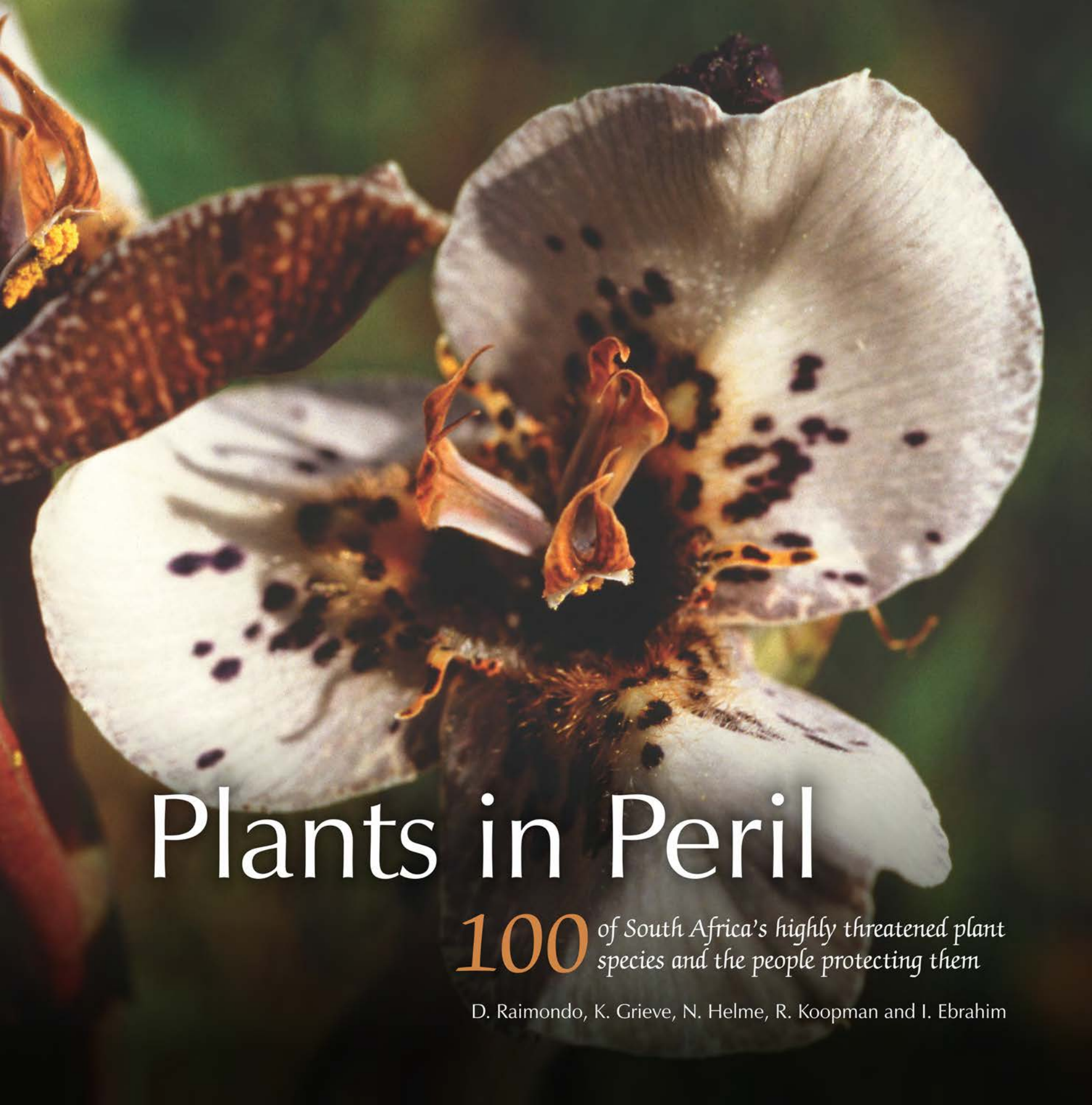

Plants in Peril

100 of South Africa's highly threatened plant species and the people protecting them

D. Raimondo, K. Grieve, N. Helme, R. Koopman and I. Ebrahim

Plants in Peril

Editors: D. Raimondo, K. Grieve, N. Helme, R. Koopman
and I. Ebrahim

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Plants in Peril

Editors: D. Raimondo, K. Grieve, N. Helme, R. Koopman and I. Ebrahim

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Cover image: *Moraea atropunctata*, a Critically Endangered member of the Iris family known from only one tiny fragment between cultivated wheat fields in the Overberg. Fewer than 300 plants remain, and numbers continue to decline due to overgrazing and trampling by livestock. Photograph Colin Paterson-Jones.

Inside cover, *Serruria meisneriana*, an endangered species known from two locations in the Babilonstoring Mountains near Bot River, Western Cape, photograph Colin Paterson-Jones.

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Acknowledgements

The Botanical Society of South Africa (BotSoc) and the South African National Biodiversity Institute (SANBI) have partnered to co-finance the implementation of the Custodians of Rare and Endangered Wildflowers (CREW) Programme featured in this publication. The production of this publication has been made possible through this strong partnership.

The Parker family of the Elandsberg Nature Reserve are thanked for the generous support they provide to the CREW Programme in the Fynbos region. The Fynbos Biome, which houses 70% of South Africa's threatened plants, is the epicentre of plant conservation work and the ongoing support of the Elandsberg Nature Reserve has enabled CREW to build a strong presence in this region.

Dedication

This book is dedicated to the nature photographer, Colin Paterson-Jones, who passed away in 2012. Many of the spectacular images of threatened plants in this book were taken by Colin who had a special interest in photographing plants that were on the brink of extinction. The idea to produce this book came from Colin whose dream it was to produce a publication to showcase and build awareness of highly threatened species.

For our volunteers

For the individuals working as part of the Custodians of Rare and Endangered Wildflowers (CREW) Programme, who give selflessly of their time and energy to search for, and conserve, the multitude of threatened plants in our country.

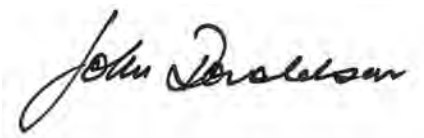
Foreword

South Africa has considerably more than its fair share of the diversity of life on earth and is one of the most biologically interesting countries in the world. The remarkable concentration of biodiversity at the southern end of the African continent, including three internationally recognised biodiversity hotspots, is a unique heritage that also poses some significant challenges for conservation. This is particularly true for plants where more than 2 500 species are threatened with extinction.

On the positive side, South Africa has been at the forefront of initiatives to assess the status of plants and to develop sustainable models for conservation. These include the publication of a comprehensive Red List for plants for South Africa—the first mega-diverse country to achieve this—as well as integrated programmes for conserving biodiversity in the most diverse and threatened biomes such as the Cape Floristic Region, and the Succulent Karoo and Grassland biomes.

One of the success stories has been the partnership between civil society, represented by the Botanical Society of South Africa, and the South African National Biodiversity Institute to engage the public in activities to survey and monitor threatened plants. This partnership has generated an incredible amount of information on the distribution and status of plants across the country and needs to be celebrated as a model for what can be achieved when state institutions and civil society work together.

As a centre of plant diversity, South Africa makes an important contribution to learning and sharing networks that promote plant conservation around the world. Already the publication of the *Red List of South African plants* has resulted in sharing and learning with other countries with high plant diversity such as Brazil and Colombia. The UN Convention on Biological Diversity has set aside the decade from 2011–2020 to achieve the five objectives of a Global Strategy for Plant Conservation. These objectives include documenting plants, conserving them, and engaging the public in plant conservation and comprise 16 global targets. The work currently taking place in South Africa highlights some the actions that can achieve these targets. Plants in Peril is a reminder of the critical status of many of our plants, a celebration of the unique attributes of these threatened species, and a sharing of how we can work together to make a difference to their future.



John Donaldson
Chair: IUCN/SSC Plant Conservation Subcommittee

Introduction

The network for plant conservation in South Africa

South Africa has the highest documented number of extinct plant species of any country in the world. Thirty-nine species are extinct and a further 64 are believed to be extinct as they have not been seen for over 50 years and very little of their habitat remains. This level of extinction is perhaps not surprising given the country's extremely high plant diversity (over 20 000 species), 60% of which cannot be found anywhere else on Earth. A quarter of South Africa's plant species have restricted ranges—typically occurring in the vicinity of a single town, on one mountain range, or in a single valley. Sadly, these restricted natural ranges often overlap with areas that are under intense agricultural and/or urban development pressure. As a result of human impacts on natural areas, as well as, the spread of invasive alien plants and illegal harvesting of plants for the horticultural and medicinal trade, 2 553 plant species are currently threatened with extinction. This publication focuses on 100 of these plants, some of which are on the brink of extinction, with the aims of highlighting the factors threatening their survival, and raising awareness of the conservation actions required for their continued survival.

The monitoring and protection of over 2 553 threatened plant species is a major conservation challenge and clearly requires both extensive manpower and funding. South Africa is fortunate in having a cadre of professional botanists and horticulturists based either at universities, conservation agencies or at botanical gardens and herbaria managed by the South African National Biodiversity Institute (SANBI), as well as independent specialists and knowledgeable amateurs.

Since 2003 the capacity to conserve and monitor South Africa's unique flora has been significantly expanded by enabling members of the public to work as citizen scientists. The Custodians of Rare and Endangered Wildflowers (CREW) Programme (see below) is a vehicle through which conservation-minded citizens can participate in national plant conservation work, and a powerful network has been established over the past decade by linking professional botanists and citizen scientists. This publication profiles the excellent work being done by the citizen scientists involved in the CREW Programme, who donate considerable time and resources to ensuring the conservation of South Africa's most threatened plants. It also profiles the work of several professional botanists who are dedicated to plant conservation and who help train and guide the citizen scientists working with CREW.

Satyrium carneum, Near Threatened from the Riversdale Plain, photograph Jan Vlok.

The CREW Programme—citizen scientists in action

The CREW Programme, jointly implemented by the Botanical Society of South Africa (BotSoc) and SANBI, operates by organising local plant enthusiasts into community groups. CREW groups survey remaining pieces of natural vegetation for species of conservation concern and identify critical fragments of land with high numbers of threatened species that are in need of conservation. They work with landowners, local municipalities and conservation authorities to promote the conservation of these sites.

CREW started in 2003 in the Fynbos region, but has expanded nationally and now has a strong presence in both the summer and winter rainfall regions. CREW volunteers are true citizen scientists. They systematically target all remaining natural fragments in the areas they work in and their surveys of the plant species present in these fragments allow for a thorough understanding of the distribution of populations of restricted range or endemic species. They also closely monitor selected populations of highly threatened species to determine if populations are stable, increasing or decreasing. This survey and monitoring information is provided to SANBI's Threatened Species Programme for annual updating of the Red List of South African Plants. South Africa is unique amongst the world's 17 megadiverse countries (countries that together house 70% of the world's animal and plant species) in being the only country where a complete assessment has been undertaken of the conservation status of all its indigenous plant species. It is also distinctive in having ongoing field surveys taking place specifically to inform the conservation status of plant species. The distribution data on threatened plants collected by CREW volunteers are used in biodiversity conservation plans and protected area expansion strategies.

The CREW volunteers' contribution to science is not restricted to informing the Red List and Conservation Plans. Plant specimens collected by volunteers help professional botanists, particularly taxonomists, to describe and classify plant species. Since the start of the project in 2003, volunteers

have discovered 20 species new to science. The CREW Programme connects volunteers to professional botanists, and a mutually beneficial relationship exists. Volunteers find new populations, collect fresh herbarium material and assist taxonomists working on specific plant groups, and in exchange, professional botanists help volunteers to identify their collections and observations.

CREW volunteers make a significant contribution to conservation of key sites by engaging with Biodiversity Stewardship Programmes being implemented by provincial conservation agencies. Stewardship is the process of contracting private or communally owned land into the Protected Area network, in terms of the National Environmental Management Act: Protected Areas (Act 57 of 2003) and Biodiversity (Act 10 of 2004). CREW volunteers systematically survey land parcels with natural vegetation, and in the process, they identify the properties with natural vegetation in the best condition and with the highest concentration of endemic species. They also work on building landowner awareness of the important plant species found on their land. Building good relationships with the landowners helps facilitate the stewardship negotiation process. The relationship between CREW and landowners involved in stewardship does not end with the contracting of a property. CREW groups provide long-term support by monitoring the biodiversity conserved at each site and in partnership with the conservation agency, continually advise on the required management of vegetation for the persistence of threatened or endemic species.

After a decade in operation, the CREW Programme now has over 500 active individuals spread across South Africa, focused on the regions of highest plant diversity. The programme expands into new regions every year. With most CREW volunteers being BotSoc members and the programme receiving operational funding support from the Botanical Society of South Africa, CREW is an integral part of the society's conservation work. The 100 plants celebrated in this book are in honour of BotSoc's centenary celebration in 2013. The extraordinary network for plant conservation that exists in this country, and the active role played by civil society in plant conservation work, is largely the result of the social and conservation investment made by the BotSoc over the past 100 years.

Below, CREW volunteers searching for threatened plants in the Midlands of KwaZulu-Natal, photograph Isabel Johnson. Opposite, *Gibbaeum haaglenii*, an endangered succulent plant from the Riversdale Plain, photograph Jan Vlok. Overleaf, one of only three populations of the Critically Endangered *Hesperantha sufflava* destroyed by a housing development on the outskirts of Malmesbury, photograph Rupert Koopman.

Plants in peril

The Conservation of South Africa's threatened plant species depends on the passion and commitment of hundreds of conservation minded South Africans. This chapter profiles individual plant species on the brink of extinction whose continued existence and conservation depend on being monitored and protected by committed groups and individuals. Accounts have been written by the actual custodians of each of these species.

Only 40 of South Africa's 2 500 threatened plant species are showcased here and thus represent a tiny fraction of plants that are being monitored and conserved. The stories included here have been purposefully chosen to represent the diversity of different plant species under threat and are a celebration of the successes of the conservation actions taken by South Africans across the country.

Serruria furcellata

Critically Endangered

Population size:	One plant in the wild
Range:	Cape Flats, Western Cape
Threats:	Habitat loss to urban and industrial expansion, bush clearing and mowing; alien plant invasion; invasive alien ants; inappropriate fire management; trampling; mole rat activity associated with disturbance
Action required:	Propagation and restoration of plants to suitable habitats in the wild

Known as the Kraaifontein spiderhead, this species was once common in Kraaifontein and Brackenfell on the Cape Flats. Its habitat is Cape Flats Sand Fynbos, a critically endangered vegetation type. The population of this species has declined over the years and in 1987 fewer than 250 plants remained at one site in North Pine on the Cape Flats. By the late 1990s, only two plants remained. Cuttings were taken of these two plants for *ex situ* conservation. In 2005, one of the two remaining plants was destroyed by municipal brush cutting. At present only a single plant is known in the wild.

This species, already on the brink of extinction, still faces threats from many sources, including urban and industrial expansion, bush clearing and mowing, alien plant invasion, invasive alien ants, inappropriate fire management, trampling and increased mole rat activity associated with disturbance.

Cuttings from North Pine have repeatedly been collected and grown at Kirstenbosch but the plants do not survive in the display garden and are difficult to maintain in pots. After various trials the threatened plant horticulture team have successfully established an *ex situ* collection of this species by growing the cuttings in stock beds which receive little irrigation, thereby simulating the well-drained soils of this species' natural habitat. *Serruria furcellata* is initially difficult to establish and there is a loss of about 50% in the first year, after which the plants appear to survive much better. Kirstenbosch is experimenting with the best method of preparing plants for reintroduction into the wild. One approach is to grow plants long enough to produce a rootstock before restoring them to their habitat, thereby increasing their chances of survival. Due to its severely threatened status, a number of attempts have been made to introduce this species back into natural fragments on the Cape Flats. Attempts to introduce this species to Bracken Nature Reserve, the closest reserve to the North Pine population, have had limited success. This is due to the plant's original habitat not being available in the reserve. Bracken Nature Reserve is higher and therefore drier than North Pine. The plants re-established around the last remaining natural plant at North Pine have thrived and they were growing well and flowering by 2011. Unfortunately, attempts by the City of Cape Town to establish a reserve have been unsuccessful and development has reduced the remaining area to a small fenced off patch about 50 m in diameter. Another population propagated from the two remaining collections has been established on a smallholding at Brackenfell where horticulturists Rod and Rachel Saunders are caring for them. Seed collected from these plants were sown in 2012 but did not germinate. This indicates that the reintroduced population is not able to survive without human intervention at this stage.

Because on-site conservation provides the plant with the best chance of survival, a co-ordinated effort involving the City of Cape Town conservation staff and Kirstenbosch Research and Gardens is required to find a suitable and viable reserve within the original distribution so that the plant can be restored. The Kirstenbosch National Botanical Garden conservation programme needs to focus on maintaining the remaining two collections safely in their threatened species stock beds and producing viable seed for long term storage at the Millennium Seed Bank.

SANBI Kirstenbosch CREW: Anthony Hitchcock (author), Tony Rebelo, Ismail Ebrahim, Louise Nurrish, Pat Holmes, Rod Saunders and Rachel Saunders

Left, *Serruria furcellata* in flower, photograph Colin Paterson-Jones. Top right, the last remaining wild plant of *Serruria furcellata*, photograph Adam Harrower.

Above, Michalla Correia, Grade 2 learner from Durbanville Preparatory, conducted a school project on species that are threatened with extinction. Michalla chose this plant as it grows near to where she lives and is a species about to go extinct within her own city. She made the poster of the plants and also brought a plant to her school to show her fellow classmates. She was assisted with information provided by Kirstenbosch Specialist Horticulturist, Anthony Hitchcock. Kirstenbosch's Threatened Species team work hard to build awareness of the status of species on the brink of extinction. Photograph, Anthony Hitchcock.

Right, plants grown *ex situ* being reintroduced to suitable habitat in the wild, photographs Ismail Ebrahim. Opposite, the last remaining habitat of *Serruria furcellata*, photograph Adam Harrower.

Moraea loubseri

Critically Endangered

Population size:	14 plants
Range:	Langebaan, Western Cape
Threats:	Urban development, quarrying, animal predation
Action required:	Protection of locality; cultivation to establish new populations

Moraea loubseri was discovered in 1973 by bulb grower Johan Loubser. It is known from only one location, a granite outcrop near Langebaan on the West Coast. At the time, the population was described as plentiful. However, subsequently more than 80% of the site was destroyed through extensive quarrying for ballast used in the construction of a new iron ore harbour terminal in the adjacent Saldanha Bay. The rest of the site was degraded by overgrazing. Habitat quality continued to decline because of surrounding housing development. By 1995 there were fewer than 10 plants. In 2002 only three plants were found in flower and it was noted that burrowing porcupines were disturbing the remaining plants. Between 2004 and 2008 volunteers from the CREW Programme repeatedly surveyed the site but did not find any plants in flower. *Moraea loubseri* was listed as Possibly Extinct in the 2009 *Red List of South African plants*. Fortunately, in 2011 CapeNature botanist Rupert Koopman found two plants in flower—great news that *M. loubseri* was not extinct. In 2012 local CREW volunteer Koos Claassens counted 14 plants. This indicates that there is still a small but viable population of this species remaining in the wild.

Although there is nothing unique about the granite outcrop where this species occurs, as there are similar hills in this coastal area, *Moraea loubseri* does not grow anywhere else and its present distribution is less than 1 km^2.

Because of the rapid loss of habitat to development in the 1980s, Johan Loubser became concerned about the future of this species and collected plants for cultivation in his private collection, subsequently donating corms and seeds to the bulb collection at Kirstenbosch. This species grows well in cultivation and horticulturist Graham Duncan repeatedly propagated this species from seed at the Kirstenbosch nursery. Surplus seed has been donated to members of the Botanical Society of South Africa and this species is now being grown by a number of bulb growers in South Africa as well as in Australia, France, New Zealand and the UK. As *Moraea loubseri* has proved to be very easy to cultivate, reintroduction to augment both the existing remaining population as well as to expand the population to other suitable habitat on the West Coast is an urgent conservation priority.

Jacobsbaai CREW: Vathiswa Zikishe (author), Koos Claassens, Elise Claassens, Rupert Koopman, Rhett Smart and Ismail Ebrahim

Opposite, top, top and centre right, *Moraea loubseri* in flower, photographs Graham Duncan. Above, Vatiswa Zikishe author of account. Bottom right, habitat of *Moraea loubseri*, photographs Rupert Koopman.

Tulbaghia cominsii

Critically Endangered

Population size:	30–50 plants
Range:	King William's Town District
Threats:	Infrastructure expansion, urban expansion and overgrazing
Action required:	Continued monitoring of only known population and search for new populations

The original population of *Tulbaghia cominsii* was found in an extremely small area to the west of King William's Town in the Eastern Cape. It grows on dolerite outcrops in Albany Thicket and has a range of only 7 km^2. In 2010, the site of this population was destroyed as a result of road construction work. The only other population, known from a historical collection, is unlikely to survive as the area on the banks of the Buffalo River has been extensively transformed and degraded as a result of urban expansion. Fortunately, the story does not end there…

Next to the N2 highway from King William's Town to Grahamstown in the Eastern Cape, a rocky dolerite outcrop provides a unique habitat for a variety of interesting plant life, including *Brachystelma meyerianum* and *Haworthia cooperi* var. *dielsiana* as well as large populations of *Nerine filifolia* and *Massonia echinata*. Intrigued by a small *Tulbaghia* growing in the cracks of dolerite boulders in the outcrop, CREW volunteer Cameron McMaster collected a specimen and took it to the Compton Herbarium in Cape Town. There it was identified as *Tulbaghia cominsii* by Dr Canio Vosa, the botanist who had described the plant in 1979 and who was coincidentally visiting the herbarium at the same time.

Having established that this was a rare plant, probably confined to this particular habitat, the site was visited regularly and a small population was established in the nursery. A report was submitted to CREW in August 2010 to record this important conservation site and protect the species. Unfortunately, a few months later the site was destroyed by construction work for the highway and the only known population of *Tulbaghia cominsii* had apparently been wiped out.

The engineer was contacted and the rarity of the plant and the importance of rehabilitating the area where the plants grow were stressed. Fortunately, the response was immediate and positive. Within 12 hours and despite pouring rain, the Environmental Control Officer appointed by the South African National Roads Agency Limited (SANRAL) to supervise the project, arranged a site inspection with the engineers. They agreed to rehabilitate a section of the site where a few *Tulbaghia* plants remained, clear it of earth works, expose the original surface and secure the area within the road reserve with stone walls so no further damage

would take place. They undertook to protect the area where the *Tulbaghia* grow for the remainder of their tenure on site. In addition, the SANRAL officer conducted searches in the surrounding vegetation to see if more plants were to be found. She discovered other areas nearby where *Tulbaghia cominsii* is surviving but where livestock trample and graze the plant, which is clearly palatable, especially to goats.

This conservation success story is thanks to the persistent efforts of the CREW volunteer Cameron McMaster who will continue to monitor the site regularly. The experience emphasises the importance of alerting SANRAL of potentially important plant sites and endangered species long before road construction begins. However, the threats posed by construction, quarrying, overgrazing and urban expansion remain and it will be necessary to keep a watchful eye over the site to prevent the species from becoming extinct in the wild.

Photographs and text: Cameron McMaster

Opposite and right top, *Tulbaghia cominsii*. Right middle and below, former habitat of *Tulbaghia cominsii* destroyed for the upgrade of the N2 highway. Below, author Cameron McMaster.

Dioscorea strydomiana

Critically Endangered

Population size:	ca. 220 plants
Range:	Oshoek, Mpumalanga
Threats:	Sustainable harvesting of tubers for traditional medicine, collection for horticultural purposes and mining
Action required:	Community engagement to establish reason for harvest and to investigate substitution options; *ex situ* propagation and reintroduction

The South African wild yam, *Dioscorea strydomiana*, is one of the world's 100 most threatened species. It occurs on the tribal lands of the Ebutsini community in eastern Mpumalanga, near the border with Swaziland. Plants grow in loose rocky soil on very steep, dry, south-facing slopes. There is only one known population of approximately 220 mature plants. Sadly, the population is declining due to unsustainable harvesting for traditional medicine purposes. Repeated, severe cutting of tubers for medicinal use leads to the death of the plant. Annual monitoring of the most accessible section of the population for the past five years has revealed that 32% of the monitored plants died as a result of harvesting and at present, 91% of them show signs of damage from harvesting practices. An additional threat to the population is the possibility of mining in the area—a mining prospecting application was submitted in 2012 for the property where the only known population of this species occurs.

Dioscorea strydomiana is named in honour of the late Gerhard Strydom, a conservationist with the Mpumalanga Parks and Tourism Agency. He spotted the plant at a muthi market and realised that it was different from other *Dioscorea* species. He asked the muthi sellers where it came from and he was taken to the site where it grows, in a remote part of Mpumalanga. Johan Hurter confirmed that it was indeed a new species. This find came to the attention of the Plant Specialist Group/CREW in Mpumalanga in 2007. Despite the necessity of climbing a mountain to reach the plants, annual outings take place to record information about the remaining plants.

Unlike most of the *Dioscorea* species with underground tubers that enable them to survive veld fires, *D. strydomiana* has a large tuber above ground.

The tuber has a thick, corky outer surface that provides protection from fire. When the tubers are cut during harvesting for medicinal purposes, this outer protective layer is damaged and plants become vulnerable to fire as well as infections and rotting. Material from the plant is claimed

to treat cancer but this is unsubstantiated. However, it is likely to contain similar anti-inflammatory compounds to those found in other *Dioscorea* species.

These plants grow extremely slowly. Annual monitoring of selected plants has indicated virtually no change in tuber size over a period of five years. They also live for a very long time and it is estimated that the largest individuals in the population are several hundred years old. Although they produce large amounts of seeds, very few seeds germinate successfully and even fewer survive to become mature plants. This species' population growth and sustainability therefore relies on the long-term survival of mature individuals. This is why medicinal harvesting, which targets mature plants, is of such grave conservation concern. Current harvesting is unsustainable because the population is very small and plants are extremely slow-growing. In addition, there is the potential threat of collection for horticultural purposes, as the plant has an attractive growth form. Being very slow-growing, it is likely to be difficult to establish in cultivation, which may put pressure on the wild population to meet commercial demand.

Trials are underway at the Lowveld National Botanical Garden in Nelspruit and the Walter Sisulu National Botanical Garden in Roodepoort to develop methods for cultivating *Dioscorea strydomiana* for reintroduction into the wild in order to boost the rapidly dwindling wild population. Unfortunately, this species has proved difficult to cultivate, with extremely low rates of seedling survival.

Mpumalanga Plant Specialist Group, Mpumalanga Tourism & Parks Agency and SANBI CREW staff (Mpumalanga): Mervyn Lötter, Lize von Staden (authors), John Burrows, Tommy Steyn, Karin van der Walt, Andrew Hankey, Lientjie Cohen and Domitilla Raimondo

Opposite, caudiform habit of *Dioscorea strydomiana*, photograph Mervyn Lötter. Right top, flowers of male plants; right middle, a heavily harvested individual of *Dioscorea strydomiana*, photographs Karin van der Walt. Right bottom, a tagged seedling being monitored by the Mpumalanga Plant Specialist Group to understand growth and survival rates, photograph Mervyn Lötter.

Above top, harvesting panga with dead plant—overharvesting leads to the death of *Dioscorea strydomiana* plants, photograph Mervyn Lötter. Above, germination rates of seeds being tested, photograph Mervyn Lötter. Right top, middle and bottom, Mpumalanga Plant Specialist Group members monitoring *Dioscorea strydomiana*, photographs Mervyn Lötter. Opposite, the rugged savanna habitat of *Dioscorea strydomiana*, photograph Mervyn Lötter.

Brunia trigyna

Critically Endangered

Population size:	ca. 20
Range:	Pondoland, from the Umtamvuna River to the Mkambati River
Threats:	Habitat loss to agriculture and development; fire
Action required:	Management of the populations in formally protected areas

Brunia trigyna, known as the Pondoland ghostbush, is the only member of the Bruniaceae family in the summer rainfall region. This species is endemic to Pondoland, where it grows in open grassland on Msikaba sandstone in seasonally moist areas along stream banks. Its former range extended from the Murchison district in KwaZulu-Natal to the Magwa Gorge near Port St Johns in the Eastern Cape. It was known from collections made in the early 1900s but since then the species has declined rapidly. By the 1960s it reached critically low numbers, to the extent that extinction was a possibility. The species was rediscovered in 2001 but at present there are fewer than 20 mature plants in the wild, in three severely fragmented populations.

Undoubtedly, habitat destruction played a significant role in the decline of the species. Grasslands around Murchison were all converted to sugarcane and streams were badly degraded so they were unlikely to provide the seepage conditions that *Brunia trigyna* appears to prefer. The large numbers of plants observed in the early 1900s above the Magwa Gorge probably gave way to tea estates, a grove of *Eucalyptus* trees drying up the moist habitat, or trampling by cattle disturbing the water flow. Burning is another potential threat, as the plants appear to be sensitive to fire and tend to grow in sites protected from fire. One of the factors limiting the propagation of this species is that the success rate of cross-pollination is low. Plants grown in nurseries and introduced near isolated individual plants in the wild have not been able to boost the reproduction rate of the population. The single reproductively active population of about 12 mature individuals occurs outside a protected area and may still rapidly decline if their habitat is threatened.

In the 1960s, conservationist and amateur botanist Mr Hugh Nicholson found an unknown shrub covered in white flowers in the Umtamvuna Nature Reserve. The specimen was identified as the Pondoland ghostbush by Mr R. Strey at the Natal Herbarium. After the demise of this particular plant as well as the one found in 1988 near Magwa Falls, it was believed

Left, *Brunia trigyna*, photograph Colin Paterson-Jones.

that the species was extinct in the wild. However, later that year a plant was found in the Umtamvuna Nature Reserve by one of Mr Hugh Nicholson's Thursday Botanical Group, of which Tony Abbott was a member. In 1999 another plant was found at Mkambati by the reserve manager. In 2001 Simon Woodley and Matt Williams found a small population with a very restricted range at the Msikaba River.

