of threatened plant species, enhancing both ecological integrity and public enjoyment of the park. Additionally, Avondale Gardens supports ex situ conservation in alignment with the SANBI Priority Species Recovery strategy, through targeted collections of highly threatened species from surrounding areas.

Boland Park's informal zonation into conservation and public areas allows for targeted management practices, such as ""No Mow Zones"" for minimal intervention and controlled vegetation growth to maintain safety and aesthetics. This strategic approach not only preserves the biodiversity of the Swartland Silcrete Renosterveld but also promotes responsible sustainable urban greening. By leveraging collaborative efforts and innovative management techniques, Boland Park aims to serve as a model for urban renosterveld rehabilitation, demonstrating the potential of public open spaces to contribute significantly to urban biodiversity conservation.

Certification to Promote Best Practices in Alien Clearing and Generate a Market for the Resulting Biomass

Caroline Gelderblom

biomas, certification, invasive alien plants, water impact indicators

"The sustainability of invasive alien clearing in South Africa could be enhanced by a certification scheme for biomass generated by clearing, which incentivises best practices. Internationally, as the world unites to tackle the climate crisis, more companies are shifting from linear, fossil-based economies to circular, bio-based ones, creating potential demand for South African-produced biomass. However, even with the best intentions, this can still cause harm if the biomaterial is not produced sustainably.
The global objective of the Roundtable on Sustainable Biomaterials (RSB) is to promote the sustainable utilisation of alternative materials to accelerate the transition to a just and sustainable bioeconomy and benefit rural livelihoods. RSB is working to construct, quantify, and monitor the sustainability impacts of investments in new bio-based and circular value chains.

In South Africa, RSB is partnering with key stakeholders from industry (Coega Biomass Centre), NGOs (WWF South Africa), and technical consultancies (Blue North/Blue Science) to translate the local scientific understanding of the positive impacts of clearing invasive alien plants into a credible international certification scheme by adding sustainability impacts to existing certifications. The objective is to develop water impact indicators aligned with RSB's science-backed 12 Principles & Criteria for sustainability, which are globally recognised as being particularly robust and practical.
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POSTER

Cracking the crust: Uncovering biocrust geochemistry and biotic interactions in GCFR drylands

Tallulah Rose Glasby

Biocrust, ecophysiology, mesofauna

Biological soil crusts (biocrusts) are complex communities on the soil surface that consist of close associations between soil particles and both photoautotrophic and heterotrophic microorganisms. Covering approximately 12% of Earth's land surface, biocrusts play a crucial role as ecosystem engineers by enhancing organic matter content, soil stability, and nutrient availability. These enhancements can influence soil fauna diversity and the germination and growth rates of surrounding vascular plant communities. Despite their prevalence and ecological significance, biocrusts are largely undocumented and understudied on a global scale. This is particularly true for Southern African ecosystems, where there are significant gaps in our understanding of biocrust distribution, species composition, and biological interactions. In Southern Africa, biocrusts are present in seven different biomes, including the Fynbos and Succulent Karoo. Despite this, only a handful of studies on the ecological role of biocrusts in South African ecosystems have been published. Thus, there is a pressing need for comprehensive studies to uncover the ecological significance of biocrusts within South African ecosystems - such as the unique and floristically diverse Greater Cape Floristic Region (GCFR). By integrating field measurements and laboratory experiments, this study seeks to provide a comprehensive understanding of the ecophysiology of biocrusts and their significance for faunal and floral biodiversity in the Cederberg region of the GCFR. Specifically, this study will investigate the contribution of biocrusts to nutrient and water cycling, microfauna habitat provision, and interactions with co-occurring vascular plants. Ultimately, this research aims to fill critical knowledge gaps and inform conservation strategies for these vital yet overlooked components of the GCFR ecosystem.

Data tools and products

CASABIO - New technologies bolster citizen science capability.

David Gwynne-Evans

S2 Geometry, JPEGXL, Citizen Science

Because Google's S2 geometry reduces a coordinate system to a single number, it greatly improves the efficiency for several key solutions. One of these is the question: If I'm in a place, what species am I most likely to encounter. In this paper, we briefly introduce S2 geometry and how we at CASABIO.org have leveraged its properties, in combination with observations, to facilitate primary taxonomy. Secondly we introduce JPEGXL: the next generation of the Joint Photographic Group's image standard; it's challenges and advantages. Finally we provide an overview of our solutions and how they safely and efficiently facilitate the rapid acquisition of scientific observations.

Supporting nature-based solutions that address climate-change risks effectively and equitably

Petra Holden

nature-based solutions, climate change adaption, sustainability, social equity, transdisciplinarity, investment

"Nature-based solutions have long been used in the fynbos biome. Also known as ecosystem-based approaches, these solutions involve people working with nature to address a range of societal challenges, including water, food and energy security; disaster risk reduction; biodiversity loss; environmental degradation; social and economic development; and climate change.

Despite being popular in policy and research, nature-based solutions are underfunded and underprioritized compared to grey and hard infrastructure. In attempts to incentivise investments in these solutions, many researchers have theorised or quantified their ability to provide benefits to people and nature, including their disaster risk reduction function. But rarely have researchers quantified the benefits and limits of nature-based solutions for climate change adaptation. And it's this quantification that could unlock additional finance mechanisms – such as climate finance and loss and damage finance – for the people and biodiversity of the fynbos biome.

In this keynote, first by focusing on the infamous Day Zero Cape Town drought, I will show how one can compare an extreme event with and without climate change, and determine if and how nature-based solutions can reduce or offset the impacts of climate change on the extreme event. I will illustrate how this process can enhance the portfolio of investment options and opportunities and drive diverse investments in nature-based solutions and adaptation planning.

Next, drawing on examples from the fynbos biome and elsewhere in southern Africa, I will illustrate the importance of ensuring that nature-based solutions are not only effective and sustainable under climate change, but are contextually appropriate and confer equitable benefits.

Finally, I will highlight the value of working collaboratively and in a transdisciplinary fashion to uncover and share the diverse forms of knowledge and evidence necessary to guide and incentivise policy and finance decisions that promote local and planetary climate resilience."

KEYNOTE

Farming with Biodiversity

Marijke Honig

reslience, biodiversity, farming

"Globally the food system is the primary driver of biodiversity loss, with agriculture identified as the threat to 86% of the 28,000 species at risk of extinction. This shocking trend is particularly important in a global biodiversity hotspot such as the Cape florist region, which is also the fruit and wine basket of the country.

Here, farmers and landowners are the custodians of much of the critical biodiversity areas needing conservation. On some farms “veld” patches, abandoned fields and corridors are providing great opportunities for supporting biodiversity and enhancing the ecosystem functioning upon which the farming business and surrounding society survive. However, looking after pockets of “veld” on farms is not the same as farming with biodiversity. The latter is a holistic approach where ecosystem functions are restored and enhanced applying a philosophy that recognizes complexity, diversity and inter-connectedness as the building blocks of resilience.

Having visited a few farms where this philosophy is tangible, we met with several pioneers of this approach and were inspired by their patient journey of experimentation, learning and adaptation. This presentation will share a few practical examples as case studies and functional palettes of plants used, aimed as a starting point for sharing the learnings, gathering input and creating an online resource to further support the adoption of farming with biodiversity.

Conservation effectiveness and looking to the future

Improving Management Effectiveness of Existing Biodiversity Stewardship Protected Areas in the Western Cape

Sarah Hulley

Biodiversity, Stewardship, Management Effectiveness, CapeNature, METT

"The effective management of biodiversity stewardship nature reserves plays a crucial role in safeguarding South Africa's valuable ecological infrastructure. CapeNature' draft expansion strategy is aligned with international and national strategic and policy frameworks, specifically target 3 of the GBF, which is to effectively manage and govern a system of protected areas that are representative of import biodiversity and ecosystem functions and services. This project aims to enhance the management effectiveness of these protected areas by addressing key aspects and focus on building the management effectiveness of the management authorities. Specifically, we focus on three critical objectives:
Assessment and Gap Identification: Through the use of the Management Effectiveness Tracking Tool (METT), we assess the management effectiveness of Stewardship protected areas in the Cape Floristic Region. This assessment helps identify gaps and areas for improvement.
Management Plan Enhancement: We ensure that Stewardship nature reserves have relevant and updated management plans, compliant with the NEM: Protected Areas Act and approved by the MEC.
Capacity Building: We empower management authorities by enhancing their capacity to implement these management plans effectively.
Additionally, we facilitate networking and knowledge sharing among landowners and the conservation sector, fostering collaboration and better management practices.

WORKSHOP

Uniting Stakeholders for the Future of the Cape Floristic Region

Sarah Hulley

Collaboration; Conservation; Sustainable Practices; Sustainable Financing; Stakeholders

"The Cape Floristic Region (CFR) Partnership plays a crucial role in fostering collaboration, advocacy, learning, and communication among a diverse group of stakeholders and role players across the floristic region. Its primary objective is to successfully and sustainably conserve the unique biodiversity of the CFR, building upon the legacy of the Cape Action for People and the Environment (CAPE). The Partnership aims to create a platform for voluntary engagement, fostering collaboration at multiple scales. Over the past year, progress has been made in establishing the foundation of this successful partnership.

