The rise of conservation in the Succulent Karoo
and the role of the Leslie Hill Succulent Karoo Trust

Timm Hoffman

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Director: Plant Conservation Unit (UCT)
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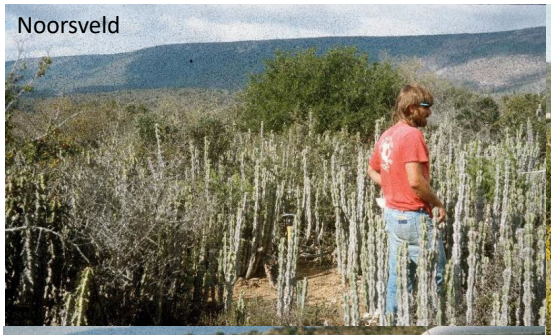
1 September 2020

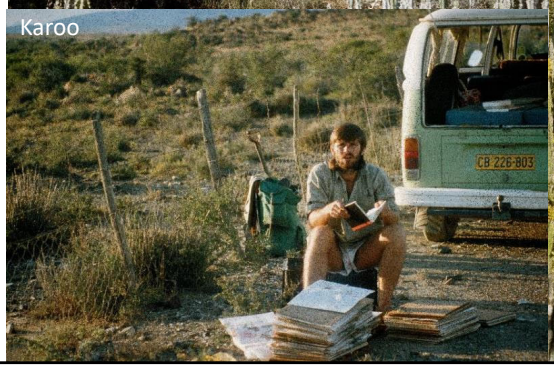
Introduction – Thank you

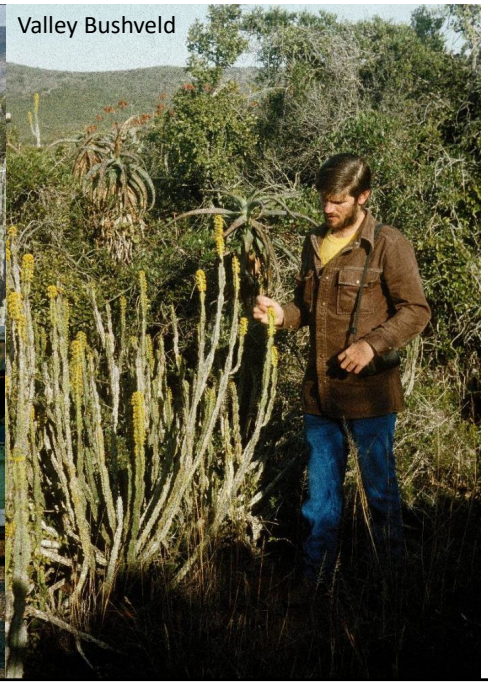
Thank you to Vusi for the introduction and to Morné and the WWF Board and all those who decided to bestow this award on me. I feel honoured to have my contributions to conservation and sustainable development recognised in this way and I am humbled by the company I share as a recipient of WWF's Living Planet Award. An award of this nature doesn't only reflect the work of the person receiving the award but the contributions of many colleagues, students and friends. I am therefore mindful of just how much others have contributed to my receiving this award and am deeply grateful to everyone involved. Thank you.

In the next ½ hour I am going to say a bit more about myself, I'm going to highlight the work of the Leslie Hill Succulent Karoo Trust and I'm going to end with a discussion of some of the challenges faced by conservationist working in the Succulent Karoo.

‘Vegetation studies & the impact of grazing in the Sundays River Valley’



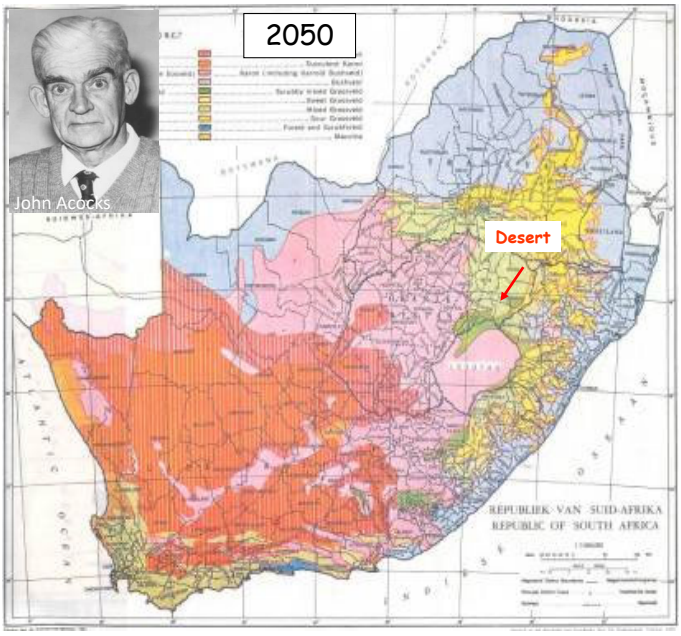




PhD

So, a bit about me. I grew up in the Eastern Cape but studied botany and zoology at UCT. I especially loved ecology and was encouraged by one of my lecturers and now friend, Eugene Moll, to carry on with my studies. I was fortunate to return to the Eastern Cape in the mid-1980s and start a PhD with Richard Cowling in the Sundays River Valley. Richard was a wonderful supervisor and introduced me to the joys of Valley Bushveld, the Noorsveld and the Karoo.

WHAT IMPACT ARE WE HAVING ON THE ENVIRONMENT AND WHAT WILL SOUTH AFRICA LOOK LIKE IN THE FUTURE?

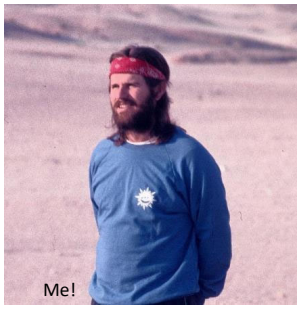


286 - 294 South African Journal of Science Vol. 86 July – October 1990

Vegetation change in the semi-arid eastern Karoo over the last 200 years: an expanding Karoo – fact or fiction?

M.T. Hoffman and R.M. Cowling

We present historical and photographic evidence and survey data to test current theory of vegetation change in the eastern Karoo and southern Orange Free State (OFS) over the last two hundred years. This theory states that the eastern Karoo has been altered from a perennial grassland to a dwarf shrubland which is invading the southern OFS grasslands at a predictable rate. We find little support for this and propose an alternative view of vegetation change in the region. We suggest that the pre-colonial eastern Karoo may not have been dominated by perennial grasses and that seasonal rainfall effects might be responsible for much of the perceived vegetation change in the eastern Karoo and southern OFS.


Me!

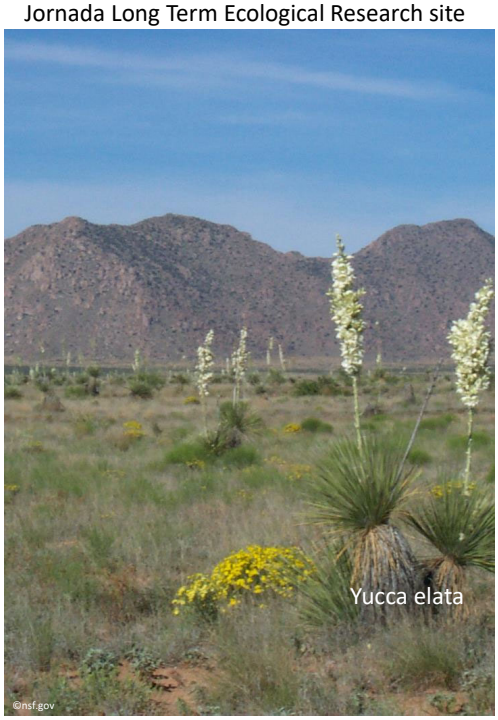

Richard Cowling

An expanding Karoo

Since my PhD was all about vegetation change it was inevitable that I would come across John Acocks' epic account of how he thought South Africans had destroyed much of this country's vegetation in which he warned that if we continued overgrazing the veld as we had done that we would be left with little but pure desert by 2050. John published his maps in 1953 and my first job after completing my PhD in 1989 was to see how far along this road we had gone. Were John's predictions holding up?

I teamed up with Richard on this and we found to our surprise that, for the Karoo at least, vegetation cover and composition seemed better in 1989 than it had been in the first part of the 20th century. This question: What impact are we having on the environment and what will South Africa look like in the future has been core to pretty much all that I have done ever since.