Cuttings from the Magwa Falls plant were grown successfully by Dr Hannes de Lange at the Kirstenbosch Endangered Plant Laboratory and small populations were established in the Umtamvuna and Mkambati Nature Reserves. Efforts at cross-pollination were not successful. Subsequently, Simon Woodley successfully propagated plants from seed so that it was possible to re-establish a population at a suitable site in the Umtamvuna Nature Reserve as well as distribute plants to keen gardeners in the area. At present, the plants in the Umtamvuna and Mkambati Nature Reserves are protected but the only viable population in the wild is not protected.

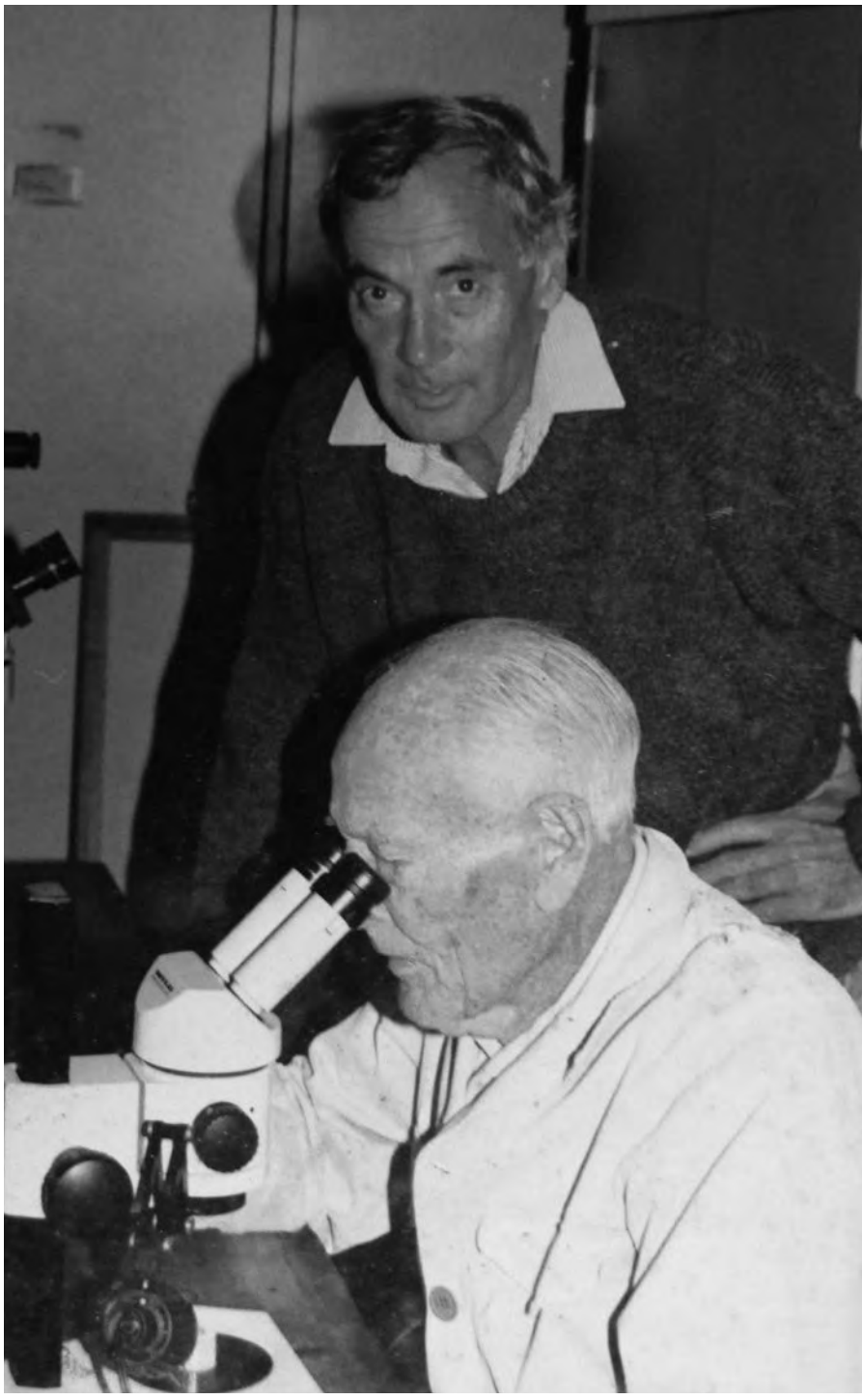
The number of plants in the wild is still critically low but the discovery of the fertile population brings new hope that there is a chance of survival. The Umtamvuna population appears to be thriving and rewards visitors with a mass of white flowers each year.

Nicholson Botanical Group, Pondoland CREW: Tony Abbott, Kate Grieve (authors), Maggie Abbott, Joan Smith, Dorothy MacIntyre, Graham Grieve, Anne Skelton and Uschi Teicher

Left, *Brunia trigyna* in flower, photograph Tony Abbott. Right top and middle, the Nicholson Botanical Group who closely monitor the survival of remaining individuals of *Brunia trigyna*. A new generation of botanists being introduced to this paleoendemic, photographs Lize von Staden.

Below right, this naturally rare species has seen efforts to save it from extinction taking place since the 1960s when amateur botanist, Mr Hugh Nicholson, first found the plant.

Far right, Hannes de Lange with Mr Nicholson examining *Brunia trigyna* under a microscope. Dr Hannes de Lange from the Kirstenbosch Endangered Plant Laboratory grew cuttings and established a few small populations in the Umtamvuna and Mkambati nature reserves in the 1980s.



Disa barbata

Critically Endangered

Population size:	600–700 individuals
Range:	Extinct on the Cape Flats; extant at one site near Malmesbury, Western Cape
Threats:	Invasive alien plants, human activities related to fire wood collection and alien clearing
Action required:	Securing the part of the population occurring outside of the reserve; ongoing alien clearing and establishment of new populations from propagated individuals

Disa barbata, also known as 'Ou man met sy baard', is one of South Africa's most threatened orchids. It was once fairly common on the Cape Flats around Cape Town but has been lost to urban expansion. The last record from this area dates back to 1950. Currently there is only one small surviving population in and around a small nature reserve near Malmesbury. Although the invasion of alien plants in the reserve is being managed, community land outside the reserve is still densely covered in invasive alien plants and is further degraded by vehicles driving through the sandy veld to collect firewood.

It is almost impossible to spot *Disa barbata* when not in flower as the plants grow in patches of 'Cape reeds' and their leaves closely resemble the stems of the reeds. Furthermore, flowering is restricted to a period of two weeks in late spring, which means that annual monitoring must be timed precisely. In 2001, after searching for the plant at the locality for the entire day, Benny Bytebier (currently curator of the Bews Herbarium at the University of KwaZulu-Natal, Pietermaritzburg) could find only eight plants. When this alarming news was reported to CapeNature, it was decided to draw up a monitoring and rescue plan, which received US$ 3 500 in seed funding from the Endangered Species Fund of the Chicago Zoological Society and the Chicago Board of Trade.

The *Disa barbata* project was initiated in an attempt to rescue this species by surveying for additional populations, gaining a better understanding of its life history and its interaction with the environment, *in vitro* propagation, and raising awareness in the surrounding communities particularly with schoolchildren. Issues being investigated include the frequency of flowering, response to fire, the effect of alien species and alien clearing on not only the plants but also the fungi needed for germination, and the conservation status of the pollinator, a specialist carpenter bee.

In 2002, a small group of volunteers began monitoring the population and Hildegard Crous collected the first batch of seed in an attempt to

propagate the species. Over a period of 10 years a great deal has been learnt about this particular orchid. It is now estimated that the single remaining population consists of 600–700 individuals and that most of them flower only occasionally. The plant has been propagated from seed through tissue culture and young plants have been introduced in a protected area where they used to occur in the past. To raise the profile of this species amongst orchid growers, yet to discourage them from digging up plants in nature, the artificially propagated young plantlets are offered for sale to the interested public. Discussions with the community were initiated and local schoolchildren are now learning about conservation issues relating to this species through their involvement in field visits.

The future needs of this plant include integration of annual monitoring with the management plan for the reserve, safeguarding the population that occurs outside the reserve, continuing the search for new populations beyond the reserve, monitoring the artificially propagated plants that were introduced to the wild, as well as investigating the reproduction of these plants, their response to fire and their precise habitat requirements.

The reserve where this orchid occurs is small and consists of dry, sandy, flat coastal hinterland surrounded by farms or land made useless due to heavy infestation with alien acacias. As a result of this project the reserve management now has a flagship species in the form of an attractive orchid to convey its conservation message to the public in general and to the surrounding communities in particular. This is a pilot project, using a

Left, *Disa barbata*; right and below the *Disa barbata* volunteer group monitoring the only population of this Critically Endangered plant, photographs Benny Bytebier.

hands-on approach to species conservation. Today Stellenbosch University, University of KwaZulu-Natal, CapeNature, CREW, SANBI, Working for Water, a commercial tissue culture laboratory (the Cape Institute of Micropropagation), as well as interested members of the public are working together towards the same goal—the survival of the species.

The *Disa barbata* core volunteer group: Annelise le Roux, Benny Bytebier, Dirk Bellstedt, Ted Oliver, Tessa Oliver (authors), Johny Witbooi, Koos Steenkamp, Hildegard Crous, Ismail Ebrahim, Rupert Koopman and Patrick Wiltshire

Left top, bottom and opposite, *Disa barbata* in flower, photographs Benny Bytebier. Below, the restioid flats habitat of *Disa barbata*, photograph Rupert Koopman.

Mimetes stokoei

Critically Endangered

Population size:	ca. 24 individual plants
Range:	Palmiet River Mountains, Western Cape
Threats:	Naturally low population numbers, harvesting for cut flowers, habitat loss to horticulture, inappropriate fire management and susceptibility to a plant pathogen causing root rot
Action required:	Protection of the existing site, nursery propagation and introduction to suitable habitats

Known as the mace pagoda because of its unique appearance, *Mimetes stokoei* was discovered by Thomas Stokoe in 1922 at a site in the Palmiet River Mountains. A naturally very rare species, since its discovery there have never been more than 40 plants in the population. It is believed that wild flower harvesting caused the population decline during the early 20th century. The last known individual died in 1950 and for half a century this species was considered extinct. However, after a very hot fire in 1999 a small population of approximately 40 plants reappeared. The population is limited to a 4 ha area of Kogelberg Sandstone Fynbos.

Thomas Stokoe was an avid collector of fynbos plants and during his lifetime he discovered 150 species new to science. Of all of the new species he discovered, *Mimetes stokoei* was his favourite and between 1922 and 1950 he searched continually for them in the Kogelberg and Hottentots-Holland Mountains. He only ever found very small populations of a handful of plants and a total of just 10 in flower.

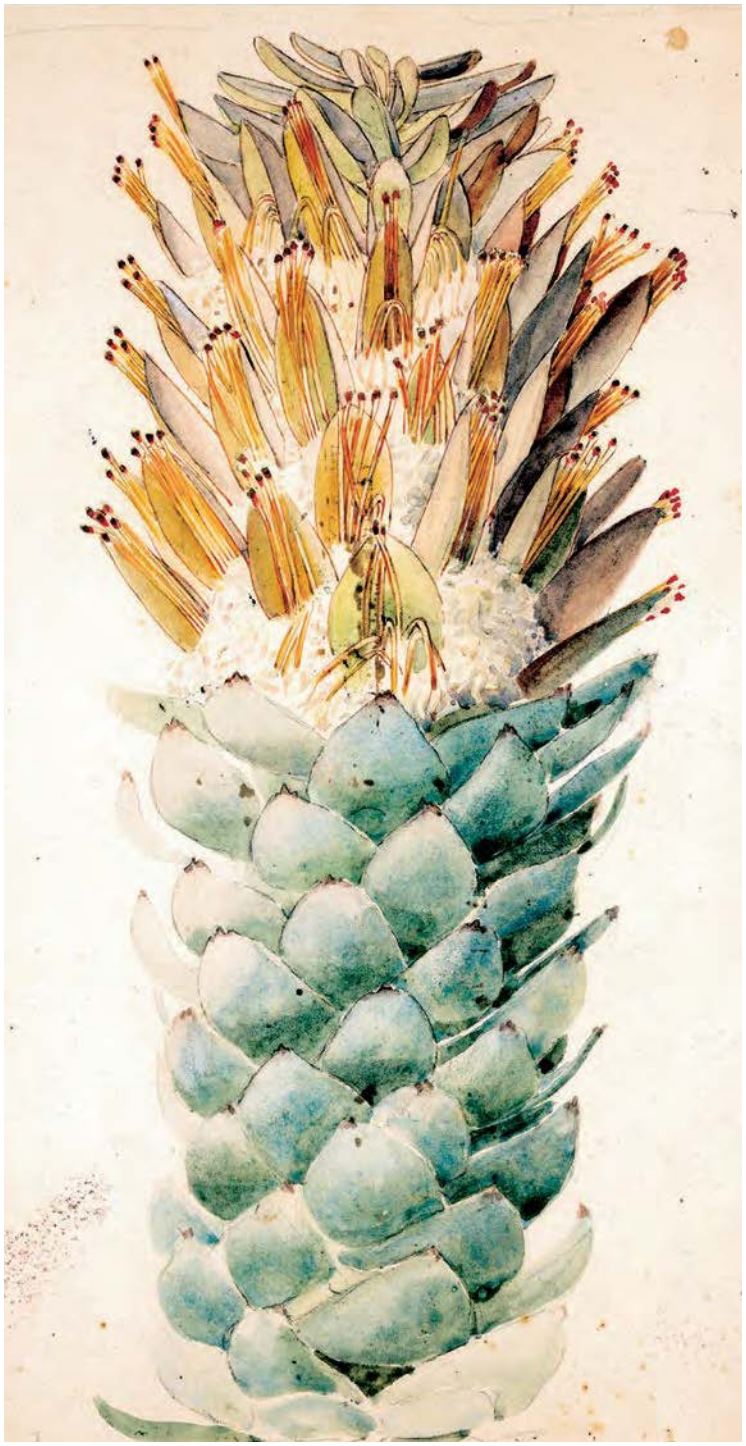
In 1965, protea horticulturist, Dr Marie Vogts, established a horticultural experimental plot on the only known locality of the species to propagate other species of protea. The vegetation was cleared and as part of this clearing process soil was disturbed, which resulted in the stimulation of a seed of *Mimetes stokoei* and the germination of a single plant. To protect the plant from wind damage, a stabilising tripod was erected in 1969 but unfortunately this snapped the stem of the seedling

and the plant died, becoming the last known herbarium specimen of this species.

Mimetes stokoei depends on hot summer fires for germination. Attempts to restore the species with controlled burns in July 1971 and April 1984 were not successful. However, there was a hot summer fire in December 1999, almost 50 years after the last plant flowered, and in 2001 Marc Johns, Kogelberg Reserve Manager, discovered 40 young plants in three clumps. These plants flowered in 2004, some four years later. This population was monitored intensively. The plants flowered only in March and approximately 157 inflorescences were produced, although the amount of seed was not measured. Unfortunately, each year a few plants died so that there were only five plants in 2010 when the area burned again. In 2007 another two small colonies were discovered a few kilometres away to the southeast. These plants differed from the main population in having gold and not pink florets. Sadly, they were all dead by 2009.

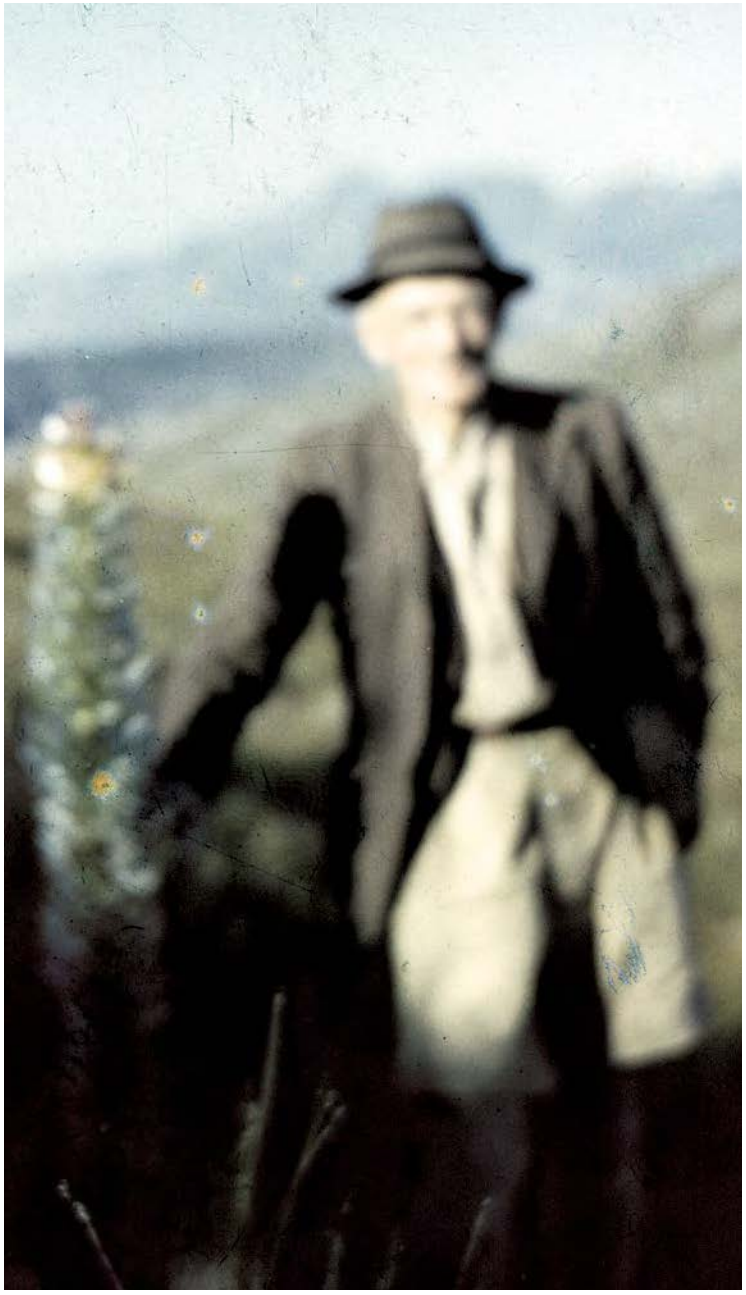
Several other suitable habitats have been extensively searched, without success. The present locality is being monitored and visitors discouraged to prevent trampling around the plants, which could damage the root systems, introduce pathogens, and compact the sandy-peaty soil. Another attempt to secure the survival of the species was made by Robbie Thomas, who has propagated plants by grafting. Despite a setback in the winter of 2008 when most of the ten cuttings appeared to have acquired a fungal infection with many leaf lesions, all cuttings recovered and seven flowered in 2009. Seeds from these plants have been deposited in the Millennium Seed Bank and some were retained for sowing in 2013. Cuttings have also been established at Kirstenbosch National Botanical Garden and permission is being sought to plant some of these in similar habitat near the existing stands, but in separate drainage compartments.

Protea Atlas Project: Tony Rebelo (author), Marc Johns, Robbie Thomas, Jan Vlok, AnneLise Vlok, Ted Oliver, John Rourke, Nigel Forshaw and Colin Paterson-Jones



Left, *Mimetes stokoei*, photograph Colin Paterson-Jones.

Right, botanical drawing of the magnificent *Mimetes stokoei* by T.P. Stokoe himself. Stokoe discovered 150 species new to science in his lifetime, but *Mimetes stokoei* was most certainly his favourite.



Above, Thomas Pearson Stokoe, who discovered *Mimetes stokoei* in 1922, photographed here with *Mimetes stokoei* by his friend, Will Cloete, who was clearly a very poor photographer.

Top, Tony Rebelo responsible for the Protea Atlas Project, photograph Nigel Forshaw. Above, Mark Johns, conservation manager for the Kogelberg Nature Reserve and his wife, Amida, who have spent their lives protecting the habitat of *Mimetes stokoei* and hundreds of other endemic species restricted to this mountain range, photograph Nigel Forshaw. Opposite, *Mimetes stokoei* in flower, photograph Colin Paterson-Jones.

Erica recurvata

Critically Endangered

Population size:	34 plants
Range:	Soetmuisberg near Napier
Threats:	Invasive alien plants and too frequent fires
Action required:	Correct fire regime, clearing invasive alien plants, *ex situ* cultivation

Erica recurvata is a fynbos species that occurs only in a very specialised habitat—in crevices on large sandstone rock outcrops along the top of mountain ridges and plateaux. Until 2007 the species was known solely from a painting by Andrews from the early 1800s and was thought to be a garden hybrid. Seed was presumably collected in the Cape by Niven in the early 1800s and sent to England where plants were grown. When they flowered, they were illustrated and the description published by Andrews. It was only when a small wild population was discovered near Napier in the Western Cape that the origin of the plants was confirmed as South Africa.

This species had not been seen or collected in the wild for 200 years until 2007 when it was rediscovered by independent botanist Ross Turner, who had been commissioned by the Napier Mountain Conservancy to do a botanical survey in the area. Turner found nine plants of this extremely rare species. One of the members of the conservancy, Stephen Smuts, is also a CREW member and he alerted fellow CREW volunteers Cameron and Rhoda McMaster of the discovery. They undertook a wider search and found a second population of approximately 25 plants about a kilometre away. The range of the two populations is 1.26 km^2. These bonsai-like plants all seem to be very old and there is a possibility that seed collected by Niven may have been taken from the same individuals seen today. There is no evidence that the population is increasing. Monitoring the plants has become a CREW group project and although similar habitats on adjacent mountains have been investigated, additional plants have not been found.

The area in which the plants grow is threatened by alien plant invasion. The eastern population does not fall within the conservancy and no attempt has been made to remove the mature pines in the vicinity. On each visit, members of the CREW group have pulled out young pines and seedlings close to the population but clearance of all alien vegeta-

Top right, *Erica recurvata* original plate in Andrews Heathery painted ca. 1805. Opposite and right, the very rare *Erica recurvata*, photographs, opposite, Colin Paterson-Jones; right, Cameron McMaster.

tion around the sites is required. Another threat to the plants is frequent burning of the area as part of agricultural management practice, which may affect plant regeneration.

It is clear that the specimens in Europe were cultivated from seeds. Nursery cultivation from seed or cuttings is probably the only way to conserve this species for the future. However, it is doubtful whether cultivated plants could be re-established in their specialised natural habitat.

Napier CREW: Cameron McMaster (author), Rhoda McMaster, Stephen Smuts, Odette Curtis and Dorothy Buggs

Left above and below, Napier CREW group monitoring *Erica recurvata*, photographs Rhoda and Cameron McMaster. Below, *Erica recurvata*'s highly specialised habitat of rock crevices, photograph Cameron McMaster. Opposite, *Erica recurvata*'s pendulous flowers that are possibly pollinated by mice, photograph Ross Turner.

Ixia versicolor

Critically Endangered

Population size:	1 000–2 000 individuals
Range:	Stellenbosch to Somerset West
Threats:	Naturally low population numbers, harvesting for cut flowers, habitat loss to horticulture, inappropriate fire management and susceptibility to a plant pathogen causing root rot
Action required:	Appropriate fire management and ongoing invasive alien clearing

Historic records suggest that *Ixia versicolor* was once common on the seasonally wet clay flats in the Strand and Gordon's Bay area. In the past 15 years, there has been an 80% loss of sites where this species occurred due to urban development in Gordon's Bay and Somerset West. As a result of urban expansion, a large population at Disa Road in Gordon's Bay was lost in 2005. At present, this species is known only from two small, highly fragmented populations occurring within an area of 1 km^2 in Gordon's Bay. Both remaining populations are declining due to invasion by alien grasses and one site is mowed annually by the municipality, preventing seed being set. Fortunately, the second site falls within the Harmony Flats Nature Reserve, a tiny reserve of only 9 ha managed by the City of Cape Town in collaboration with the local community. The frequent mowing of the one population as well as too regular burns at both sites is a serious concern as both these factors encourage growth of alien invasive grasses and shrubs, which negatively impact on the viability of remaining *Ixia versicolor* plants.

The Harmony Flats Working Group (HFWG) was established in 2002 and consists of members of the Cassablanca community living next to the Harmony Flats Nature Reserve. The group was established as part of the Cape Flats Nature Project responsible for facilitating community interaction at selected Cape Flats nature reserves. Since its inception, the group has been part of the CREW Programme and they regularly monitor the threatened flora present at Harmony Flats Nature Reserve. Historically, the reserve was well known for its geometric tortoise population but when the HFWG and botanists from Kirstenbosch and CapeNature started conducting field surveys in 2003, the amazingly rich botanical diversity was discovered. *Ixia versicolor* is one of the reserve's flagship species and the group looks forward to late spring when they start flowering. The HFWG and the reserve staff conduct special field days at the reserve to encourage local communities and plant enthusiasts to experience the amazing botanical diversity of the reserve. One of these field days is dedicated to monitoring *I. versicolor.*

The HFWG is integral to the management of the reserve and their members monitor the site regularly to ensure that alien plant invasion is con-

trolled and they are also involved in extinguishing accidental fires. This group has played a pivotal role in justifying the existence of the reserve by creating awareness and engaging the politicians in the area. Since the inception of the group, there has been great progress in the environmental management of the site. It has been fenced, a community forum has been established, and an environmental resource centre is being built.

Ixia versicolor requires continual monitoring to ensure that the species survives. Due to the intense pressure on the species and its habitat, it is important for the reserve staff and the community to continue working together to effectively manage the Harmony Flats Nature Reserve.

Ismail Ebrahim (author). Harmony Flats CREW: Julian Brits, Jan Geldenhuys, Luzanne Walters, Sabelo Lindani, Doris Taylor, Irene Philander, Joan Alberts, Florence Young and Stacy-Anne Michaels

Above, the Harmony Flats Working Group being trained on plant identification at the Compton Herbarium Kirstenbosch. Photograph Rupert Koopman.

Previous and left, the flowers of *Ixia versicolor* which, as its name indicates, take various colour forms, photographs, previous, Colin Paterson-Jones; left, Ismail Ebrahim.

Right, the Harmony Flats Working Group, members of the Cassablanca community who live next to the Harmony Flats Nature Reserve monitoring *Ixia versicolor*, photographs Ismail Ebrahim.

Erica jasminiflora

Critically Endangered

Population size:	ca. 2 000 individuals
Range:	Caledon district
Threats:	Habitat loss to development, agriculture and grazing, invasion of alien plant species, harvesting for horticulture, loss of pollinators
Action required:	Formal protection of the known populations, clearing of invasive alien species, search for new localities

Erica jasminiflora was first found in 1977 at Shaw's Pass in the Caledon district. The 150 plants in the original population declined to 15 plants in 1982 and in 1985 there were none to be found. Attempts to re-introduce plants from seed failed. However, approximately 75 plants were recorded in 1994 after a fire but the number declined again until there were just two plants remaining in 2009 and the species was thought to be on the verge of extinction. The site was severely threatened by habitat loss to infrastructure development, severe infestation of alien plants and loss of pollinators. Fortunately, in 2010 a new population was discovered 10 km away from the first one. There are 2 000 individual plants in this population and although invasive alien plants are present, the landowner is conducting ongoing alien clearing.

Erica jasminiflora, or jasmine heath, was formally considered one of the most threatened plants in the country. When the CREW Programme was started in 2003, monitoring this species was a top priority as only two plants were known to exist. CREW was fortunate to get a historic data set from CapeNature called ISEP (Information System for Endangered Plants) and this reflected the decline in plant numbers since 1977. CREW started monitoring this species in 2003 with the help of local volunteer Adriaan Hanekom from Caledon. Hanekom revisited the population in 2005 and found five plants in flower. It was also noticed that the plants were not setting seed, indicating that they were not being pollinated. The following year Hanekom pollinated two plants by hand and successfully managed to harvest seed and propagate some plants in cultivation. In 2010 a member of the Hermanus branch of the Botanical Society discovered a new population of *E. jasminiflora* on a property he had purchased in the Hemel en Aarde Valley. The CREW team immediately went out to confirm the identification and were thrilled to find a large population of about 2 000 plants. The current landowner is committed to conserving the site and managing it sustainably.

Right, *Erica jasminiflora*, photograph Colin Paterson-Jones

Several attempts have been made to ensure the formal protection of Shaw's Pass but none has been completely successful. In 2006, CREW organised a field trip with the mayor and councillors of Caledon to show them the important biodiversity sites in town. At that stage there was a group of small scale farmers using part of the commonage to graze cattle and pigs. CapeNature and CREW raised concerns about the livestock damaging the veld and having a negative impact on the highly threatened endemic species on site. Fortunately, the field trip resulted in the municipality finding alternative land for the small scale farmers, thus alleviating the grazing threats at Shaw's Pass. Since 2012, CapeNature has been working with the provincial roads department to protect the Shaw's Pass Commonage as an offset for the damage being done to fynbos vegetation with the upgrade of the road between Hermanus and Caledon. The goal is to proclaim the majority of the Shaw's Pass commonage as a nature reserve through the Stewardship Programme. A Stewardship contract is also being negotiated with the landowner of the second population. The future of *Erica jasminiflora* looks far rosier than it did a decade ago.

Once these sites are formally protected, a rehabilitation programme for the Shaw's Pass population can be implemented. The Hemel en Aarde Valley also needs to be surveyed for additional populations of this very special *Erica*.

Caledon CREW and SANBI CREW staff: Ismail Ebrahim (author), Adriaan Hanekom, Eugene Marinus, Rupert Koopman, Vathiswa Zikishe, Caitlin von Witt and Anthony van Hoogstraten

Left and below, *Erica jasminiflora,* photographs Ismail Ebrahim.

Cattle allowed to graze in eco gold mine

NATURE conservation officials are hoping desperately that grazing cattle have not destroyed the last known remaining populations of two critically endangered indigenous plant species.

Despite being specifically briefed about the extremely high conservation value of the municipal-owned Shaw's Pass commonage between Caledon and Hermanus, Caledon municipal officials have allowed at least 16 head of cattle to be grazed on the site in the past fortnight.

JOHN YELD
Environment Writer

The cattle, owned by landless stock farmers, may have eaten the only known population of an indigenous plant of the pea family, *Otholobium lanceolatum*, which occurs only here and which may have become extinct because it is highly palatable to stock.

The cattle could also have destroyed the beautiful *Erica jasminiflora*, also a critically endangered plant that occurs at Shaw's Pass.