The upcoming workshop provides an opportunity to consolidate and broaden participation among those actively involved in safeguarding the Cape Floristic Region. During the workshop, we will update our progress and explore future directions on certain working group themes. Key areas of focus include strengthening relevant research, promoting volunteerism, implementing integrated alien and fire management strategies, and supporting the green/biodiversity economy. These conversations will contribute to the working groups that are being formed to optimize community involvement and resource utilization.
Agenda:
1.Welcome
2. Setting the Scene- Financing future CFRP activities
3. Overall update for CFRP: CFRP branding, Vision and Mission; Communication Plan; Action Plan; progress to date and next steps.
4. Introduction to the different CFRP working groups:
o Communication - research and practitioners.
o Integrated Fire and Alien Invasive Plant Management
Comfort break
o Green/Biodiversity Economy and Investment
o Volunteerism
5. Break out groups on each of the above topics with a rotating leads.
6. Feedback and Synthesis
7. Close and thanks
Dates for the AGM and Knowledge Exchange"

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POSTER

The Ecology of Fire in Fynbos: The Indirect Effects of Fire on Bird Community Composition in Tsitsikamma Sandstone Fynbos.

Julian Johnson-Barker

Fire – Bird communities – Time since last fire

Wildfires are a natural process occurring globally, and play a significant role in shaping ecosystems, habitats, and biotic interactions. While much is known about the effects of fire on fynbos vegetation, little is known about its effects on the faunal communities within this vegetation type. The responses of indigenous bird communities to fynbos fires are relatively understudied within the fynbos fragments closely associated with forested areas along the Southern Cape Coast. My study investigates the behavioural responses of bird communities to fire in Tsitsikamma sandstone fynbos, by examining changes in community composition in response to fire driven changes in: vegetation structure, and vegetation functional group composition. The study examines pre- and post-fire bird and vegetation communities in three study sites of varying time since last fire. Initial results suggest that directly after a fire, bird species richness decreases, with nectivorous bird species showing the largest decline. Granivorous and generalist bird species, increase in diversity and abundance, compared to older fynbos sites. Results from this study will contribute to our understanding of the role of fire in fynbos, and its effects on important avian communities, as well as demonstrating the importance of a mosaic of fynbos ages for maintaining biodiversity in avian communities.

Data tools and products

Habitat, plant communities and threats to the Robertson Granite Renosterveld

Thapelo Kgomo

FRg3, Plant communities, Threats

Robertson Granite Renosterveld (FRg 3), is a vegetation type distributed at altitudes of between 250 – 850 m asl., on the Tierberg, north of La Colline in the Breede River Valley near Robertson, Western Cape Province of South Africa. FRg3 is an understudied vegetation type due to the isolation of the granite pluton, which makes it virtually unknown and thus identified as a priority for scientific research. Therefore, this study aims to further our understanding of the communities, dominant and endemic species, threats, and important habitat characteristics that define the FRg3. Fifty-three,10mx5m plots were sampled for vegetation cover abundance coupled with environmental variables (altitude, herbaceous cover, litter cover, bare ground cover), and fire scars mapped using MODIS/061/MCD64A1 on Google Earth Engine to assess fire history (2000 – 2023) of the communities within the vegetation type. In addition, soil samples were collected per plot and are being analysed for pH, C, B, P, Na, Mg, K, Ca and soil texture. Preliminary results based on a dissimilarity hierarchical cluster analyses reveal that FRg3 is made up of 7 plant communities, namely: Muraltia heisteria & Restio capensis, Pteronia paniculata & Dicerothamnus rhinocerotis; Dicerothamnus rhinocerotis & Dodonia viscosa; Euyrops tenuissimus; Dodonia viscosa & Dicerothamnus rhinocerotis; and Passerina obtusifolia & Dodonia viscosa. Furthermore, the results also show that the Muraltia heisteria & Restio capensis community was commonly found in areas that have been recently burnt (2017). Results from the soil analyses combined with other environmental variables will be used to investigate how the habitat characteristics influence the distribution of communities. Some of the threats to the vegetation type include the presence of alien invasive plants such as Hakea sericea, this data will be used to perform a red list of ecosystems (RLE) assessment for FRg3 using IUCN criterion A3, A2b, B1, B2, and D of the RLE.

Pollination

Geographic variation in pollinator community composition drives remarkable floral variation in painted ladies

Katharine Khoury

floral variation, pollinator importance, mechanical-fit traits, attractive traits

Pollinator-mediated selection on floral traits is well documented as a key driver of floral variation within the angiosperms. Gladiolus carneus is one of the most iconic geophytes within the GCFR and is known for its exceptional geographic variation in floral morphology. Across 17 populations, we document and quantify this floral variation and associate different pollinator communities with previously described varieties across its distribution range. Multivariate analysis shows that Gladiolus carneus is extremely diverse in floral traits involved in pollinator attraction and morphological fit and separates into at least seven distinct floral varieties. We also found between population variation in floral traits, even within the same variety. This variation is largely driven by the most effective pollinator within a community. Additionally, we found that flowers with the longest and shortest tubes were visited by a single functional pollinator. Our results support the hypothesis that floral variation in Gladiolus carneus has largely been driven by adaptive generalization and highlights the gradual transition in importance of one functional class of pollinators to another, in generating floral variation.

FIELD TRIP

Stellenbosch University Botanical Garden: ex-situ conservation in practise threatened species, lowland conservation, ex-situ collections, urban conservation, Stellenbosch, Cape lowlands

Donovan Kirkwood

"The field trip will start at the Duthie Nature Reserve - a tiny urban alluvial remnant that perfectly illustrates the challenges of conservation in a highly transformed and fragmented landscape.

We will then run through an overview of our conservation programme in practise and the realities and challenges of what even the first steps look like towards achieving global best practise in ex-situ population management and species recovery . SA has a massive gap between our ex-situ and species recover goals and actual achievement, and we'll talk to both the need, and some innovative approaches towards closing the gap.

Recommended reading:
Hoban, Sean. 'New Guidance for Ex Situ Gene Conservation: Sampling Realistic Population Systems and Accounting for Collection Attrition'. Biological Conservation 235 (1 July 2019): 199–208. https://doi.org/10.1016/j.biocon.2019.04.013.
Hoban, Sean M. 'Saving Seeds: Optimally Planning Our Ex Situ Conservation Collections to Ensure Species' Evolutionary Potential'. Academic. Forestry Service, US Dept. Agriculture, 2016. https://www.fs.fed.us/pnw/pubs/pnw_gtr963_051.pdf."

Data tools and products

Prioritizing plant species for recovery in South Africa

Tristan Kruger

Recovery, Prioritization, Decision Tree, National Redlist

Considering the Kunming-Montreal Global Biodiversity Framework goals for 2030, Target 4 highlights the need to halt human-induced extinctions by means of recovery and conservation efforts for known threatened species. The Threatened Species Unit, within the South African National Biodiversity Institute (SANBI), developed a means of prioritizing our over 560 critically endangered plant species in South Africa. The National Redlist is very comprehensive and utilizes the International Union for Conservation of Nature (IUCN) criteria for status ranking, thus providing a good source of base data. The first priority list was produced in 2022 by ranking combinations of the IUCN criteria and added population dynamics and locality criteria and running this ranking through the Redlist database. This produced 262 species in need of urgent intervention. This number has risen to 293 since the Redlist was updated in 2024. Realistically, this number of species poses a challenge for the available resources in the environmental and conservation sectors and thus a decision tree was developed to refine this list. Each species is put through the decision tree, which then places the species into one of five baskets: monitoring required, site requires protection status, species requires propagation research, priority seed collections required and suitable candidate for recovery. This produces a list of species that are most suitable for a species recovery project development, while also indicating gaps in the knowledge of other species that would aid in successful recovery efforts.

POSTER

How far do they move? The utilisation of nectar rich stepping stones by nectar feeding birds in urban areas

Muneeba Lamera

Bird-pollination, urban ecology, stepping stones, nectar availability, nectar robbing, sunbirds

Habitat fragmentation is a global problem impacting plant-pollinator interactions. One of the regions most impacted by anthropogenic pressures due to rapid population increase is the Cape Floristic Region (CFR), a biodiversity hotspot in South Africa, due to its exceptionally high plant diversity. The city of Cape Town alone consists of approximately 3 250 indigenous plant species, many of which are threatened and endemic. The Ingcungcu Sunbird Restoration Project addresses this issue by establishing nectar rich biodiversity gardens at urban schools in the Cape Flats. These gardens provide food for nectar-feeding birds and act as stepping stones that enable them to move between the urban matrix and protected areas surrounding the city. This ensures pollen transfer of plant species highly dependent on nectar-feeding birds. Any disruption in pollinator movements could result in devastating impacts to plant populations, such as lower seed sets and eventual extinction. The gardens aim to prevent this and assist in restoring the link between birds and plants through these gardens. However, it is uncertain how far these nectar-feeding birds move, to what extent they utilise these stepping stones and whether there are enough nectar resources available for them. This study will therefore attempt to answer these questions by analysing bird movement via bird ringing data obtained by the South African Bird Ringing Unit; determining nectar availability through floral counts and nectar measurement; and assessing nectar robbing rates in the urban school gardens and a natural protected area (i.e., Rondevlei Nature Reserve).