Jornada Long Term Ecological Research site

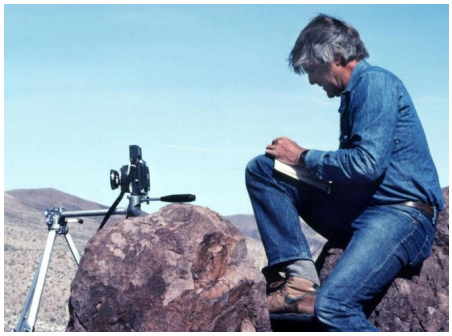


Echinocereus coccineus

Ephedra trifurca

Opuntia violacea

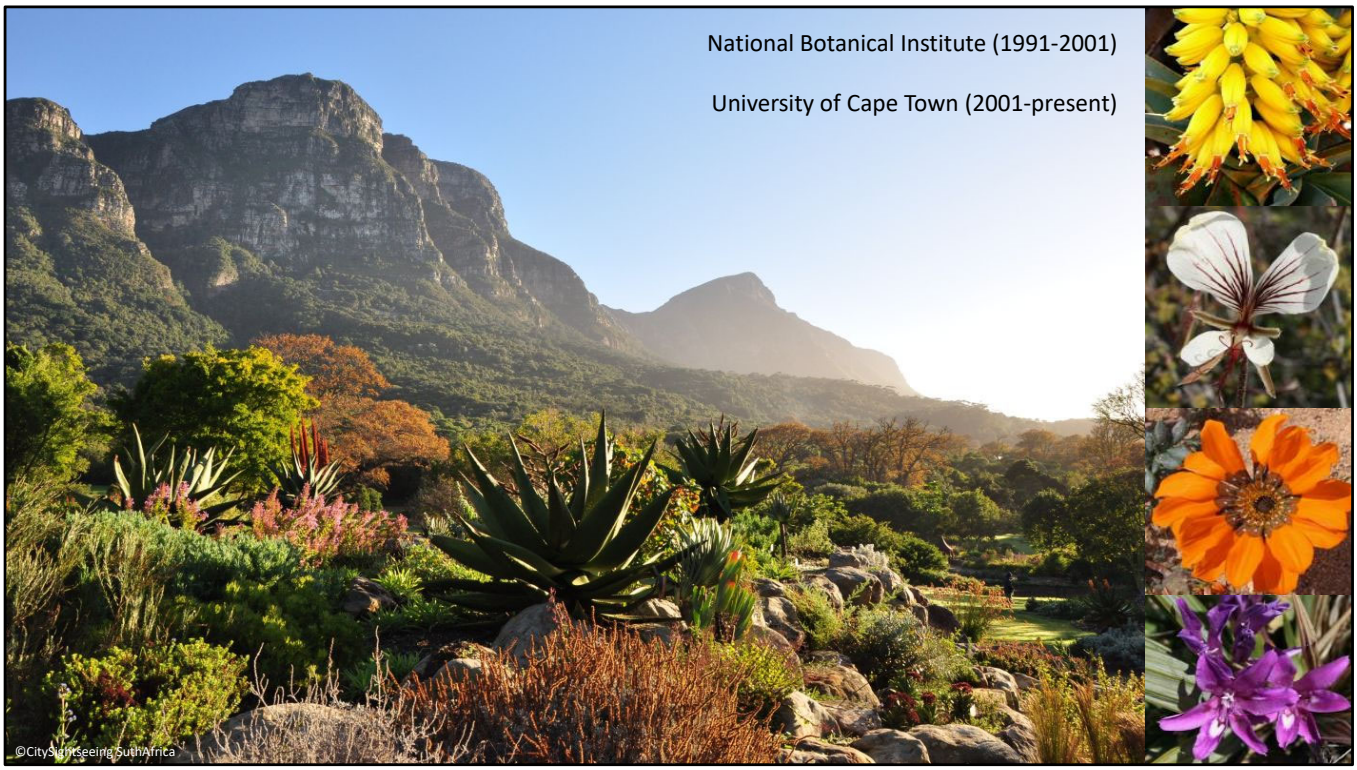
Ray Turner



Post-doc

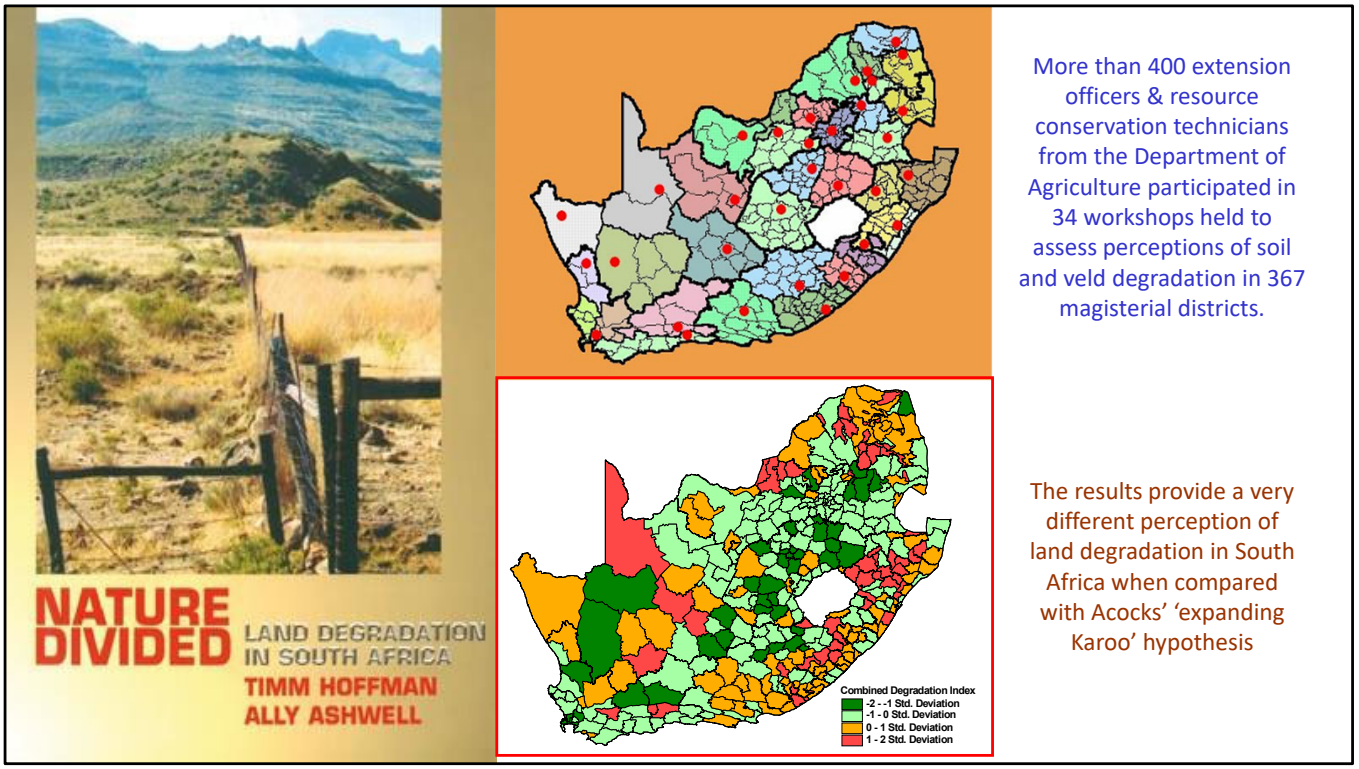
Another big influence on my research career was the post-doc year I spent working on the Jornada Long Term Ecological Research site with Walt Whitford in Las Cruces, New Mexico. It wasn't so much the work I did on the reproductive ecology of these beautiful plants that influenced my career but the introduction the post-doc gave me to the value and importance of long-term studies in conservation.

I also got to meet a number of other desert ecologists like Jim Brown and Joe McAuliffe who remains a good friend today, but it was the few days spent with the doyen of repeat photography, Ray Turner that had a big influence on my approach to the study of environmental change, and especially the use of repeat photographs as you will see later.



NBI & UCT

After my post-doc year in New Mexico I returned to South Africa and started working for NBI (now the South African National Biodiversity Institute) at Kirstenbosch. I enjoyed 10 very happy years with the National Botanical Institute, working under the leadership of Brian Huntley and with a group of smart, talented colleagues such as Mike Rutherford, Guy Midgley and John Donaldson amongst many others. In 2001, I moved across to UCT where I have been ever since. Another happy period in my life and for nearly 20 years now.

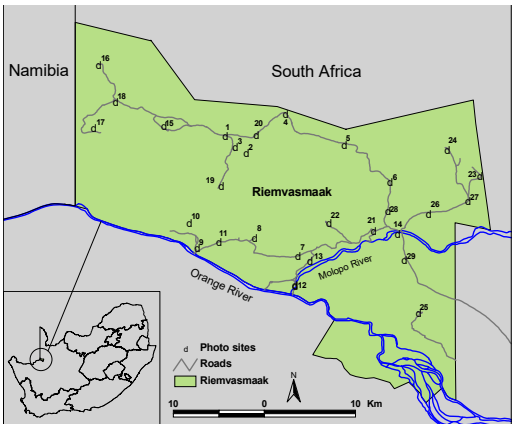


Nature Divided

Part of Brian Huntley's genius as the director of the National Botanical Institute was to structure the research unit to serve the three main international conventions. It fell to me to contribute to South Africa's research efforts around the United Nations Convention to Combat Desertification. Together with an interdisciplinary team from the Department of Agriculture and UWC's Programme for Land and Agrarian Studies as it was called then, we held 34 workshops around the country with more than 400 extension offices and resource conservation technicians to get a sense of the extent of degradation in South Africa at the time.

The results were very different from John Acocks map published 50 years earlier. Instead of the focus being on degradation in the Karoo we argued in our final report, and in the book written with Alice Ashwell, that one of the enduring legacies of the colonial and apartheid periods was not only the devastation that these periods had on the people of South Africa but also on the environment. For example, the high incidence of red and orange in the Eastern Cape, KZN and Limpopo in this bottom map, suggest that the vegetation and soils are more heavily impacted in the former homelands than in other parts of the country.

Reasons for these differences are complex but point to different levels of use and agricultural investment.

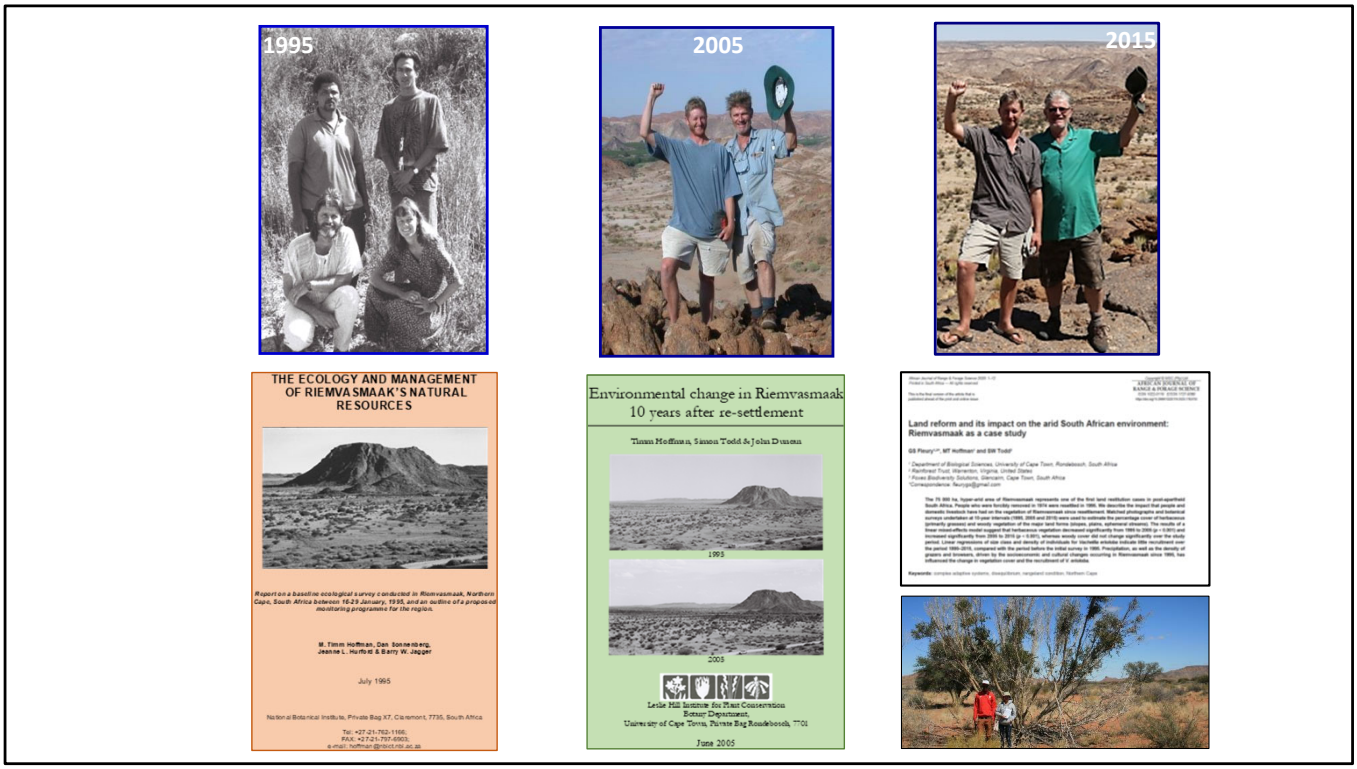


Mr Willem Vass at Xubuxnap in 1995 sitting on the ruins of his father's ox-wagon that was brought to the area in 1939.