This area is ecologically important because it is a transition zone between mountain fynbos and renosterveld.

Renosterveld is one of the vegetation types in the Western Cape that has been largely lost to agriculture, and of which less than 4% survives.

Another four critically endangered plants are also found at the Shaw's Pass commonage.

Too late? This critically endangered Erica species is found only on municipal commonage between Caledon and Hermanus, where Theewaterskloof municipal officials have allowed cattle to be grazed in recent days.

Above top, members of the Hermanus branch of the Botanical Society who discovered a large new population of *Erica jasminiflora* in 2010, photograph Ismail Ebrahim. Above, Adriaan Hanekom, CREW volunteer, hand-pollinating the few remaining plants at Shaw's Pass, photograph Ismail Ebrahim. Right, the newspaper article published in the *Cape Argus* in 2005 at the time that small scale farmers were allowed to graze stock at the then only known location of this highly threatened species, Shaw's Pass.

Disa procera

Critically Endangered

Population size:	< 100 plants
Range:	Sedgefield
Threats:	Habitat loss to coastal development, agriculture and forestry, invasive alien species, irregular fire, collection for horticultural purposes
Action required:	Reserve management practices; protection from collection

Disa procera is a very rare species. There are few historical collections and there is no information about its former range. Currently, it is known from a single population occurring within a 170 ha fragment of fynbos near Sedgefield in the Western Cape. Annual surveys conducted since 2006 have mapped the extent of the population and recorded between 40 and 70 plants. The fluctuation in numbers indicates that individual plants do not flower every year.

This species is endemic to Southern Cape Dune Fynbos, a vegetation type occurring on the coast between Wilderness and Knysna. This part of the coast is already at least 40% transformed, primarily due to expanding coastal development but also agricultural expansion and forestry plantations. Large sections of this vegetation type are also densely infested with invasive alien wattles (*Acacia* species). The only known population of *Disa procera* is protected, but the small area in which it occurs is at risk of too infrequent fire. Most orchid species benefit from fires, often flowering profusely in response to fire while remaining dormant when vegetation becomes very dense. A number of *Disa* species have become locally extinct at sites where fires have been excluded for very long periods of time. An additional threat is the continued invasion of the habitat by alien plants, particularly naturalised aliens from surrounding properties. Some of these are very difficult to control and eradicate.

In the past, there has been some confusion about the identity of *Disa procera*. It was first collected by Thunberg in 1773 and by 1794 he was already discussing its various names. In 1913 Rolfe named it *Herschelianthe excelsa*. After its rediscovery in 1993 by William Liltved and Steven Johnson, it was revised by Linder and the name was updated to *D. procera*.

The Outramps CREW group saw *Disa procera* for the first time in 1996 in the Sedgefield area and they were entranced by its beauty. A scan of this small cerise orchid was sent to Jan Vlok at the Saasveld Herbarium. He identified it and described it as being very rare. The Outramps continued to monitor it and in 2009 this became a formal CREW project. Local reserve managers were notified of the orchid's presence and vul-

nerability. The last monitoring was done in 2012 but one of five spatially separated localities could not be monitored as it had been mistakenly brush cut during the growing phase of the orchid.

Threats to the conservation of this species include illegal collection, inappropriate management actions and a lack of fire due to transformation of the surrounding landscape. In an attempt to improve conditions for the species, SANParks recently successfully implemented a controlled burn to rejuvenate dense vegetation in the area which had not burnt for over 40 years.

To ensure the survival of this plant, it is important to remind authorities on an annual basis about the dangers of mowing near the plants. The plants also need to be protected from unauthorised collectors. Perhaps the most urgent need is an intensive search for other localities. Failing this, photographs may be the only reminders of its beauty in future.

George Outramps CREW: Di Turner (author), Bill Turner, Rusell Bantich, Marge Webster, Ann Symons, Jean Purcell, Gail Nootenboom, Casey Nootenboom, Nicky van Berkel, Jenny Potgieter, Thys Potgieter, Ashleigh Harvey and Brian du Preez

Opposite and below, *Disa procera*, photographs, opposite Ismail Ebrahim; below, Nicky van Berkel. Right, the Outramps CREW group monitoring *Disa procera*, photographs, right top and bottom, Ismail Ebrahim; right centre, Di Turner.

Gerbera aurantiaca

Endangered

Population size:	< 5 000 individuals
Range:	KwaZulu-Natal Midlands and northern mistbelt; Badplaas area, Mpumalanga
Threats:	Habitat loss to urban development, forestry and crop cultivation; invasive alien species
Action required:	Protection of habitat; correct fire management; search for suitable localities for reintroducing plants

Also known as the Hilton daisy, this species is endangered largely because of habitat loss. It occurs in the Midlands and northern KwaZulu-Natal as well as near Carolina and Badplaas in Mpumalanga. Its habitat is mistbelt grassland, in well drained areas with underlying dolerite. Unfortunately more than 90% of this habitat has been transformed for commercial forestry plantations and crop and pasture cultivation over the past 120 years. There has also been extensive recent loss of habitat to urban development in the KwaZulu-Natal Midlands. Populations of *Gerbera aurantiaca* are scattered and are not found in all mistbelt grasslands.

First collected by Ferdinand Krauss in 1840, populations of *Gerbera aurantiaca* in and around Pietermaritzburg have been well-known to plant enthusiasts in KwaZulu-Natal for many decades. More recently populations have been found near Ngome in northern KwaZulu-Natal, and in 2005 John and Sandie Burrows (CREW/PSG Mpumalanga) recorded a population between Carolina and Badplaas in Mpumalanga. There is considerable geographical variation of inflorescence colour throughout the range, from the typical bright red to clear yellow. The Umvoti CREW group has been involved with surveying known and new populations as well as assisting with pollination studies of the Umvoti populations. Christina Potgieter of CREW has assisted with pollination studies at Ngome, Byrne and Umvoti.

Isabel Johnson, who started the CREW Programme in KwaZulu-Natal, is doing a PhD on aspects of the conservation and evolutionary biology of *Gerbera aurantiaca*. She is investigating both *ex situ* and *in situ* approaches to conserving this species and her work has brought to light important aspect of its life history—information required for effective management.

Populations of *Gerbera aurantiaca* have varying degrees of protection, ranging from formal protection in Ezemvelo KZN Wildlife and Department of Agriculture and Environmental Affairs sites, Biodiversity Stewardship Nature Reserves, municipal, and informal private nature reserves to committed landowner protection. In some cases there is no protection at all. Attempts to germinate seed in nursery conditions have met with limited success, but seedlings introduced into an area of mistbelt grassland near Pietermaritzburg where the plants occurred historically have matured and flowered. Additional plantings are planned for this and other sites.

Protection and appropriate management of the habitats of the remaining populations are essential. The most important issues are the prevention of livestock grazing or limiting grazing to the non-growing season, regular controlled burns at appropriate times of the year, and carefully managed invasive plant control. There are very few pollinating insects (and very little pollen) at some of the sites and a better understanding of the requirements of these insects is needed so that appropriate management measures can be adopted. Additional artificial hand pollination should be considered in populations where very little seed is produced. Further suitable sites for reintroduction of the plants are needed. However, in view of the continuing habitat destruction and degradation of the remaining areas of mistbelt grassland, the prognosis for the long-term survival of the species is not good.

Umvoti CREW: Isabel Johnson (author), Vic Schutte and Sue Swan

Left, *Gerbera aurantiaca* being pollinated by a member of the monkey beetle family. Overleaf: left above, the mistbelt grassland habitat of *Gerbera aurantiaca*; left middle, Isabel Johnson, author and scientist studying the population dynamics of *Gerbera aurantiaca*; left below, the Umvoti CREW group; right, the clonal habit of *Gerbera aurantiaca*, photograph Isabel Johnson.

Disa scullyi

Endangered

Population size:	< 1 500 individual plants
Range:	KwaZulu-Natal Midlands around Estcourt southwards along the KwaZulu-Natal and Eastern Cape Drakensberg foothills to the Amathole Mountains near Hogsback
Threats:	Destruction and disturbance of wetlands, urban expansion, agriculture and forestry, and invasive alien species
Action required:	Conservation of wetlands, management of invasive alien plants

Formerly widespread and frequently recorded, this orchid has become extremely rare. It occurs in the KwaZulu-Natal Midlands around Estcourt and southwards along the KwaZulu-Natal and Eastern Cape Drakensberg foothills to the Amathole Mountains near Hogsback. Its habitat is wetlands, seepages or the edges of streams in high altitude grasslands (1 500–2 000 m). This orchid has been recorded from only seven populations with an estimated total of 1 000 mature plants. One of the reasons for the decline of the species is habitat loss from damming, draining and channelling wetlands for agriculture. Other reasons are development in the Midlands, forestry in Hogsback, overgrazing and trampling by livestock, and the invasion of habitat by alien plants.

Orchid experts agree that this species has declined significantly and is in danger of extinction. It was still frequently collected in the 1970s and 1980s, but by the 1990s, it was known from a single subpopulation of about 250 mature individuals in the Eastern Cape. It was believed to be extinct in KwaZulu-Natal. Steve Johnson, who studied the pollination biology of this species, spent more than a decade searching for this species, but could only find the Eastern Cape subpopulation, while two other orchid experts spent many years searching unsuccessfully for this species.

In 2005, before CREW was active in Underberg, the group visited a wetland after hearing about it from Tessa Dean, a well-known Durban botanical artist. The landowners have lived in the area for many years, have always been interested in the local flora, and are aware of the very special wetland on their property. The CREW group found a population of *Disa scullyi* there and now visit the wetland every year in December. Another population of 100–200 plants was found in another protected wetland on the same property in 2011.

The landowners have been informed of the status of the orchid and conservation of their land through a Stewardship Programme has been

discussed. As it is a working farm, there is some danger of trampling by livestock but it appears they seem to stay clear of the wetland. The CREW group would like to ensure that the farmers in the area are aware of the fragility of the orchids and every attempt should be made to protect the wetlands. Relatively undisturbed wetlands still remain at three additional sites where this orchid was recorded in the past and it is possible that there are other surviving populations. Surveys of these wetlands will be ongoing.

Underberg CREW: Julie Braby (author), Anne Rennie, Jane King, Sharon Berrutti and Ansel Matcher

Previous, left and opposite right, *Disa sculyii*. Below, the moist grassland habitat of *Disa scullyi*. Opposite left, the Underberg CREW group monitoring *Disa scullyi*. Photographs Richard Braby.

Adenia wilmsii

Endangered

Population size:	ca. 500 individuals
Range:	Lydenburg (Mashishing) to Waterval Onder, Mpumalanga
Threats:	Harvesting, land tenure
Action required:	Monitoring

Adenia wilmsii is a rare species, occurring in a range of 95 km² between Lydenburg and Waterval Onder in Mpumalanga. It grows on dolerite outcrops or in red loam soil in open woodland at an altitude of 1 300–1 500 m. The species was initially known to occur at two locations around the town of Lydenburg but these two populations cannot be relocated and are presumed extinct. Two additional populations have been found in the past decade, together consisting of over 500 plants. The first population consists of 20 plants occuring on a ridge near Lydenburg. This ridge population is surrounded by scattered informal settlements and it is likely that the population is vulnerable to harvesting. The roots, bark and leaves of *Adenia* species are harvested for traditional medicine. The second, significantly larger population is on private property in a secluded valley and there is no evidence of harvesting pressure at this stage.

The discovery of the large population on the private property at Waterval Onder by CREW volunteers Graham and Kate Grieve in 2008 extended the known range of this species considerably. The population was discovered by the Grieves in the course of drawing up a plant list for this property which they frequently visited. While surveying the vegetation they found a strange bulbous plant with a few yellowing leaves. Being the end of summer, there was no fertile material and they were unable to identify the plant. Shortly afterwards, there was a brief article in the Mpumalanga Plant Specialist Group newsletter about a search for the endangered *Adenia wilmsii* near Lydenburg, with an accompanying photo showing a similar leaf. This prompted Graham and Kate to contact John Burrows at the Buffelskloof Herbarium. John agreed that the leaf could belong to *A. wilmsii* and encouraged the search for plants and in particular for fertile material. The site was visited in spring and several plants were found, some in flower and a few bearing fruits. Searching different sections of the property revealed more and more plants. Over the following few years and after many walks, efforts were rewarded by finding a healthy population of several hundred plants in the Swartkoppies River Valley and surrounds. There are young as well as mature plants and flowers and fruit are regularly seen. A visit to a property in a neighbouring valley revealed the presence of plants there also.

The management board of the property was informed of the presence of the plants and the manager takes a keen interest in their progress.

Specimens were collected for the herbaria in Pretoria, Lydenburg and Buffelskloof. Contact was made with horticultural staff from the Nelspruit National Botanical Garden, who collected fertile material for propagation. The seed at Nelspruit has germinated, resulting in some healthy young plants. In addition, some seed was sent to the Millennium Seed Bank at Kew. Monitoring the plants has provided new information on flowering and fruiting times as well as insect and animal predation. Although the plants are not formally protected, the Waterval Onder population is not threatened at present.

Mpumalanga Plant Specialist Group: Graham Grieve and Kate Grieve (authors)

Previous and left, the caudiform habit, flowers and fruits of *Adenia wilmsii*, photographs Graham Grieve. Below left and right, the Mpumalang Plant Specialist CREW group monitoring this species, photographs, right, Graham Grieve; left, Suvarna Parbhoo.

Haworthia bayeri

Endangered

Population size:	< 1 000 individuals
Range:	Uniondale to south of Oudtshoorn, Western and Eastern Cape
Threats:	Illegal plant collection (succulent trade); habitat degradation due to erection of cell phone masts, firewood collection, dumping and overgrazing
Action required:	Prevention of illegal collecting, protection of sites, raising awareness amongst the public

Haworthia bayeri is much sought after by succulent collectors and this has contributed significantly to the decline in the population, which is estimated at 50% over the past 20 years. Although this species occurs in a relatively large area between Willowmore and Laingsburg as well as the Klein Karoo, the individual populations are small and few and far between. Some plants do occur on rocky outcrops but they typically grow in the shade of shrubs—a 'patient' species that grows under a 'nurse' plant. When shrubs and small trees such as the sand olive (*Dodonea viscosa*) are collected for firewood, the protective vegetation is removed and the plants are killed by the summer sun.

Haworthia bayeri plants are very variable in appearance, with the exposed leaves ranging from dark green to shades of brown and purple, sometimes with white marking. At one time different species names were ascribed to each variation and some succulent collectors still regard almost every population as a different species. This has contributed to the decline of the species, as these collectors want original plants from each of these 'species'. Illegal collection of plants remains one of the main threats to the species.

During plant surveys in the early 1990s, Jan Vlok found several populations and was subsequently dismayed when at least two of the populations were partially destroyed when cell phone masts were erected on hills near De Rust and Uniondale. As a result of his intervention with the cell phone company, erection of these masts is now a listed activity that requires an environmental impact assessment before a mast can be erected. Jan and AnneLise Vlok have continued to monitor the populations and sadly there is a decrease from several hundred plants in 1990 to three plants at Uniondale and about 50 plants at De Rust by 2010. The De Rust hill is also host to species such as *Euphorbia colliculina* (Endangered), *Moraea regalis* (Critically Endangered), *Syringodea derustensis* (Vulnerable) and *Trichodiadema burgeri* (Vulnerable). A tiny as yet unnamed *Bulbine* species present may also be another very localised and threatened species.

During the 1990s some Uniondale residents took a keen interest in the conservation of their 'fort koppie' (hill) but the interest has waned, despite the biodiversity present and cultural-historical value of the locality. The hill is easily accessible, increasing the vulnerability of the population. Several attempts have been made to conserve the De Rust hill site. There have been many promises of funding (including from the cell phone company) but nothing has been forthcoming and the degradation of the site continues. An awareness campaign was initiated and some inhabitants of De Rust attempted to launch conservation action but it was not supported by the local municipality or outside funders. The site is still negatively impacted by dumping, firewood collection and grazing by stray domestic stock. However, the newly launched De Rust Eco Festival may stimulate enough interest to save the population. In addition, raising awareness amongst landowners can help to ensure the survival of less accessible populations.

National government intervention can contribute to the future existence of this and many other threatened species' habitat by ensuring that local municipalities fulfil their environmental responsibilities. Ongoing law enforcement and severe penalties for illegal collection of plants are also important. A severe fine recently imposed on a prominent Japanese collector seems to have helped considerably in curbing the removal of these plants from the veld. Ultimately, protection of natural populations is the best way of conserving the unique genetic material of the plants at different sites.

Jan Vlok and AnneLise Vlok

Previous and top left, *Haworthia bayeri*. Right, three other restricted endemic species that share the same habitat as *Haworthia bayeri*: *Euphorbia colliculina* (Endangered), *Moraea regalis* (Critically Endangered), and *Syringodea derustensis* (Vulnerable). Left below, illegally collected *Haworthia* plants confiscated in 2003 from a prominent Japanese collector. Harworthias are highly sought after by succulent collectors. Sadly their very slow growth rate makes them highly vulnerable to the impacts of succulent plant poaching. Photographs Jan Vlok.

Diosma aristata

Critically Endangered

Population size:	< 500 plants
Range:	Mossel Bay area from the coast to about 2 km inland between The Point and Dana Bay; currently only known from a single subpopulation and a number of scattered individuals within approved development sites
Threats:	Urban expansion, coastal development, invasive alien plants, lack of fire, illegal dumping of waste, off-road driving with quad bikes and motorbikes, vegetation clearing for firebreaks and tracks
Action required:	Formal protection of the site and effective management practices

Diosma aristata is the most threatened species in the genus *Diosma*. Dr Ian Williams described the species in 1975 after collecting specimens just east of Mossel Bay. Another population of the species was discovered in 1986 by Jan Vlok just west of Mossel Bay, when the roads for the Heiderand development were being bulldozed. Jan Vlok managed to convince Mr Kobus Venter, then Head of Parks at Mossel Bay Municipality, to relocate the open space area within the development to include the area where this population occurs. Subsequently, more plants were found within the coastal fynbos area between The Point and Dana Bay. However, during the late 1990s and early 2000s this area became increasingly dissected and fragmented by several large-scale developments, such as residences, golf courses and estates, a casino and a private school. These developments were approved despite repeated protests by concerned individuals and organisations during the development application and evaluation processes. Gradually the fragmented areas became more and more degraded by disturbance caused by construction activities, vegetation clearing, increased invasion by alien plants, illegal dumping, off-road driving and general lack of management.

After a runaway fire in 2005 had burnt a large section of the open space area, a careful survey of the site was carried out by CapeNature to determine the status of the species. A total of 18 seedlings were counted within the burnt section. CapeNature obtained funding to clear the area of invasive alien plants and to fence the western side of the reserve. The Mossel Bay Municipality was engaged in the discussions regarding ownership and management of the site. They confirmed their responsibility for managing the area and discussions were initiated to formally declare the area as a Local Authority Contractual Reserve, as well as to expand the area southwards to the boundary of the Pinnacle Point development to ensure long-term ecological viability and facilitate fire management. This process has, however, come to a halt due to political interference.

The site is currently in dire need of follow-up management, particularly follow-up clearing of invasive alien plants, repairs to the fence, removal of illegally dumped waste, closure of roads, putting up signage, maintenance of firebreaks, etc. Discussions with the municipality need to be reinitiated to ensure the expansion of the area under conservation and proclamation of the area as an Authority Contractual Reserve under CapeNature's Stewardship Programme.

CapeNature continued to monitor the open space reserve, officials counted 77 plants in 2011 and 153 in 2012. Recently a total of 380 plants were recorded in the area. Several other threatened species have also been noted, namely, *Erica dispar* (Near Threatened), *Agathosma muirii* (Vulnerable), *Hypodiscus procurrens* (Near Threatened) and *Protea lanceolata* (Near Threatened).

To date, the survival of *Diosma aristata* can be accredited to a caring scientist and supportive concerned individuals who continually motivate the authorities to implement management actions. Champions from the local community are needed to take over the responsibility of ensuring the continued management of the area. Without continual intervention *Diosma aristata* will become extinct within 20 years.

AnneLise Vlok (author), Carlo van Tonder, Patrick Meyer,
Jan Vlok, Lucretia van der Walt and Dirk Zietsman

Left, and overleaf, the most threatened species in the buchu genus *Diosma*, *Diosma aristata*, photograph AnneLise Vlok. Above, invasive alien plants being cleared from the only known viable population of *Diosma aristata*. photograph AnneLise Vlok.

Below, all remaining habitat of *Diosma aristata* is threatened by invasive alien acacias, photograph AnneLise Vlok. Below bottom, *Protea lanceolata* co-occurs with *Diosma aristata*, photograph AnneLise Vlok. Right, AnneLise and Jan Vlok, custodians of the flora of the Southern Cape and Little Karoo, photograph Marlene Vlok.

Babiana pygmaea

Critically Endangered

Population size:	ca. 1 000 plants
Range:	Hopefield to Mamre, Western Cape
Threats:	Invasive alien species, and loss of habitat to agriculture and urban expansion
Action required:	Landowner co-operation, clearing invasive alien species

With a substantial loss of wetland habitat primarily due to agricultural expansion and urban sprawl, *Babiana pygmaea* has become Critically Endangered. There are only three known populations in the Darling area, namely on the farms Oude Post, Janswartsvlei and Burgherspost. Fortunately the numbers of individuals have increased steadily in the years since monitoring and conservation efforts started in 2005, and there are now nearly 1 000 plants at these three sites.

Until 2005 only one population of this delicate bulb species was known from the farm Oude Post in Darling. Despite efforts by previous landowners to conserve this area Port Jackson willows (*Acacia saligna*) had encroached onto the site. When these invasive plants were cleared between 2009 and 2011, the population of *Babianna pygmaea* doubled within three years. By August 2012 there were more than 500 plants at this site.

In 2005 the CREW Darling Flora Group located a previously unknown population about four kilometres away from Oude Post on the road verge between Darling and Moorreesburg, extending into an adjacent farmland. With the co-operation of the landowner, CREW volunteers started monitoring this site. The number of plants has remained relatively unchanged, perhaps because they occur in a protected habitat surrounded by granite outcrops.

The conservation officer at the Burgherspost Private Nature Reserve found another population of 40 plants in 2010, after intensive clearing of invasive alien plants. Subsequent searches led to further discoveries of small pockets of plants of roughly 400 in total. Most of the plants are within the designated Burgherspost Conservation Stewardship site and they are fenced and monitored annually. A dramatic increase in flowering plants has been recorded. However, the greatest threat to this species is the encroachment of alien vegetation. Some of the plants survive just outside the Burgherspost reserve where dense stands of invasive alien plants occur. Fortunately, these invasive species have been earmarked for clearing.

Because not all remaining populations are located within state owned conserved areas, ongoing monitoring is necessary to ensure their sur-

vival. All three populations are located on private farmland that is grazed by cattle. However, the CREW team has arranged with the landowners that the sites are not grazed from May until end October each year to ensure undisturbed flowering and seed production. An additional measure to protect these plants is ensuring that the tractor rides during the annual Darling wildflower show do not traverse the sensitive areas where these plants occur.

Darling Flora Group: Helene Preston (author), Libbes Loubser, Maggie Fowle, Judy Wood and Jacques van der Merwe; photographs Helene Preston

Previous, below and opposite, *Babiana pygmaea*. Right above and below, Darling Flora CREW group monitoring *Babiana pygmaea*. Right centre, the seasonally moist lowland habitat of *Babiana pygmaea*.

Polhillia brevicalyx

Critically Endangered

Population size:	31 plants
Range:	Swellendam
Threats:	Invasive alien species, habitat loss and degradation, and pollution
Action required:	Fire management, *ex situ* conservation and reintroduction

Polhillia brevicalyx is known only from one population on the farm Uitvlugt south of Swellendam. The populations consists of two stands, one has declined from 15 plants recorded in 1985 to three plants in 2003 and two plants in 2009. The location of the second stand is a drainage line between cultivated fields. From the 90 plants originally recorded in this population, there were 12 remaining plants in 2012. However, an additional 17 plants were found in the direction of flow of the river to the north. No other populations have ever been found despite extensive searches on surrounding farms. The existing population is declining because of habitat loss to wheat cultivation, alien grass invasion and lack of fire.

The search for these plants started in 1985. The first population was found on the bank of the Freek Botha River by Simon Streicher, the previous owner of Uitvlugt, together with Chris Burgers, CapeNature botanist. There were 15 plants with beautiful grey foliage and bright yellow, typical pea flowers. Simon was fascinated with the genus and also found the second stand of *Polhillia brevicalyx*, but he watched with horror as the original stand declined to two plants by 2009. He showed the plants to Christi Kloppers, a passionate conservationist and CREW volunteer. The populations have been monitored by CREW since 2003 throughout crop rotations and different grazing regimes in adjacent lands. The sites are waste areas for the farmer and the plants have survived harsh conditions, including alien grass infestations. They are growing on the edges of the tiny remnants of their once former renosterveld habitat.

There has been much discussion about the reasons for the decline in the population. One possible explanation may be a lack of fire, as other species in the genus *Polhillia* respond well to burning. As the remaining plants occur in tiny remnants of former renosterveld vegetation, there has been no effort to actively conserve them. However, since engaging with CREW and the Overberg Lowlands Conservation Trust, the landowner, Andries Streicher (now retired) and his nephew Matthias, have taken an active interest in the plants. Together they have worked out a management plan, which will include an autumn burn in part of the locality and fencing the area to protect the plants from being grazed or trampled. After that, the plants will be carefully monitored to assess

future needs, which may include a mosaic burn plan for the remaining population. Seed has been collected by the Millennium Seed Bank Project but so far, propagation beyond the seedling stage has failed.

Swellendam CREW: Flora Cameron (author), Odette Curtis, Andries Streicher and Matthias Streicher; photographs Flora Cameron and Odette Curtis

Previous and left, *Polhillia brevicalyx*. Below and right top and centre, the only remaining habitat for this species is a tiny fragment of renosterveld in a drainage line between wheat fields. Right below, the landowner on whose property *Polhillia brevicalyx* occurs, Andries Streicher, discussing management options with CREW volunteers. Far right, Simon Streicher, a local from the lower Breede River Valley who has been monitoring *Polhillia brevicalyx* for 30 years and who bought this species to the attention of conservationists and CREW volunteers.

Mimetes chrysanthus

Vulnerable

Population size:	< 3 000 individuals
Range:	Gamka and Outeniqua Mountains, southern Cape
Threats:	Invasive alien hakeas and too frequent fire
Action required:	Ongoing alien plant clearing

Mimetes chrysanthus occurs in fynbos on steep southeast-facing sandstone slopes in the Gamkaberg and Perdeberg near Herold in the Western Cape. There are only two known populations, approximately 70 km apart and despite thorough searching, plants have not been found between them. The plants are threatened by too frequent fires and invasive alien vegetation, particularly *Hakea sericea*.

This species was first seen in 1987 by Mr Willie Julies, a ranger at the Gamka Mountain Reserve. Rory Allardyce, the reserve manager, collected a specimen and sent it to Jan Vlok of the Saasveld Herbarium at George. Vlok immediately recognised it as a new species and sent it on to John Rourke of the Compton Herbarium who confirmed it as such. This caused much excitement and interest in botanical circles.

The Outramps CREW group stumbled on the second population quite by chance. Here is their story:
"One hot April day in 1996, a depleted party of the Outramps slogged up a long dry ridge in the northern foothills of the Outeniquas. We were hot and tired when we came over the crest of the Perdepoort ridge. Some distance below us, we noticed tall plants with golden yellow flowers. 'Probably daisies' was the comment. When we got closer, it was evident that we were dealing with something entirely new to us. I took a specimen and phoned Jan Vlok when we got home. 'Jan, could there be a species of *Mimetes* with yellow flowers on Perdepoort that I wouldn't recognise?' There was silence before he replied with, 'Send me the specimen'. Three days later he confirmed that we had found the second known colony of *M. chrysanthus* about 70 km away from the first discovery. It was one of the most exciting days of our lives."

The Perdepoort population grows on Stephen Keyser's farm in the northern foothills of the Outeniqua Mountains. When it was first found, there was a heavy infestation of hakea on the site and despite the CREW team's repeated efforts at hacking the alien plants away, it became obvious that more needed to be done to get things under control. CapeNature co-opted a team from Working on Fire in about 2004 and these young people made big inroads into the colony of invasive alien plants. Since then, members of the Outramps CREW group make an annual pilgrimage to the top of the ridge to clear the hakea bushes and this

particular threat is now almost under control. It is hoped that CapeNature will consider the locality for a Stewardship Programme as there are several Species of Conservation Concern as well as a new species of *Arctotis* on the site.

The population of *Mimetes chrysanthus* at Perdepoort extends over several farm boundaries and landowners need to be made aware of the value of the plant as well as the danger of too frequent fires. The species' survival depends on regular clearing of hakea and this may require involvement of CapeNature or Working for Water. Until then, the Outramps will carry their slashers up the ridge and continue the good work to protect the plants.

Outramps CREW: Di Turner (author), Rusell Bantich, Gail Nootenboom, Casey Nootenboom, Bill Turner, Jean Purcell, Marge Webster, Jenny Potgieter, Thys Potgieter, Ann Symons, Nicky van Berkel, Veronica Tyndall, Graeham Tyndall, Ashleigh Harvey and Richard Taylor

Opposite, *Mimetes chrysanthus*, photograph Jenny Potgieter. Right top and bottom, CapeNature field rangers and Working on Fire alien clearing teams with the Outramps CREW group, photographs Gail Nootenboom. Right middle, Di Turner, champion of the Outramps CREW group, photograph Casey Nootenboom. Below, Mr Willie Julies, the ranger from the Gamka Mountain Reserve who discovered this species in 1987. Sadly, he passed away in 2013.

MR WILLIE JULIES . . . with the new species of Mimetes. Picture: Dept of Nature Conservation.

New species discovered

THE botanical world has been shocked — and delighted — with the discovery of a beautiful new species of Mimetes at the edge of the Little Karoo.

As shown in the picture on the left, the new Mimetes boasts a strikingly attractive "candlestick" of yellow flowers — quite unlike any of the other 12 surviving Mimetes.

"This comes as a complete shock," said Dr John Rourke, head of the Compton Herbarium at Kirstenbosch Botanic Garden, and a world authority on Mimetes, which are members of the Proteaceae family.