Biodiversity origins and ecology

Avian Conservation in the Cape Floristic Region: Insights from the BioSCape's BioSoundSCapes Project

Alan Lee

Key words: Bird monitoring, fynbos, remote sensing

During 2023, several projects associated with the NASA funded BioSCape project collected field data across the Cape Floristic Region in conjunction flights that collected hyperspectral data. The BioSoundSCapes project was one of these, one of the objectives of which was to monitor bird species within South Africa's unique Fynbos biome. Birds such as the Cape Sugarbird are vital to the Fynbos ecosystem, acting as pollinators and indicators of ecological health. This talk will explore the methodologies employed in the BioSoundSCapes project, including the use of AudioMoth devices and Point Count methods, to monitor avian presence and behavior. We report on densities and distributions of the Fynbos endemic bird species. By integrating these data with remote sensing outputs, we aim to model species richness and provide valuable insights for ecological studies and conservation planning. These findings contribute to regional Red Listing efforts, aiding in the assessment of species' conservation statuses. Our results highlight the importance of acoustic monitoring in capturing the complex dynamics of bird populations and their habitats, offering a framework for future conservation strategies in the Fynbos and beyond.

Conservation initiatives

Food from our Ancestors

Nicole Loebenberg

Fynbos, Culture & Tourism

"The Table Mountain Fund Prosperity Programme (TMF) seeks to harness the potential of Fynbos-based economies for community socio-economic benefits.

With funds from TMF and other donors, !Khwa ttu developed a Fynbos supply chain model focusing on protection, restoration, and sustainable use in the West Coast National Park buffer zone.

Protection: A 50ha granite renosterveld remnant was fenced to recover from overgrazing post-drought. This aided plant recovery over a 3-year period, allowing for controlled grazing and foraging around rocky outcrops in future.

Restoration: To address poor recruitment in compacted areas, !Khwa ttu is trialling subsoiling, soil inoculation, deep planting seeds, composting and mulching methods. A Mother Garden is being cultivated to produce seeds.

Sustainable Use: Collaborating with experts, !Khwa ttu identified climate-resilient plants used historically by San hunter-gatherers, to create a WILD foods menu and introduce sustainable sourcing policy - 25% of ingredients are foraged on the farm, with the rest sourced responsibly from smaller suppliers. Carrying capacity analysis by an expert confirms foraging levels are sustainable.

New San-guided tours and intern programmes were developed using the fynbos-based examples of protection, restoration and of sustainable use to promote education and skills of young ambassadors for San culture and nature.

Socio-economic benefits: By 2023, the fynbos-based restaurant and tour menus were attracting more visitors, spending more money and enhancing their understanding of San culture and nature. Fynbos-related protection and restoration support 5 staff, training and tourism an additional 45-50 staff/interns, and sustainable sourcing an additional 40-50 small local suppliers annually. This clearly illustrates a multiplier effect. Other community benefits include education of 1200 students and regular enjoyment of indigenous fynbos gardens and trails by locals, with over 6000 recorded visits.

Awards: This replicable model earned !Khwa ttu the World Travel Market Responsible Tourism silver award for being ‘Nature Positive’ in May 2024."

POSTER

Reptile Establishment Risk Assessment: A proactive approach to minimizing reptile invasions in the Western Cape

Xolani Mabaso

Reptile, Pet-trade, Invasion, Bomford, Redlist, fauna

The introduction of exotic reptile species poses a significant threat to biodiversity and ecological stability. Reptiles are a particularly concerning due to their diverse feeding strategies and potential to establish themselves in new environments. The importation of reptiles into the Western Cape presents significant challenges to biodiversity and public health, making effective screening methods crucial for CapeNature. The Bomford Model, originally developed for predicting invasive potential in vertebrates, offers a structured framework applicable to assessing the risks associated with imported reptiles before they hit the shores. The Bomford model used at CapeNature incorporates key parameters such as the species' reproductive rate, invasion history, environmental tolerance, dietary variation and potential impact on native ecosystems. By systematically evaluating these factors and scoring them, CapeNature can generate a final risk score, which guides decision-making regarding reptile import permits and prioritize species for further scrutiny or restriction based on their potential invasiveness. This proactive approach aids in preventing the establishment of invasive reptile species that could threaten local biodiversity. The product of such a transparent and science-based framework is the generation of a list of species that pose an ‘unacceptable’ establishment risk, ‘significant but manageable’ establishment risk, and ‘low’ establishment risk. In conclusion, The Bomford Model is a valuable tool for management authorities like CapeNature that seek to minimize the risks associated with reptile imports. By applying Bomford model, CapeNature makes informed decisions to protect Western Cape ecosystems while facilitating legitimate reptile trade activities that support livelihoods.

Restoration

Minimum optimal seed sowing densities for active restoration in Swartland Shale Renosterveld

Thabang Makola

seed viability, limiting factors, species richness, species cover

Large parts of the Cape Floristic Region are degraded due to anthropogenic impacts such as biological invasions, and habitat transformation. Swartland Shale Renosterveld (SSR) is one of the most severely affected vegetation types. The need to reverse such impacts has therefore never been greater and ecological restoration remains the foremost tool to achieve this. However, seed availability to restore large areas remains a limiting factor. Hence, there is urgent need to reduce seed requirements for ecological restoration while maintaining maximum ecosystem recovery. This study aimed at determining minimum optimal seed sowing densities to restore Swartland Shale Renosterveld and reach the desired plant diversity and vegetation cover. Also, the study aimed to develop an effective restoration protocol for SSR plant species, such as Helichrysum, that are difficult to restore. Methods included different seed sowing densities, with 50%, 75% and 125% of the recommended sowing density tested. Also, seed viability, germination and pre-treatment methods were tested. The seed amount sown had no significant difference on species richness, vegetation cover or species abundance. Only the control treatment, where natural recruitment was tested, had significantly lower recruitment. Poor recruitment of Helichrysum was either due to low seed viability or pre-treatment method, reasons varied between species. This study shows that by even using half the recommended seed amounts, similar restoration outcomes can be reached. Therefore, testing minimal sowing densities is critical to minimize costs. There is also a need to study alternative reproduction techniques, enhancing seed viability and suitable pre-treatment methods for specific selected species / genera that are difficult to restore.

Restoration

Swartland Renosterveld: Seed Restoration of a previously ploughed field at Tygerberg Nature Reserve

Tshepo Mamabolo

restoration, resilience, renosterveld, Swartland, seed restoration, Tygerberg Nature Reserve

Swartland renosterveld, a critically endangered vegetation type within the Cape Floristic Region, has experienced extensive habitat loss and fragmentation due to agricultural activities, notably the historical ploughing of fields. This study focuses specifically on the seed restoration efforts in historically ploughed fields of Swartland renosterveld vegetation at the Tygerberg Nature Reserve. The focus points are the strategies used to restore this unique biodiversity hotspot and evaluate the resilience of the renosterveld ecosystem in response to restoration interventions. The study investigates various methods of seed collection, storage, and dispersal, alongside soil preparation techniques tailored to the specific ecological requirements of renosterveld species. By assessing the germination success and survival rates of indigenous flora, the aim is to identify optimal practices for re-establishing a self-sustaining plant community. The findings contribute to understanding the ecological dynamics and resilience mechanisms inherent to the renosterveld.

Pollination

Supplemental feeding impact on nectarivorous birds and bird-pollinated plants in young fynbos

Asekho Mantintsilili

Supplementary feeding, Nectarivorous bird, Plant-bird mutualisms, Young vegetation, Visitation rate

The use of supplementary sugar-water feeders to feed nectarivorous birds has gained popularity worldwide, including in South Africa, and may put pressure on plant-avian pollinator mutualism. This study explored the impact of supplemental feeding on plant-bird mutualism in post-fire environments with young vegetation, where nectar-feeding birds often have limited resources. We examined the effects on bird abundance and visitation rates at young and old sites during winter and spring. In winter, bird abundance was higher at natural sites than feeders, with the older site showing increased abundance during the experimental phase (when feeders were present). The young site showed no difference between pre-experimental (before feeders were present) and experimental phases. In spring, both sites had higher bird abundance than feeders, with no significant differences between timeframes. Bird visitation rates in winter were significantly lower at flowers growing at the young site compared to feeders, while no difference was noted at the older site. In spring, the young site saw more bird visits to flowers than feeders, with no differences at the older site. These findings suggest that supplemental feeding variably affects bird abundance and visitation, attracting birds in resource-limited environments during seasons of low resource availability and potentially impacting plant-bird mutualism. In resource-rich environments and during seasons of high resource availability, feeders do not significantly alter visitation patterns. This highlights the need for careful consideration of supplemental feeding in conservation, especially in young post-fire vegetation.

Conservation initiatives

Five years into our conservation strategy and we look back to look forward.

Kerry Maree

Funding fynbos; Table Mountain Fund; Fynbos conservation strategy

"The Table Mountain Fund (TMF) is a capital conservation trust fund that was established in 1998 with funds from local and international sources. Founded by WWF-SA, the fund has invested over R100 million into more than 350 fynbos conservation projects based with the Cape Floristic Region.