Riemvasmaak: Mr Vass

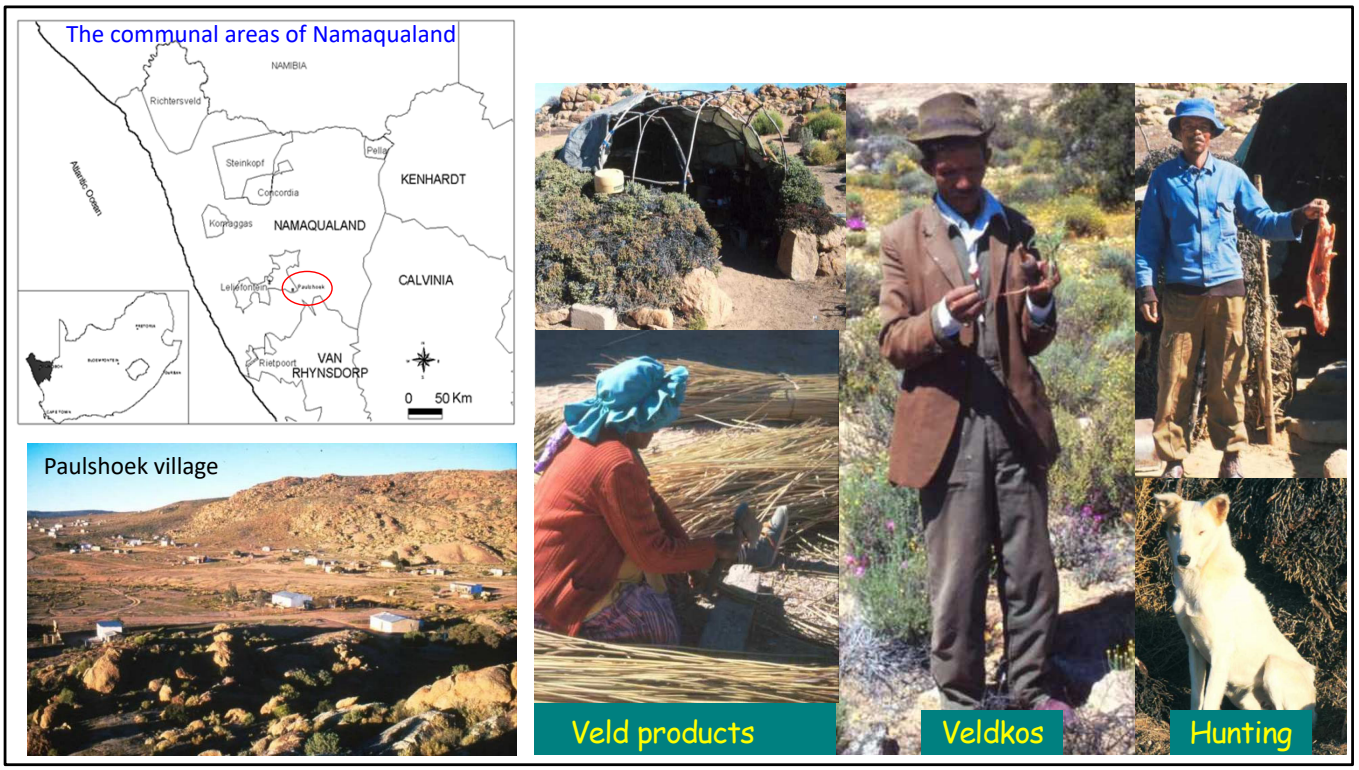
I had already experienced something of the communal areas when I was asked to set up a long-term monitoring programme in Riemvasmaak near the Augrabies Falls National Park in the Northern Cape in 1994. Riemvasmaak was the first land restitution case in the new South African democracy and its inhabitants were given the green light to return to the area after they had been forcibly removed by the apartheid government in 1974.

One of the most enduring memories of my entire career is the day I spent with Mr Willem Vass in Riemvasmaak in Jan 1995. No one had been allowed to return to the area since their removal and Mr Vass was therefore seeing his family homestead and grave sites for the first time in 20 years. He was so happy to be home again and cried tears of joy as he gave me a tour of the areas he knew so well from his childhood. He not only pointed out the ruins of his father's ox-wagon that was brought to the area in 1939 but also showed me the tree where his father had given him a hiding as a young boy for being derelict in his duties as young herd boy. Such memories reflect the deep attachment that people have to land, space and place. Thank you, Mr Vass, for sharing those memories with me and may you rest in peace.



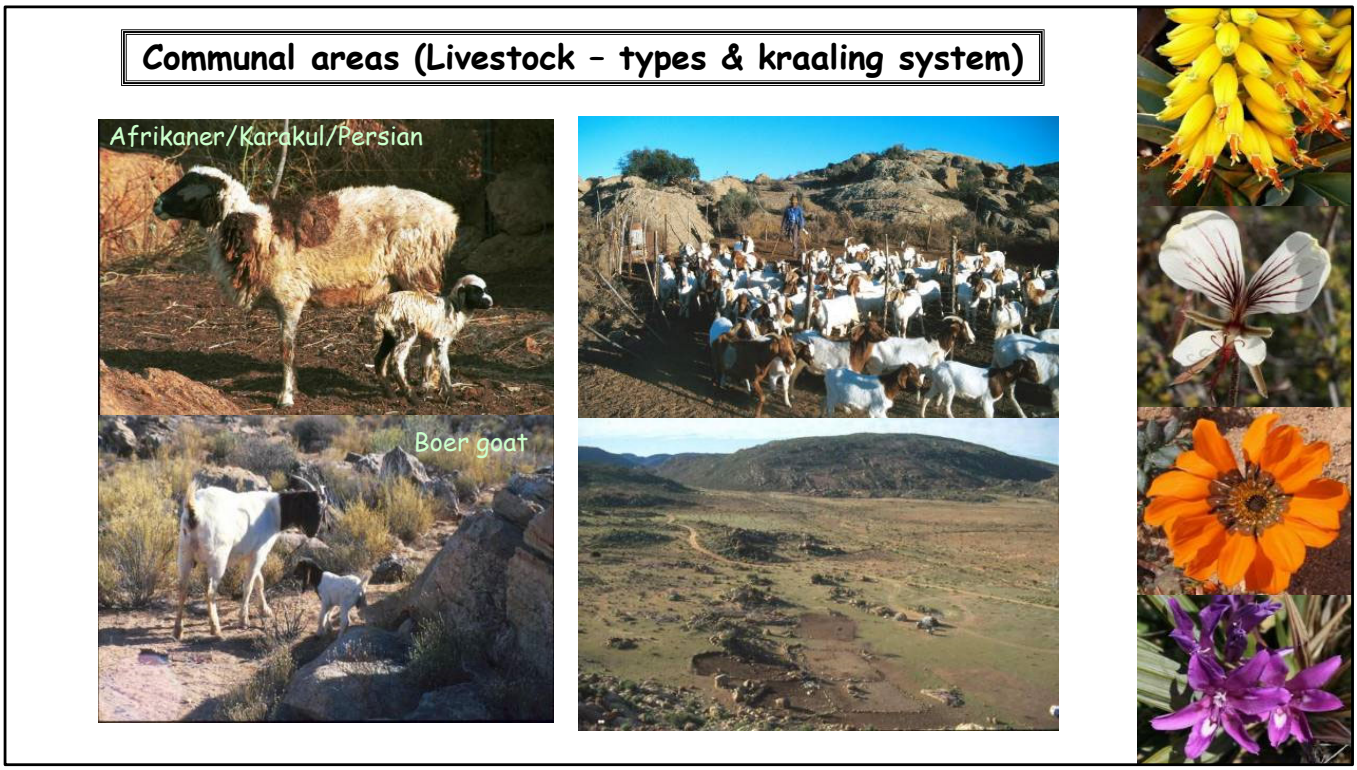
Riemvasmaak: Change

I returned to Riemvasmaak in 2005 and again in 2015 to monitor the impact that people had on the environment. My colleagues at Kirstenbosch as well as Simon Todd were a great help on these trips and in 2020 one of UCT's Conservation Biology Master's students, Gabi Fleury, published the findings from 20 years of monitoring. She is seen here in the photograph in the bottom right with Lionel Mapanka our local field assistant from Riemvasmaak. The results show the most important change that has occurred over the course of 20 years is my girth and the colour of my hair. The environment seems to be just fine - for now at least.



Paulshoek village

Around this time, I also started working in Paulshoek, which is a small village of about 400 people which forms part of the Leliefontein communal area. Together with a string of local and international students, especially from Germany we learnt, not only about the environment, and about the plants, insects and animals, but also about how people from Paulshoek lived, in the village and at their stock posts, how they created shelters, hunted and used medicinal plants collected from the veld.



Paulshoek: Livestock

We also learnt about livestock and its cultural and economic importance for local herders and about the arrangement of stockposts in the wider landscape and the central role that mobility plays in the lives of many livestock owners. We knew next to nothing when we started but thanks to the generosity of the herders from Paulshoek and the wider Leliefontein area we now know a lot more. Some of our students, such as Igshaan Samuels, who completed their MSc and PhD studies in the region remain actively involved in research and have contributed significantly to the rangeland science community in recent years. Another one of our postgrads Pippin Anderson is now lecturing at UCT.