"This new species, which has not yet been named, was found growing in several populations on an isolated mountain of fynbos in an extremely desolate region.

"The Mimetes group of plants is small, distinctive and found in a fairly small area of the southern Cape," said Dr Rourke. "Just when we thought we knew this family well, this comes out of the blue."

The plant was discovered by a game guard, Mr Willie Julies, who was surprised by the beautiful flower and wanted to know its name.

The local nature conservation officer, Mr Rory Allardice, then alerted the botanical authorities.

Very fortunately the

● To Page 2

Brunsvigia littoralis

Endangered

Population size:	< 5 000 plants
Range:	Great Brak River to Port Elizabeth
Threats:	Habitat loss to coastal development
Action required:	Monitoring and propagation

Brunsvigia littoralis occurs in small, severely fragmented populations and is restricted to coastal flats between Port Elizabeth in the Eastern Cape and the Great Brak River in the southern Cape. The total area of available habitat is less than 250 km² and it continues to decline because of coastal development and the threat of invasive alien plant species.

This species has large, showy flowers and they are therefore not difficult to find at the right time of year. The CREW group knew that they were to be found in the St Francis Bay area and once they started looking, they found far more than expected, scattered around on open ground in the village. When they began looking on the farm Goedgeloof—now the St Francis Links Golf Estate—to their surprise and delight, they found six on the first day and three times as many the next day. In total at least 80 plants were found on the farm. Subsequently, others have come to light in a more or less straight line between St Francis Bay and Paradise Beach, parallel with the prevailing southwesterly wind as the seeds are wind dispersed.

Because the plants were in a vulnerable area, many were relocated to a nearby farm where they occur naturally. The developers on Goedgeloof were advised about the plants and a search and rescue operation was initiated. The CREW group also assisted with a pollination study and continues to monitor two of the populations. A constant watch is being kept on proposed coastal development, which is the greatest threat to this species.

Fourcade Botanical Group, St Francis Bay CREW: Caryl Logie (author), Valda Barratt, Erica Knight, Bart Logie, Godfried Potgieter, Sally Silberbauer and Ron Thomassen

Left and overleaf centre right, *Brunsvigia littoralis* being pollinated by the Lesser double-collared sunbird, photographs Sjirk Geerts. Overleaf opposite and top right *Brunsvigia littoralis* in bud and full flower, photographs Sjirk Geerts. Overleaf top left, centre left, and bottom left and right, the Fourcade Botanical CREW group involved in education and monitoring work with *Brunsvigia littoralis*, photographs Carol Logie.

Erica verticillata

Extinct in the wild

Population size:	0 wild individuals, < 200 reintroduced individuals
Range:	Cape Flats between Mowbray and Muizenberg, Western Cape
Threats:	Urban expansion and cut flower harvesting
Action required:	Protection and effective management of sites where the plants have been re-introduced

Called the marsh heath because of its typical moist habitat, this striking *Erica* formerly occurred in large numbers on the Cape Flats, from Mowbray to Zeekoevlei and Muizenberg. However, its natural habitat was destroyed by agriculture and urban development as colonial Cape Town expanded. Intensive harvesting for cut flowers—it flowers during the late summer dearth—contributed to the decline of the population and the species was presumed extinct in the wild by 1950. In the 1980s, plants surviving in cultivation were discovered following a quest by Kirstenbosch horticulturalists. Propagated plants have been introduced to suitable sites and the species has been brought back from the brink of extinction, to become the flagship conservation species of the Kirstenbosch National Botanical Garden.

Historical records reveal that *Erica verticillata* was collected by one of the earliest plant collectors in the Cape, Paul Hermann, who made the first herbarium collection in 1672. The only other known historical collection from the wild was made by Ms. Louisa Bolus, first curator of the Bolus Herbarium in Cape Town, who collected seed from plants growing on damp flats in Wynberg in 1917.

Erica verticillata had not been seen for many decades and was presumed extinct by the early 1980s. Deon Kotze, the erica horticulturist at Kirstenbosch at the time, initiated a concerted search for surviving plants in the remaining sand fynbos fragments on the Cape Flats. No plants were found, however, Kirstenbosch scholar, David von Well, noted that large pink-flowered ericas matching the description of *E. verticillata* were growing in Protea Park, Groenkloof, Pretoria. The identity of these plants were confirmed by Dr Oliver at the Compton Herbarium as *E. verticillata*. How the three ancient plants came to be growing in a park in Pretoria is not documented.

Left, Kirstenbosch restoration team, Julia Dabush and Anthony Hitchcock with a reintroduced plant of *Erica verticillata* at Rondevlei, photograph SANBI.

Following news of the Pretoria rediscovery David Cooke, Temperate House Manager and erica enthusiast at the Royal Botanic Gardens, reported that Kew also had living specimens. Plants were also found to be in cultivation in the nursery at the Belvedere Palace Gardens in Vienna for over 200 years. Franz Boos and Georg Scholl, who were commissioned to collect plants from Mauritius by Emperor Josef II, were forced by bad weather to land at the Cape. They collected many plants and seeds, including *Erica verticillata*, at the Cape between 1786 and 1799 and sent them back to Vienna. A further plant in cultivation was discovered in the Kirstenbosch National Botanical Garden in 1990 by Head Foreman, Mr Adonis Adonis, behind the Braille Trail. This plant is probably a remnant seedling from Ms Bolus' old *Erica* collections that were grown on terraces nearby. The search for more 'lost collections' generated a great deal of interest amongst botanists and collections were recorded from far flung places such as Tresco Abbey Gardens on the Scilly Isles, Monrovia Nursery in California and a nursery in Germany, amongst others.

Cuttings were collected from all cultivated sources and these, together with plants produced from the breeding programme established at Kirstenbosch, have been introduced to fragments of Cape Flats Sand Fynbos within the former natural range of the species. One of these is the middle of the Kenilworth Racecourse (Kenilworth Racecourse Conservation Area). The Kenilworth site is severely infested with alien invasive plants and has been excluded from fire for over 100 years. Following a controlled fire in 2005, the old senescent fynbos regenerated spectacularly, and *Erica verticillata* plants were reintroduced both in unburnt areas as well as in areas cleared by fire, where all the planted populations are currently thriving. Other restoration sites are Tokai Park in the Table Mountain Nature Reserve, in the Soetvlei and Prinskasteel wetlands, and at the Rondevlei Nature Reserve. Initial introductions at Rondevlei in the 1990s, had limited success—specifically it was found that strains are self-infertile and only set seeds if different strains are co-planted. Repeated plantings have been successful and there is now a healthy population.

These introduced populations still need to prove that they are self-sustaining. They are dependent on effective fire cycles being restored and managed—a difficult task given the small remnants within dense urban areas, where fire poses a risk to surrounding properties. Ongoing alien clearing is also needed. The good news is that seedlings of *Erica verticillata* have been recorded by Dalton Gibbs at Kenilworth after he cleared around mature plants. The earliest restored population at Rondevlei were burnt in April 2013 and we wait with anticipation to see whether the seed germinates. The success of this project provides evidence that cultivation can play an important role in preserving species.

Anthony Hitchcock and Tony Rebelo

Right top Anthony Hitchcock inspecting *Erica verticillata* restored to Rondevlei, photograph Adam Harrower. Right centre, pollination of *Erica verticillata,* photograph Colin Paterson-Jones. Bottom, Mr Adonis Adonis, discoverer of the Kirstenbosch form of *Erica verticillata*. Opposite, *Erica verticillata* in flower, photograph Colin Paterson-Jones.

Brachycorythis conica subsp. tranvaalensis

Endangered

Population size:	ca. 100 plants
Range:	Waterberg to Balfour in Gauteng, Mpumalanga and Limpopo provinces
Threats:	Invasive alien plant species and habitat loss to urban development
Action required:	Formal conservation of habitat and control of invasive alien plants

Herbarium collections and early records suggest that this orchid was once fairly common in Gauteng Province, with records from 11 localities. There were also scattered appearances in adjacent provinces. At present, Gauteng has the largest and most viable population of approximately 100 plants scattered over a wide area. However, this population is threatened by urban development.

In January 2007, Andrew Hankey was conducting a general survey when he rediscovered the Gauteng population at the same site where J.P.H. Acocks recorded the species in 1956. The initial field survey in 2007 revealed only 21 individuals but surveys conducted in the ensuing years increased that number to the current count of just over 100 plants. For some time this was regarded as the last known population on record. Surveys of all known historical localities in Gauteng over the years and during the 2010 flowering season did not reveal any additional populations. Subsequently two isolated plants were recorded in Mpumalanga. Disjunct locality records like this are somewhat typical of orchids and may be the result of long distance wind dispersal of fine orchid seeds. However, it is not known whether isolated populations established in this way are viable in the long term. This orchid is not closely associated with any particular vegetation type and its habitat requirements are not well understood.

The greatest threat to this orchid is urban expansion in Gauteng. Apart from ever increasing urban development, there is also the threat of habitat degradation by illegal off-road vehicles as well as invasive alien plant encroachment.

The population is being monitored to gain a more accurate estimate of its scope and size. This information of its precise locality has been provided to the provincial conservation authority, allowing for more effective urban and conservation planning and hopefully preventing extinction of the population. To ensure the future of this orchid, the area

should be protected from degradation and habitat loss by securing land use for conservation purposes. This would prevent access to illegal off-road vehicles and allow for eradication of invasive alien plants.

Photographs and text Andrew Hankey

Left, and right top, *Brachycorythis conica* subsp. *transvaalensis* in flower and habit. Below centre and right bottom, habitat of *Brachycorythis conica* subsp. *transvaalensis*. Right centre the Walter Sisulu National Botanical Garden team monitoring *Brachycorythis conica* subsp. *transvaalensis*. Below bottom, author Andrew Hankey, horticulturist from Walter Sisulu National Botanical Garden.

Cotula myriophylloides

Critically Endangered

Population size:	> 10 000 plants
Range:	Cape Peninsula to Stanford
Threats:	Grazing and trampling by horses
Action required:	Conservation of the estuarine environment

The daisy family (Asteraceae) is one of the largest plant families in the world with over 25 000 species. Most are annuals or shrubs, and floating aquatics are relatively rare within the family. *Cotula* is a genus of about 50 species, most of which are restricted to southern Africa, and the species are generally annuals or soft herbs. Although various *Cotula species* display a liking for wetlands, *Cotula myriophylloides* is the only fully aquatic species in the genus, and inhabits lagoons and slow moving backwaters, often those with a relatively high salinity. The species was originally known only from five localities on the Cape Flats and adjacent lowlands of the Cape Peninsula, but it is now extinct at all these previously recorded localities, being a victim of urbanisation and the destruction of wetlands. Some of the wetlands have been filled in, while others have been converted from shallow, seasonal pans or vleis into deep, permanent water bodies with excessively high nutrient inputs. In early 2008 the species was thus thought to be extinct, but the discovery in that year of two populations east of Cape Town showed that the species was fortunately wider ranging than had been previously recognised. The two extant populations are about 100 km apart, and are both vulnerable to grazing and trampling, and the eastern population is also vulnerable to excessive nutrient inputs.

The search for *Cotula myriophylloides* became a quest for Nick Helme, independent botanist and avid collector of fynbos plants.

This is his story:
"I became aware of this curious aquatic species while compiling a list of the endemic plants of the Cape Peninsula and searched for it in vain at all its previously recorded Peninsula locations. Then in October 2008 I was doing fieldwork in the Botriver Vlei area for CapeNature, who were looking at possible reserve expansion options in the region, and I stumbled upon it, growing in the vlei about 1 km upstream from the mouth. It seemed to be flourishing here, in a slightly saline estuarine environment, rooted in muddy sands, and I was thrilled to have finally found it alive. Subsequent to this I was alerted by Laco Mucina to another old record from even further afield and I immediately made plans to go and track it down. In December 2008, some 100 km southeast of the Botriver Vlei, I found a small population on a muddy, heavily trampled tributary of the Heuningnes River, east of Cape Agulhas."

This is an aquatic species that appears to flourish in river estuaries and therefore the good health of rivers and estuaries is a key requirement

for its survival at its two known locations. At both locations the plants are threatened by trampling and grazing by cattle and horses. This is especially the case at the Heuningnes River locality, which is close to a farmhouse and also a source of excess nutrients. Further fieldwork is needed in the Heuningnes River area to look for other populations, as the habitat appears to be suitable. The Botriver Vlei population appears to be healthy but it is vulnerable to grazing and trampling by the feral horses that occur in the area. Although no specific conservation action has been taken that has benefited this species in particular, one of the primary goals of the management of the Botriver Vlei is conservation and preservation of estuary functioning. Recent attempts have been made by both CapeNature and the local municipality to control invasive alien plants in the area.

Photographs and text Nick Helme

Left, the aqautic *Cotula myriophylloides*. Right centre and below left and right, the habitat of *Cotula myriophylloides*, lagoons and slow moving backwaters, often those with a relatively high salinity. Top right, author Nick Helme.

Chrysocoma esterhuyseniae

Critically Endangered

Population size:	ca. 200 plants
Range:	Melkbosstrand to Hopefield on the west coast
Threats:	Habitat loss to crop cultivation, urban development and invasive alien species
Action required:	Management of invasive alien species and search for other populations

Chrysocoma esterhuyseniae grows in deep sand along the coast between Melkbosstrand and Hopefield, a range of 24 km². When in flower, they are relatively easy to spot as they are at least 1 m tall. The survival of the species is severely threatened by habitat loss. It is estimated that 97% of its habitat has already been lost to crop cultivation, urban development and severe infestations of alien plants in the past 90 years and it is now locally extinct at more than 80% of recorded locations. There are only two remaining populations with fewer than 200 individual plants, most of them occurring in the Riverlands Nature Reserve.

This species is named after Elsie Esterhuysen, an amateur botanist who collected extensively in the Western Cape until she was well in her eighties. Until 2008, the plants were known only from the Riverlands Nature Reserve. Most of the historical localities in the Hopefield to Malmesbury area could not be located because they have been degraded or transformed. While undertaking a baseline botanical survey and impact assessment for a proposed commercial wind energy facility (Umoya Energy) on properties southeast of Hopefield, Nick Helme was fortunate to find nine plants on the southern boundary of the study area. In addition to *Chrysocoma esterhuyseniae* there are more than 30 plant species of conservation concern on this site. This motivated the recommendation for formal conservation of the area by sale, contract or donation to the West Coast National Park (WCNP). Umoya Energy supported the idea and as the WCNP had recently acquired various nearby properties, the proposed addition of this land to the WCNP was appropriate from a conservation planning perspective. In 2012 the parties signed a 99 year lease and the land will now be formally incorporated into and managed by the WCNP. This links the Strandveld of the West Coast to the Renosterveld of the Swartland and provides a wonderful example of where appropriate development can significantly benefit conservation initiatives.

The primary need of this species within the two formal conservation areas where it occurs, is management of invasive alien (*Acacia* species) vegetation. It is encouraging that the invasions have been brought under control to some extent in many parts of Riverlands Nature Reserve in the last five years. Given that the Riverlands Nature Reserve and Hopefield populations are 45 km apart, it would also be worthwhile searching for

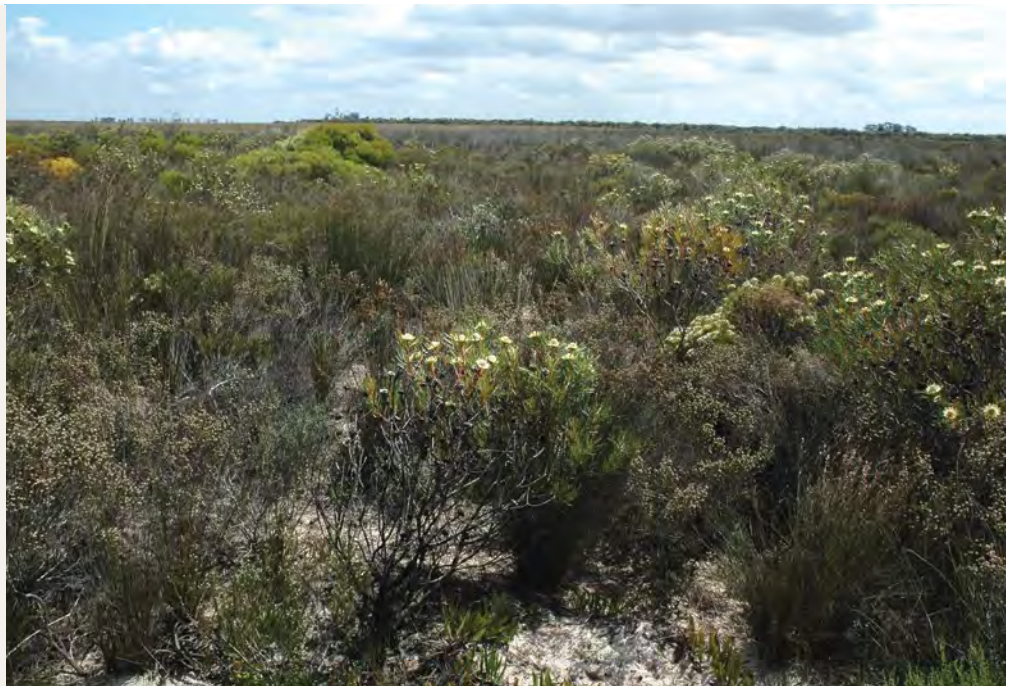
this species in suitable habitat remnants in the intervening area, which is degraded badly by alien acacia invasion.

Text Nick Helme

Opposite top and bottom, *Chrysocoma esterhuyseniae*, photographs Nick Helme. Left bottom, Riverlands Nature Reserve, home to the largest population of *Chrysocoma esterhuyseniae*, photographs Rupert Koopman. Right top, Elsie Esterhuysen. Right bottom, Elsie Esterhuysen on a collecting trip with Ted Oliver.

This species is named after Elsie Esterhuysen (left), one of South Africa's most prolific plant collectors. During her 60-year career as a botanist and collector, she amassed more than 37 000 herbarium specimens. She found large numbers of new species, and as a result two genera and 56 species are named after her. Elsie Esterhuysen spent most of her life collecting in mountains. The image below left shows her on a collecting trip with Ted Oliver on Milner Peak. In her later years Esterhuysen also collected extensively in the Cape Lowlands, the area with the highest concentration of threatened plants in South Africa. Her incredible knowledge of the Cape Flora meant that she was able to find and survey large numbers of species overlooked by other collectors. *Chrysochoma esterhuyseniae* is an example of one of the many new species she discovered in the well-botanised district of Malmesbury.

Most of the *Chrysocoma esterhuyseniae* population occurs in Riverlands Nature Reserve (shown right and above). This diverse mosaic of fresh and saline seasonal wetlands, deep, well drained acid sands, ferricrete patches, and numerous combinations of the above, is home to more than 120 Species of Conservation Concern (SCC). There are several species which are now known only from the reserve, which punches well above its weight in conservation terms, given that it is only 1 714 ha in extent. Riverlands is currently the anchor property for the Dassenberg Coastal Catchment Partnership, a long anticipated landscape conservation corridor to the coast, which was first envisioned in the 1980s and is rapidly being realised through the efforts of a vibrant multi-stakeholder group including CapeNature, the City of Cape Town, SANBI, Cape West Coast Biosphere, Wilderness Foundation, TMF, SanParks, WWF-SA and the local communities.



Geissorhiza malmesburiensis

Critically Endangered

Population size:	< 250 plants
Range:	Malmesbury to Atlantis in the Western Cape
Threats:	Habitat loss to urban expansion and agriculture; invasive alien plants
Action required:	Clearing invasive alien species; correct fire management

Geissorhiza malmesburiensis is restricted to the area between Malmesbury and Atlantis in the Western Cape in deep loamy granitic soils in an area of approximately 51 km^2. It is severely threatened by destruction of its renosterveld habitat. Three small, isolated, fragmented populations remain after more than 90% of its habitat has been lost, mainly because of crop cultivation. A surviving population of fewer than 250 mature individuals is declining due to ongoing urban expansion around Malmesbury as well as competition from invasive alien plants and agricultural expansion at two other locations.

In 1985 the species was known only from a single small population on the outskirts of Malmesbury but most of this site has now been developed for housing. In 2002, a small population was found on Doornfontein farm some 8 km south of Malmesbury, during a survey of renosterveld vegetation for a conservation plan being done for the Swartland. This population was part of a patch of about 20 ha of remaining suitable habitat. This site has not been monitored since then and it is not known how many plants remain. The third site was found in 2012, on the Municipal Commonage south of Malmesbury, where the veld had been burnt the previous summer. There are several other Species of Conservation Concern on this site including a new undescribed species of *Geissorhiza*.

No specific conservation action has been taken that has benefited this species, but two projects could potentially result in conservation of remnants of their preferred habitat. The first was the identification of three priority areas of municipal land (including the site where this species was found in 2012) for long-term conservation as part of a requirement for approval of development on municipal land. This was supported in 2010 by the local Urban Edge Study, ensuring that these areas are designated conservation areas, which cannot be easily developed. Unfortunately there is as yet no actual management of these three areas.

The primary needs of this species are ongoing alien invasive vegetation management and optimal fire management. Both known localities are threatened by invasions of alien *Acacia saligna* that pose a severe threat to the remaining rich biodiversity of both sites. The Doornfontein site is surrounded by agriculture and the remaining patch of natural habitat is thus not burnt often enough, to the detriment of short-lived species such as *Geissorhiza malmesburiensis*.

Photographs and text by Nick Helme.

Opposite and above, *Geissorhiza malmesburiensis* in flower.

Asclepias concinna

Critically Endangered

Population size:	< 50
Range:	KwaZulu-Natal Midlands to Maclear in the Eastern Cape
Threats:	Habitat loss and degradation
Action required:	Appropriate reserve management

Asclepias concinna is a rare plant that occurs in a small area in the KwaZulu-Natal Midlands, although previously the range was from the Midlands to Maclear in the Eastern Cape. According to historical records, there were two known populations. Rudolf Schlechter collected one specimen in grasslands near the Tina River in the Eastern Cape. This area has been searched in recent times but it is likely that the plant is locally extinct as the habitat is highly degraded by transformation for rural settlement, erosion and overgrazing. A second specimen was collected from an unknown location in KwaZulu-Natal by John Medley Wood, once curator of the Durban Botanical Garden. The only known existing population was discovered in 1981 by Ashley Nicholas, *Asclepias* specialist, at the Nkonzo forest in the Impendhle Nature Reserve. This population is potentially threatened by afforestation and rural settlement.

On one of their first outings in 2007, the Boston CREW group visited Impendhle together with members of the Boston and Dargle conservancies to monitor the population of *Asclepias concinna*. There was an abundance of flowers and they collected a specimen on a stream bank, the usual habitat of this species. The following year the plants were not found in flower. In November 2009 a smaller group of CREW volunteers went to monitor the population size and found a new stand of six individuals. Only one plant was in flower during the 2011 outing to the area. A further population of about twenty plants was found at Umgano near Creighton by Rob Scott-Shaw and Isabel Johnson in late 2012 while carrying out veld condition assessments.

One member of the Boston CREW group, David Clulow, is working with Ezemvelo KZN Wildlife to implement conservation measures to protect the wild flowers, including *Asclepias concinna*, at Impendhle Nature Reserve. The reserve is under pressure from the surrounding community who wish to use it for livestock grazing. As this is only one of two known sites with populations of the species, it is imperative that the habitat within the Impendhle Nature Reserve is conserved.

Boston CREW: David Clulow, Barbara Clulow and Christeen Grant (authors); Photographs Isabel Johnson

Opposite, *Asclepias concinna*. Top, the Boston CREW group monitoring the grasslands where *Asclepias concinna* occurs.

Watsonia strictiflora

Critically Endangered

Population size:	ca. 150 plants
Range:	Klapmuts to Joostenberg and Paarl, Western Cape
Threats:	Habitat loss to urban expansion, invasive alien plants
Action required:	Formal protection via stewardship of largest population

Watsonia strictiflora is a highly restricted species that occurs only from the northern suburbs of Cape Town to Paarl in the Western Cape. It grows in renosterveld on clay flats. Its global range is less than 20 km² and 98% of its habitat has been lost to vineyard and wheat cultivation as well as urban expansion over the past 200 years. It is now known from four small populations isolated from one another. Its remaining habitat is being degraded by alien plants and livestock grazing and some of the populations are potentially threatened by urban expansion.

The majority of the places where this beautiful species used to grow no longer exist and in 2006, only two small patches of these plants were known. This species became a priority for volunteers from CREW to find and monitor. In 2008, a population was found on a small patch of renosterveld near Stellenbosch. In 2012, another CREW group, Friends of the Tygerberg Hills, found a group of 50 plants on the farm Hercules Pilaar between Cape Town and Paarl. This property is one of the highest priority sites for threatened plant conservation as it hosts 47 Species of Conservation Concern species, six of which are Critically Endangered. Because of the rich and interesting vegetation, Hercules Pilaar is a site visited regularly by the Friends of the Tygerberg Hills CREW group.

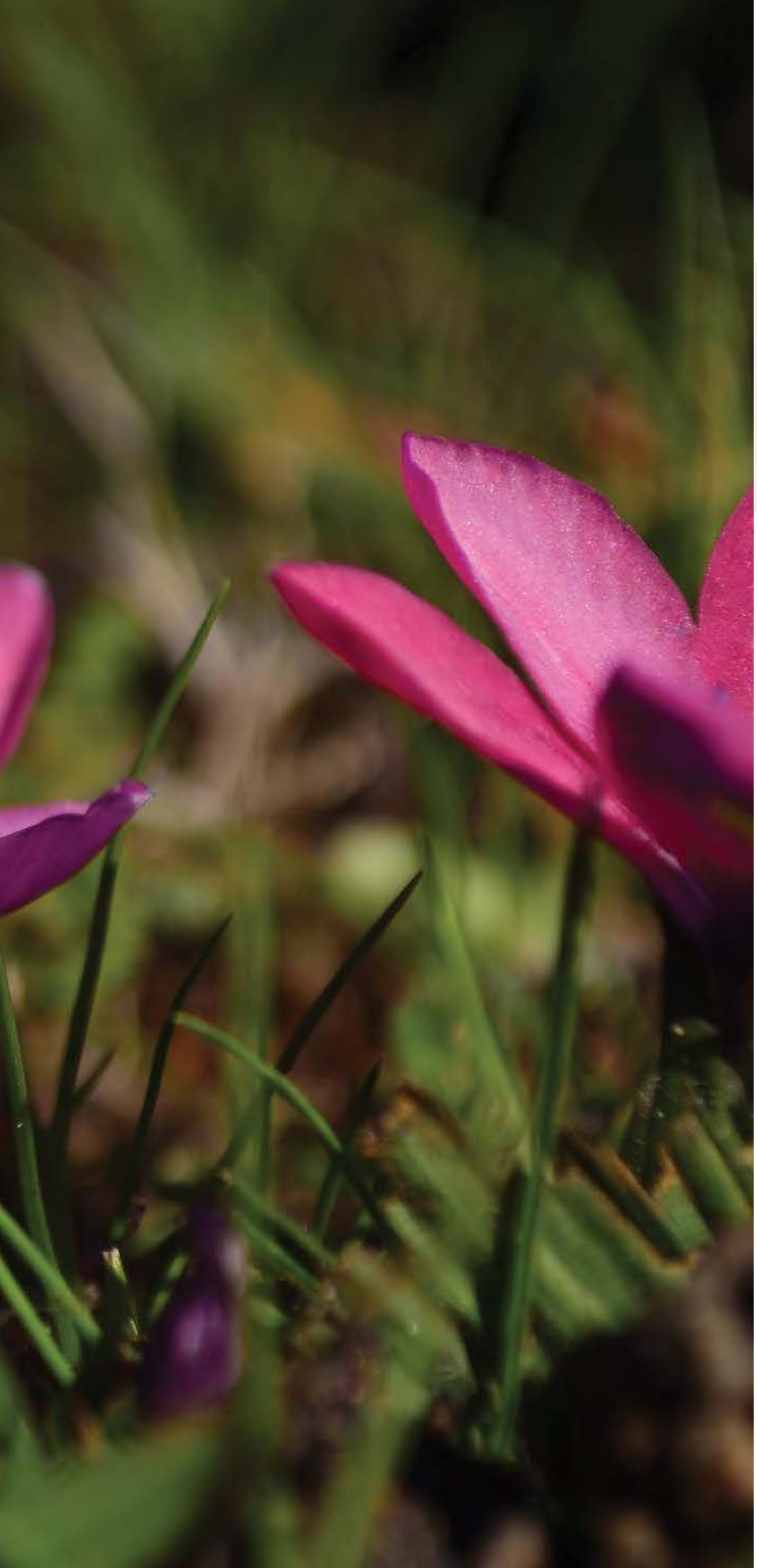
In January 2012 an entire hillside of natural vegetation on Hercules Pilaar was burnt during a run-away fire. Fire is vitally important for the ecology of renosterveld species and many plants flower and recruit well after fire. For renosterveld fragments in the agricultural areas surrounding Cape Town, fire is a rare event as farmers often cannot afford the risk of crop damage. The CREW group was very excited by this opportunity to monitor renosterveld after fire. During a field visit in November, the group found a number of deep pink *Watsonia* plants in full bloom on a piece of land that had not been burnt. Walking further uphill into the burnt area they found many more of them, dotted here and there between the dominantly flowering *Berkheya herbacea*, orange-yellow *Ixia dubia*, mauve *Corymbium* species and the blackened stumps of *Leucadendron lanigerum*. A total of 50 flowering individuals were counted. The Friends of Tygerberg then contacted John Manning, Iridaceae expert based at the Compton Herbarium at Kirstenbosch, who confirmed the identification of this species as the Critically Endangered *W. strictiflora*.

This was really good news and the landowners, Stephen and Mariette de Wit, were delighted to discover from the CREW volunteers that a Critically Endangered species occurred on their property. They undertook to ensure that the hillside where this population occurred would be carefully managed and livestock grazing avoided.

Despite having 47 Red Listed species, the farm Hercules Pilaar still has no formal conservation status. With willing landowners, the site is ideal for engagement in the Conservation Stewardship Programme. At the time of writing no negotiations regarding stewardship had been initiated but it is one of the top priorities of the Environmental Resource Management Department of the City of Cape Town. The CREW Programme will continue to encourage the City of Cape Town to formally conserve this site.