In 2019, TMF launched its new conservation strategy which highlighted four main programmes for investment: Pride, Prosperity, Fynbos Forever and Care Programmes. In addition, a clearly defined Theory of Action which highlights how we intended to bring about change as well as a subset of important considerations were identified and introduced to the fund and partners.

Although it has already been decided that the TMF conservation strategy will be supported by a second term of granting between 2024 and 2028, the management team have carried out an intensive review on the performance of our projects and programmes over the last four years to help inform our approach going forward. We aim to identify those TMF objectives which were well addressed and what gaps remain and should (or perhaps should not) be prioritised going forward. We bravely share our learnings and even failures with our partners and provide a glimpse into the priority funding areas for the years ahead. "

Restoration

The effect of polymer coating technology on selected fynbos seeds to overcome ecological barriers for restoration in Lowland Sand Fynbos

Bongiwe Mbombo

Seed coating technology, coating material, seed germination, fynbos, seed dormancy, restoration

Seed coating technologies are mostly used by the agricultural sector to improve germination, emergence, and crop survival. Such technologies have been tested on native seeds in Australia and America to overcome ecological barriers for restoration in dry lands, but no work on native species has been reported in South Africa. Recognising this gap, the polymer coating technology including ash (germination promotion), smoke-water (germination promotion), and chili flake (seed predation prevention) coating materials was evaluated against seed germination of five shrubs in petri dish experiments. Species included (=Anthospermum aethiopicum, Cliffortia polygonifolia, Diosma oppositifolia, Passerina corymbosa, and Pelargonium capitatum, one restio (Thamnochortus punctatus), and Panicum miliaceum as an assay species. The coating materials were tested as fillers (powder) and at concentrations of 50% and 100% (water or solvents) and they all had a significant effect ($p<0.0001$) on the germination of the selected fynbos seeds except for C. polygoniflia seeds coated with solvents ($p=0.1$). Controls had higher germination percentages in four species and coated seeds from three species were slower to germinate than noncoated seeds. The highest germination of coated seeds was observed on P. miliaceum (65%) and T. punctatus (22.5%) seeds coated with smoke-water. Chili flakes coating material (50% and 100%) improved A. aethiopicum germination by 21% and 17%, respectively compared to 46/42% germination of the control. Results suggest the need to use germination ques to first overcome dormancy prior to coating the seed. To overcome ecological barriers for restoration in Lowland Sand Fynbos, more research is required.

POSTER

Pleistocene sea-level changes as a driver of incipient speciation in coastal endemic Stoebe daisies (Gnaphalieae: Asteraceae)

Kayleigh Mengel

Cape Flora, coastal endemic, next-gen sequencing

The Cape Floristic Region (CFR) is a region of incredibly high species diversity and endemism, and various drivers have been noted as casual to this expansive diversification. However, the role of sea level changes as a driver of speciation is poorly understood. Pleistocene sea level changes have greatly impacted the assemblage and distribution of coastal flora in the CFR, particularly for coastal endemic species restricted to alkaline, calcareous substrates. During glacial maxima, sea-levels were drastically lower, effectively doubling the size of the CFR, and uncovering large expanses of calcareous substrates. As sea-levels rose to contemporary levels, suitable alkaline coastal habitats were fragmented, resulting in highly isolated populations constituting unique, and often rare, flora. It is likely that the extreme isolation of coastal habitat fragments will pose a harsh barrier to gene flow, particularly for species with limited dispersal ranges, as in the Stoebe daisy clade. This study will aim to investigate if these barriers are driving incipient speciation in eight species of Stoebe by generating genome-wide SNP data through genotyping-by-sequencing. These data will be used to quantify population-level genetic differentiation through Fst, number and location of “private alleles” and patterns of isolation-by-distance, within six populations for each species. Comparisons will be made within species pairs, where each pair will consist of one coastal endemic and one closely related, non-coastal endemic species. This study will provide further understanding of the complex web of drivers that have shaped the Cape’s unique flora, while also providing insight into gene flow patterns in these highly fragmented, and often threatened coastal environments.

PROMOTIONAL STALL

The newly constructed Seed Bank

Millennium Seed Bank Team

Seed conservation, Seed Bank, Millennium Seed Bank

"The Millennium Seed Bank Partnership is the largest ex situ plant conservation project in the world. Our focus is on global plant life faced with the threat of extinction and plants of most use for the future. Millennium Seed Bank Partnership (MSBP) is an international ex situ plant conservation project aiming to collect and conserve seeds from 25% of the world's orthodox plant species. The project is working with partners across 80 countries including South Africa. It has been working in partnership with the South African National Biodiversity Institute (SANBI) for the past twenty-four years.
The project makes a significant contribution to conservation by collecting and banking the seeds from native wild plant species. The seeds, together with herbarium specimens and field data are collected and currently sent to the Millennium Seed Bank in the United Kingdom. Duplicate collections will soon be dispatched back to South Africa, once our own Seed Banking facilities are operational in the coming weeks. The seeds will now be banked in South Africa, with backup collections securely housed in the United Kingdom.
Encouragingly, the seed bank is instituted within the confines of the Kirstenbosch National Botanical Garden. The objective of this proposal is to increase awareness and appreciation for the invaluable work we undertake, shedding light on the state-of-the-art infrastructure that now stands ready to house our seeds for long-term preservation. Through the concerted efforts of the Millennium Seed Bank Partnership project in South Africa, numerous plant species within our richly diverse flora will find protection against the looming threat of extinction.
"

POSTER

Protocols for in-vitro seed germination and callus induction for Freylinia visseri (CR) and Gladiolus roseovensus (CR).

ZAMASODI MKHUNGO

In- vitro, Seed germination, Callus Culture, Conservation, Ecological Restoration

The flora of South Africa is experiencing significant decline due to plant poaching, agricultural activities, and various environmental factors. Freylinia visseri, previously extinct in the wild due to agricultural impact, it was reintroduced to its native veld in 1992 through collaborative restoration efforts. Despite subsequent conservation measures, it remains critically endangered, with only 15 mature plants known in the wild. Similarly, Gladiolus roseovensus had approximately 200 wild plants in 2008, but due to afforestation and invasive alien species, only three of the original four subpopulations persist. This study aims to develop protocols for testing totipotency by extracting callus from in vitro germinated seedlings, facilitating the recovery, restoration, and reintroduction of these species. A qualitative approach will be employed, using corms, stems, and leaves as explants. These explants will be treated with auxins, cytokinin's, and a combination of both, with each hormonal treatment replicated eight times. Treatments will be subjected to both light and dark conditions to induce callus production. Data will be analyzed using R Studio, with Analysis of Variance (ANOVA) and Pearson correlation tests applied. Tukey's Honestly Significant Difference (HSD) test will be used to determine statistical significance. The anticipated outcome of this study is that hormonal treatments will stimulate callus formation, leading to robust root and plant growth in both fynbos species. This research is expected to contribute significantly to the conservation and restoration of South African flora.

Data tools and products

How to use iNaturalist and CarryMap as tools for field vegetation data and introducing

National Vegetation Map 2024 beta

Kagiso Mogajane

Vegetation type, Data, Map

"Since 2018 we have leveraged the wealth of data and contributors from iNaturalist into enhance the VEGMAP through the VEGMAPhoto. iNaturalist's extensive database, supported by a community-driven approach, ensures that information is continuously updated and verified, offering reliable real-time data about vegetation types' species and plant assemblages, among other things.
Meanwhile, the CarryMap app is an invaluable tool for VEGMAP users. It provides offline and mobile access to the National Vegetation Map. The application's GPS functionality enables users to pinpoint their exact location and cross-reference it with the vegetation types mapped in the National Vegetation Map, facilitating accurate field identification of vegetation types. Using iNaturalist for data collection and CarryMap for vegetation type identification, the VEGMAPhoto project can achieve higher accuracy and efficiency in the visual representation of vegetation types across South Africa, contributing to the better understanding of vegetation patterns and the field condition of vegetation types.
I will share these tools with the Forum and how contributors can make use of them to contribute to the VEGMAP Project. Thereafter we will share a video presentation of the next version of the National Vegetation Map 2024 beta. This version includes a full remapping of vegetation in the North-West Province (including many savanna and grassland types), a re-delineation of VhaVenda Miombo, small changes to the boundaries of Elim Ferricrete Fynbos and surrounding vegetation types, the addition of new Southern Afrotemperate Forest polygons in Langeberg, and the addition of five new strandveld types in the Fynbos Biome.
"

Assessing the response of Aspalathus amoena to different disturbance regimes in Breede

Alluvium Fynbos agroscapes in the Western Cape, South Africa.