Interdisciplinarity is key

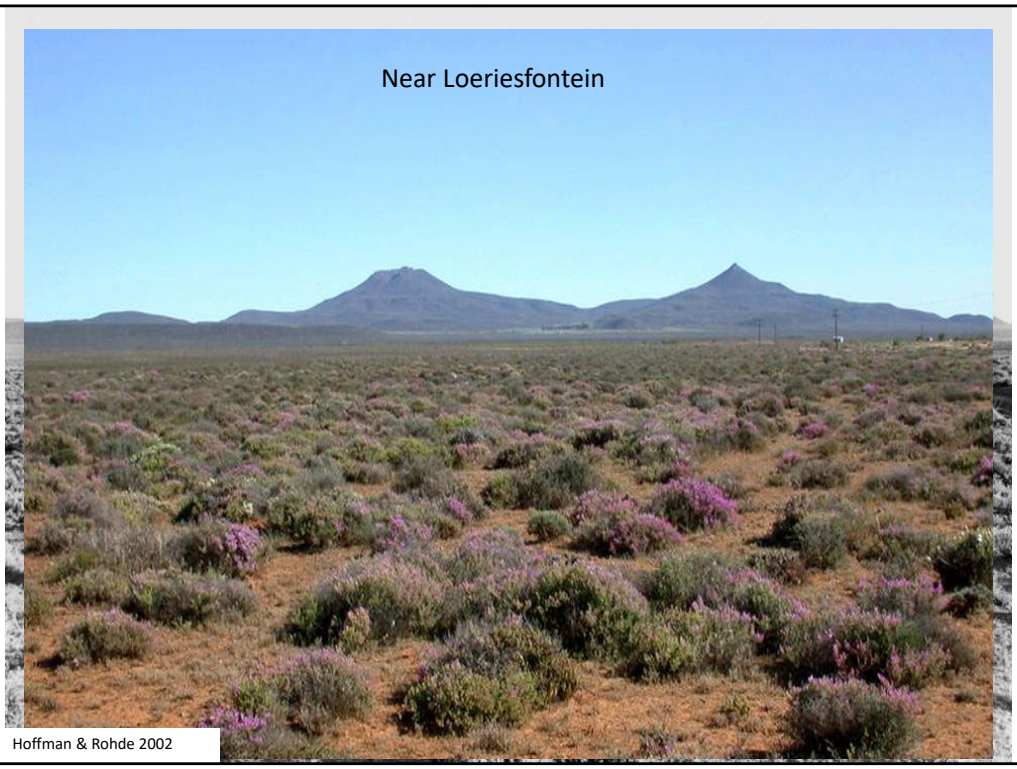
We were involved in a wide range of projects across the disciplinary divide: ecology, agriculture, history, economics, social science, ethnobotany and so on. My friend and anthropologist, Rick Rohde even led a community photography project which resulted in a prize-winning book showcasing the talents of Sophia Klaase from Paulshoek seen here in the yellow pullover. Her photographs captured daily life in the village and at the stockposts in a way that none others could do. I cannot emphasise enough the value of being open to other disciplines in conservation-related research. I have benefited enormously from discussions with Ben Cousins and Rick Rohde, my friends and colleagues from anthropology but also from many other social scientists and political geographers.

Long-term studies

This photograph from Paulshoek is one that I like a lot. It speaks to the value of long-term research, to opportunity and to the enormous potential that exists for young people in the field of conservation. Simon Todd, on the right, who is still active in the environmental sector studied the vegetation of Paulshoek in 1996 when he was an MSc student with the Fitzpatrick Institute's Conservation Biology programme. Seen here on the left in 2016 is Elelwani Nenzhelele another CB Masters student who is sampling the same plots that Simon set up 20 years early. She is now a lecturer at Sol Plaaitjie University in Kimberley. Helping Elelwani is Marianna Lot from Paulshoek who trained as a paraecologist as part of a programme led by my friend and colleague Ute Schmiedel under the German funded BIOTA project. Marianna is now permanently employed by the Plant Conservation Unit as our on-site research assistant. As for me, well, I am taking the photograph and enjoying watching my colleagues hard at work.

Repeat photography

The question that I posed at the start of my research career is still with me. One of the main techniques I have used to try and answer it is repeat photography. While Ray Turner really ignited my passion in this field my main partner in crime over the years has been my friend Rick Rohde. Together we have travelled thousands of kilometres and taken hundreds of photographs together. The technique is quite simple: You find an old photograph, stand on the same place as the previous photographer and retake the image. The really fun part, however, is in the sampling of the vegetation and the interpretation of the changes which can stretch your knowledge way beyond anything that you can imagine.



Near Loeriesfontein

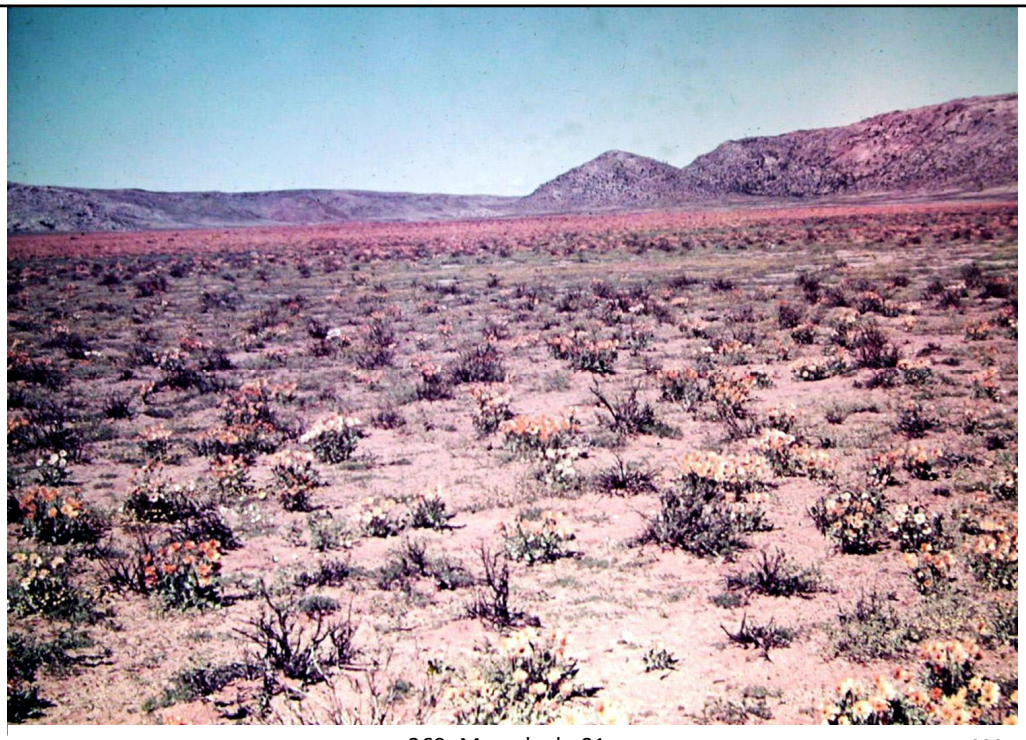
It's a powerful tool though and shows, for example, the stability that exists in some areas such as here near Loeriesfontein where the veld looks pretty much the same as it did in the 1920s.

Acocks 388_Soetwater 20 Aug 1958

Soetwater

or near Nieuwoudtville on the way to Calvinia where the most important change seems to have been a re-routing of the main road.