Friends of the Tygerberg Hills CREW: Hedi Stummer (author), Gurli Armbruster, Veronica Straub, Melda Goets, Keith Breetzke and Sandra de Swardt

Opposite, *Watsonia strictiflora*, photograph Melda Goets. Right top and below, CREW volunteers monitoring *Watsonia strictiflora*, photograph Hedi Stummer. Right centre, Friends of the Tygerberg Hills CREW group, photograph Ismail Ebrahim. Below right, *Watsonia strictiflora* in habitat, photograph Hedi Stummer.



Babiana blanda

Critically Endangered

Population size:	ca. 2 500
Range:	Darling to Paarl, Western Cape
Threats:	Agriculture, urban expansion, invasive alien species
Action required:	Protection of the sites and control of invasive alien species

Early collections of *Babiana blanda* indicate that it occurred on the seasonally damp sandy flats south of Mamre adjacent to the Melkbosstrand Road. Three collections were made in this area in the 1940s. It was then not seen again for 56 years, during which period 98% of its habitat was transformed for urban expansion and agriculture and there was extensive invasion of Port Jackson willow (*Acacia saligna*). Nick Helme and Rupert Koopman, who were exploring an interesting lowland remnant on Schoolgezicht farm, rediscovered the species in August 2006.

This is how they found it:
"After clocking in at the farmhouse, we had our first impression that this was a special place when we found *Senecio cadiscus* in the dam, which must be a modified Cape Vernal Pool. We parked and clambered through a fence to cross a 'grazing lawn' punctuated with pink *Oxalis purpurea*, progressing towards the intact veld. On closer inspection, some of the pink flowers were a beautiful, quite short *Babiana* which John Manning confirmed as *B. blanda* soon afterwards."

A year later, Rupert did a spring trip to the Malmesbury Klipkoppie to look for other threatened species and had no difficulty finding *Babiana blanda*, which was growing on the road verge and at the edge of municipal water infrastructure.

There are now two known discreet populations, one near Philadelphia and the other in Malmesbury. Much of the Philadelphia population, of about 1 000 plants, occurs in a paddock, spreading out into a dense Port Jackson willow thicket. The Malmesbury population is in a large remnant of Swartland Granite Renosterveld, which is in good condition and there are more than 1 500 plants. Both sites have been identified as Stewardship priorities and the City of Cape Town and CapeNature are negotiating with the respective landowners.

These populations face constant pressure from infrastructure maintenance (roads and electricity pylons) and invasive alien plants. Their survival depends on protecting the habitat through Stewardship Programmes and effective management of invasive alien species. Both localities have Critically Endangered habitat and numerous other Spe-

cies of Conservation Concern and if contracted into Stewardship would significantly add to the conservation estate.

Rupert Koopman (author) and Nick Helme; photographs Rupert Koopman

Previous, below and opposite, *Babiana blanda*. Right, one of only two known populations.

Hesperantha kiarataylorae

Endangered

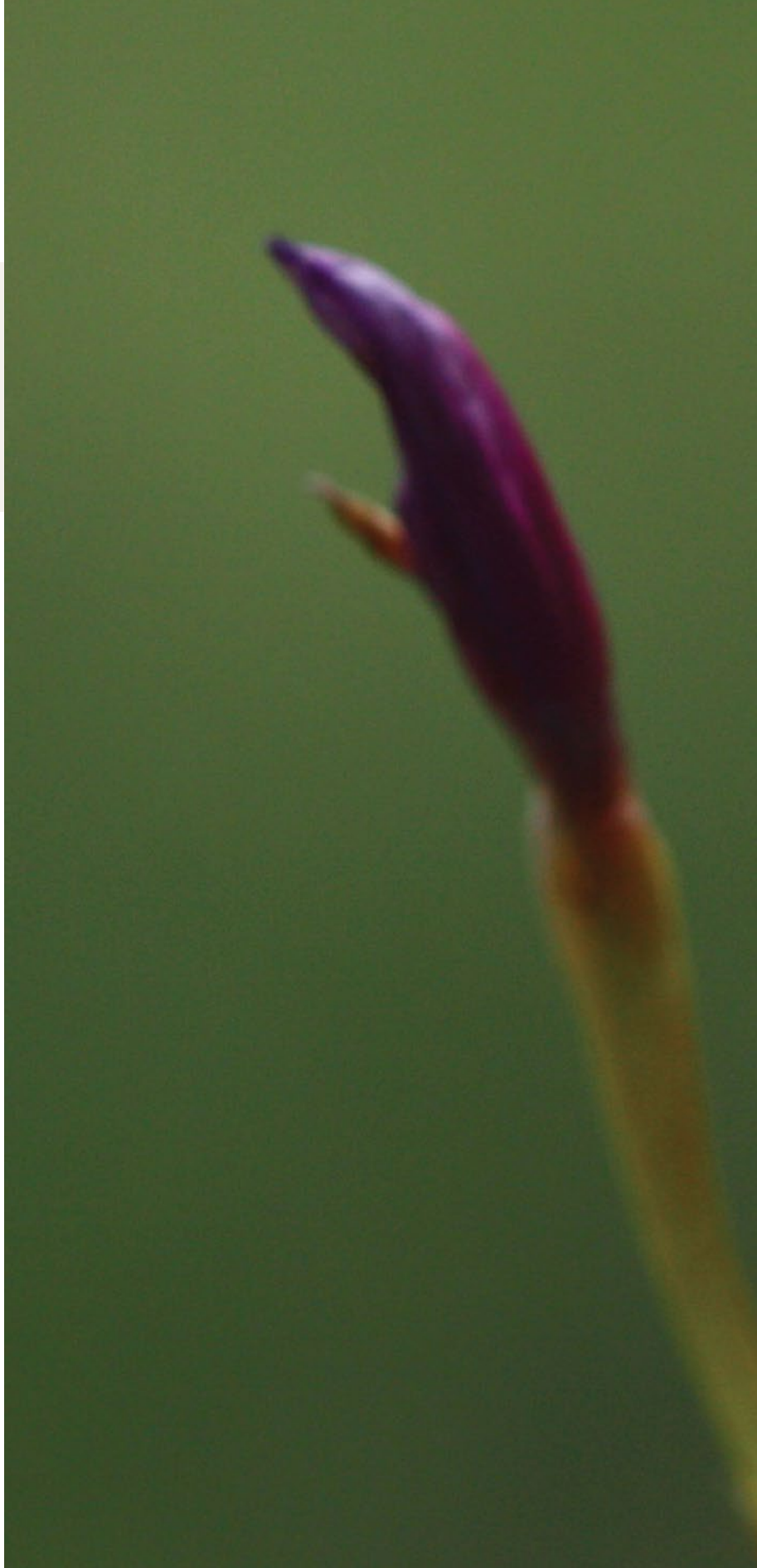
Population size:	ca. 100 plants
Range:	Plaatjieskraal, eastern Overberg in the Western Cape
Threats:	Land tenure
Action required:	Encouragement of good veld management practices, and conservation of renosterveld

Hesperantha kiarataylorae was discovered in 2011 by botanist Odette Curtis. Approximately 100 plants are known from only one locality. This species occurs in a very specialised habitat, quartz patches in the highly threatened Eastern Rûens Shale Renosterveld vegetation type, in the Lower Breede River Valley near Bredasdorp. Its unique habitat is shared with several other rare and threatened species.

CREW member Odette Curtis was on an outing with Charles Stirton, legume expert from Kew, when they came across this new species. Odette describes what happened as follows:
"In November 2011, Prof. Charles Stirton and I were on a legume-collecting trip on the farm Plaatjieskraal, a particularly botanically rich property in the eastern Overberg. We stopped to have a break on a beautiful quartz koppie overlooking the renosterveld and were admiring some new legumes that Charlie would be describing, when I looked down and noticed these tiny pink flowers between the white quartz pebbles. What a sight! Because we had never seen anything like it, I joked with Charlie and said 'I bet that's a new species too!' Sure enough, later that evening Peter Goldblatt and John Manning confirmed this from photographs kindly forwarded to them by CREW volunteers Cameron and Rhoda McMaster who also had never seen the flower before.

The following season (November 2012), I went back to the site to see if I could find out what was pollinating this beautiful little flower. I was lucky enough to witness a skipper butterfly (*Tsitana tulbagha*) land on an unpollinated flower and feed on the nectar. Pollen from the anthers of the flower attached to the butterfly's frons, after which the flower was clearly pollinated, as pollen granules were deposited onto the stigma. This is the first record of butterfly pollination in any sub-Saharan species of Iridaceae—what a special find! This makes one wonder how much more we might discover with continued research and conservation efforts in the region. It also makes one wonder how much we have lost, given the fact that there is less than 10% of this habitat remaining."

Negotiations with the current landowner are underway for either a land purchase or a conservation easement. This process has been ongoing for a few years, given the very special nature of the site, with several rare and



threatened plants growing there, as well as the fact that this site contains some of the most intact and well-managed remaining Eastern Rûens Shale Renosterveld. Finding the new *Hesperantha* species has strengthened the motivation for persisting with securing this land for conservation. More surveys are required to determine the extent of its range and whether this is in fact the only existing population. Presently, it is not under immediate threat, but land tenure issues mean that this could change at any time.

As a result of the poor protection status of renosterveld in the Overberg, the Overberg Lowlands Conservation Trust was established in April 2012, in order to focus exclusively on saving the last remnants of renosterveld through creating awareness amongst landowners, encouraging better veld management practices and ultimately, conserving renosterveld for the future. The naming 'rights' of this *Hesperantha* were auctioned by Fauna and Flora International UK, in order to raise funds for the Trust. This iris is named after Kiara May-Leen Taylor, in honour of the generous donation to renosterveld conservation (through the Overberg Lowlands Conservation Trust) by her father, Oren Taylor.

Napier CREW: Odette Curtis (author), Rhoda McMaster, Cameron McMaster and Charles Stirton; photographs Odette Curtis

Previous and opposite, *Hesperantha kiarataylor*ia. Right top and below, the quartz vein habitat in Overberg Renosterveld where this new species was discovered. Botanists who discovered this species, Odette Curtis, right below and Charlie Stirton, right centre.

Planea schlechteri

Critically Endangered

Population size:	ca. 200 individuals
Range:	Paarl to Klapmuts
Threats:	Invasive alien plants; habitat loss to agriculture, forestry, urban expansion and infrastructure development
Action required:	Searches for additional populations

Planea schlechteri is an extremely rare, range-restricted species and until recently, it was known only from two historic herbarium collections. The one population recorded near the Klapmuts station in 1935 is extinct, because of urban expansion, infrastructure development and quarrying. The other population, found in 1897 on the lower slopes of the Limietberg Mountains below Bain's Kloof, could not be located and is presumed extinct. Large tracts of this species' habitat have been lost to vineyards and timber plantations. The only remaining population occurs within a small 30 ha protected fragment of lowland granitic fynbos and renosterveld, the Briers Louw Nature Reserve, where it is threatened by competition from invasive alien grasses as well as fertiliser and herbicide runoff from surrounding agricultural lands.

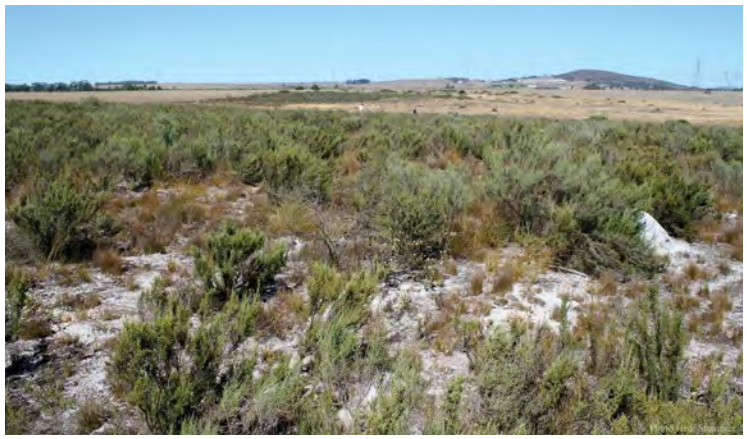
The Friends of the Tygerberg Hills CREW group made monthly visits to Briers Louw Nature Reserve during 2011 after a controlled burn in part of this reserve at the end of 2010. As *Planea schlechteri* flowers in February, well outside the peak fynbos flowering season, the group first visited the reserve in February 2012 to look for plants. This is how they found it:
"We did not have to look for long—there it was, an inconspicuous, resprouting plant, with many branches coming out from the base and with erect flowering tips, growing in between the renosterbos. Other plant species were also resprouting in the burnt area, but these were more densely branched and erect. Together with Rupert Koopman from CapeNature, we counted a total of 57 plants on our next visit in March. Our searches in surrounding areas for more populations were unsuccessful. Without its flowers, this plant is difficult to spot, as we found out in November when Norwegian Prof. Per Ola Karis, who had described *Planea schlechteri* from herbarium specimens, came to see the plants in the wild. We could only find two plants then. This motivated us to mark each plant with a GPS reading and tag them for future monitoring."

Right, *Planea schlechteri* inflorescences, photograph Keith Breetzke.

There are approximately 200 mature plants in the only known population of this species. At present, they enjoy formal protection in the reserve. Briers Louw is a privately owned nature reserve which has entered into a 10 year Biodiversity Stewardship Agreement with CapeNature. Friends of the Tygerberg Hills CREW will be searching for further populations in the few remaining fragments of lowland granitic fynbos over the next few years.

Friends of the Tygerberg Hills: Hedi Stummer (author), Gurli Armbruster, Mirek Siroky, Melda Goets, Rupert Koopman, Martina Treurnicht, Keith Breetzke, Veronica Straub, Ursula Aldini, Zoë le Roux and Sandra de Swardt

Right top and below bottom, Briers Louw Nature Reserve, the site of the rediscovery of *Planea schlechteri*. Below and right centre and below, the Friends of the Tygerberg Hills CREW group with Norwegian Prof. Per Ola Karis, who described this species from herbarium specimens, photographs Rupert Koopman and Hedi Stummer. Opposite, *Planea schlechteri* fruiting inflorescence, photograph Ismail Ebrahim.



Bulbinella calcicola

Critically Endangered

Population size:	ca. 400 plants
Range:	Jacobsbaai
Threats:	Habitat loss to mining and development
Action required:	Environmental Impact Studies that focus specifically on methods to mitigate damage to the population

This species has an extremely localised distribution in the area of Jacobsbaai on the west coast. It occurs on rocky limestone outcrops in Saldanha Limestone Strandveld, a rare coastal vegetation type restricted to the Vredenburg Peninsula. The entire known population of about 400 plants can be found within an area of 44 ha. The largest clump of about 300 plants occurs on land earmarked for limestone mining, while three other clumps of about 10 plants each occur on separate properties, two of which are likely to be developed in the near future. These areas are not formally conserved and a population reduction of 90% is anticipated in the near future because of habitat loss as a result of mining and development.

In 2008 the Jacobsbaai CREW group visited a limestone ridge in an area belonging to a mining company just east of Jacobsbaai, where *Crassula nudicaulis* and *Albuca longipes* had been found previously, and they stumbled across an unknown plant with yellow flowers. It could only be identified as being in the genus *Bulbinella*. A specimen was taken to Dr John Manning, geophyte expert at Kirstenbosch. The plant did not resemble any of the *Bulbinella* specimens in the herbarium and was confirmed to be a new species. It was named subsequent to its official description in 2010.

Because the areas where the plants grow are not formally conserved, their time is running out. The CREW group continues to lobby for their protection. Fortunately, a donation from the World Wildlife Fund has enabled the purchase of a limestone site at Jacobsbaai for conservation and the CREW group's surveys of threatened plants in the area contributed to the selection of the locality. There are several *Bulbinella calcicola* plants growing in this newly purchased 180 ha conservation area.

However, the plants remain threatened because the largest part of the population occurs in an area where a limestone quarry, as well as the pipeline route for the Saldanha municipality's water desalination scheme, are planned. In addition, the plants' locality is close to town and homeowners often collect stone for decoration of their houses, resulting in potential damage to the plants. The future of the plants hinges on careful environmental impact studies for these developments.

Jacobsbaai CREW: Koos Claassens (author), Elise Claassens, Danie Grobler and Deanna Grobler

Opposite, *Bulbinella calcicola*, photograph Koos Claassens. Below right, Koos Claassens discoverer of 12 species new to science, including *Bulbinella calcicola*, and Dr John Manning; below left, Jacobsbaai CREW monitoring threatened species, photographs Rupert Koopman.

Leucadendron floridum

Critically Endangered

Population size:	< 10 000 individuals
Range:	Olifantsbos to Kuilsriver in the Western Cape
Threats:	Habitat degradation and loss to urban expansion, human disturbance, invasive alien species, and harvesting for the cut flower market
Action required:	Restoration at suitable sites and prevention of hybridisation

This beautiful conebush is much sought after for the cut flower market. It was originally known from 19 locations in a 50 km range in the Western Cape but now there are only two remaining populations in the southern Peninsula. It is estimated that the population has decreased by approximately 80%. By the 1970s it was extinct on the Cape Flats as a result of ploughing of its wetland habitat, invasive alien plants and urban expansion. The survival of the species is threatened by wild flower harvesting, inappropriate fire management and habitat degradation as a result of trampling and dumping.

The largest remaining population of *Leucadendron floridum* can be found at Schustersvlei in the Cape of Good Hope section of the Table Mountain National Park. In 2000 there were several thousand plants along a 4 km stretch of the Schusters River, with a few plants just outside the reserve. The plants in the reserve enjoy formal protection and have had the benefit of hand-weeding of alien invasive species. The second and smaller population of approximately 100 plants occurs along the Bokramspruit on the Slangkop River near Ocean View. Although the site has been cleared of alien acacias, it requires protection from too frequent fires and flower harvesting for sale at street markets. In addition to these localities in the wild, there are also five planted populations. One of these was established at Theefontein by Derek Clarke in 1986 and it is estimated that some 100 plants have survived. Between 2010 and 2012 several populations were planted at Tokai Park, with seed and seedlings from the populations in the wild.

The restoration of the species is made difficult by the fact that it hybridises with other *Leucadendron* species. Although plants were successfully propagated at Kirstenbosch from seed collected at Schustersvlei, hybridisation was detected. The plants at another planted population, at the Alexandra reservoir on Table Mountain, exhibit features of *L. uliginosum* and they may be hybrids. Another population established at the Rondevlei Nature Reserve in the 1990s was destroyed by fire and the subsequent young plants were found to be hybrids with *L. coniferum*, also planted in the area. The hybrids were removed from Rondevlei and the population is being restored with pure genetic stock. However the Alexandra reservoir population of hybrids still needs to be removed.

Introduction of this species at suitable conservation sites on the Cape Flats may be a way to ensure its survival, as initially evident from the success of planted populations at Rondevlei and Tokai. Possible additional conservation sites that should be considered for reintroduction include Kenilworth, Edith Stephens, Raapenberg and Haasevlakte (near Kuilsriver). Care should be taken to prevent hybridisation with other closely related species of delta-seed and sunshine conebushes.

Tony Rebelo (author), Tony Hall, Derek Clarke, Dalton Gibbs, Anthony Hitchcock, and Friends of Tokai Park—Erik Harley, Margaret Kahle, Jenny Mountain, Emile van Rooyen and Berta van Rooyen

Opposite, male inflorescence. Right female inflorescence. Below, the habitat of *Leucadendron floridum*. Photographs Collin Paterson-Jones.

Aspalathus cliffortiifolia

Critically Endangered

Population size:	ca. 120 individuals
Range:	Port Elizabeth
Threats:	Competition from invasive alien species; urban development
Action required:	Reserve management; clearing invasive alien species; seed propagation

Aspalathus cliffortiifolia and *A. recurvispina* occur only in the coastal fynbos in the Port Elizabeth District. *Aspalathus cliffortiifolia* is a very range restricted species, occurring in an area of under 10 km² in the south of Nelson Mandela Bay in Port Elizabeth. It was known only from the type specimen collected in Humewood in 1911, which is now a built up suburb of Port Elizabeth. In 2009, this species was listed as Possibly Extinct in the *Red List of South African plants*.

Aspalathus recurvispina was also listed as Possibly Extinct in the 2009 Red List, as all six of its historically recorded locations have been transformed into suburbs of Port Elizabeth. Like *A. cliffortiifolia*, it is a very range restricted species and is limited to the coastal areas in the south of Nelson Mandela Bay, Port Elizabeth.

During a visit to Port Elizabeth in 2010 to initiate CREW work in the area, Threatened Plant programme manager from SANBI, Domitilla Raimondo, noticed an inconspicuous yellow flower on the side of the road and collected a specimen, initially thinking it was *Aspalathus cliffortiifolia*. This plant turned out to be *A. recurvispina*, that had not been recorded for several decades. The CREW volunteers then started searching for more plants in the area and to their surprise, came across a tiny population of *A. cliffortiifolia*. Another small population was found near Schoenmakerskop, approximately 10 kilometres away. These two small populations occur in remnant fragments of coastal fynbos and are severely fragmented, each comprising 60 to 90 mature plants. Even though one of these populations occurs within a protected area, both are declining due to alien plant invasion. Furthermore, one of the populations occurs in a road reserve next to a busy road in the suburb of Humewood, where further urban expansion remains a serious threat to this species.

(Continued on page 110)

Left and right, *Aspalathus cliffortiifolia*, photographs Kirk West

Aspalathus recurvispina

Critically Endangered

Population size:	ca. 120 individuals
Range:	Port Elizabeth
Threats:	Competition from invasive alien species; urban development
Action required:	Reserve management; clearing invasive alien species; seed propagation

Since the rediscovery of *Aspalathus recurvispina*, five populations have been recorded at Cape Recife, Schoenmakerskop, Sardinia Bay, in the Nelson Mandela Metropolitan University (NMMU) private nature reserve, and in the suburb of Summerstrand, although these are all severely fragmented. Alien plant invasions are likely to cause a decline to most of these populations, while urban expansion and indiscriminate mowing potentially threaten the subpopulations in Humewood and Summerstrand. Sadly, the overwhelming majority of the initially rediscovered population in Humewood was lost to urban expansion towards the end of 2012, with only a handful of plants remaining in this area. Fortunately, it appears that the species is fairly tolerant of mowing, as evident in its presence along road verges and in parks in Summerstrand.

The CREW group contributes to the protection of these species by clearing alien plants around the population in Summerstrand, to prevent the loss of habitat in that area. They have also raised awareness of the plants' plight, with the rediscovery of *Aspalathus recurvispina* featuring in local and international newspapers. Discussions have been held with the municipality about the management of these two species in the open spaces and nature reserves of the city, with only limited effect. As both *Aspalathus cliffortiifolia* and *A. recurvispina* occur in highly urbanised areas, it is imperative that awareness of their locations in these areas be raised so as to avoid a repetition of the recent destruction of a population due to urban development. There are only two known populations of *A. cliffortiifolia* and further surveys of the southern coastal areas of Port Elizabeth are required. Because of the small size of the known populations, seed collection and propagation may be necessary, while the viability of ex *situ* conservation of this species should also be considered.

Port Elizabeth CREW: Clayton Weatherall-Thomas (author), Nelia Garner, Adriaan Grobler, Merika Louw, Susan Tee, Jenny Eldridge, Cathy Wiid and Keith Mark

Left and right, *Aspalathus recurvispina*, photographs Kirk West

Marasmodes

Critically Endangered

Range:	Western Cape Swartland and Breede River Valley
Threats:	Habitat loss, invasive alien plants
Action required:	Surveys to establish range, management plans for conservation of the species, and collection of seed for *ex situ* conservation and restoration work

The small genus in the Asteraceae family, *Marasmodes*, is not very well known. There are currently 13 species described and they are all highly threatened. Two species are possibly extinct with the Red List status of seven species Critically Endangered, three species Endangered and one is Data Deficient. Habitat loss is the main threat to all the species as they only occur in low-lying areas on nutrient-rich substrates suitable for agriculture. The majority of *Marasmodes* species occur in the Swartland region where 95% of natural vegetation has been converted for crop farming. The remnant patches of renosterveld, where isolated populations of *Marasmodes* can be found, are continuously being degraded by poor fire management and invasion by alien plants.

In 2006, the CREW Programme became interested in the *Marasmodes* genus. All the species seem to occur in very threatened habitats and very little information about these species was available in herbaria. *Marasmodes* have small inconspicuous flowerheads and they flower between March and May, which is not a popular time for botanising in the lowland renosterveld areas. The first species monitored was *Marasmodes undulata*, which only occurs in a tiny fragment of vegetation on the outskirts of Paarl. Only 25 individuals were found, growing amongst senescent shrubs that had not been burnt for over 30 years. The critical situation of this species inspired the CREW team to take a closer look at other *Marasmodes* species and an annual monitoring day dedicated to this genus was established.

The first *Marasmodes* Day was held on 27 May 2007 and it has grown in popularity since then, with more and more volunteers attending each year. Some significant discoveries have been made and a number of taxonomic mysteries of the genus have been solved. In addition to finding several new populations of described species, three new species have been discovered. A new species found between Worcester and Villiersdorp will be named *Marasmodes crewiana* in honour of the work done by the CREW Programme to monitor and conserve threatened plants. This species is highly threatened as there are fewer than 30 individuals at the site. This find of a *Marasmodes* species in the Upper Breede River Valley in 2009 inspired further work in the region and the following year *Marasmodes* Day focused on botanical hotspots with suitable habitats

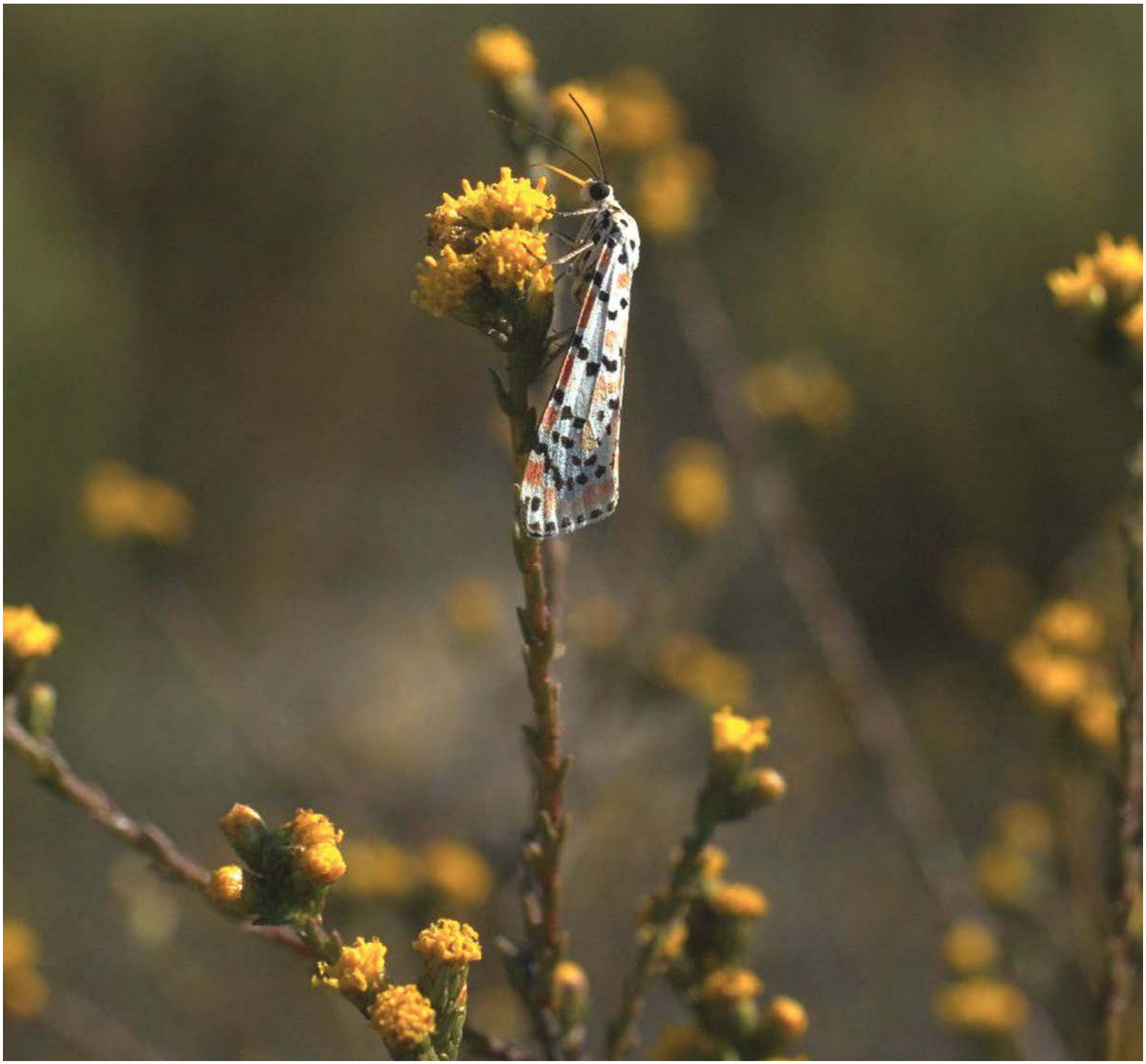
for *Marasmodes* in the valley. As a result, two more new species were found close to Wolseley.

CREW has initiated conservation measures for certain *Marasmodes* species. Most of them occur on privately owned land so the focus has been on creating awareness of these special plants amongst landowners. At selected sites, CREW has participated in facilitating conservation management actions such as controlled burns and alien clearing. CREW volunteers have also supported conservation agencies by surveying reserves and stewardship farms for *Marasmodes* species. They have started demographic monitoring of one species to gain insight into population trends, obtain vital morphological data, and assess the impact of certain threats to *Marasmodes* species. The outcomes of this study will be used to inform management actions for other similar species.

The *Marasmodes* Day strategy has worked exceptionally well and will be continued. Additional field work is required to establish the distributional range of all the species of *Marasmodes*. There is a need for compilation and implementation of management plans for all the Critically Endangered *Marasmodes* species, particularly those known only from a single locality. In addition, there is a need for seed collection and a pilot project to determine the most effective manner of propagating and re-establishing rapidly declining populations.