Fadwa Mohammed

Fynbos, disturbance regimes, response, land use planning

"Two plant species of conservation concern, Aspalathus amoena (Critically Endangered) and Serruria fasciflora (Near Threatened), were dominant in areas where the soil was disturbed/cleared for agricultural development. The remaining natural areas on the farms have a high conservation value. If there is no proper farm planning or if the current conservation strategy of land use exclusion in some alluvial Fynbos habitats continues, the species Aspalathus amoena may likely go locally extinct. This study aims to understand the ecology and distribution of seemingly secondary successional plant species, such as Aspalathus amoena and intact patches of alluvial Fynbos in the Breede River area to ensure proper land use and farm planning that would protect the species and provide connectivity between intact Fynbos populations. It is hypothesized that Aspalathus amoena is a pioneer reseeder in secondary succession and thrives on periodic disturbance. Sixteen vegetation monitoring plots will be set up. The disturbance types that will be examined are brush cutting, veld fires and ploughing. Due to the vegetation characteristics in the study site, the plots will be 20x5 meters in size to accommodate larger and smaller plants. Within the plots, plant species diversity, composition, structure and life form diversity will be assessed. A corresponding 100m transect line at the site will be used to assess vegetation cover through the descending point method. Sites will be monitored for a full year to capture species that may be dormant during a certain time of the year. Conserving natural vegetation would ensure the presence and movement of biodiversity on a farm, the connectivity of natural vegetation and resources and ultimately a healthier Agro-ecosystem.

"

POSTER

Monitoring endangered plants in the greater Stellenbosch area: our mission and work

Nicolaas Tobias Moolman

Conservation, biodiversity, monitoring, data collection, CREW

"The Cape Floristic Region is renowned for its extraordinary diversity of plant species. CREW (Custodians of Rare and Endangered Wildflowers) volunteer groups play a crucial role in monitoring and protecting taxa of conservation concern across large parts of this region. However, the Stellenbosch area is currently not served by a dedicated CREW volunteer group to conduct monitoring, data collection, and conservation projects. This is despite the large availability of eager volunteers and large number of threatened species.

I was recently put forward as the CREW Champion of the new Cape Winelands CREW to form a volunteer group, and I am committed to engaging both students and the broader Stellenbosch community in establishing a consistent and dependable team with the support of CREW and the Botanical Society of South Africa. I think the Fynbos Forum is the perfect platform for myself as a young scientist to garner interest in the group and gain public input and support for our mandate in the area.

I propose to present a poster that will provide details on our target species, upcoming workshops, projects, field trips, and the specific areas we intend to cover. Through these activities, we hope to build a sustainable network of dedicated volunteers and experts working together to protect our region's precious plant biodiversity.

Through meticulous monitoring, data collection, habitat protection, and strategic collaboration, we strive to protect and monitor the species of conservation concern identified by the threatened species unit (SANBI) and CREW. By involving the community, we aim to raise awareness about the importance of plant conservation and inspire a sense of stewardship for our natural heritage.
"

Debbie Muir

Essential components of effective regional guidelines for registration of biopesticides and biological control agents

Biopesticides, IPM, harmonized frameworks, regulatory practices, agriculture

There has been a steady decline in African food exports over the last few years. While sub-Saharan Africa was a net exporter of food before 2000, the region, which is home to 13% of the world's population, now has a net food deficit of $7 billion and accounts for less than 3% of global agricultural exports. Part of the reason for the massive decline in exports is the heavy reliance on chemical pesticides that makes it difficult for growers to comply with residue standards in export markets, a situation that has been compounded by the ever-decreasing Maximum Residue Levels for pesticide residues on food that continues to be a technical barrier to trade. Overuse or misuse of chemical pesticides also comes with significant environmental, ecological and human health impacts. Even though biopesticides (which are adaptable to current IPM technology and include benefits such as short-lived environmental fate and low toxicity) have great potential in reducing the use of synthetic chemical pesticides in agriculture, they still constitute less than 3% of the global pest control products market. Challenges facing the use of biopesticides include, inter alia, the fact that, in many countries, they are evaluated and registered following the same system as for chemical pesticides. This causes unnecessarily high and inappropriate regulatory burdens for product developers. The establishment of more tailored and harmonised regional mechanisms for evaluating and registering biopesticide products would make it possible to get more of these products to market, as countries with common regulatory practices, would be able to benefit from, among other things, reciprocal acceptance of data generated, or registrations concluded elsewhere. It would also permit limited resources to be shared amongst member states and improve the regulatory management of biopesticide products manufactured, traded, and used.

Promoting local, small-scale plant conservation through volunteer stewardship

Kayleigh Murray

Conservation guidelines; community-based; volunteerism

"The Cape Floristic Region (CFR) is a global biodiversity hotspot of conservation priority, renowned for its extraordinary biodiversity. The region currently faces mounting threats from land-use change, climate change, and the spread of alien invasive species. With the guidance and expertise of botanists and conservation practitioners, there is a significant role for civil society to play in actively conserving their local green spaces and increasing the capacity of our institutions to respond to these threats. The Botanical Society of South Africa's is a member-driven organisation that offers citizen scientists, amateur nature enthusiasts and the general public the opportunity to be actively involved in the solutions to biodiversity challenges. BotSoc's conservation programme aims to mobilise small-scale, low cost community-driven initiatives to conserve local green spaces within the framework of our conservation strategy and branch priorities. I will present our preliminary branch conservation guidelines in a poster at Fynbos Forum to stimulate conversation around the promises and potential drawbacks of community-based conservation programmes in conserving local biodiversity. These branch guidelines are being piloted in BotSoc's Cape region, namely the Weskus branch, and aim to direct local interventions to priority biodiversity areas. These guides will provide decision-making tools for prioritising core conservation actions linked to existing initiatives, such as threatened plant monitoring (CREW-linked), invasive alien clearing (linked to existing networks), species rescue with partner nurseries, and educational programmes on land under different ownership structures. The poster will include examples of existing local initiatives supported by BotSoc's conservation programme, including our work supporting the poaching crisis response at Karoo Desert BG and propagation of indigenous medicinal plants.
"

Conserving the Golden Moles of the South African West Coast

Samantha Mynhardt

small mammal, detection, conservation, environmental DNA (eDNA)

Golden moles are small subterranean mammals endemic to sub-Saharan Africa. Most species are severely range-restricted, due to poor dispersal ability, and are therefore highly vulnerable to population fragmentation and isolation. Habitat transformation, resulting from urban development, mining and agriculture, is the major threat facing these animals. Of the 21 species, ten are listed as threatened (CR, EN or VU) on the IUCN Red List. Four species occur in the Fynbos and Succulent Karoo Biomes of the South African west coast: The Cape golden mole (Chrysochloris asiatica; LC), Grant's golden mole (Eremitalpa granti; LC), De Winton's (Cryptochloris wintoni; CR) and Van Zyl's golden moles (Cryptochloris zyli; EN). We, the Endangered Wildlife Trust, have been working towards the conservation of the latter two threatened species, by developing methods to track them down in the wild, better understand their distributions, and protect their habitat. After trialing various detection methods, including thermal imaging drones, scent-detection dogs and environmental DNA (eDNA), we developed a reliable approach and were able to rediscover a species that had been lost to science for over 80 years. We are using eDNA to map species distributions for various golden moles and other threatened species, and we know that this approach to species detection and biodiversity monitoring has the potential to revolutionize the field of conservation science.

Reviewing observed climate change impacts on plant communities in Mediterranean-type ecosystems

Hana Petersen

Climate change, plant communities, Mediterranean-type ecosystems

Mediterranean-type ecosystems (MTEs) are projected to be among the most vulnerable terrestrial ecosystems to global change in the long term. Much research has gone into understanding how plant communities in these regions may respond to future climate change scenarios using experiments and modelling approaches, but few articles have reported how they have already responded to ongoing climate change. We conducted a systematic review of observed climate change impacts on plant communities in the five global MTEs followed by thematic analysis to determine (i) the primary drivers of vegetation change that have been reported, (ii) the most common vegetation responses observed and reported, (iii) which plant communities appear most impacted, and (iv) the conservation efforts that have been suggested and/or successful in mitigating these changes. We compare and contrast the emerging trends across MTEs, and report on the summary findings, discussing relevance for the Cape Fynbos.

Biodiversity origins and ecology

Alastair John Potts

Thicket, Fynbos, Flammability, Exaptation, Climate

The Fynbos biome in the southwestern tip of Africa experiences a wide range of precipitation and temperature. The mean annual precipitation varies from 100 to 3100 mm, while the mean monthly minimum and maximum temperatures cover a range of -12°C to 32°C. Since fire is crucial for maintaining its open structure and preventing forest encroachment, the evolution of highly flammable plant traits is a perplexing question. The plant traits associated with flammability, such as a large proportion of dead and/or fine fuels and phenolics, are unlikely to have evolved to promote flammability at the community level. In this talk, I will use the Climate Leaf Analysis Multivariate Program (CLAMP), a method for estimating paleoclimate using leaf physiognomy, to analyse modern-day fynbos and thicket communities. Surprisingly, the predicted climate of the thicket community from leaf analysis aligns with the actual climate, whereas the predicted climate diverges significantly from the actual climate for the fynbos community, being far colder and drier. This may provide insight into the exaptation of flammable plant traits.