Hoffman & Rohde 388_Soetwater 28 Oct 2005

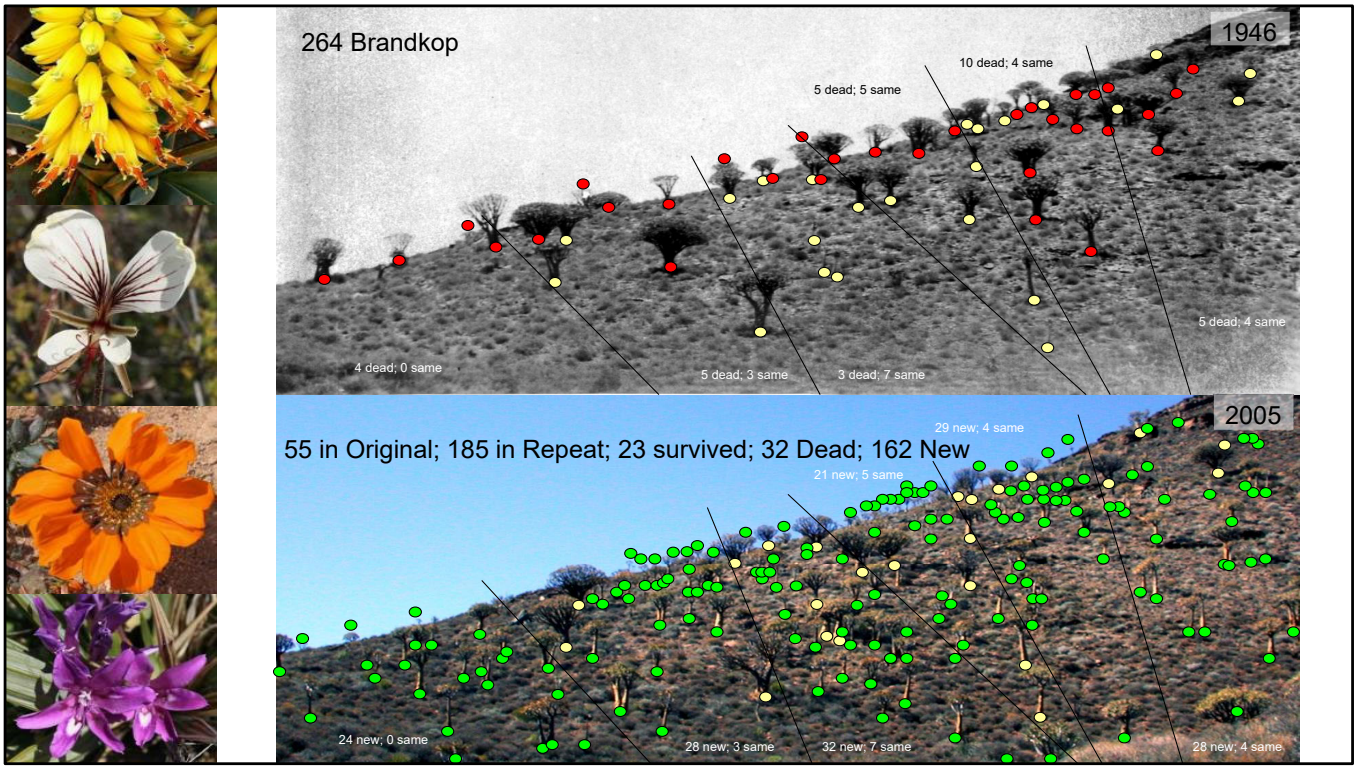


Herre 369_Moreskadu 01 Sept 1939

Moreskadu

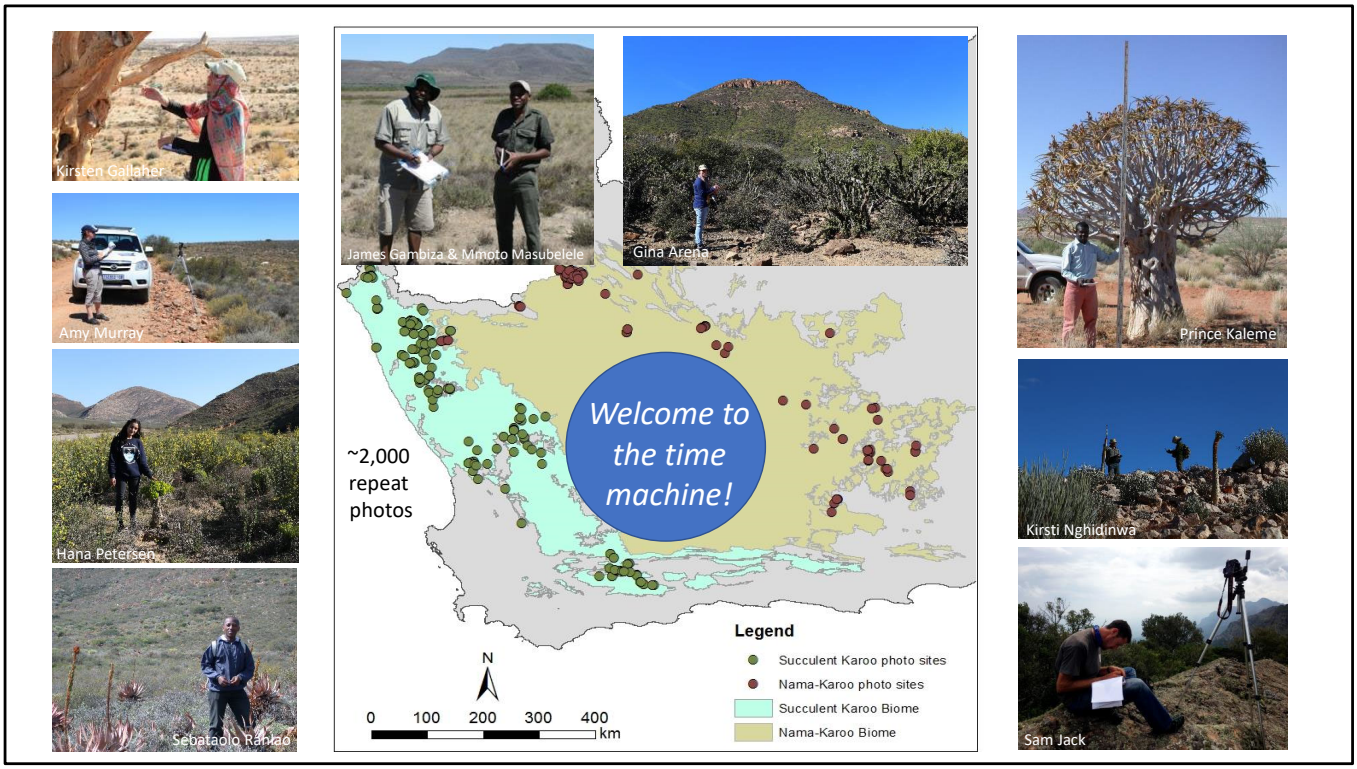
Sometimes, however, the changes can be dramatic such as this Bushmanland set of repeats shows where the heavily grazed, annual-dominated rangeland has given way in just 60 years to a vegetation dominated by perennial grasses.

Rohde & Hoffman 369_Moreskadu 01 20 March 2005



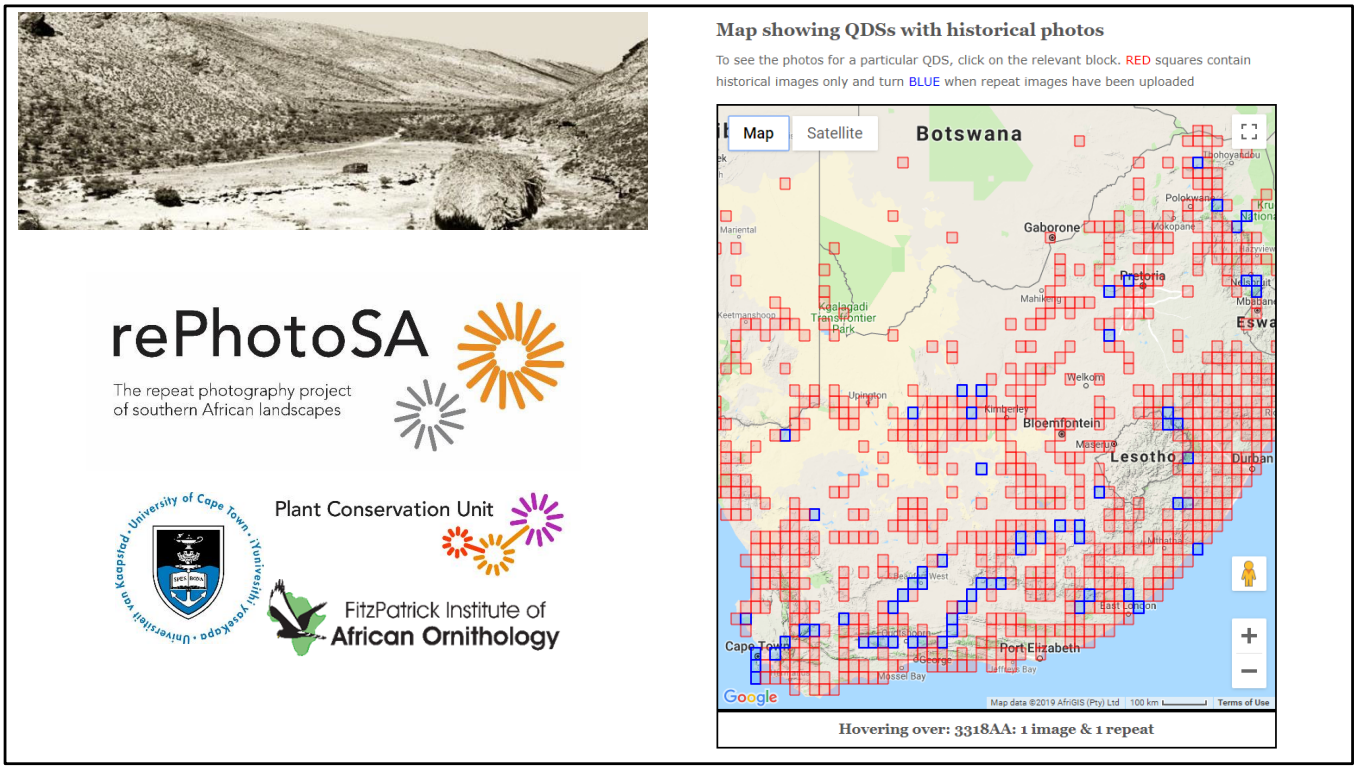
Aloe dichotoma

Repeat photographs can also be put to good use to document long-term changes in populations such as *Aloe dichotoma* or the half mens, *Pachypodium namaquanum* to test ideas about the impact of climate change.



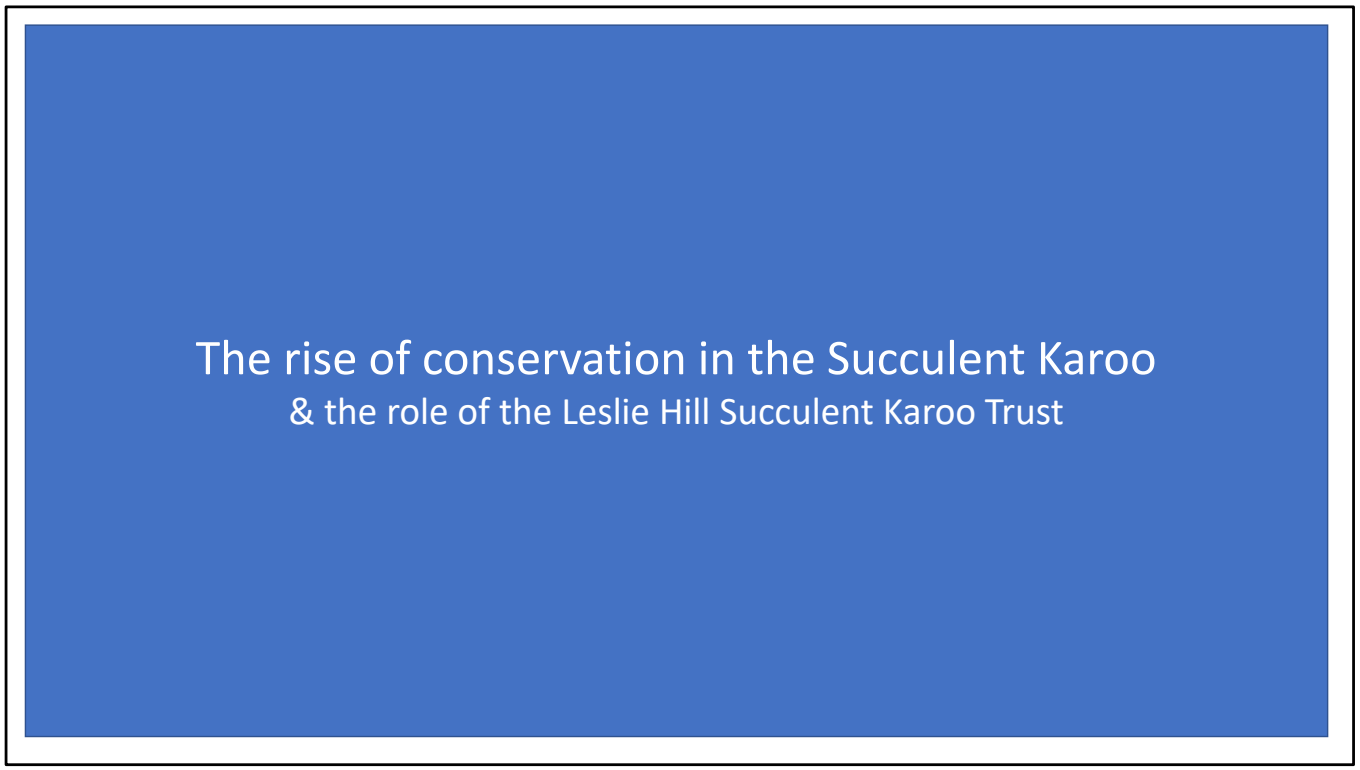
Welcome to the time machine

Repeat photography has been an extremely valuable tool for understanding long-term change and about a third of our student projects over the years have used this technique in one form or other. It is the closest thing we have to a time machine and is a lot of fun as well.