Ismail Ebrahim (author), Vathiswa Zikishe, Patrick Fraser, Rupert Koopman, Hedi Stummer, Hanna Glanville, Gurli Ambruster, Janeen Nicolls, Penny Waller, Alan Wood, Phillip Nel, Hentie De Wet, Chris Cupido, Anele Tshotsho, Karen Frehse and Sandra Swarts

Previous, *Marasmodes dummeri*, photograph Colin Paterson-Jones. Left and below, two new species of *Marasmodes* discovered by CREW, photograph left Patrick Fraser; below Ismail Ebrahim. Opposite, *Marasmodes dummeri* with undescribed pollinator, photograph Rupert Koopman.



Species threatened by use

The majority of South Africa's plant species are threatened by conversion of their natural habitat for agricultural or urban and industrial land uses. Conservation efforts usually focus on the maintenance of the habitats and ecosystems where these species occur. However, there are particular plants species and groups of plants that are targeted for use. For these species, individual plants are continually removed from the wild causing ongoing declines in populations.

There are two main utilisation pressures. The first major pressure is unregulated specialist horticultural collections, where unique and often highly attractive species are removed from the wild to be included in private collections. Slow-growing species where *ex situ* cultivation is not able to supply sufficient plants for the demand by collectors are especially vulnerable. Specific groups of succulents, some bulb species and cycads are plants that are threatened by specialist horticultural collection. Cycads are the group that are most severely threatened by horticulture and are showcased here.

The second utilisation pressure on South African plants is for subsistence, medicinal use and use in cultural rituals. Over 80% of South Africans still make regular use of wild harvested plants for these purposes, and this impact is explained in this chapter.

Cycads—the world's most threatened group of plants

South Africa has 38 cycad species, which represents about 12% of all the world's cycads and more than half of the African cycads. The two cycad genera that are endemic to Africa (*Encephalartos* and *Stangeria*) both occur in South Africa. For this reason, the country is regarded as one of the global centres of cycad diversity, together with countries such as Mexico and Australia.

The 2010 IUCN Global Cycad Assessment showed that approximately 63% of all cycads are threatened with extinction, making them one of the most threatened groups of organisms to have been comprehensively assessed. Even so, given the poor status of the world's cycads, the situation in South Africa is particularly dire. Nearly 76% of the South African cycad species fall into one of the IUCN categories of threat (i.e. Critically Endangered, Endangered or Vulnerable) or are already classified as Extinct in the Wild. South Africa and Swaziland stand out as the only countries with cycads that are classified as Extinct in the Wild, and South Africa also has the highest proportion of Critically Endangered cycads.

Results from population surveys and monitoring show an ongoing decline towards extinction, with >90% decline since 1995 for populations of seven out of eight species that have been monitored. By far the major reason for the poor status and ongoing decline is the removal of plants from the wild by plant collectors. Analyses of repeat photographs showed that nearly 80% of the change in cycad populations over 30–90 years was due to loss of individual plants. The same is true of the information gathered through population monitoring. As important, evidence for other major drivers of decline, such as habitat loss and invasive species, showed that these factors had a relatively small impact on wild populations.

There has also been an increase in harvesting for traditional medicinal purposes and this is evident from greater damage to plants in the wild and increased availability of cycad parts in muthi markets. The small *Stangeria eriopus* has been harvested in large numbers for several decades but it remains a fairly common and widespread species. Typically, medicinal harvesting of *Encephalartos* species results in stripping of sections of the stem which can kill the plant if large sections are removed. This has had a negative impact on populations across the country. There is some evidence for the removal of entire *Encephalartos* plants for medicinal use but the regular and organised removal of large plants from the wild, as observed in South Africa, is not typical of the medicinal trade.

Various conservation actions have been implemented but to date none have been very effective. More than 60% of cycads occur in reserves, some of which have been specifically created to protect cycads, such as the Lily Reserve in Limpopo Province. Sadly, this has not protected cycads from collectors and at least 10 species have been poached from within reserves, leading to spectacular population declines within protected areas.

Regulations to protect cycads have been in place since the 1970s and for most of this time, it has been necessary to obtain permits to own, sell or transport cycads in most provinces. They are also listed in Appendix 1 of the Convention on International Trade in Wild Fauna and Flora (CITES), which means that international trade in wild specimens is prohibited. In 1994, Gauteng Province decided they would not implement a permit system aimed at possession of cycads, opting instead to focus resources on protecting wild cycads. Several other provinces have struggled to maintain effective permit systems and at least one province has provided an amnesty period to enable people with cycads to legalise the plants in their possession. The resulting absence of a universal and properly implemented system created problems for cycad conservation. Cycads are now listed under the national Threatened or Protected Species regulations, which provides a national system that is intended to remedy this situation.

Biodiversity Management Plans, a legislative tool available under the Biodiversity Act, represent the latest tool available for cycad conservation and the first management plan published under the new legislation was for the cycad *Encephalartos latifrons*. Management plans make it possible to deal with multiple issues relating to a single species and they provide measurable targets for conservation, so they have the potential to be a powerful tool for conservation.

Text and photographs by John Donaldson

Right, cycads are illegally harvested from the wild to supply a demand for horticultural specimens. Cycads grow slowly and large individuals are not available in nurseries. Stems like the one shown here are preferentially harvested from the wild resulting in rapid loss of adult individuals and collapse of populations.

Encephalartos latifrons, Critically Endangered

Records from the late 19th century suggest that this cycad from the Eastern Cape was always scarce but this robust plant with densely packed spiny leaflets has been further impacted by land use and it is highly sought after by collectors. Loss of habitat and removal from the wild over the past 50 years have reduced a rare plant to a critical situation with <70 mature plants in the wild. However, a few farmers in the Eastern Cape have been protecting some of the remaining plants and are even propagating seedlings for restoration. In 2006 a Population and Habitat Viability Analysis was carried out to examine management and recovery options and this led to a Biodiversity Management Plan for the species in 2010.

John Donaldson

Encephalartos hirsutus, Critically Endangered

This attractive blue-leafed species used to occur in several populations across the Soutpansberg Mountain Range in Limpopo Province. Most of these populations no longer exist and conservation authorities have documented the disappearance of 65 multi-stemmed plants they were monitoring. Only one of the monitored plants remains and it may be the only surviving specimen in the wild although there are unconfirmed reports of additional plants. Landowners in the Soutpansberg have expressed interest in developing a management plan to secure the last specimens and to examine the feasibility of reintroducing plants to the wild.

John Donaldson

Encephalartos dyerianus, Critically Endangered

These magnificent plants occur on a single hill in Limpopo Province and the population is remarkably healthy given its small size. In the 1980s conservation authorities attempted to increase the population size by introducing plants, but the plants have taken a long time to establish and a large number of them were dug up by poachers. Despite fencing of the population and its location within a reserve, plants have been poached and conservation authorities have now stationed armed guards at the site to prevent further losses.

John Donaldson

Encephalartos laevifolius, Critically Endangered

This species was once widespread with populations in KwaZulu-Natal, Mpumalanga, Limpopo and Swaziland. It is now locally extinct in KwaZulu-Natal, and is thought to be extinct in Limpopo Province. There are very few plants remaining in Swaziland and most of the surviving plants are in Mpumalanga. Even here, populations at Kaapsehoop and Mariepskop have been decimated by collectors and the total population has declined by >90% since 1984.

John Donaldson

Medicinal plants

South Africa has over 2 000 different plant species that are recorded as being used for traditional medicine, out of a total of over 20 000 plant species. Of these medicinal plant species, a third (656 species) are actively traded or recorded in the medicinal markets of KwaZulu-Natal, Gauteng, Eastern Cape, Mpumalanga and Limpopo. The highest number of medicinal plant species in South Africa occurs in the Grassland, Forest and Savanna biomes.

An estimated 27 million South Africans (more than half the population) are consumers of traditional medicine, with a significant supporting industry. Trade in traditional medicinal plants and products were estimated to be worth R2.9 billion per year in 2007, with at least 133 000 people employed in the trade, many of whom are rural women.

Harvesting of plants for medicinal use is often destructive to the plant, as the plant parts used typically include bulbs, roots and bark, so one might expect to find that a large proportion of medical plant species are threatened with extinction. However, the Red List shows that of the 656 medicinal plant species that are traded, 9% (56 species, or about one in 12) are currently threatened. A further 12% (78 species) are of conservation concern, for example classified as Near Threatened, Data Deficient, Rare or Critically Rare, or as Least Concern but with evidence of population decline.

Urgent attention needs to be paid to the 56 traded medicinal plant species that are threatened, seven of which are Critically Endangered and now extremely scarce. In addition, research and monitoring of the remaining traded species is important, especially those that are of conservation concern, to ensure that harvesting patterns are sustainable and that they do not become threatened. To date there has been no co-ordinated efforts to conserve medicinal plant species. In 2013, 65 plant species threatened by medicinal trade were included under national Threatened or Protected Species regulations (TOPS). This is the first step towards co-ordination of conservation efforts. However, there is still much work to do. There is an urgent need to establish in which parts of each of these species ranges over harvesting is taking place and to develop interventions to help conserve species.

Text by Domitilla Raimondo

Right, Warwick Muthi Market in Durban, photograph Kerry Sink.

Siphonochilus aethiopicus, Critically Endangered

Siphonochilus aethiopicus, also known as wild ginger, is the most highly sought-after medicinal plant traded in South African muthi markets. It is used to treat asthma, colds, coughs and flu. The underground rhizomes and roots are harvested and either chewed fresh, or brewed as a tea. This species is now extinct over most of its former range in South Africa, with a 90% reduction in its extent of occurrence over the last 100 years. Numbers remaining in the wild are critically low. For example, recent monitoring of populations in Mpumalanga recorded an 84% decline in only four years. All indications are that harvesting of this species is unsustainable and that it is rapidly heading towards extinction. It is now considered among traders as the scarcest of all traded plants. *Siphonochilus aethiopicus* is found in Limpopo and Mpumalanga, but has become extinct in KwaZulu-Natal. It is widespread elsewhere in Africa.

Opposite, Warwick Muthi Market in Durban, photographs Kerry Sink. Below, Colin Paterson-Jones. Right, Vivienne Williams.

Warburgia salutaris, Endangered

Warburgia salutaris, or pepper-bark tree, is used as an expectorant for treating chest infections, as well as for treating a range of yeast, fungal and bacterial infections. The bark is harvested either directly from the tree or by felling branches so that bark can be stripped to the tips. The bark re-grows fairly rapidly, but if trees are debarked too often, when the bark has only partially re-grown, or if the roots are debarked, the tree is not able to recover and may die. In addition to being widely used by practitioners of traditional medicine, *Warburgia salutaris* is readily available in tablet form in health shops in urban centres.

There has been at least a 50% decline in the South African population due to excessive harvesting of bark, especially in KwaZulu-Natal. While some healthy populations exist in Mpumalanga and Limpopo, most populations have been impacted by bark harvesting. The average thickness of the bark sold in markets has decreased, indicating that progressively smaller trees are being debarked as the larger (more mature) trees become unavailable. Both shop traders and street traders consider the bark to be popular and very scarce. *Warburgia salutaris* occurs in KwaZulu-Natal, Limpopo and Mpumalanga, as well as in Swaziland, Mozambique, Zimbabwe and Malawi.

Hotspots under pressure

Endemic and rare plants are concentrated in areas of the country with rich topographic, edaphic and climatic variability. Sadly, some of these important areas for plant diversity are under threat as they are also desirable areas for agricultural and urban expansion. In this section, nine botanical hotspots have been selected to showcase the variety of land use pressures on South African plants and to demonstrate some interventions to conserve them. It is important to note that this is not a comprehensive analysis of areas of endemism for the country, and the areas covered are only a small fraction of the important areas for plant diversity in South Africa.

Saldanha Peninsula

The Saldanha Peninsula is located on the West Coast, about 120 km north of Cape Town (Western Cape) and is a major hotspot of plant diversity. The area can be defined roughly as lying west of the R27, north of Yzerfontein and south of the Berg River. Key drivers of vegetation turnover in the area are soil and rock types, and proximity to the sea (and associated temperature gradients). The former affects the main vegetation types and the latter is an important determinant of individual plant communities, with many of the localised endemics being restricted to cooler microclimates within 1 km of the cold Atlantic Ocean. There is also a high incidence of coastal fog, which keeps things cooler and damper along the coast. The main vegetation types in this area are Saldanha Limestone Strandveld, Saldanha Granite Strandveld, Langebaan Dune Strandveld and Saldanha Flats Strandveld. Particularly important habitats are those where granite and limestone are exposed at the surface—these habitats being rare elsewhere on the West Coast. About 40 species are endemic to this relatively small area.

Pressures

The Saldanha Peninsula has a long history of agriculture, mostly for cereals (particularly on the granite-derived soils), dairy farming and grazing, and more recently urban and industrial expansion has resulted in further loss of habitat. Saldanha Bay has been developed into a major deepwater port for iron ore export from Sishen and this has attracted a suite of associated industries, with many more in the planning stages—especially if the area is declared an Industrial Development Zone. The proposed expansion of the port itself is another threat to the northern shore of the Bay. In addition, the expansion of Vredenburg, the largest town in the region, is threatening or destroying many remnant patches of habitat. Expansion of a large limestone quarrying operation west of Saldanha will have a significant negative impact on Saldanha Limestone Strandveld. Saldanha Granite Strandveld has already lost almost 75% of its original total extent and Saldanha Flats Strandveld has lost about 65% of its original extent.

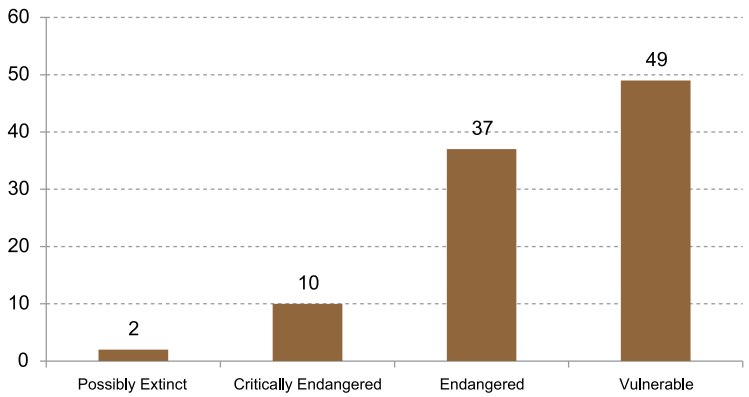
About 98 plant species within the region are threatened with extinction, with 10 species Critically Endangered and two possibly extinct.

Conservation interventions

The establishment of the West Coast National Park in 1985 in the southern part of the region (centred on the Langebaan Lagoon Ramsar wetland) was

Summary of the main vegetation types in the Saldanha Peninsula

Vegetation type	Threat status	Total original extent (ha)	Total area protected (ha)	Percentage protected	Remaining natural area (ha)	Percentage remaining
Saldanha Limestone Strandveld	Vulnerable	3 564	50	0.01	1 717	48.1
Saldanha Granite Strandveld	Endangered	22 480	2 015	8.6	5 474	24.3
Saldanha Flats Strandveld	Vulnerable	75 887	10 811	14.2	26 212	34.5



Number of threatened species in the various IUCN categories of threat.

the first major conservation initiative in the region and has proved to be most fortuitous, given the ongoing development pressures in the area. The park conserves significant portions of Langebaan Dune Strandveld, Saldanha Granite Strandveld, Saldanha Flats Strandveld and Hopefield Sand Fynbos, and is still expanding. Without the park, the conservation status of the regional vegetation types would be very worrying.

Because the park does not conserve large areas of Saldanha Limestone Strandveld, this is now the priority habitat for conservation in the region. In 2010 WWF South Africa raised funds for land purchase in this habitat by auctioning off the naming rights to a newly discovered plant species. The proceeds were used to purchase a small but key property for conservation just south of Jacobsbaai where many of the regional limestone endemics are present. An offset area proposed by the cement company, Afrisam, will hopefully also conserve a significant portion of this habitat.

The CREW Programme started a group in this area. Under the able leadership of Koos Claassens from Jacobsbaai, this group has discovered numerous new populations of threatened species and various undescribed species.

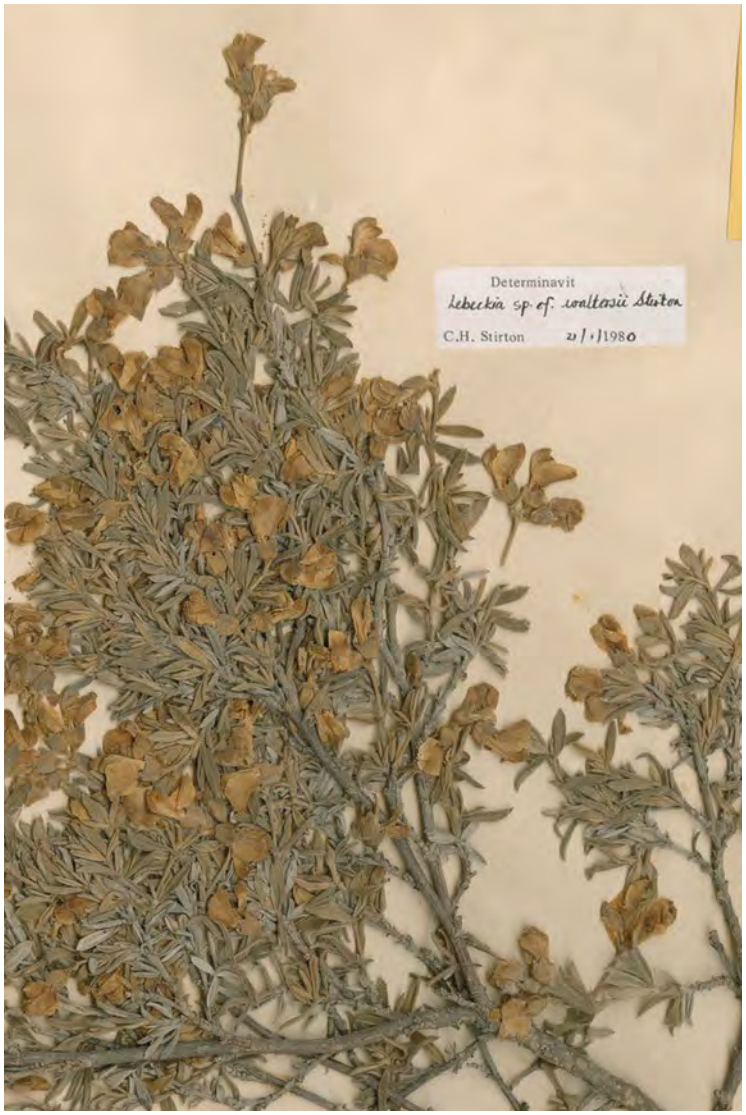
CapeNature's Stewardship Programme has also been working with various private landowners in the region, with the aim of contracting these areas for conservation.

Text and images by Nick Helme

Right, Saldanha Granite Strandveld, hosts a number of restricted endemic plant species, and is threatened by urban and industrial development.

Polhillia ignota, Extinct

Only known from two collections, the last made in 1928 from between Vredenburg and Saldanha Bay. Large parts of this range have been cultivated or developed since then.



Wiborgiella dahlgrenii, Endangered

First described in 2010, this highly localised species is only known from Limestone Strandveld in the vicinity of Jacobsbaai (<65 km²). Eight small subpopulations are known, and the total population is thought to be less than 200 plants. Only two of these subpopulations are in a protected area, and the others are vulnerable to limestone quarrying and urban development.

Nick Helme

Silene ornata, Endangered

This species was originally collected by Masson in 1773, and subsequently became widely cultivated in Europe. In the wild however, it is restricted to coastal limestones in the Saldanha and Postberg area, and is threatened by quarrying and urban expansion in parts of its very narrow range (<100 km^2).

Nick Helme

Pauridia longituba, Endangered

This species is endemic to Saldanha Granite Strandveld, where it occurs only in shallow grit pans and in humus or grit-filled crevices on rocky outcrops. This specialised habitat has not protected it from urban development, although some populations are relatively safe within huge granite domes.

Nick Helme

Cephalophyllum rostellum, Endangered

The genus *Cephalophyllum* is primarily a genus of the Succulent Karoo. This is the only species of the genus on the Saldanha Peninsula and it is endemic to the region. This creeping species is restricted to rocky, coastal habitats (calcrete, limestone or granite), but is vulnerable to grazing, trampling and urban development. It is known from fewer than 10 locations.

Nick Helme

Phylica greyii, Endangered

One of only a few coastal *Phylica* species, this species has adapted to its windy environment by becoming a low, sprawling shrub with wiry branches. It is restricted to coastal limestones on the Peninsula and at Yzerfontein, and is known from less than 1 000 plants, in four subpopulations, some of which have been impacted by coastal development.

Nick Helme

Opposite, Saldanha Limestone Strandveld (left top and below, right below) and Saldanha Granite Strandveld (right, top), both host to numerous endemic plants, are highly threatened by coastal housing development.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West Coast Sandveld

The West Coast Sandveld referred to in this account is centred on a single vegetation type—Leipoldtville Sand Fynbos, which is found on the western coastal plain, some 150 to 250 km north of Cape Town, in the Western Cape. The area is bounded by the Olifants River to the north, the Berg River to the south, and generally lies west of the Olifants River Mountains, although there are also outlying strips along the Olifants River north of Clanwilliam and near Citrusdal. The vegetation type is one of five Sand Fynbos vegetation types found on the Cape West Coast, stretching all the way from Cape Town, 500 km north to the Hondeklipbaai area.

The defining feature of the Sandveld is deep, nutrient-poor, acid, sandy soil. The unit does not reach the coast, as structurally similar sandy soils occupy the coastal strip, but they are more recent alkaline to neutral sands, and support various forms of Strandveld. Although the Sandveld referred to here may have some Strandveld elements (especially closer to the sea) it is predominantly a Fynbos vegetation type, and is thus a vegetation type that requires occasional fire. The area west of the mountains is a coastal plain, and is largely flat, with occasional sandstone inselbergs (which support Graafwater Sandstone Fynbos). Summers are hot and dry, and the area receives a relatively low rainfall, virtually all in winter. The area has, until recently, been surprisingly poorly known botanically.

Wetlands are rare in the well-drained sands, but the region does harbour the Ramsar-listed Verlorenvlei wetland east of Elandsbaai.

About 25 plant species are endemic to this vegetation type.

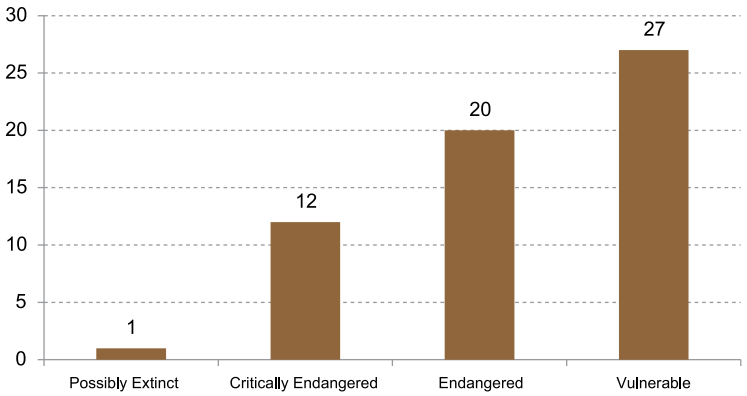
Pressures

The infertile, sandy soils are seemingly unsuited to cultivation, and until the 1980s, small scale rooibos tea (*Aspalathus linearis*) was practically the only cultivation taking place in the area, other than along the edges of the few wetlands. However, with the introduction of rural electrification in the 1980s, farmers were able to install centre pivot irrigation and pump water from deep aquifers, and this saw an explosion in potato cultivation. Today about 60% of South Africa's potato crop is grown in this relatively arid region, and at least three of the 12 catchments are being pumped at above their recharge capacity, leading to serious impacts on wetlands and areas, which depend on shallow water tables. Although the rate of habitat loss has slowed down recently, the loss of habitat to agriculture is ongoing and is the primary pressure on the region, along with associated water abstraction. Climate change is also likely to have a negative impact on this area, and the last six summers have been amongst the hottest ever recorded in the region. Other pressures include alien invasive vegetation and heavy grazing.

Leipoldtville Sand Fynbos has already lost at least 57% of its original total extent.About 60 plant species within the region are threatened with extinction, with an alarming 12 being Critically Endangered and one probably extinct.

Summary of the main vegetation type in the West Coast Sandveld

Vegetation type	Threat status	Total original extent (ha)	Total area protected (ha)	Percentage protected	Remaining natural area (ha)	Percentage remaining
Leipoldtville Sand Fynbos	Endangered	190 857	About 4 000	2.0	84 705	44.3



Number of threatened species in the various IUCN categories of threat.

Conservation interventions

There are no state owned conservation areas within this region, which partly accounts for the high number of threatened plant species in this area.

CapeNature's Greater Cederberg Biodiversity Corridor includes two major corridors within this area, and their Stewardship Program has thus been working with various private landowners and the Redelinghuys Municipality. To date, a number of landowners have agreed to set aside portions of their farms for conservation, and these come to a total of about 4 000 ha.

Text and images by Nick Helme

Right, Leipoldtville Sand Fynbos has already lost at least 57% of its original total extent since the 1980s as a result of ploughing for potato and rooibos tea cultivation.

Heterorachis hystrix, Critically Endangered

This species was first described in 2010, and is known from a single population of fewer than 200 plants, southwest of Graafwater. The extremely localised nature of this species makes it very vulnerable to habitat loss.

Nick Helme

Felicia josephinae, Endangered

This striking annual daisy was only discovered and described about 10 years ago, and is restricted to a fairly small area in the central Sandveld. It is curiously intolerant of habitat disturbance and is threatened by habitat loss, degradation, grazing and trampling.

Nick Helme

Lampranthus stanfordiae, Endangered

Although known from a relatively large total area (4 900 km²) only three populations of this striking vygie are known, and it has lost at least 40% of its habitat to cultivation and alien invasive vegetation.

Nick Helme

Leucospermum arenarium, Critically Endangered

This species appears to have always been very localised (at the northwest base of Piketberg in a 50 km² area), and has lost at least 75% of its known range to cultivation and alien invasive vegetation. Fewer than 300 mature plants are known.

Nick Helme

Argyrolobium velutinum, Endangered

Although it has a relatively wide range (4 000 km²) in the southern Sand Fynbos types (Cape Town to Clanwilliam), this species is today known from fewer than 10 viable locations, and has lost the majority of its habitat to cultivation and alien invasive vegetation. The species is also vulnerable to grazing pressure.

Nick Helme

Restio impolitus, Vulnerable

Although it has a relatively wide range (7 000 km²) in the southern Sand Fynbos types (Cape Town to Leipoldtville) this species is today known from fewer than 10 viable locations, and has lost the majority of its habitat to cultivation and alien invasive vegetation.

Nick Helme

Opposite, strip cultivation for rooibos tea results in fragmentation of natural vegetation and stops fires, necessary for maintaining ecological integrity and diversity, from reaching these fragments.

Bokkeveld Escarpment and the Matsikamma and Gifberg mountains

The Bokkeveld Escarpment lies at the northern extremity of the Fynbos Biome, some 300 km north of Cape Town, and is here defined to include the western edge of the Nieuwoudtville Plateau, extending south towards the Doring River and including the Gifberg and Matsikamma mountains south of Vanrhynsdorp. It occupies an interesting area bioclimatically, in that significantly more arid Succulent Karoo habitats surround the area, thanks to significantly lower elevations. Summers are hot and dry, with occasional thunderstorms, and winters are generally cool, with most of the rain falling in winter. Pronounced rainfall gradients are evident from the relatively wet western edge of the Bokkeveld portion of the escarpment towards the drier east, and this, combined with a transition from nutrient-poor sandstone derived sands to richer tillite derived clays, drives major vegetation transitions. Add to that heavier dolerite derived soils on the eastern edge, and numerous transitions (ecotones) between the three main soil types and the primary causes of the area's spectacular plant diversity are evident. The region is renowned for its bulb (geophyte) diversity, but the display of spring annuals can also be impressive. The area is also a hotspot for insect diversity, and features numerous fascinating examples of species-specific co-evolution.The main vegetation types in this area are Bokkeveld Sandstone Fynbos and Nieuwoudtville Shale Renosterveld. A number of seasonal pans and associated wetland fringes significantly increase the diversity, but all habitats are species rich and support unique plant assemblages. About 70 species are endemic to this area, and if one includes the dolerites, this number rises to about 85.

Pressures

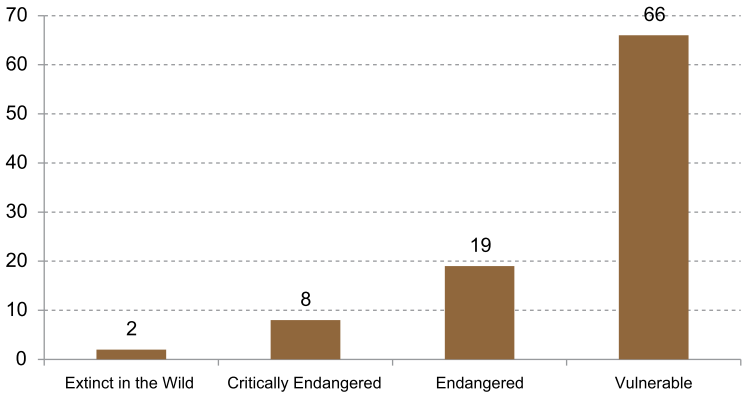
The rich tillite (similar to shale) soils of the Bokkeveld have long been cultivated for cereals and sheep grazing, but it was not until about 1970 that rooibos tea (*Aspalathus linearis*) cultivation started to have an impact on the vegetation of the sandy soils. The first decade of the 21st century saw significant expansion of the rooibos tea footprint into Bokkeveld Sandstone Fynbos, and this remains the primary ongoing pressure. Associated with this is a reluctance by landowners to allow this fire prone and fire driven vegetation type to burn, which means that many remaining natural areas between rooibos tea fields are becoming moribund, which may lead to local extinction of certain plant species, particularly the shorter lived ones. Urban expansion and alien invasive vegetation are not significant pressures in this area.

Bokkeveld Sandstone Fynbos has already lost almost 21% of its original total extent, and Nieuwoudtville Shale Renosterveld has lost about 50% of its original extent.