Quantifying resilience: within and between biome tipping points in palaeoecological data from the Cape Floristic Region, South Africa

Sabine Prader

forest-fynbos; resilience; palaeoecology; GAM; regime shifts

"Understanding what controls Fynbos ecosystem's capacity to buffer against and recover from environmental stressors is essential to better understand how fynbos might respond in a warmer, drier environment. Palaeoecological data can be used to study aspects of long-term ecological resilience and resistance as the longer time windows provide insights into past responses to changes in disturbance regimes and climate.
Orange Kloof is an excellent study site to investigate the factors influencing ecological resilience as it comprises fynbos and forest vegetation elements. Fynbos and forest exist as alternate stable states and are naturally maintained by feedbacks between vegetation, fire and climate. The site provides opportunity to study changes in fynbos and forest dominance and changes in the internal composition of fynbos that may buffer changes until critical thresholds are crossed. Furthermore, fynbos is Orange Kloofs environment is anthropogenically controlled since European settlement (1652 CE), which affected forest extent through logging and fire suppression.

We analysed a palaeoecological sequence from Orange Kloof to quantify the temporal dynamics of key components of the fynbos/ forest ecosystem over the past 3690 yr. We used generalized additive models (GAM) to quantitatively detect major transitions between ecosystem states and further statistical modelling to determine possible causes of such ecosystem shifts.

So far, our methodology identified an internal turnover of fynbos from an asteraceous- to an ericoid-dominated fynbos state at around 150 CE, signalizing resilience through internal reorganization. But within the last ~ 3500 yr. the mechanism of resilience of fynbos became overwhelmed twice resulting in a regime shift where fynbos contracted at the expense of afrotemperate forest. While fynbos could recover from the first regime shift, the last quantified period of fynbos capacity to buffer against disturbance ended with the beginning of the 20th century, leading to forest dominance. Our method further identifies a trend towards fire exclusion in the most recent decades.

The results suggest that current levels of forest dominance are unusual in the context of the late Holocene history of Orange Kloof, which could lead to further losses of unique fynbos vegetation. The internal shifts in fynbos composition provide a glimpse of how at Orange Kloof's may shift in hotter, drier climates that are accompanied by more fires.

"

WORKSHOP

Accessing iNaturalist data for research and management

Anthony Rebelo

iNaturalist, Citizen Science, data, download

"

iNaturalist has become a powerful citizen science tool, and with (as of June 2024) 4.5M observations of almost 44k wild species in southern Africa, an indispensable data source for research, planning and management in biogeographical, conservation, phenological and climate change sciences. Although iNaturalist data can be accessed via GBIF, or downloaded directly, it is crucial to understand the definitions and limitations of the data available.

This workshop will introduce data users to the quirks of the iNaturalist data, as well as the tools needed to clean and prepare the data for downloading, how to obtain additional information, and how to encourage and enlist citizen scientists to contribute specifically to your research or management projects. The identification-curation tool, data quality assessment, filtering data, accessing observation fields and project design will be addressed. This is an intermediate level course, and wont deal with data extraction and manipulation via APIs and programming.

Participants are expected to have signed up, and contributed at least a dozen observations to iNaturalist, and to have an interest in exploring and using citizen science data. Please bring your laptop to the workshop.

"

KEYNOTE

PSHB invasion of urban, agricultural and natural habitats in the Cape Floral Region

Francois Roets

PSHB, CFR, invasion, Afromontane

The polyphagous shot hole borer (PSHB) beetle is a pest of global significance. Together with its mutualistic fungal partners, it can quickly kill susceptible woody hosts. Its impressive host range includes a multitude of native and exotic species, many of which are considered ecologically and economically important. Originally from southeast Asia, it has invaded Israel, California, Hawaii, South Africa, and, most recently, Australia and Brazil. South Africa boasts the largest global geographic outbreak even though PSHB was first detected only in 2017. The greatest current impact is in urban forests where it leads to considerable economic losses. Agricultural impact in South Africa has yet to be realised, but PSHB has now been found investing multiple crops. Ecological threats posed by the invasion of PSHB into native ecosystems may be severe, yet are globally understudied. It has been recorded from numerous indigenous tree species in gardens where it rapidly kills susceptible species. PSHB has now also been recorded invading native forest systems in South Africa including parts of the Cape Floral Kingdom (CFR). This presentation will describe the current PSHB invasion in South Africa and in the CFR, highlight the challenges presented by it, and present an overview of current research.

Invasive species control

Willie speel nie' - Innovative clearing of invasive alien plants in the Kammanassie Riversystem

Dr AnneLise Schutte-Vlok*

conventional clearing, controlled burning, drone spraying, follow-up clearing, partnerships

CapeNature, Private Bag X658, Oudtshoorn, 6620.
* Research associate, Dept of Botany and Biotechnology, University of Johannesburg.
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Water is a scarce commodity in the Klein Karoo and as such can easily lead to a great deal of conflict within and amongst communities. During 2020-2021 farmers living downstream and dependent on water from the Kammanassie Dam complained heavily about the poor flow of water into the dam, and accused the upstream farmers of exceeding their water user rights and illegally expanding their agricultural developments. Upstream farmers in return put the blame on the dense infestations of invasive alien plants in the Kammanassie River system. This led to the intervention of the Breede-Olifants Catchment Management Agency (BOCMA), Western Cape Dept of Agriculture: LandCare, CapeNature and the Stompdrif-Kammanassie Water Users Association (SKWUA). BOCMA funded the mapping of invasive alien plant species in the river system.
A pilot invasive alien plant clearing project in the Molen River, a main tributary of the Kammanassie River, was undertaken using manual clearing, burning and followed up with drone spraying with herbicide. This method worked exceptionally well and the costing far less than conventional clearing methods using contractor teams. The project is currently focussing on the Kammanassie main river channel and since November 2023 a stretch of 20 km covering 120 ha have been cleared with densities between 50 and 60%. This has led to the strengthening and building of new partnerships amongst key stakeholders – the bottom line being learning through doing.

"

Charlotte Stafford

Impacts of Fire and Grazing as Potential Management Strategies for Fynbos Vegetation in the Cape Floral Region

Management, Fynbos, Fire, Elephant, Biodiversity

Understanding the effect of different management strategies on the biodiversity of Cape Floral Region (CFR) is crucial for informing the implementation of conservation efforts aimed at preserving this highly endangered ecosystem. In this study, we investigated the impact of fire and different grazing pressures on the species richness of the Fynbos shrublands, a type of Cape Floral vegetation. Conducted on a Big-5 game reserve in the Western Cape Province of South Africa, our experimental study aimed to assess the efficacy of different management approaches in promoting vegetative biodiversity. Using unpaired t-tests we compared between the treatments individually as well as their combined effects. Our results revealed that the non-burnt, grazed areas had the highest species richness and the added grazing pressure of megaherbivores like elephants did not influence this effect. There has been previous studies on other vegetation types within the region but their findings do not align with this study on fynbos, suggesting that the consideration of different vegetation types is needed in management decisions within the region. The findings in this study highlight the importance of the presence of grazing mammals in promoting vegetative biodiversity and provides evidence that large mammals can exist in reserves like this without detrimentally harming the vegetation. It also emphasises the requirement to consider historical land use and burn history when assessing the impacts of management strategies on the biodiversity of the vegetation.

Invasive species control

Management of Billardiera heterophylla in the Western Cape, South Africa

Talifhani Takalani

eradication, invasiveness and extirpation

"Management of Billardiera heterophylla in the Western Cape, South Africa

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Billardiera heterophylla, commonly known as Bluebell creeper, is an intertwined, woody climber that grows up to 5 m tall. This species is native to south-western Australia and is naturalised in California and south-eastern Australia where it invades heath-, grass- and woodlands. Billardiera heterophylla was first recorded in South Africa in 1959 where it was found spreading from a garden planting in the Kirstenbosch National Botanical Gardens in Cape Town. A second invasive population was discovered on the slopes of Little Lion's Head (Klein Leeukoppie) in Hout Bay in July 2014, which also appears to have escaped a garden planting. Both known populations are of concern as they border the Table Mountain National Park and pose a risk to local endemic and threatened ecosystems. More recently a third population was discovered in December 2020 at the De Hel Conservation Area near.... These detected incursions of Billardiera heterophylla prompted a rapid assessment of its invasiveness and eradication feasibility for South Africa. Billardiera heterophyla is currently listed as a category 1a species according to South African legislation and therefore requires compulsory control. In September 2014 clearing of B. heterophylla and data collection was initiated in Hout Bay. Here, we present progress made on the management interventions of B. heterophylla and speculate about the feasibility of eradicating the species in South Africa.