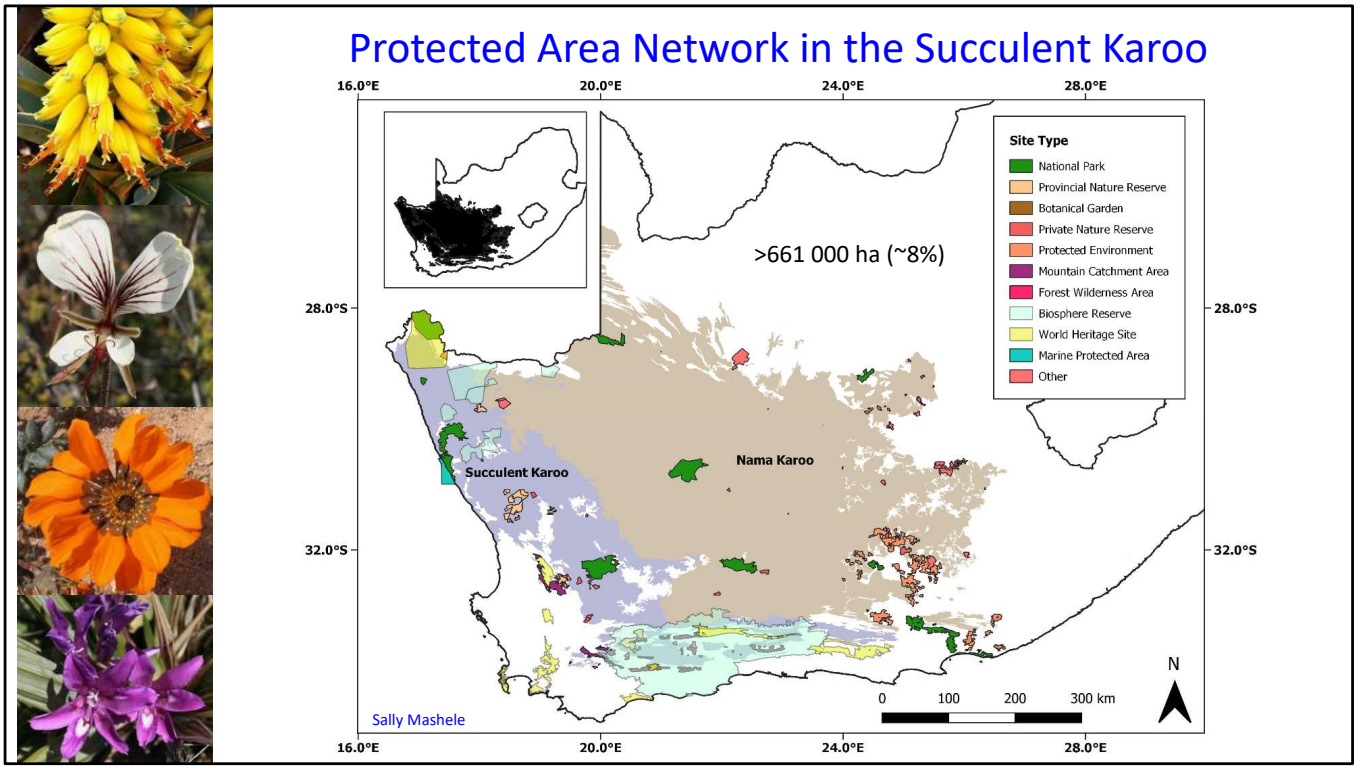


rePhotoSA

I've tried to share this fun and a few years ago, together with many colleagues and hard-working research assistants, we launched a citizen science project called rePhotoSA in which we encourage people to rephotograph historical South African landscapes and upload their images for research and educational purposes. About 250 photographs have been uploaded using this platform.



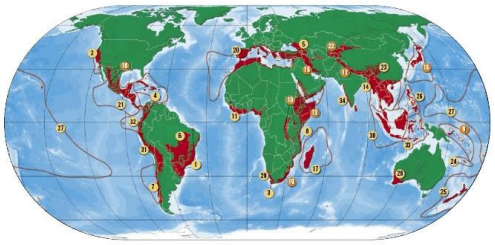
So that was a rather patchy summary of my research career over the last 35 years. That is the experience which I have brought to the more formal role in conservation that I have played primarily as a Trustee of the Leslie Hill Succulent Karoo Trust. It is to this work and to the conservation of the Succulent Karoo biome in general that I would now like to turn my attention.



The PAN of the Succulent Karoo biome

Today the Protected Area Network in the Succulent Karoo biome covers more than 661,000 ha or about 8% of the biome. This network is made up of several different types of protected areas each with its own level of protection and its own management authority. These range from the iconic UNESCO World Heritage sites of the Richtersveld and the Cape Region as well as the Gouritz Cluster Biosphere Reserve to the National Parks, Provincial Nature Reserves, Private Nature Reserves and Protected Environments which are scattered throughout the biome. The establishment of the current network of Protected Areas in the Succulent Karoo has to be one of the greatest conservation success stories in our country especially since this has all unfolded in the last 35 years. How did this happen? How did it all start?

Biodiversity Hotspots CONSERVATION INTERNATIONAL



60% of the Earth's terrestrial species in 1.4% of its land surface

The richest desert in the world!

>6,000 plant species

250 birds

78 mammals

132 reptiles & amphibians

? Insects (lots of)

>40% found nowhere else in the world

Succulent Karoo Ecosystem Planning Project

Involved 60+ scientific experts and over 400 stakeholders.

The Conservation Planning Process

- Understand the distribution of biodiversity & threats.
- Determine what is needed to conserve species & the ecological processes on which they depend.
- Set conservation targets.
- Derive maps so as to achieve these targets.

Based on this process 9 priority areas were identified in the SK.

The richest desert in the world!

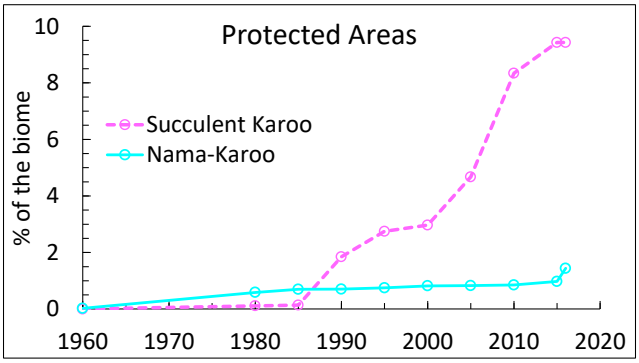
While the early history of conservation in the Succulent Karoo biome has yet to be written, it was arguably Norman Myers concept of 'Biodiversity Hotspots' in 1988 and the involvement of Conservation International and other global players that really triggered the explosion of interest and action around conservation in the Succulent Karoo. The idea of the Biodiversity Hotspots programme that emerged from this was that because biodiversity is not evenly distributed across the planet by focusing on just 1.4% of the Earth's land surface (such as you see in the map on the top left) it would be possible to conserve at least 60% of the species.

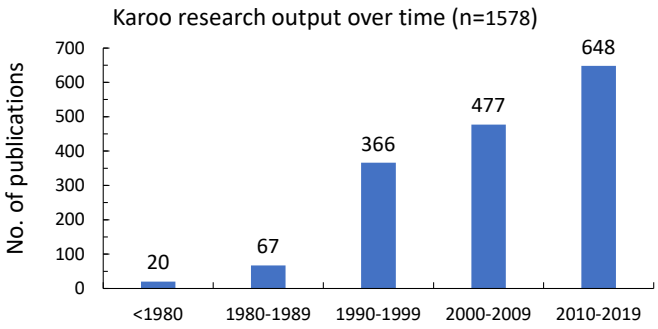
It turns out that the Succulent Karoo biome qualified as just such a hotspot. With more than 6,000 plant species and high richness in other taxa as well, the Succulent Karoo emerged as the richest desert in the world.

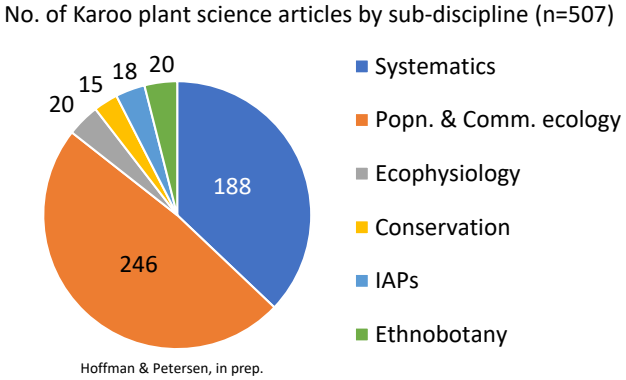
This provided the impetus for the developed of an internationally funded conservation planning programme called the Succulent Karoo Ecosystem Planning Project or SKEP for short. It was an extraordinary initiative whose impact is still being felt today.

It involved more than 60 scientific experts and over 400 local stakeholders from government, academia, NGOs, private sector interests and local communities. The process was fairly straightforward and was based primarily on an understanding of the distribution of biodiversity and threats. Then it was determined what was needed to conserve the species and ecological processes on which these species depended. Conservation targets were then set, and maps were derived to achieve these targets. Based on these criteria nine priority areas were identified in the wider planning domain of the Succulent Karoo biome.

- SKEP provided the intellectual blueprint for the expansion of protected areas in the SK which went from almost zero in 1985 to close to ~8% of the biome in 2019.
- The increase in protected areas was mirrored by a similar increase in the number of published scientific papers.
- Studies in population & community ecology as well as in systematics dominated.
- Conservation studies are surprisingly under represented in the literature.





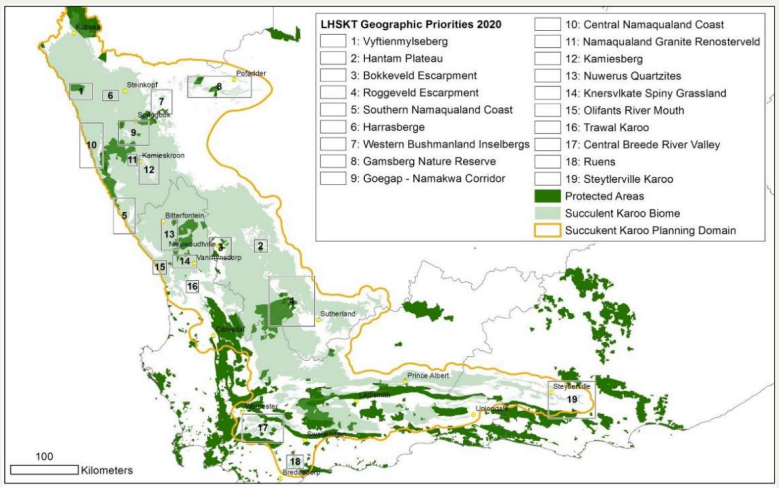


A rapid increase in protected areas as well as research

SKEP provided the intellectual blueprint for the expansion of protected areas in the Succulent Karoo which went from almost zero in 1985 to close to 8% of the biome in 2019. Government conservation agencies such as SANParks and the provincial authorities especially CapeNature were hard at work at this time.

This increase in the area under formal conservation protection was mirrored by a similar increase in the number of published scientific papers. I would like to suggest that the explosion in scientific knowledge has fuelled an increase in conservation protection and vice versa. Studies in population and community ecology as well as in systematics dominate the list of published research.

Refinement of Geographic Priorities



- Biodiversity is not evenly distributed across the landscape.
- Conservation planning maps which identify biodiversity 'hotspots' need to be refined continuously.
- After SKEP funding came to end the Leslie Hill Succulent Karoo Trust has played a key role in the evolution of the geographic priorities map.
- SKEP participants are still involved in this process via the LHSKT.