Plant species within the region threatened with extinction amount to 116, with seven Critically Endangered and four possibly extinct species.

Summary of the main vegetation types of the Bokkeveld Escarpment and the Matsikamma and Gifberg mountains

Vegetation type	Threat status	Total original extent (ha)	Total area protected (ha)	Percentage protected	Remaining natural area (ha)	Percentage remaining
Bokkeveld Sandstone Fynbos	Vulnerable	136 139	4 028	2.9	107 741	79.1
Nieuwoudtville Shale Renosterveld	Vulnerable	15 922	914	5.7	8 074	50.7



Number of threatened species in the various IUCN categories of threat.

Top left, cultivation for rooibos tea, photograph Nick Helme. Bottom left, the Bokkeveld Escarpment is well known for its abundance of geophytes, photograph Colin Paterson-Jones. Overgrazing by livestock are threats to plant diversity on the Bokkeveld Escarpment, photograph top right Nick Helme; below right, Bettina Koelle.

Conservation interventions

Oorlogskloof Nature Reserve was the first major conservation initiative in the region, and is still the largest conservation area in the region (about 6 000 ha), with a number of recent extensions. The rugged and varied terrain in this reserve conserves significant portions of Bokkeveld Sandstone Fynbos and Nieuwoudtville Shale Renosterveld.

The Nieuwoudtville Municipality owns a small but important wildflower reserve on the outskirts of the town, and this borders the Hantam National Botanical Garden. In 2007 a highly biodiverse farm belonging to the McGregor family was sold to the South African National Biodiversity Institute and became the Hantam National Botanical Garden, the only national botanical garden in the Northern Cape. Although about 15% of this property was cultivated, the remainder supports a range of habitats within Nieuwoudtville Shale Renosterveld and Nieuwoudtville to Roggeveld Dolerite Renosterveld.

In 2008, Avontuur and Ouplaas farms (20 km northwest of Nieuwoudtville) were bought for conservation, with funds from the World Wide Fund for Nature (WWF) and private donors. These properties conserve prime examples of all three vegetation types in the region, including four large seasonal pans and associated wetlands.

Northern Cape and CapeNature's Stewardship Programmes have also been working with various private landowners in the region, although to date only two farms have been signed up to this program, totalling about 2 000 ha.

Text and images by Nick Helme

Vernal Pools (top left), constitute a unique habitat type present on the Bokkeveld Escarpment, these seasonally inundated areas support a host of endemic plant species. The Bokkeveld escarpment posts spectacular rock formations, for example the Nieuwoudtville Waterfall (bottom left).

Leucadendron remotum, Endangered

One of four endemic *Leucadendron* species on the Bokkeveld, this species is found mostly in the northern parts of the Bokkeveld Escarpment, where it is threatened by expanding rooibos tea cultivation and the associated lack of fire in the remnant patches of natural veld.

Nick Helme

Oxalis dines, Vulnerable

Although it has a relatively wide range (6 000 km²) in the arid parts of the region, this aquatic species is a habitat specialist restricted to shallow, seasonal clay pools. Fewer than 20 locations are known, and it is threatened by degradation of its habitat and by direct trampling and grazing.

Nick Helme

Aspalathus obliqua, Vulnerable

Prior to 2009, this species was known only from the original collection made in 1830. In 2009 it was rediscovered after a fire on the conservation property Avontuur, where fewer than 200 individuals were found. This locality is not far from the original locality, but the species is one that germinates and lives for only a few years after fire, and thus in the long-term absence of fire, it will not be evident.

Nick Helme

Trachyandra prolifera, Vulnerable

This tiny species flowers in autumn, when little else is in flower. It is known from three small subpopulations around Nieuwoudtville, within the transition from dolerite to tillite soils, and has lost at least 50% of its habitat to cultivation.

Nick Helme

Euryops mirus, Endangered

Only three subpopulations (all with <250 plants) of this long-lived resprouter are known, and it is restricted to a small area around Nieuwoudtville, favouring seasonally damp sandy loams. Large areas of suitable habitat have been lost to cultivation.

Nick Helme

Arctotheca marginata, Vulnerable

This creeping species was only described in 2002, and occupies a very specific and restricted habitat along the seasonally flooded edges of just a handful of clay pans on the edge of the Bokkeveld escarpment.

Nick Helme

Breede River Valley

The Breede River Valley, stretching from Tulbagh to Bonnievale in the Western Cape, is a hotspot of plant diversity. Sculpted by the once mighty Breede River, massive alluvial deposits alternate with mostly Bokkeveld shales in many combinations. The addition of significant climatic gradients and a varied relief produces vegetation with great complexity. There are six vegetation types in this valley: Breede Alluvium Fynbos, Breede Alluvium Renosterveld, Breede Shale Fynbos, Breede Sand Fynbos, Breede Shale Renosterveld and Robertson Karoo. In addition, hundreds of different microhabitats exist as a result of the braided system of rivulets, streams and wetlands draining from surrounding mountains. This diversity of ecosystems has stimulated plant speciation and 160 species are endemic to this valley.

Pressures

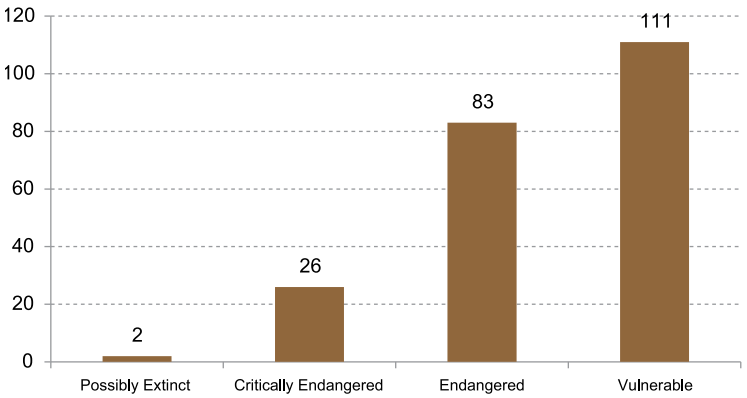
Abundant water supplies and sufficient alluvial soils present in this ancient floodplain have made the valley highly suitable for agriculture. Parts of the valley have been farmed for over 300 years, with the farms in Tulbagh established in 1700, Goudini in 1709, and Robertson in 1728. Over the centuries, with ongoing improvements in drainage and irrigation technologies, farmlands have expanded away from the moist slopes and river valleys into drier areas. Significant crop footprint expansion has taken place in the last 30 years around Robertson, in the Slanghoek Valley and in many foothill areas such as Romansrivier. Conversion of natural vegetation for agriculture (predominantly wine grapes) has resulted in many endemic plant species losing habitat, with many species now restricted to small fragments of vegetation between farmlands. Construction of the shallow Brandvlei Dam, started in 1922 and expanded twice in 1950 and again in 1975, has resulted in 2 553.5 ha of Breede Sand Fynbos being destroyed and the extinction of the species *Lampranthus vanzijliae*.

Most of the towns in the valley are fairly small and urban development has a relatively low impact on natural vegetation compared to agriculture. Worcester is the exception—its population and economy continue to grow, resulting in ongoing loss of the Endangered vegetation types Breede Alluvium Fynbos and Vulnerable Breede Alluvium Renosterveld, as well as the species rich westernmost extent of Robertson Karoo (Least Threatened).

Of all the plant species within the valley, 222 are threatened with extinction with 26 Critically Endangered and two possibly extinct.

Summary of the main vegetation types in the Breede River Valley

Vegetation type	Threat status	Total area (ha)	Total area protected (ha)	Percentage protected	Remaining natural area (ha)	Percentage remaining
Breede Shale Fynbos	Least Threatened	31 847	9 450	29.67	23 756	74.59
Breede Shale Renosterveld	Least Threatened	104 636	5 898	5.64	68 093	65.08
Breede Alluvium Fynbos	Endangered	51 054	1 633	3.20	23 225	45.49
Breede Sand Fynbos	Vulnerable	9 278	226	2.43	7 373	79.47
Breede Alluvium Renosterveld	Vulnerable	49 834	492	0.99	24 951	50.07
Robertson Karoo	Least Threatened	61 300	955	1.56	50 853	82.96



Number of threatened species in the various IUCN categories of threat.

Conservation interventions

Priority sites for conservation in the Breede River Valley were first identified in 1986, but conservation implementation only started recently. In 2005, the Tulbagh Renosterveld project implemented by the CREW Programme initiated a systematic sampling of the lowland remnants of the Upper Breede area and many populations of threatened species were surveyed. A priority list was made of the remaining lowland fynbos areas optimal for formal conservation in this upper part of the valley.

As a result of intense ongoing pressure to develop more vineyards, the Western Cape Department of Agriculture and CapeNature together began implementing the first Area Wide Plan in the Slanghoek Valley in 2002, under the guidance of Rudolph Roscher. In 2003, independent botanist, Nick Helme, conducted a botanical survey of all properties within the Slanghoek Valley to ensure identification of all conservation priority areas, which were then included into the Area Wide Plan. As part of their expansion of protected areas, CapeNature started Landowner Stewardship work in 2006. The priorities emerging from the Tulbagh Renosterveld project and Slanghoek surveys were taken up by the Upper Breede Stewardship team, under the guidance of Garth Mortimer. Rudolph and Garth now head the Upper Breede Collaborative Extension Group (UBCEG), which was formed to ensure effective partnerships between agriculture and conservation departments. UBCEG is a multi-stakeholder group bringing together the various departments in the area responsible for natural resource management, biodiversity conservation and sustainable agricultural land use. It catalyses action and pools scarce resources towards these ends.

At present, CapeNature has 12 Stewardship agreements conserving more than 3 200 ha of threatened lowland habitat in the Upper Breede (including iconic properties such as Romansrivier, Grootvlei, Klein Geluk wetland in the Slanghoek Valley, and a groundbreaking first Biodiversity Agreement with emerging black farming group, Fynbos, Vrugte & Wyn). There are several more in the negotiation phase. UBCEG is viewed locally and internationally as a model for coordinating sustainable development and conservation actions.

So far all conservation work has taken place in the Upper Breede River with the lower Breede not receiving much conservation attention. This area has one of the greatest concentrations of unprotected plant species in South Africa with 34 unprotected threatened species occurring between Worcester and Stettyn. In 2005, Nick Helme noted the importance of Rainbow Chickens as a landowner in the region and conducted a survey of all their properties for CapeNature Stewardship. At the same time, a survey of the extensive Brandvlei Prison grounds was undertaken for CapeNature Stewardship. Sadly, these sites have not yet received attention from the Stewardship Programme due to a shortage of funds. In 2012, botanists Philip Desmet and Nick Helme highlighted the possible expansion of the Vrolikheid Nature Reserve as a feasible and worthwhile conservation priority in this region, as part of a study for the Leslie Hill Succulent Karoo Trust. During a single day of fieldwork in October 2012, two new species (*Phymaspermum* sp. and *Wiborgiella* sp.) were discovered within 5 km of the Vrolikheid Nature Reserve. This highlights the urgent need for more botanical surveys in the region. The CREW Programme will start a citizen scientist volunteer group based in Worcester in 2013 and plans to undertake systematic surveys in the Lower Breede between 2013 and 2015. Resources are required to support Stewardship work in this area.

Below, the Breede River has been impacted by water extraction for agriculture and invasion by alien plants, photograph Colin Paterson-Jones. Photographs pg 148, crop cultivation (top left and right, below right), invasive alien plants (bottom left); and the construction of the Brandvlei Dam (pg 149 right) have all led to significant loss of the spectacular natural vegetation of the Breede River Valley (pg 149 left), photographs: Ismail Ebrahim and Rupert Koopman.

Lost

Lampranthus vanzijliae, Extinct

Permanent flooding due to the building of the Brandvlei Dam was the likely cause of extinction of this species. It was collected only once in 1921 before construction of the dam.

Lost and found

Circandra serrata, Critically Endangered

This species, endemic to the Breede River Valley, was collected in 1913 and not again for close to 100 years. It was thought to be extinct due to the extensive habitat loss to vineyard and fruit orchard cultivation. It was recently rediscovered near Tulbagh. The only known location is declining due to alien plant invasion, and the site is earmarked for development of holiday accommodation.

Rupert Koopman

Lost and found

Erepsia villiersii, Critically Endangered

This species has a tiny range of less than 2 km² and occurs between Villiersdorp and Worcester. It has lost the majority of its habitat to vineyard and orchard expansion. Having not been collected for over 25 years, it was thought to be extinct, yet in 2009 it was rediscovered on small fragments of renosterveld between orchards. Requiring fire to recruit, it remains highly threatened due to fragmentation of its habitat by orchard farming and the resulting lack of fire.

Jan Vlok

Wanted

Aspalathus amoena, Possibly Extinct

Known only from collections along the Breede River at the base of Bainskloof Pass. Most of this species' habitat has been transformed for vineyard and orchard cultivation. The remaining fragments are densely invaded by alien *Acacia mearnsii*. It has not been seen for over 50 years and is quite likely extinct.

Beautiful, highly threatened species

Aristea nigrescens, Endangered

A newly discovered species, found in 2005. This highly restricted species that occurs between Wolseley and Tulbagh in an area of 49 km², is known from only three sites. It flowers after fire and is threatened by deciduous fruit and vineyard expansion, lack of fire, and alien plant invasion.

Rupert Koopman

Moraea vuvuzela, Endangered

Recently discovered and described in 2010 to commemorate the soccer wold cup, *Moraea vuvuzela* is a range-restricted (Extent of Occurence 7 km²) habitat specialist. It has declined extensively due to habitat loss to crop cultivation and dam construction. Two of the three known subpopulations occur right on the edge of the Brandvlei and Kwaggaskloof dams, where they are threatened by erosion of their habitat when the dams are filled to capacity and strong winds cause soil banks above the water's edge to collapse.

Ismail Ebrahim

Ixia viridiflora var. *viridiflora,* Endangered

This taxon is known from only three sites in the northern Tulbagh Valley. It has lost over 70% of its habitat to vineyard and orchard expansion over the past 100 years. It now occurs in remnant patches between fruit orchards, and is threatened by invasive alien plants, lack of fire, harvesting for horticultural purposes and ongoing habitat loss for crop cultivation.

Colin Paterson-Jones

Leucadendron flexuosum, Critically Endangered

A single population of 400–500 plants near Worcester continues to decline due to expanding agriculture, alien plant invasion, overgrazing, clearing and mowing of road verges and inappropriate fire management.

Colin Paterson-Jones

Nelson Mandela Bay Municipality: Port Elizabeth, Uitenhage and Despatch

The Nelson Mandela Bay Municipality (NMBM), which includes Port Elizabeth, Uitenhage and Despatch (Eastern Cape) is the meeting place of two of South Africa's biodiversity hotspots, the Cape Floristic Region and the Maputaland-Pondoland-Albany Hotspot; a very unique situation. The NMBM is also known as the 'five biome city', as the climatic and topographic variability produces a diversity of habitats. Average rainfall ranges from over 800 mm in the southern coastal areas, to 450 mm at Coega along the northern coast of Algoa Bay. The dominant biomes in NMBM are Fynbos on the coastal lowlands in the south and mountains of the east, and Thicket along the southern coast as well as the northern half of the metro. Forests are found in the southern coastal areas, and Grassland and Nama-Karoo occurs in vegetation mosaics. There are 13 vegetation types in NMBM, with Algoa Dune Strandveld, Algoa Sandstone Fynbos, Sundays Thicket and Coega Bontveld being dominant. Most of the threatened plants are associated with the lowland Algoa Sandstone Fynbos, in particular seeps, wetlands and rocky outcrops within the vegetation type. Coega Bontveld, a Thicket mosaic on limestone, and Algoa Dune Strandveld contain a number of endemic species, with *Orthopterum coegana* being limited to a single koppie (Coega Kop) in the northern half of the metro. A number of plants are endemic to rivers and wetlands as well.

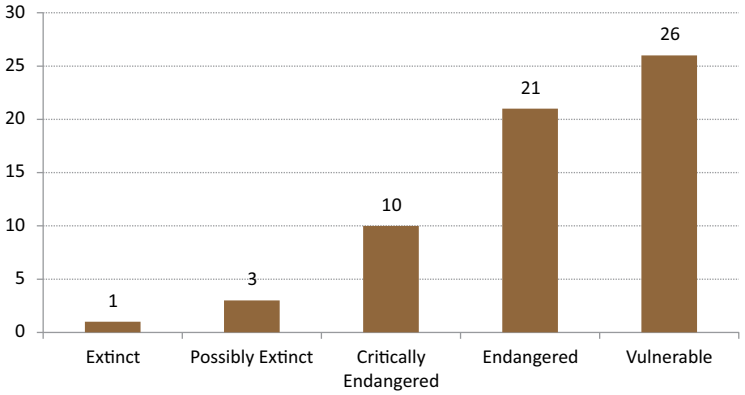
Pressures

Three vegetation types are Endangered in NMBM; the dominant Algoa Sandstone Fynbos, Albany Alluvial Vegetation, and Humansdorp Shale Renosterveld that have only minor extents in NMBM.

Large-scale change started with the establishment of permanent settlements in NMBM in the early 1800s, with Port Elizabeth founded in 1820. This has resulted in 40% of the metro area having been transformed by both urban development and agriculture. Large areas have been transformed by expansion of urban areas, leaving relatively small intact frag-

Summary of the dominant and endemic vegetation types present in the Nelson Mandela Bay Municipality

Vegetation type	Threat status	Total area (ha)	Total area protected (ha)	Percentage protected	Remaining natural area (ha)	Percentage remaining
Algoa Dune Strandveld	Least Threatened	28 154	1 100	4%	22 785	81%
Albany Alluvial Vegetation	Endangered	58 399	3 789	6%	32 495	56%
Coega Bontveld	Least Threatened	24 622	3 186	13%	23 159	94%
Algoa Sandstone Fynbos	Vulnerable	34 097	583	2%	16 898	50%
Humansdorp Shale Renosterveld	Endangered	36 662	0	0%	10 698	29%
Sundays Thicket	Least Threatened	523 565	58 703	11%	494 465	94%



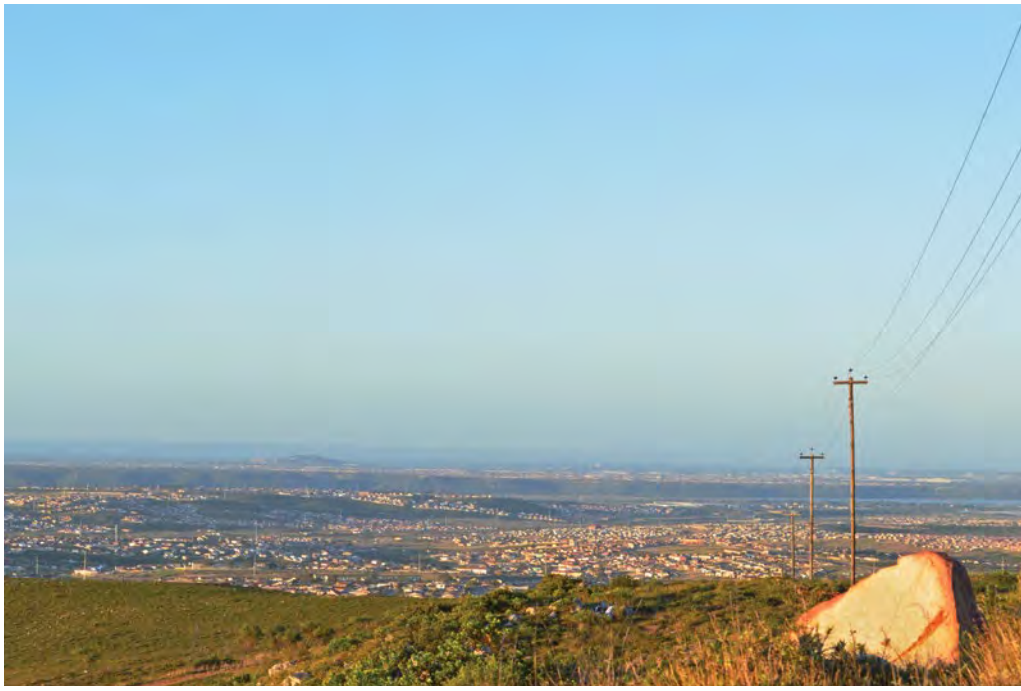
Number of threatened and extinct species according to the various IUCN categories of threat.

ments, especially in the Baakens Valley, a major green corridor in the city. Pastures for dairy farming and other grazing is the largest agricultural threat. The recent development of the deepwater Port of Ngqura and associated Coega Industrial Development Zone has greatly accelerated land transformation in the northern part of NMBM where Sundays Thicket and Coega Bontveld dominate. The situation will only worsen as many heavy industries such as the proposed Mthombo oil refinery and other major smelters go ahead. This has already led to the loss of a number of populations of threatened plant species in the veld, including half of Coega Kop. A shortage of 80 000 housing units in NMBM has resulted in large areas being cleared for mainly low cost housing in the Motherwell and Jachtvlakte area, whereas commercial and residential development in the western suburbs expand into extremely sensitive and endemic rich areas of Algoa Sandstone Fynbos. This includes the Bay West Mall and associated developments being built in the source area of the Baakens River, which contains many wetlands and rocky outcrops.

Invasive alien plants are a major source of degradation in NMBM. The areas most affected include the Algoa Sandstone Fynbos and Algoa Dune Strandveld, as well as riverine corridors across the metro. Prickly pear (*Opuntia ficus-indica*) is widespread in the drier northern areas. Large natural areas are prone to land invasion, resulting in the overgrazing and overburning of the surrounding area, promoting invasion by alien plants. The collection of plants for muthi, and the ornamental plant industry, are additional pressures targeting the variety of succulents, bulbs and even the Uitenhage cycad, *Encephalartos horridus*.

Sadly, recent developments in the city, both legal and illegal, have resulted in the loss of many populations of threatened plant species. The illegal clearing of a site in Forest Hill caused the loss of *Aspalathus recurvispina* (Critically Endangered), and the expansion of the N2 cleared a population of *Syncarpha recurvata* (Endangered). Construction of the Bay West Mall has resulted in the loss of rocky outcrops and their associated *Agathosma gonaquensis* (Critically Endangered) and *Corpuscularia lehmannii* (Critically Endangered) populations. A number of threatened plant species populations have been lost to the Coega Industrial Development Zone and other housing developments.

There are 60 threatened plant species in NMBM, with 10 Critically Endangered and three possibly extinct.



Right, the rapid urban development of Port Elizabeth and surrounds places pressure on the diverse mosaic of vegetation types present in the metro. Photographs Adriaan Grobler.

Conservation interventions

There are a number of nature reserves in NMBM, including a small section of the Addo Elephant National Park. Two new nature reserves are in the process of being declared, namely the Aloes and Van de Kemp's Kloof Nature Reserves. However, these reserves do not adequately represent and conserve biodiversity and ecological processes in the metro. This led to the creation of the NMB Metropolitan Open Space System (NMB MOSS), a conservation network of corridors and fragments stretching across the metro. The NMB MOSS consists of private and public owned land that satisfies the targets for all vegetation types and ecological processes in the metro. This conservation network was originally identified in 2005 but unfortunately, much of this network has already been eroded by developments.

A new programme that aims to conserve biodiversity on privately owned land is the NMB Biodiversity Stewardship Programme (BSP). The BSP identified a number of pilot landowners, particularly in the Van Stadens area. Unfortunately, the BSP has had to be temporarily suspended due to staff and financial constraints. Other private landowners, including the newly established Hopewell Nature Reserve, are part of the Eastern Cape Parks and Tourism Agency (ECPTA) Biodiversity Stewardship Programme, and contribute to the conservation of the Endangered Humansdorp Shale Renosterveld.

In addition to conservation efforts by state departments, local volunteer groups work to protect biodiversity in different areas of NMBM. The Swartkops Conservancy, the Dendrological Society, the Baakens Preservation Trust, the Baakens Valley Community Partnership, the Friends of Van Stadens, Friends of Groendal and the Algoa branch of the Botanical Society of South Africa are all involved in numerous conservation activities, including alien hacks, search and rescues, and the adoption of fragments of Endangered and Critically Endangered vegetation types in the city.

The local CREW group, started in 2006, monitor threatened plant populations. Thus far, they have rediscovered two *Aspalathus species*, *Othonna membranifolia* and *Senecio hirtifolius*, all previously thought extinct. Two other species previously presumed to be extinct, *Lobelia zwartkopensis* and *Albuca nana,* have been found by local experts associated with CREW. However, there are still a number of species known only from historical collections that need to be searched for. The high levels of habitat transformation in the metro means that there is an urgency to track down these species, in particular *Selago polycephala* and *Senecio serrurioides*, to ensure they are not lost for good.

Left, the development of Coega Industrial Development Zone and the urbanisation associated with this development has greatly accelerated land transformation in the northern part of NMBM where Sundays Thicket and Coega Bontveld dominate, causing many endemic species to become highly threatened. Photographs Adriaan Grobler

Cyclopia pubescens, Critically Endangered

A previously widespread species endemic to NMBM, it grows in seeps and wetlands in grassy Algoa Sandstone Fynbos. Having already lost over 80% of its habitat, 11 remaining subpopulations continue to decline due to overgrazing, alien plant invasion, transformation of habitat and too frequent fires.

Adriaan Grobler

Corpuscularia lehmannii, Critically Endangered

This species is associated with quartzitic outcrops and ridges that occur in the Baakens River Valley, and is endemic to NMBM. Many of these rocky outcrops have been lost due to urban development, but it remains relatively widespread in inaccessible areas.

Adriaan Grobler

Lobelia zwartkopensis, Critically Endangered

This small ephemeral was only known from two collections in the 1800s, but a collection by the local CREW group has recently been provisionally identified as this species. It is limited to seasonal wetlands and riverbanks.

Wesley Berrington

Rapanea gilliana, Endangered

This dwarf tree is limited to the Coastal Thicket Fynbos mosaic between St Francis and Port Alfred. Fifteen small, severely fragmented populations continue to decline due to coastal development, alien plant invasion and industrial development at Coega.

Adriaan Grobler

Cotyledon adscendens, Critically Endangered

Historically only found in Algoa Dune Strandveld between the Sundays and Baakens Rivers, large areas have been transformed for residential and industrial development resulting in only three populations remaining.

Ismail Ebrahim

Orthopterum coegana, Critically Endangered

One of two *Orthopterum* species, this one occurs only on Coega Kop, a sandstone inselberg, half of which has been quarried for the Port of Ngqura.

Adriaan Grobler

City of Cape Town

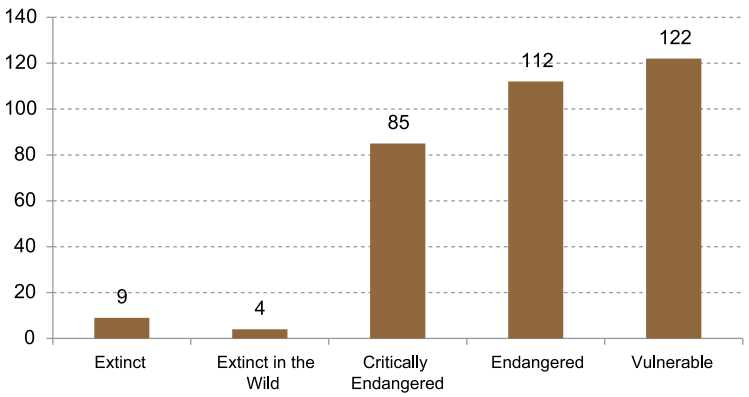
The City of Cape Town is situated in the southwestern-most portion of the Cape Floristic Region (CFR) and is considered a global urban hotspot of biodiversity. It occupies 2 460 km², extending from Silverstroomstrand in the northwest to Kogelbaai in the southeast. The city comprises four separate landscapes. In the centre lies the sandy Cape Flats, bordered on the western and southern coastal edges by the dune-dominated strandveld. Inland on the flats are the low shale and granite hills, which historically were converted to farmland, chiefly wheat in drier, low-altitude areas, and vineyards on wetter slopes. In the southwest and the east are the sandstone mountains of the Table Mountain chain and the Hottentots Holland and Kogelberg ranges, respectively.

Several vegetation types occur within the city. These can be subdivided into 12 fynbos, five renosterveld, one strandveld, and one forest type. The most widespread vegetation types historically were Cape Flats Sand Fynbos (22%), Swartland Shale Renosterveld (19%), Cape Flats Dune Strandveld (16%) and Atlantis Sand Fynbos. Eleven city vegetation types are nationally classified as Critically Endangered ecosystems, with eight of these having too little natural vegetation remaining to meet the national biodiversity targets. Three city vegetation types are Endangered and four are Vulnerable. Six vegetation types are endemic to the city, of which currently three are Critically Endangered and three are Endangered. Renosterveld vegetation types, being on more fertile soils, are highly transformed, ranging from 74 to 100%, but the Lourensford Alluvium Fynbos is the most transformed due to high urbanisationwithin this area.

The city harbours a huge number of native plant species for its small area. Over 3 250 species occur within the metro boundaries and some 2 285 species are documented from the Cape Peninsula. Endemicity in the region, typical of fynbos, is also very high. The Cape Peninsula alone has 194 near-endemic species of which nine are confined to Granite Fynbos, 16 to Sand Fynbos, and 140 to Sandstone Fynbos. Of the 1 736 IUCN Red Listed threatened species (Critically Endangered, Endangered and Vulnerable) in the CFR, 319 (18%) occur in the city. Thirteen species are extinct in the wild, 85 species are Critically Endangered, 112 Endangered and 122 Vulnerable. A further 67 are classified as Near Threatened. The vegetation type with the most threatened and Near Threatened plant species is Cape Flats Sand Fynbos which has four extinct species among its total of 108 species. Fortunately, three of these survive in cultivation and are being reintroduced into apparently suitable habitats. With 450 threatened and Near Threatened plant species, the Mother City is arguably in a league of its own and has an incredible responsibility to ensure that the rich heritage is preserved for future generations.