POSTER

Effects of rooting hormone and rooting medium on the rooting of Acmadenia alternifolia and A. heterophylla

Phophi Ceri Thovhakale

Vulnerable, Least Concern, Rotting hormone, rooting medium

"

Belonging to the aromatic Rutaceae family, Acmadenia alternifolia and A. heterophylla are plant species endemic to the Cape floristic region. According to the red-list of SA species, A. alternifolia is classified as vulnerable while A. heterophylla is classified as least concern and is a potential ornamental plant used in the horticultural industry. A. alternifolia is distributed from Knysna to Plettenberg By while A. heterophylla naturally occur on the hills and limestone outcrops around Bredasdorp in southern Cape. They are both propagated asexually and sexually however, asexual propagation presents challenges, hindering plant cloning which is rapid. This plant species must be propagated using a vegetative propagation procedure in order to maximize its rooting potential. The research aims to determine the most effective rooting hormone and medium to promoting high rooting in these two species. The study will take place at Kirstenbosch NBG's, where healthy, disease-free, plant materials will be collected from mother stock plants. Quantitative methods will be used to collect and analyze data on rooting. Various rooting mediums will be tested, including combinations of 1:1 vermiculite and bark, 1:1 perlite and vermiculite, 1:1 perlite and bark, 7:3 perlite and bark and 7:3 vermiculite and bark, and each 10 cuttings will be treated with Elsenburg 1,2,3 and Dynaroot 1,2,3 and 10 cuttings not be treated that will be control in 7:3 Perlite and Bark. Cuttings will undergo a period of 9-12 weeks in mist units on heated benches. Data analysis will done using Excel, ANOVA, and graphs to compare growth parameters such as rooting percentage, rooting length, and shoot length. Low rooting success poses a challenge to the propagation of both species. This research therefore aims to contribute to conservation efforts by contributing towards the development of a vegetative protocol for the threatened A. alternifolia and the ornamental A. heterophylla."

POSTER

Ecological condition mapping of natural remnant vegetation in South Africa: how to assess ecological condition in the Fynbos biome?

Curtley Wayne Tonkin

ecological condition; ecosystem pressures; Red List of Ecosystems

Mapping ecological condition of ecosystems is crucial for determining ecosystem threat status, however current methods to do this such as using land cover datasets have limitations. These maps show changes in ecosystem extent (e.g., habitat loss due to urban transformation) but miss crucial processes of ecosystem decline and function. For example, areas invaded by plant species such as Hakeas and Acacias might not be reflected in land cover maps, leading to a misleading "natural" classification in heavily invaded areas. Fortunately, advancements in remote sensing and GIS offer new opportunities to overcome these limitations. Using the IUCN Red List of Ecosystems (RLE), this method assesses changes in key ecological indicators (adapted to each ecosystem) to infer threats and their impact on ecological condition. For South Africa's Fynbos biome, fire regime disruptions and invasive alien plants are identified as top pressures. To map ecological condition and changes, we plan to combine methods such as: Remote sensing to track vegetation cover and fire patterns, species distribution data to identify degraded areas, and analysis of species composition changes. This research, part of the SBAPP project, aims to develop national spatial databases on ecological condition. While some data will cover the entire Fynbos biome, detailed interpretations require expert input and local perspectives from the beginning to ensure accurate condition assessments at the bioregion and ecosystem functional group levels.

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Invasive species control

Herbicide impacts on target and non-target vegetation in a fynbos environment, South Africa.

Ira Tzitzika

Herbicides, Glyphosate, Invasive clearing, Fynbos, Residuality

The management of unwanted vegetation in natural areas in South Africa, involves a combination of manual/motor-manual weeding and/or the use of systemic herbicides, which are considered important for the effective control of invasive aliens. These herbicides, although successful on targeted species, may also have an impact on the non-targeted species that are inadvertently exposed to the active ingredients. The aim of this research is to determine if registered herbicide products are successful in managing alien invasive species within a degrade fynbos environment as well as to determine the impacts of these treatments (active ingredients being glyphosate, imazapyr, triclopyr, picloram and metsulfuron-methyl) on established and/or newly germinated native vegetation. The three trial sites are located at Jonkersberg (Western Cape), which were selected due to the uniform distribution of invasive trees and seedlings of the dominant species in the area (Pinus radiata, Eucalyptus camaldulensis, and Acacia mearsnii). A Randomised Complete Block Design (RCBD) was implemented were each trial site consisted of seven plots (each plot measured to 15 20 m with 5 m buffers in between). Within each treatment plot, 10 subsequent permanent quadrats of 2 2 m were used for sampling and assessments. From the preliminary results, it is evident that the treatments do not have any effect on the native established vegetation (such as fynbos), however the data suggests that there is a difference in the cover abundance of grasses. From this data, one can conclude that the treatments are successful, although more research needs to be done on the long term effects on the environment and residuality of the respective treatments.

Dung and carrion beetle diversity in relation to forest size and isolation

Graham van Bergen

edge effect, intermediate disturbance hypothesis, southern Afrotemperate forests

There are limited local studies on the effects of forest size and isolation on dung and carrion beetle diversity that are found within the southern Afrotemperate forests in the southern Cape region. It has been noted that forest habitats support a greater beta-diversity of dung beetles but is threatened by habitat transformation. Dung and carrion beetles are taxonomically well known but there is little information on how forest size and isolation will impact the movements of these species, including their diversity and distribution patterns. The aim of this research is determining whether southern Afrotemperate forest size and isolation will have significant effects on the distribution and diversity of dung and carrion beetles around a peri-urban campus in the southern Cape, South Africa. Study design consists of 16 sites, 8 isolated forests and 8 continuous forest sites, where three baited pitfall traps (100% dung, 100% carrion and 50:50 dung:carrion ratio) were placed per site, positioned in a triangle formation. Mammal observations were recorded for 15 minutes to search for potential signs of mammals' presence. A total of eight dung and carrion beetle species were found (eight species from isolated forests and three species from continuous forests). The results show isolated forest have more species and abundance of beetles compared to continuous forests, but the average species richness per site didn't differ significantly. We show that forest size and isolation impact on beetle species richness and abundance. Thus, small forest patches in transformed landscapes can retain relatively high levels of beetle diversity.

If heathy ecosystems are necessary to buffer climate change. Then why are there so few restoration practitioners?

Johann van Biljon

restoration, practitioner, survival, resilience, adaptability

Restoration practitioners are rare creatures in the Cape Floristic Kingdom and there are numerous reasons for this. The science of restoration is complicated, ranging from ecology, botany, soil science, horticulture, hydrology and the likes. But science does not necessarily make you successful in a business world with managing cash flow, SARS, difficult clients, government tenders, bureaucracy, audits and labour challenges. Johann will share some of his 20year journey as a restoration practitioner with some honest hard truths, how to navigate tricky situations with a creative-humorous attitude. This will range from; a) managing risk (unpredictable weather events, seedling predation, water challenges, livestock) while fulfilling funding requirements and reaching targets. b) Working in team with ground staff requires (but not only limited to) effective leadership and communication skills. c)Networking and resourcefulness.

A protocol to address the impact of biological invasions on native species range shifts in response to climate change: Implications within protected areas

Dewidine van der Colf

Species distribution modelling, Climate change, conservation planning

The Kunming-Montreal Global Biodiversity Framework Target 1 requires that we reduce impacts on species, through effective protection. Protected areas are one of the tools that can be used to support achieving this goal. Protected areas can prevent habitat destruction and degradation. However, in many protected areas, invasive alien species impacts are one of many factors influencing their effectiveness. Protected areas also need to respond to climate change-driven responses from species, for example, species ranging shifting. How these range shifts align with current and future protected areas will influence these species' protection. Such shifts can be hindered by various factors including the presence of invasive alien species. Dense monocultural stands of invasive alien plants can act as physical barriers to dispersal, both by increasing the distance between suitable habitats and by preventing the dispersal and establishment of propagules. Here, we proposed a 5-step approach for exploring the interactions between invasive alien species presence and climate change-driven range shifts of native plant species, in the context of invasive plant management within protected areas: 1) identify the native species' current range; 2) model the future suitable bioclimate, 3) eliminate areas that are transformed and/or invaded from the future suitable range; 4) identify dispersal corridors between the current range and the future suitable range and where these are blocked by the presence of alien species, and 5) identify locations critical for alien plant clearing and/or formal protected area establishment to enable climate change-driven range shifts. We proposed data resources (including for species, land transformation and invasive alien plants) and detailed modelling approaches (e.g., species distribution modelling and Network Flow) for each step. We explored the use of this approach for Leucospermum truncatum (H.Buek ex Meisn.) Rourke, an endemic Proteaceae species from South Africa's Cape Floristic Region, present in the Agulhas National Park.

Conservation initiatives

Conserving 67 % of Cape Town's Biodiversity Network:

Jacques van der Merwe

Protected Area Expansion, Cape Town, Stewardship, Land banking, 30-by-30

Cape Town's natural beauty and biodiversity makes it a unique and desirable place to live and work. The city's urban footprint however coincides with many unique landscapes, vegetation types and endemic species - most of which are now threatened. Analysis of vegetation remnant losses over the past decade shows that the lowland vegetation types continue to be the most negatively impacted. A systematic biodiversity planning approach has been used to prioritize areas of biodiversity and ecological importance in Cape Town referred to the as the Biodiversity Network (BioNet) representing 34.6 % of Cape Town. Despite many challenges, good progress has been made in securing the BioNet through proactive Protected Area Expansion and by September 2023, 65,29 % of the BioNet was conserved compared to 34,1% a decade ago. The next target is to increase the conservation estate to 67 % of the BioNet which will require an additional 1743 ha to be conserved. To this end, the Table Mountain Fund provided funding to Wilderness Foundation to partner with the City to expand its conservation estate. Funding was provided for professional services (framing of diagrams, property valuations, registration of conservation servitudes etc.) and technical incentives for private conservation initiatives (alien clearing, fencing, signage, walking trails etc.). Since 2023, the City's Biodiversity Management Branch has been expanding their influence beyond the City boundary to incorporate a 10 km BioNet buffer and to expand conservation initiatives within the key catchments supplying the City's potable water.