Geographic Priority Areas

Biodiversity is not evenly distributed across the Succulent Karoo and the SKEP planning process provided the basis for setting conservation priorities in the biome especially in terms of where to establish protected areas so as to maximise the conservation of species and ecological processes for current and future generations.

However, such geographic priorities maps need to be constantly refined as new knowledge about the distribution of species and threats to their habitat become available.

After the funding for SKEP came to an end after about a decade of remarkable productivity it was left to the Leslie Hill Succulent Karoo Trust to support its evolution.

However, members of that earlier SKEP community are still involved in the process.

Celebrating 25 years of the Leslie Hill Succulent Karoo Trust

Leslie Hill (1908-2003)

So, who was Mr Leslie Hill and how has he influenced the world of conservation? Leslie was a Cape Town boy and went to SACS and UCT where he obtained a degree in commerce in 1930. He started out as an accountant for a group of companies in Cape Town and after serving in World War II he returned to a successful business career spanning many decades. In his later years he contributed generously to a number of his main interest.

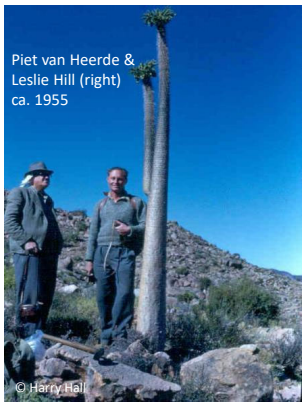
The first was a Higher Education Trust which he established in 1981 for the main purpose of providing support to students who didn't have the financial means to attend university. More than 350 students, mostly from the Western Cape benefited from this generosity. Leslie also had a long-standing interest and passion for succulent plants and had served as a trustee of the National Botanical Gardens and on the Council of the Botanical Society for many years.

He loved Kirstenbosch and when asked by Brian Huntley, the Director of the National Botanical Gardens at the time, Leslie gave generously to the development of the conservatory near the bottom entrance to the garden

as well as to the Leslie Hill Systematics Laboratory located in the Kirstenbosch Research Centre.

Leslie continued with his support for higher education and training by gifting an endowed chair to the University of Cape Town in 1991. Richard Cowling, my old PhD supervisor, and friend was the first incumbent and together with Dave Richardson started the Institute for Plant Conservation. I was appointed to the position in 2001 and Lindsey Gillson joined me in the renamed Plant Conservation Unit in 2006. Leslie's initial investment and UCT's ongoing support of the PCU has, between the four of us, resulted in hundreds of postgraduate students and research publications most of which are concerned with some aspect or other of plant conservation and environmental change.

His final gift to us all was the Leslie Hill Succulent Karoo Trust which he established in 1995. As a result of this remarkable generosity, in 1999 Leslie became the first person to be recognised internationally by WWF as having made a Gift to the Earth as part of their Living Planet Campaign.



Leslie and Phil Desmet

With Jan Vlok

Leslie's life-long, love-affair with vygies

Leslie was a quiet and self-effacing person who shunned publicity. The few evenings I spent with him at his house in Constantia were spent talking about plants and pouring over Leslie's substantial botanical library. As the new Leslie Hill Chair of Plant Conservation, he grilled me on my knowledge of plants, and on succulents especially. I am very sorry that I got to know Leslie for only the last few years of his life when his health was failing as I would have loved to have been in the veld with him and to hear his stories of travelling in the Karoo with amateur and professional botanists such as Harry Hall, Piet van Heerde and Hilmar Luckhoff. Richard Cowling enjoyed that opportunity and often took Leslie around the Karoo with his students and colleagues such as Phil Desmet, Jan Vlok and many others. Leslie had a particular fondness for Gibbaeums whether in the field or in pots but was knowledgeable about a wide range of other succulent groups as well.

Leslie Hill Succulent Karoo Trust

The Leslie Hill Succulent Karoo Trust was established in 1995 with WWF as the beneficiary.

The main OBJECTIVES of the Trust are:

"…the preservation, restoration, conservation and promotion of plant species indigenous to the Karoo…" with a particular focus on the Knersvlakte, Namaqualand, southern Richtersveld and Bushmanland [inselberg] regions.

Responsibility for implementing the objectives of the Trust is vested in three Trustees:

1. WWF (ex officio)
2. Holder of the Leslie Hill Chair of Plant Conservation at UCT
3. (Financial) Trustee

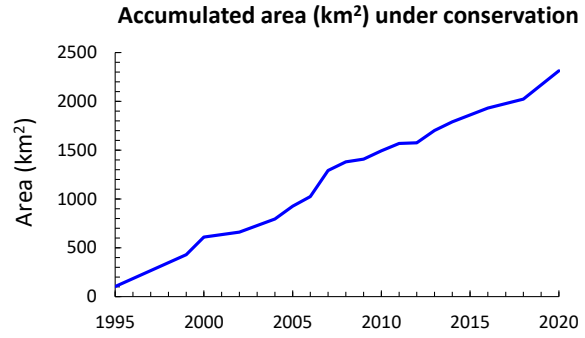
The Trust: Objectives and governance

Leslie's contribution to the conservation of the Succulent Karoo has been immense which is why we are recognising the contribution that the Trust has made to conservation this evening.

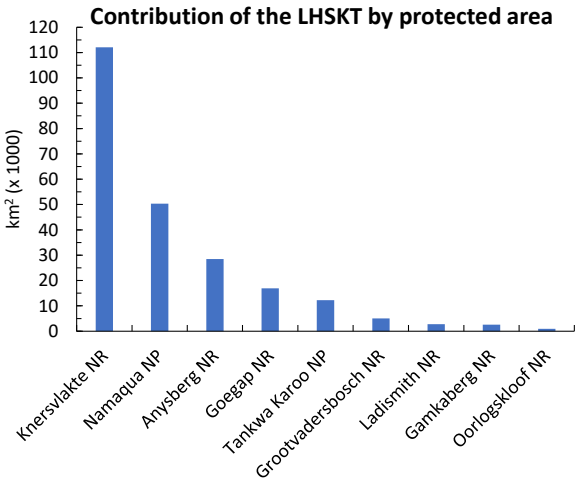
In establishing the Trust in 1995 with WWF as the beneficiary, Leslie was clear as to what the main objectives should be. These remain: "...the preservation, restoration, conservation and promotion of plant species indigenous to the Karoo...". Leslie also wanted the Trust to focus on specific parts of the Karoo especially the Knersvlakte, Namaqualand, southern Richtersveld and the inselberg regions of Bushmanland.

He stipulated that THREE trustees should take responsibility for implementing the objectives of the Trust and that they should be drawn from the head of WWF (currently Morne du Plessis), the holder of the Leslie Hill Chair of Plant Conservation at UCT (currently me) and a third, independent Trustee who should come from the business world and have some knowledge of financial matters as Leslie had little faith in the conservationists and botanists in this regard. Piet van Zyl and more recently Francois van der Merwe have been the third trustees and

the success of the Trust is in large part due to their innovation and big strategic thinking.



- Steady increase in land under conservation management to reach the current 231,000 ha.
- This represents about a third of ALL conservation land in the Succulent Karoo.
- Doesn't include the ~60,000 ha under stewardship in the Bushmanland and Little Karoo areas.
- The focus has been on the locations identified by the Trust deed.



The Trust: Land purchases

As soon as the Trust was established it got to work right away and hasn't really stopped. The graph on the top left shows a steady increase each year in the area that has been purchased for conservation. The axis along the bottom shows the years from 1995 while the y-axis is the area of land under conservation. In total, just over 230,000 ha have been added which amounts to about a third of all conservation land in the Succulent Karoo. The other two thirds have been added from the investments of the state via SANParks, CapeNature or DENC from the Northern Cape, or from the establishment of private nature reserves. An additional 60,000 ha which is not reflected in this blue line, have been added via the stewardship programme that has been supported by the Leslie Hill Succulent Karoo Trust and its partners either in government or in the NGO sector.

The graph on the right shows that the Trust has tried to honour the wishes of Leslie by focussing on those areas he stipulated in the Trust Deed such as the Knersvlakte and the Namaqualand National Park. The bottom axis shows the names of the reserves while the y-axis again shows the area under conservation which the Trust has bought.

WWF, as the beneficiary, has done a lot more than this to promote the broad objectives of the Trust

- Developed the capacity within WWF to manage the demands of the Trust (Land Programme 7+ person team)
- Build and support partnerships around conservation and stewardship
  - SANParks
  - Cape Nature
  - DENC
  - NGOs (Wilderness Foundation Africa, Conservation South Africa, etc…)
- Supported a community stewardship initiative through Conservation South Africa in Leliefontein.
- PhD research: Mapping desertification.
- Support for the Arid Zone Ecology Forum

The Trust: Other activities

While the core business of the Leslie Hill Succulent Karoo Trust is to expand the area of the Succulent Karoo under conservation protection the trust is about a lot more than the purchase of land only.

Firstly, it is about building the capacity within the organisation itself to manage the Trust's many and varied activities. The Land Programme which is managed by Jan Coetzee is a creative and highly dynamic group of conservationists within WWF who are thinking all the time about the environment, about people in the environment, and about how to see to the objectives of the trust in a way which is sustainable and equitable.

Secondly, none of the work of the Trust could happen without a network of dedicated state and NGO partners. The Trust has worked closely over many years now with several government departments and NGOs who are active in the Succulent Karoo. The innovative approaches adopted by colleagues within Wilderness Foundation Africa are especially important for the success of the Trust. Where necessary support and training in key provincial government departments has also occurred. Through WFA the Trust has supported people on

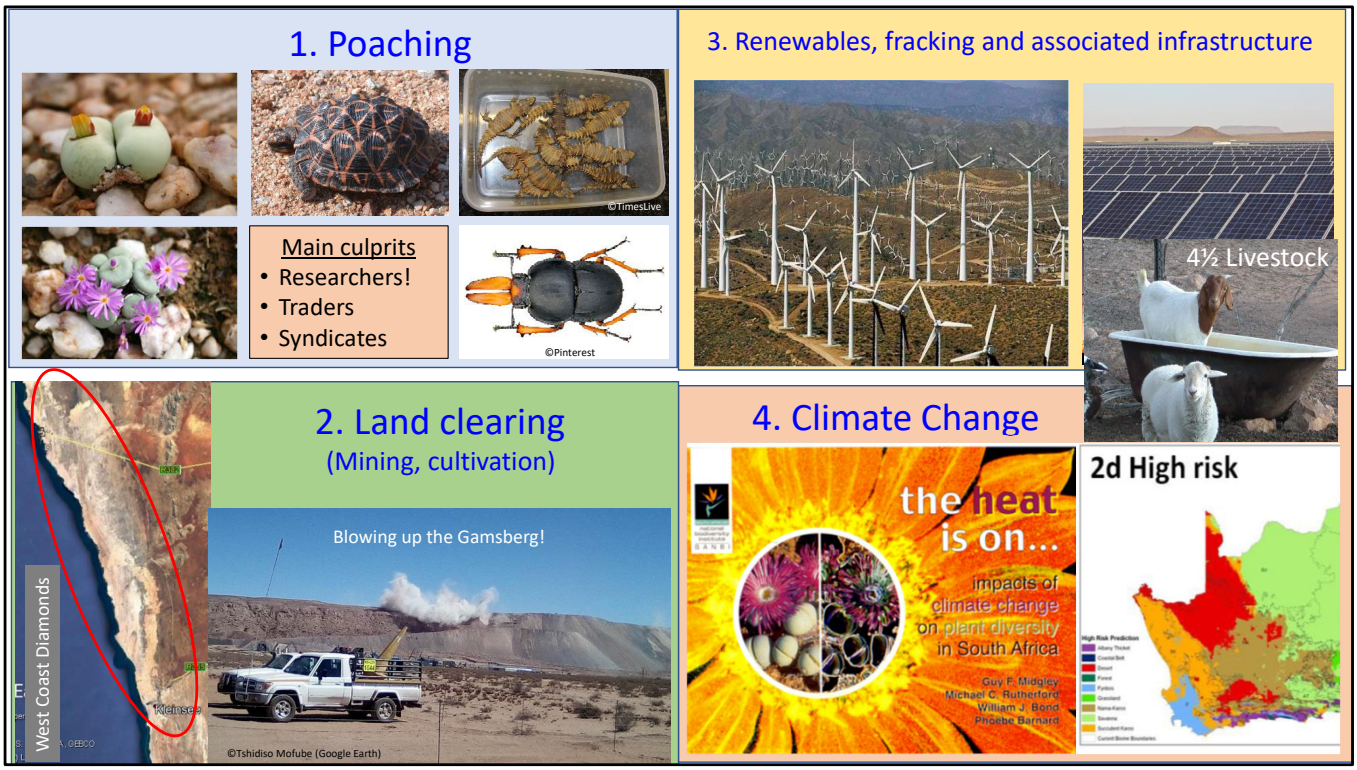
the ground who talk to landowners about conservation and raise awareness concerning the need to manage the land sustainably or even support the stewardship programme in the region.

The work of Conservation South Africa in the Leliefontein area is also noteworthy because of its work with the livestock owners from the Leliefontein communal area. I urge you to read about the work of Malinda Gardiner from CSA in WWF's recent newsletter which highlights the benefits that have emerged from the collaboration between farmers and conservation in the region.

The Trust has also supported a research programme which has mapped the extent of degradation in Namaqualand for which Wesley Bell recently received his PhD.

I could go on – for example the support provided by the Trust for the Arid Zone Ecology Forum – but I am short of time. I get the sense that the Land Programme is just getting started and I always look forward to hearing from them about their next set of innovative ideas.

Conservation challenges in the Succulent Karoo



The Big Five (or 4½)

In this closing section I would like to point out some of the challenges facing the Succulent Karoo. Most have already been highlighted but the Big Five are worth repeating. Poaching is on the rise but so too are the penalties if you are caught. The Trust has a research programme pending to find out more about this.

The mining industry poses a significant threat to the environments of the Succulent Karoo. Men and their Machines can remove a whole mountain in the space of just a few years as we have seen on the Gamsberg and have already devasted thousands of hectares along the coast.

The installation of wind farms, solar panels and the associated infrastructure such as roads and power lines are other threats facing the Karoo. The power lines seem to be just at the right height to decapitate some of the big birds, such as the bustards which traverse the Karoo.

The ever-present threat of climate change has been lurking for a few decades now. The Karoo has just gone through the worst drought in living memory and the threat is only expected to increase. The Trust hopes to support a research

programme around this as well.

In light of the other threats listed, I think overgrazing from livestock is a relatively minor challenge although it is the main land use practice in the biome.

A FRAMEWORK FOR ACTION

This is a great time to be conservationist. The climate crisis and COVID-19 pandemic have forced us to accept that "things have to change."

But what can do as conservationists, especially locally (i.e. in the Succulent Karoo)?

Four suggestions

1. Quantify the value of natural assets to reinforce the importance of having a healthy environment.
2. Build protected areas as hubs for local development in which surrounding communities benefit as collaborative partners.
3. Local people need to be properly engaged as stakeholders in conservation.
4. Conservation and human-development agendas need to be much more closely aligned.

The actions of conservationists outside of the protected areas are just as important than those which take place inside the protected environments.

A framework for action

I'd like to end on a note of optimism primarily because this is a great time to be a conservationist and we have much to look forward. The rising climate crisis and the impact of the global corona virus pandemic has forced us to accept that we simply cannot go on as we have been doing. Many important global initiatives are under way to reduce our dependence on fossil fuels and to prevent wide-scale habitat destruction and the exploitation of wildlife. But what can we do as conservationists in South Africa and even more locally, for example, in the Succulent Karoo?

Here, I draw almost verbatim on four suggestions proposed by Peter Lindsey and colleagues who published their ideas in July in a journal called *Nature Ecology & Evolution* and which should be compulsory reading for all those who are interested in the conservation of Africa's natural resources. Firstly, we need to quantify the value of natural assets and ecosystem services and reinforce the value of conservation and the importance of having a healthy environment.

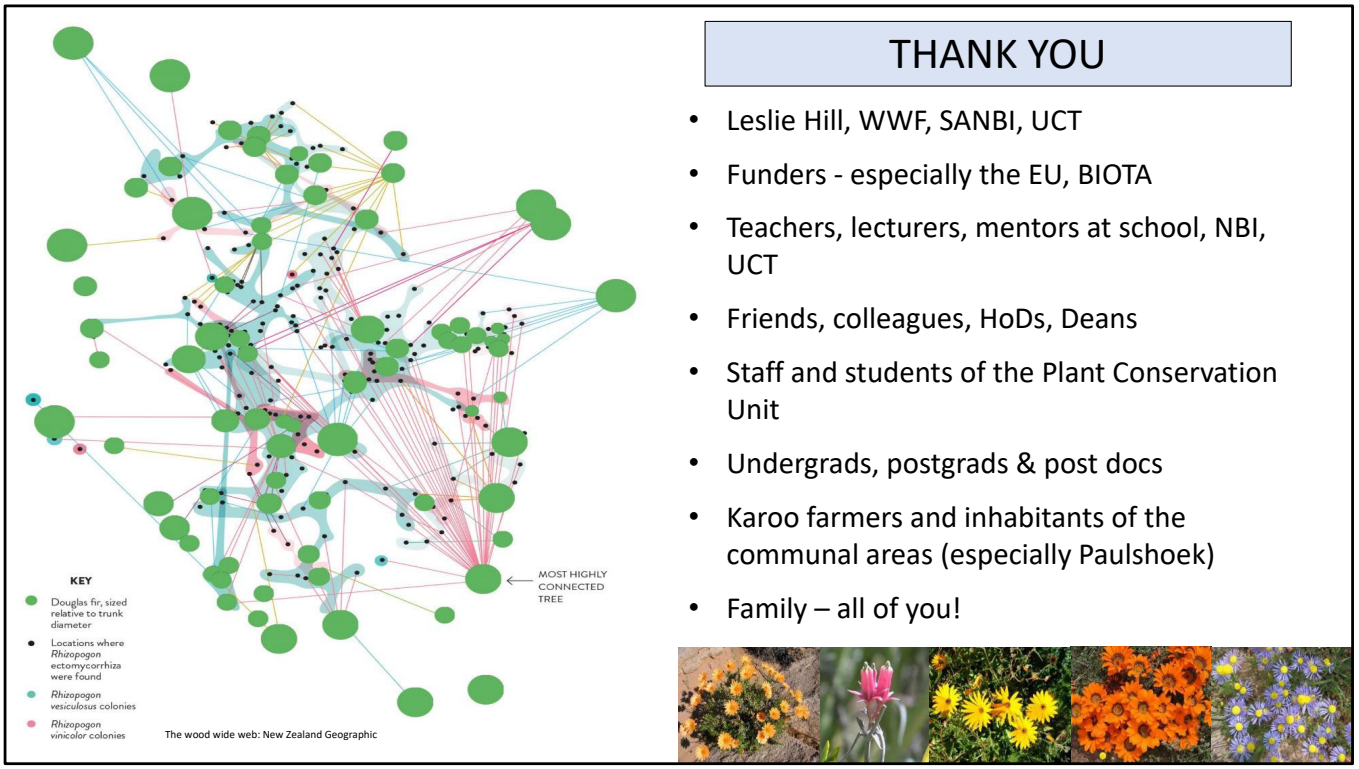
Secondly, protected areas need to become much more than simply areas set aside for conservation. Instead they need to become hubs for local development

in which surrounding communities participate as collaborative partners.

Thirdly, people from surrounding communities need to be properly engaged as stakeholders in conservation. They need to have a say in the governance of protected areas and need to derive benefits from them.

Finally, conservation and human-development agendas need to be much more closely aligned and conservationists have a critical role to play in what happens outside of protected areas as well. Collaboration with development specialists to improve community livelihoods should become a core feature of the work of conservationists today. Unless protected areas are properly integrated into the lives and livelihoods of people from the surrounding communities they will struggle to survive in the long run.

The take home message here is that the actions of conservationists outside of the protected areas are just as important, or perhaps even more so, than those which take place inside the protected environments.



ACKNOWLEDGEMENTS

I am deeply grateful to the many people, too many to mention by name, who have influenced my career over the last 35 years. In the same way that forest trees are connected to each other via an invisible thread (in this case an ectomycorrhizal symbiont) so too do we interact with each other in many wonderful and varied ways.

As I indicated in my opening comments, without Mr Hill I wouldn't have had the opportunities that have been given to me and without WWF the Trust would not exist. Both international and local funders have provided the financial support without which very little of this work would have been possible. Thank you to my two main employers SANBI for 10 years and UCT for the last 20. I am indebted to all my teachers, lecturers and mentors at school and at university for their early guidance. Thank you to the many friends, colleagues, heads of departments and Deans of the Science Faculty who have taken an interest in me and the work of the Plant Conservation Unit and who have influenced my ideas and the kind of work that I have focused on. To the staff and students of the Plant Conservation Unit and to the more than 100 postgraduate students from across the continent and the world and whose work I have had the privilege of supervising – thank

you. I would especially like to recognise the Karoo community, the farmers as well as the inhabitants of the communal areas especially the community of Paulshoek. My life has been enriched immeasurably by your warmth and generosity. I could go on and on – to the international research community who have given so much to the Succulent Karoo – but I need to stop. However, I would like to end by thanking my family – the whole bang shoot for their enduring love and support over a lifetime. Without that core assembly little is possible.