FIELD TRIP

Conserving 67 % of Cape Town’s Biodiversity Network

Jacques van der Merwe

Protected Area Expansion, Cape Town, Stewardship, Land banking, 30-by-30

Proposed Field trip that aligns to the Long Paper submission with same title. To visit Klipheuwel Corridor (including properties such as Damarakloof Conservation Area, Joostenberg Private Nature Reserve & Joostenbergskloof Conservation Area) roughly 25 km south of Technopark. These 'new' conservation areas showcase the challenges around urban conservation on the Cape lowlands in an immensely fragmented landscape where biodiversity is under extreme pressure. Despite the immense challenges, progress is being made with new Conservation Areas becoming established and species brought back from the brink of extinction. Both pro-active and reactive methods are being implemented to facilitate Protected Area Expansion within the most threatened ecosystems in the Cape.

Drivers and change: climate and fire

An analysis of selected influencing factors of wildfire regimes over the last three decades in the Boland Mountain Complex, South Africa

Andrie-Maryna van Heerden

Fire regime, Boland Mountain Complex, Fynbos, Fire, Influencing factors of wildfire regimes

"This study examined the influencing factors of wildfire regimes in the Boland Mountain Complex (BMC), South Africa, over thirty years. The fynbos region, covering the BMC, has high levels of endemism and is both fire-adapted and fire-dependent. Inappropriate fire regimes are a major concern for biodiversity loss and as such it is important to understand the influencing factors to facilitate decision making. This study aimed at identifying and analysing the key anthropogenic, environmental and climatic factors contributing to wildfire frequency, size, seasonality and fire return intervals over time. Utilizing a comprehensive dataset that comprises of fire records inclusive of global positioning information, satellite imagery, land use data and meteorological records, a mixed-methods approach was employed to evaluate various relationships. The results show both an increase in fire frequency and cumulative hectares burnt per year. The cumulative hectares has a statistical link to both the number of Very Large and Large category fires. These increases could be due or partly due to reporting bias or urban expansion. The fire return period from a space-time composite perspective has an average fire return interval of 8. 63 years which is currently not conducive to maximise biodiversity. Results from this research show an overall trend of an increase in fires highlighting key risks and certain geographical areas as hotspots. It is recommended that more research is done for best land use and sustainable management practices.

"

Conservation initiatives

Experiencing Fynbos on the Edge

Alrie van Wyk

Fynbos, conservation, sustainable land management, adventure tourism, via ferrata

"Alrie van Wyk [1] and Zann Brink[2]*

1 Landowner, Papkuilsfontein Guest Farm & Protected Environment
2 Programme Manager, Endangered Wildlife Trust-Drylands Conservation Programme
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The Bokkeveld Plateau near Nieuwoudtville lies in a region where the Fynbos-, Succulent Karoo- (biodiversity hotspots) and Nama Karoo Biomes converge, resulting in exceptionally high biodiverstiy. However the increase in the frequency and severity of drought is placing farmers in the region under tremendous financial pressure, which translates exponentially into added pressure on the natural resources they depend on for their livelihoods. Nieuwoudtville is traditionally a sheep-farming area but is also a popular tourism destination during the flower season. However, this season is short (around 2 months) and, in some years, less financially beneficial due to poor flower displays.
To make tourism an inclusive and sustainable future economic contributor in support of sustainable land management, partners are working together to reimagine this approach. Papkuilsfontein is a commercial small stock and rooibos tea farm and guesthouse operation and is being declared a Protected Environment. Adventure tourism provides a much-needed opportunity to develop a sustainable income stream based on an immersive and uniquely tailored experience. This includes a via ferrata (a safe, guided rock-climbing experience) that showcases the unique fynbos biodiversity found on the edges of the Oorlogskloof gorge. The overall theory of change is that if packaged correctly, this approach can be a pathway to socially responsible community upliftment and contribute to the resilience of the landscape. The business is structured to ensure that financial returns flow back and are reinvested in the conservation of biodiversity on the farm, while educational and inspirational benefits flow to the local community and tourists.
"

Bridging the gap between research and management.

Antoinette Veldtman

Research permits, management strategies

The gap between research and implementation within conservation is a well-known phenomenon. Key research is often unavailable to support vital practical implementation of conservation or management actions. This remains an ongoing issue which is challenging to address given that the pillars of adaptive management are science, monitoring and management. CapeNature has a five-year ecological surveillance, monitoring and research framework that assesses the effectiveness of management interventions to apply strategic adaptive management. However, with limited resources, we rely on much-needed research conducted by partners and tertiary institutions. Here, I analysed the research permit applications received between 2021 and 2024 to assess where the most research is being conducted, what taxonomic groups are targeted and how the research conducted by tertiary institutions and partners links to CapeNature protected area management strategies. The focus area for this analysis was the Boland Mountain Complex within the Central Landscape. Most research was conducted on faunal species, with invertebrates being most researched. Jonkershoek and Kogelberg Nature Reserves received the most research permit applications. Furthermore, very few studies are being conducted of which the results will inform management strategies that focus on fire and invasive alien plant management. Areas where more research is needed are highlighted.

Conservation initiatives

Table Mountain Fund: Prosperity programme Biodiversity Contractor Development programme.

Peter Viljoen

SMME, Biodiversity , Development

"Table Mountain Fund: Prosperity programme Biodiversity Contractor Development programme.
Key Words: SMME, Biodiversity , Development

Lincoln Meyer Training and Environmental Education Manager
Peter Viljoen: Operations Manager Contour Enviro

Abstract:
Small Medium and Micro-Enterprise (SMME) development in the environmental sector of south Africa was spearheaded by the, Working for Water program.

There are numerous studies that have been undertaken to evaluate the effectiveness of the programme and its impacts. The unintended results created a lot of dependence for those who have been trained as SMMEs and subsequently led to many issues with only a handful who managed to establish themselves as financially sustainable enterprises in this space (Coetzee & Louw 2012).

Through funding from the Table Mountain Fund Prosperity Programme, the project aimed to build capacity in four female SMME's engaged in alien clearing.

The project key objectives were to develop and enhance the business acumen and skills of four existing female SMMEs through training and mentorship; and to provide access to additional work opportunities to four SMMEs through sub-contracts.

Four existing female-led fynbos-based SMMEs identified, assessed, and selected to participate in the programme. Both accredited and non-accredited training was provided in both business management and relevant environmental training such as trails maintenance and firefighting. The three-year programme includes intense mentoring and coaching.

The project has provided significant improvements in the functionality income and productivity. The programme has significantly enhanced the business prospects of the mentees.

"

Conservation initiatives

Implementation of the Ecological Infrastructure Investment Framework: achieving biodiversity gains by addressing life's pains

John Wilson

Ecological Infrastructure, Disaster Risk Reduction, Ecosystem-based adaptation

During the height of the Day Zero drought, the Western Cape Government initiated an assessment of the risks posed by insufficient investment in ecological infrastructure as part of water security strategies. However, this process, which was spearheaded by researchers from the CSIR and bought into by many important partners, resulted in the emergence of a broader framework for investing in ecological infrastructure. In February of 2021, the Ecological Infrastructure Investment Framework ("the Framework) for the Western Cape was published, which, through co-production, arrived at four risks (namely wildfires, flooding, as well as water and food insecurity) where investment in the improved health of important ecosystems would result in substantial reductions in the aforementioned risks. Armed with these new insights the Department of Environmental Affairs and Development Planning, along with its partners, grappled with progressing the aspirations of the framework in a time of severe resource constraints. This presentation will touch on the Framework, showcase implementation efforts since 2021, and provide an understanding of the future of ecological infrastructure investment in the province. The purpose of the talk will be to provide transparency in terms of the status quo of government's ecological infrastructure investment, highlight critical challenges encountered to date, provide guidance to anyone wanting to contribute towards the Framework, and welcome insights for improved implementation.

Conservation effectiveness and looking to the future

Consider the Mediterranean Shrubland: What is Effective Conservation Action?

Julia Wood

Conservation, effective action, successful outcomes, opinions, views

This loss of biodiversity is one of the serious environmental crises of the 21st century, as it is recognised that biodiversity and the services that it provides are essential to human well-being and necessary for future generations. While there are good tools for measuring habitat decline, species subsistence, conservation planning, and protected area management, there is a lack of conceptual details on what effective conservation action is and how this is achieved on the ground. How effective conservation action links to successful conservation outcomes is often vague and ill-defined. Effective conservation action and successful conservation outcomes are thus frequently open to interpretation and can mean different things to planners, ecologists, practitioners, implementers and managers. In order to explore this topic, we interrogated the relevant literature, used this to inform a workshop of conservation practitioners (held at Medecos 2022), and, building on both these elements designed a questionnaire used to survey managers, ecologists, and people and conservation officials, in the City of Cape Town, SANParks and CapeNature. This paper compares and contrasts perceptions and views from across a range of professionals within the conservation sector. This study demonstrates the diversity of perceptions among practitioners and explores the informing factors. There is evidently scope for more work in establishing an agreed understanding to what constitutes effective conservation.