Pressures

Habitat transformation for agriculture and urban development is the primary cause of Cape Town's high tally of threatened plants. Invasive alien vegetation, altered hydrology, pollution and mining are further prominent threats to the integrity of natural ecosystems. Historically the city itself was confined to Table Bay on the north side of Table Mountain—known as the City Bowl. Expansion began at the turn of the 20th century along the two major routes out of the city, with another node at Somerset West, accelerating after World War I. However, it was only from the 1960s, under Apartheid planning, that the sandy and often seasonally waterlogged Cape Flats was developed, a process that escalated rapidly from the late 1980s to cover much of the Cape Flats. Today some 3.8 million people (70% of the population in the Western Cape Province) are resident in Cape Town.



Number of threatened species in the various IUCN categories of threat.

Conservation interventions

Biodiversity planning is an important tool both for prioritising the most important areas to conserve and to direct new developments to appropriate areas. Biodiversity planning has improved over the decades, both through access to better site and species datasets, and iterative computer-based planning techniques. The current fine-scale, systematic biodiversity plan—known as the Biodiversity Network—makes use of the Protea Atlas and Threatened Species datasets and is aligned to national vegetation conservation targets. This spatial biodiversity plan is a key informant in the Cape Town Spatial Development Framework. It directs future development of the city, is a key reference in the Environmental Impact Assessment process, and plays a critical role in directing new developments to less sensitive areas.

City officials work with conservation partners to increase the area of critical biodiversity habitat in formal conservation. Currently the 16 local authority-managed reserves are being proclaimed under the Protected Areas Act, to secure these areas in perpetuity. Conservation of priority biodiversity land in public ownership is being explored, and in addition, private landowners are being approached for Conservation Stewardship. One of the most important new interventions is the Dassenberg Coastal Catchment Partnership (DCCP). This corridor spans different vegetation types at the northern boundary of the city near Atlantis and is highlighted as a priority in CapeNature's Provincial Protected Area Expansion Strategy. The area has been identified as one of the two most important climate change adaptation corridors in the Western Cape in a study conducted by the World Wide Fund for Nature's (WWF) Table Mountain Fund. The main objectives of DCCP are to protect the critical ecological infrastructure of the Witzands Aquifer, to deliver socio-economic opportunities, to ensure the protection of the climate change adaptation corridor, and to protect and promote the incredible natural and cultural heritage of the area.

Text by Tony Rebelo and Patricia Holmes

Above, urban development on the Capes Flat has led to the highest number of plant extinctions of any city in the world. Photograph Rupert Koopman.

Summary of the dominant and endemic vegetation types present in the City of Cape Town

Vegetation types (* = endemic to City of Cape Town)	Threat status	Historic extent (ha)	Protected extent (ha)	Percentage protected	Current extent (ha)	Percentage remaining
Atlantis Sand Fynbos	Critically Endangered	25 177.30	236.10	0.94	15 475.05	61.46
Cape Flats Dune Strandveld*—False Bay subtype	Endangered	27 823.37	2 736.77	9.84	7 762.95	27.90
Cape Flats Dune Strandveld*—West Coast subtype	Endangered	12 734.27	2 669.23	20.96	10 447.66	82.04
Cape Flats Sand Fynbos*	Critically Endangered	54 334.76	937.61	1.73	7 888.65	14.52
Lourensford Alluvium Fynbos*	Critically Endangered	3 585.27	8.85	0.25	303.19	8.46
Peninsula Granite Fynbos*—North subtype	Critically Endangered	2 070.10	982.16	47.45	1 438.91	69.51
Peninsula Granite Fynbos*—South subtype	Critically Endangered	7 157.69	1 727.46	24.13	2 421.94	33.84
Peninsula Sandstone Fynbos*	Endangered	21 935.69	17 516.66	79.85	20 975.66	95.62
Peninsula Shale Renosterveld*	Critically Endangered	2 384.27	238.92	10.02	292.85	12.28
Swartland Shale Renosterveld	Critically Endangered	47 315.84	530.27	1.12	3 924.24	8.29

Lost

Leucadendron grandiflorum, Extinct

The Wynberg conebush was last seen alive in 1806 in Clapham (London) growing in the garden of George Hibbert. No records exist of its ecology, habitat, extent or time of demise, other than that it used to occur on Wynberg Mountain. The area was the location of some of the earliest colonial farms. Because of the scientific feud between Robert Brown and Richard Salisbury at the turn of the 19th century, Salisbury's description was incorrectly synonymised and its existence neglected until Ion Williams revised the genus in 1972. This must be our earliest documented extinction in South Africa, perhaps attributable to our Mediterranean love of wine.

Lost in the wild

Erica turgida, Extinct in the Wild

In an era when expenses may be measured globally by the cost of a hamburger, it is useful to know that the last wild locality for the Kenilworth heath is now a fast food outlet at Kenilworth. Formerly found on the Cape Flats from Rondebosch to Kenilworth and the Royal Cape Golf Course around Wynberg. All known sites are now under urban development. The last documented collection was by Elsie Esterhuysen, who collected it from Kenilworth in 1970. Fortunately, plants of this species were subsequently found growing at the Belvedere Palace Gardens in Vienna. Their offspring have been repatriated to South Africa and it is currently being propagated and replanted in suitable habitat at Tokai Park, Rondevlei and Kenilworth Racecourse conservation areas.

Ross Turner

On the brink

Watsonia humilis, Critically Endangered

Formerly widespread (Extent of Occurrence 3 954 km^2), occurring in the Breede River Valley between Tulbagh and Worcester, and the lowlands between Malmesbury, Franschhoek, Retreat and Gordons Bay. Only two subpopulations remain (Extent of Occurrence 93 km^2, Area of Occupancy <1 km^2), one at Gordon's Bay and a second one more than 80 km away. This species is declining due to habitat loss to urban expansion, infrastructure development and agricultural expansion. There is ongoing habitat degradation, for example, the Gordon's Bay population was illegally bulldozed in 2011. There is also competition from alien invasive plants at both of the remaining populations.

Colin Paterson-Jones

Leucadendron argenteum, Endangered

Known from eight subpopulations over an 11 km long range, and a few outliers off the Peninsula, this species occurs on the wet Shale and Granite Fynbos from Lions Head to Devils Peak, Kirstenbosch and Hout Bay, perhaps originally as far south as Muizenberg. The suburbs Witteboom and Silverhurst are named after the species. This species' habitat has been fragmented and decimated by pine and gum plantations, urbanisation, fire protection and the historic planting of vineyards. Thousands of silver trees were planted per year in the 1900s by the Cape Town City Parks and Forest Branch with no attempt to ensure genetic purity. It is prone to *Phytophthora* root-rot fungus which kills 1–5% of the population each year. Seed longevity is known to exceed 60 years, but regeneration requires fire. With the removal of plantations and re-establishment of natural fire regimes on the lower eastern slopes of Table Mountain, this species may yet retain at least part of its former glory.

Colin Paterson-Jones

Moraea aristata, Critically Endangered

This species is as close as one can come to an icon for the state of our urban flora. From once being common from the City Bowl to Rondebosch in Peninsula Shale Renosterveld, it is now confined to a remnant of 20–50 plants in an area of less than 50 m^2 in the gardens of the South African Astronomical Observatory. At one time down to five plants, the limited number of individuals and low genetic diversity, poor seed production and disturbed site renders the population non-viable. Flowering is erratic and seed set is very low. Although so rare, it is still only number 21 in the ranking of top Peninsula plant and animal species needing urgent monitoring. It responds well in cultivation, but technically it should be classified as Extinct in the Wild. There is arguably no natural habitat left into which it could be reintroduced

Colin Paterson-Jones

Gladiolus aureus, Critically Endangered

Gladiolus aureus was first collected near Kommetjie in 1894. It has always been known from a small area of less than <10 km^2 from the mountain slope above the village. Recorded as having been locally common before 1980, monitoring between 1980 and 2005 recorded an 85% decline in the population due to quarrying, groundwater extraction, alien plant invasion, flower picking and seed harvesting. Fewer than 10 plants remain at one location, which is close to a low income housing settlement. Decline due to alien plant invasion, human trampling and pollution is ongoing. Plants are able to grow in cultivation, however, numerous attempts to reintroduce individuals to the wild population have failed.

Colin Paterson-Jones

Opposite, urban and infrastructure development threats to the flora of the Cape Flats. Photographs, left top and bottom, Rupert Koopman; right top, Adam Harrower; right below, Colin Paterson-Jones.

Eastern Escarpment

The Eastern Escarpment of the Limpopo and Mpumalanga provinces, sometimes termed the Northern Drakensberg, comprises a series of mountain ranges stretching from the Wolkberg in the north, to the Barberton Mountains on the Swaziland border in the south. It is a region dominated by rocky peaks and ridges reaching 2 330 m and rolling montane grasslands bisected by forested ravines and valleys. While the Eastern Escarpment is dominated by three major vegetation types, it also encompasses two important centres of endemism, the Wolkberg Centre and the Barberton Centre. Much of the endemism is associated with the three major geological formations that occur along the Escarpment: the Barberton Greenstones (including schists, shales, intrusive granites and the endemic-rich serpentines), the dolomite outcrops along much of the Escarpment, and the nutrient-poor quartzites which form the eastern spine of the Escarpment. These three geological types support the majority of the region's endemics which, in turn, when affected by the numerous threats facing the region, give rise to the bulk of the Escarpment's threatened plants.

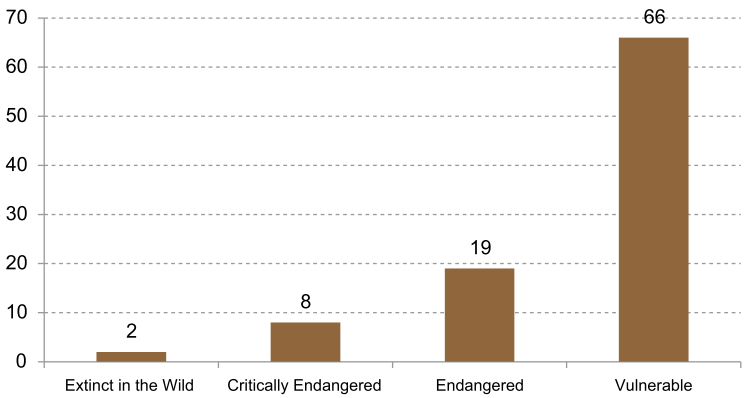
Pressures

The Eastern Escarpment receives a high rainfall of up to 2 000 mm per annum. Besides it therefore being the source of water for the northeastern regions of South Africa, the high rainfall has attracted extensive forestry plantations, agriculture and alien plant invasion. It is also a region that is well populated and, as a result, the vegetation is under additional pressure from medicinal plant collection and human settlement. Mining for coal and gold, as well as quarrying for monument stone, pose rapidly increasing threats to the Escarpment. The extensive wetlands of the Dullstroom/Steenkampsberg region are frequently converted to trout dams for popular holiday properties. Almost 50% of the Barberton Montane Grasslands have been transformed, mainly by pine plantations, while the eastern slopes of the Escarpment in the Sabie/Graskop districts (mostly Lydenburg Montane Grassland) represent some the most densely afforested land in the country.

Foremost among the most highly threatened plants of the Eastern Escarpment are the cycads. The region supports—or supported—eight species of *Encephalartos*, two of which are now Extinct in the Wild, four are Critically Endangered and two are Vulnerable. The almost uninterrupted pillaging of the region's cycads has never seriously been slowed down, so that they now represent the Escarpment's most endangered genus of plants.

Summary of main vegetation types and their status on the Eastern Escarpment

Vegetation type	Total area (ha)	Total area protected (ha)	Percentage protected	Remaining natural area (ha)	Percentage remaining
Northern Escarpment Quartzite Sourveld	136 528	34 175	25	87 587	64
Lydenburg Montane Grassland	492 128	17 364	4	387 335	79
Barberton Montane Grassland	131 700	38 904	30	74 063	56



The number of threatened species occurring on the Eastern Escarpment.

Conservation interventions

Of the three main vegetation types that make up the Eastern Escarpment, 11.9% of their combined area is protected in some way, mainly by way of the Wolkberg/Serala Wilderness Area in the north, and the Blyde River Canyon National Park north of Graskop. Smaller but significant areas are conserved in the Barberton Mountainlands Nature Reserve, Verlorenvallei Nature Reserve, Mount Anderson Nature Reserve, as well as several pockets of state land scattered along the escarpment administered by the Mpumalanga Tourism and Parks Agency (MTPA).

Prior to 1994, the conservation of the Eastern Escarpment fell under the Division of Nature Conservation of the Transvaal Provincial Administration whose main focus was on *ad hoc* species conservation in the form of monitoring and protection of mainly cycads and succulents (*Euphorbia* species, stapeliads and *Aloe* species). Post-1994, with the formation of the Limpopo and Mpumalanga provinces, the region was split between two conservation agencies. The bulk of the area fell under the MTPA, which was fortunate to have the services of botanist-ecologist Mervyn Lötter who, with the assistance of Tony Ferrar, developed the detailed Mpumalanga Biodiversity Conservation Plan (MBCP). The Conservation Plan identified the remaining untransformed areas of the province and prioritised these areas based upon their biodiversity importance and their sensitivity to degradation. From a floral perspective, much of the Conservation Plan was based on the simultaneous explosion of data regarding all the rare and threatened plants of the region made possible by the untiring work of SANBI's Threatened Species Programme, as well as the MTPA's Flora Section. The MBCP has now passed into provincial law and it therefore provides a powerful legal tool with which to proactively protect the rare plants of the region. The conservation authorities in Limpopo Province are in the process of developing a similar conservation plan.

Two additional initiatives are also having a significant positive effect on habitat and species conservation. MTPA's Stewardship Programme, led by Brian Morris which facilitates the conservation of private land under various legal agreements, has begun yielding results. First was the proclamation of the Buffelskloof Private Nature Reserve in the Lydenburg district as a provincial nature reserve. This is being followed up by extensive Stewardship Agreements being drawn up with landowners in the Wakkerstroom district to protect their species-rich grasslands.

In recent years the CREW Programme has been extended, with the participation of Mpumalanga's Plant Specialist Group, into Mpumalanga and, with the enthusiasm of a small private group of residents, into the Wolkberg/Haenertsburg area of Limpopo Province. The CREW activities target threatened or data-deficient plant taxa and motivate the monitoring of these plants in known localities or focused surveys in poorly-explored areas.

Text and images by John Burrows

Top, forestry plantations are the primary cause of habitat loss to grasslands of the Eastern Escarpment—pines occupy the site where formerly the threatened species *Helichrysum lesliei* occurred. Photograph John Burrows. Above, the grasslands in the Lydenburg district, photograph Domitilla Raimondo.

Gladiolus pavonia, Critically Endangered

This striking pink gladiolus was discovered on the Abel Erasmus Pass in 1987 and first described in 1996. It is confined to rocky hillsides on dolomites in what was once mixed deciduous woodland, but which now has been severely degraded by wood-cutting and overgrazing by cattle and goats. It is known only from a single locality where it is sporadic, perhaps totalling 300–400 plants. Recent efforts to gather seed of this species for preservation by the Millenium Seed Bank have been made difficult by the frequent destruction of tagged seed plants by livestock.

John Burrows

Leucospermum saxosum, Endangered

This northernmost member of the genus *Leucospermum* was first described from the Chimanimani Mountains of eastern Zimbabwe. A later discovery of the species on the quartzites of the Eastern Escarpment of South Africa in four localities totalled less than 250 plants. Because of the latter's distance (>500 km) from the Zimbabwean locality, this population is genetically important to conserve. Commercial pine plantations, as well as alien plant invasions, pose the greatest threat to this striking species.

John Burrows

Helichrysum lesliei, Endangered

A species known with certainty from only two localities, about 25 km apart, and comprising an estimated 1 000 plants. Its habitat of rocky ridges on the escarpment summit at ±2 000 m a.s.l. has been severely transformed by pine plantations. In addition, the threat of alien plants and too frequent burning dictated by forestry company policy, continue to place pressure on these two remaining populations.

John Burrows

Aloe craibii, Critically Endangered

This recently described aloe occurs on wind-swept rocky ridges on the Barberton Mountains, in montane grassland usually on chert and sandstone. It is known from 4–5 localities, totalling perhaps 250 individuals. Many of the ridges in its area of occupancy have been planted up with pine plantations and the frequent burning by the forestry industry suppresses seedling recruitment which, in conjunction with alien plant encroachment, is resulting in a steady decline in its numbers. It frequently occurs in association with *Aloe albida* (Near Threatened) and *A. chortolirioides* var. *chortolirioides* (Vulnerable).

Delia Oosthuizen

Ledebouria galpinii, Endangered

This distinctive little ledebouria occupies an area of less than 5 km² and has the small village of Kaapsehoop situated in the centre of its only known locality. Apart from the historical destruction of its limited habitat by the village, a new road and adjacent afforestation, its remaining area is threatened by the grazing and trampling of the numerous Kaapsehoop wild horses, as well as the encroachment of alien plants.

John Burrows

Erica subverticillaris, Vulnerable

This diminutive erica is known from five restricted sites between Mount Anderson and Mokubulaan Mountain on the Long Tom Pass Range where it grows only in rocky grassland on wind-swept ridges, many of which have been afforested with pine plantations. Additional potential threats include alien plants and frequent burning. It invariably co-occurs with *Erica atherstonei* (Near Threatened).

John Burrows

Eastern Escarpment Grasslands, photographs left and bottom, right bottom, Lize von Staden and right top John Burrows.

Pondoland Centre of Plant Endemism

The Pondoland Centre of Plant Endemism (PCE) extends from Port St Johns on the Eastern Cape Wild Coast to the Mzimkulu River at Port Shepstone in Kwa-Zulu Natal. It is one of the principal centres of plant diversity and endemism in southern Africa and forms part of the Maputaland-Pondoland-Albany Hotspot, one of only 34 recognised areas of conservation significance in the world. The plant diversity is largely the result of the geology, the underlying Msikaba sandstone formation, that has shaped the Wild Coast's distinctive rolling hills separated by precipitous gorges. The soils of the Pondoland Centre are sandy and light as well as high in aluminium. Leached by the relatively high rainfall, these low nutrient level soils created unique conditions (along with temperature, hours of daylight and moisture levels) for the evolution of a diverse group of specialised plants, encouraging high levels of plant endemism.

The main vegetation types in this area are the Pondoland-Ugu Sandstone Coastal Sourveld and Scarp Forest. The PCE is relatively small (approximately 180 000 ha) but there are approximately 80 plants endemic to this area.

Pressures

Although changed environmental conditions can have a negative impact on the intrinsic ability of these specialised plants to thrive, the plants face far greater threats to their survival from extrinsic sources. The lower south coast of KwaZulu-Natal is dotted with small villages and most of the Pondoland Centre within KwaZulu-Natal has been lost to development. In addition, agriculture has overtaken vast areas of grassland.

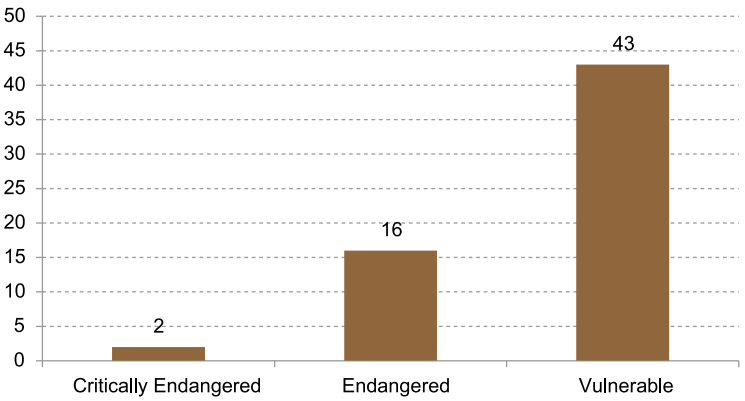
There is little formal development in the Eastern Cape portion of the PCE but this area is heavily used and there is pressure from livestock grazing, too frequent burns and unsustainable collection of plant material for medicinal purposes. Although most of the human population is concentrated away from the coastline, the construction of illegal holiday cottages on the coast puts pressure on natural resources. There is presently concern about the potential impact of a planned major highway (with some of the longest bridges in the southern hemisphere) from East London to Bizana. Because of the wealth of heavy minerals in the area, there is also the very real future threat of dune mining between the Msikaba and Mtentu rivers, a core area of the PCE. If the highway and mining projects proceed, the forests and grasslands face increasing commercial exploitation with the promise of short-term wealth for poor rural communities. Currently 61 plant species in Pondoland are threatened with extinction.

Conservation interventions

Apart from the work of early explorers such as Drège and Bachmann, more recent knowledge of the plants of Pondoland resulted from exploration of the area by Rudolf Strey, then curator of the Natal Herbarium, and Hugh

Summary of the main vegetation types in the Pondoland Centre of Plant Endemism

Vegetation type	Threat status	Total area (ha)	Total area protected (ha)	Percentage protected	Remaining natural area (ha)	Percentage remaining
Pondoland-Ugu Sandstone Coastal Sourveld	Least Threatened	130 352	8 803	6.75	85 430	65.54
Scarp Forest	Least Threatened	86 718	18 137	20.92	61 501	70.92



Number of threatened species in the various IUCN categories of threat.

Nicholson, forester and conservationist, who established the Skyline Arboretum in Uvongo upon his retirement in 1962. Strey and Nicholson travelled extensively throughout the area collecting and documenting plants, laying the foundation for the description of the PCE. The plants of the PCE are protected in three formal reserves: the Umtamvuna Nature Reserve near Port Edward; the Mkambati Game Reserve between the gorges of the Mtentu and Msikaba rivers on the Wild Coast, comprising nearly 6 000 ha of grasslands sloping down to the Indian Ocean with dramatic gorges and waterfalls cascading from the cliffs into the sea; and the Oribi Gorge Nature Reserve in the Mzimkulwana River Valley, a smaller inland reserve of some 1 800 ha of mostly gorge and forest, with different species because of lower rainfall.

The Umtamvuna Nature Reserve is a botanical paradise with approximately 1 500 flowering plants. Awareness of this special area is largely due to the efforts of amateur botanists, Hugh Nicholson and Tony Abbott, after whom the herbarium at the reserve is named. The involvement of Braam van Wyk, Professor of Botany at the University of Pretoria, stimulated the collection of plant material in the reserve and resulted in the description of many new species (with many still pending). The Thursday walks initiated by Hugh Nicholson in the 1960s continue to this day, now led by Tony Abbott whose dedicated mentoring is encouraging another generation of enthusiastic amateur botanists. This group has become the CREW Pondoland team, who continue to monitor vulnerable and special species in the forests and threatened coastal grasslands. Most of the work of the Nicholson Botanical Group takes place within the KwaZulu-Natal area of Pondoland. The group actively support conservation stewardship work, and their efforts have resulted in the core site near Port Edward, Red Desert, being declared a Nature Reserve.

In the largely pristine section of Pondoland which falls within the Eastern Cape, there is still a dearth of knowledge on the distribution of species in this area. Due to the potential future threats of the N2 highway project and possible mining, it is vital that the biodiversity in this area is documented accurately to guide sustainable development. The CREW Programme has initiated a project to engage communities to conduct this biodiversity monitoring. Young individuals from the four villages in the Amadiba district—Sigidi, Baleni, Gobodweni and Mtentu—are being employed as part of the Groen Sebenza Programme, a national initiative funded by the Development Bank of South Africa, to build skills in conservation. The Groen Sebenza interns are collecting plant and animal specimens from the Pondoland region that will be identified by taxonomists across South Africa and included in SANBI's species status database to ensure that distribution information on important taxa can be provided to decision makers. The Groen Sebenza interns are being supervised by Sinegugu Zukulu, a Pondo who is a passionate conservationist and whose mission it is to build awareness of the unique biodiversity of the Pondoland region amongst South Africans and in particular his people, the AmaPondo. An additional threat to the biodiversity of the Eastern Cape portion of Pondoland is overharvesting of medicinal plants. Sinegugu Zukulu and his team are working with herbalists to document medicinal plants important to the AmaPondo culture and they will monitor harvesting activity particularly by muthi collectors, who are typically not residents of the area, in the four regions where this project is being implemented.

Text by Tony Abbott, Kate Grieve and Domitilla Raimondo

Top, Pondoland, home to the Amapondo people. Above, young Pondos are employed as para-ecologists to monitor the rich biodiversity of the region, photograph Domitilla Raimondo.

Eriosema umtamvunense, Vulnerable

This long-lived suffrutescent grassland forb is locally common but has a very restricted distribution. Its natural habitat is Pondoland coastal grassland. The population trend is decreasing because of the very real threat of habitat loss to coastal development, subsistence agriculture and too frequent fires.

Tony Abbott

Watsonia pondoensis, Endangered

This species is considered extremely rare and is known from only two populations. Growing in standing water of permanent vleis, it is restricted to a specialised habitat. Outside the Umtamvuna Nature Reserve, the population is decreasing because of decline in habitat quality due to livestock overgrazing, too frequent fires and crop cultivation.

Tony Abbott

Cineraria dryogeton, Vulnerable

Known from only one location in the Umtamvuna Nature Reserve, this species is a rare, narrow endemic. It can be found in grassland near forest margins and waterfalls on forest margins. Coastal grasslands and forests are being transformed extensively and plants outside the reserve are threatened by habitat degradation.

Tony Abbott

Crassula streyi, Rare

This charismatic species was named after Rudolf Strey, curator of the Natal Herbarium. Known from less than five sites, it is restricted to a specific and inaccessible habitat on sandstone cliffs in scarp forest. Although it is potentially threatened by collectors, it is protected in reserves and by its inaccessible habitat.

Tony Abbott

Lydenburgia abbottii, Endangered

Considered one of the rarest trees in South Africa, this species is known only from two river gorges less than 10 km apart. It is named after amateur botanist and PCE specialist Tony Abbott, who discovered it in the Umtamvuna Nature Reserve. It is protected by its inaccessible habitat—scarp forest in deep river gorges.

Tony Abbott

Colubrina nicholsonii, Vulnerable

There is a total population of less than 200 mature individuals of this species, named after Hugh Nicholson, amateur botanist and conservationist. The trees occur in secluded, inaccessible gorges, mainly between Port St Johns and the Umtamvuna Nature Reserve, although there are outliers in the Vernon Crookes Nature Reserve near uMzinto in the north and Kentani (Eastern Cape) in the south. Growing on stream banks deep inside scarp forest, the type of light conditions are also preferred by an aggressive invasive alien species, *Chromalaena odorata*. Poor recruitment is a concern and because the species appears to rely on vegetative reproduction, the population could be devastated by fire.

Graham Grieve

Pondoland, a centre of plant endemism and home to the Amapondo people. Photographs left and right bottom, Sinegugu Zukulu; right top Michael Raimondo.

Mistbelt Grasslands of KwaZulu-Natal

The two areas with mistbelt grasslands in KwaZulu-Natal are the Midlands Mistbelt Grassland and the Northern Zululand Mistbelt Grassland. Both areas are characterised by high summer rainfall and heavy mists, and both are important centres of endemism.

Midlands Mistbelt Grassland stretches in scattered patches along a broad band from Babanango in central KwaZulu-Natal in the north to the Flagstaff area of the Eastern Cape Province in the south. The landscape is hilly and mainly associated with a discontinuous east-facing scarp between 760 and 1 400 m formed by dolerite intrusions. The soils are derived from Ecca Group shale and sandstone and Jurassic dolerites and sills. In its pristine state the grassland is dominated by species-rich, sour *Themeda triandra* (rooigras) veld, interspersed with extensive patches of Eastern Mistbelt Forest. Degraded grasslands are dominated by the unpalatable ngongoni grass, *Aristida junciformis* subsp. *junciformis*. Doleritic rocky outcrops are important refugia in this landscape and are typically rich in species.

Northern Zululand Mistbelt Grassland occurs on the crests and slopes of the Ngome Mountain Range and the Ngoje Mountain surrounding Louwsburg, as well as on some smaller mountainous areas such as Inhlazatshe, between altitudes of 780 and 1 540 m, on hard dolerite dykes, similarly dominated by forb-rich, sour *Themeda triandra* grasslands.

The major differences between the two mistbelt grasslands are their unique suites of endemic plant species and the absence of ngongoni grass in degraded areas of Northern Zululand Mistbelt Grassland.

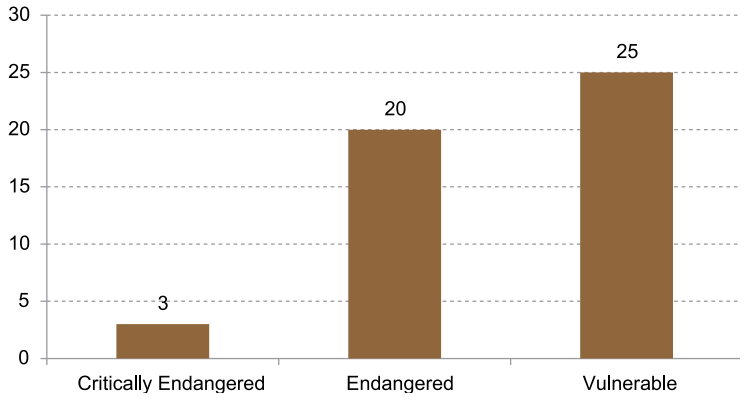
Pressures

Midlands Mistbelt Grassland is one of the most threatened vegetation types in KwaZulu-Natal, with over half the area already transformed. High agricultural potential has led to extensive industrial forestry plantations and cultivation of food crops, which together with high levels of urban and industrial development, especially around Pietermaritzburg, have resulted in high levels of transformation. Lack of fire management, severe overgrazing by livestock, and invasive aliens plants including *Solanum mauritianum*, species of *Rubus*, *Acacia*, *Pinus* and *Eucalyptus* are placing additional pressure on remaining fragments.

Large areas of Northern Zululand Mistbelt Grassland have been transformed for forestry plantations and cultivation of crops, and there is extensive heavy selective grazing and annual burning of the remaining grasslands. *Acacia mearnsii* and *Eucalyptus* species are alien invaders of serious concern in this area.

Summary of the main vegetation types of the KwaZulu-Natal Mistbelt Grasslands

Vegetation type	Threat status	Total original extent (ha)	Total area protected (ha)	Percentage protected	Remaining natural area (ha)	Percentage remaining
Midlands Mistbelt Grassland	**Endangered**	65 766	4 655	0.4	236 590	39
Northern Zululand Mistbelt Grassland	**Vulnerable**	8 896	6 874	1	398 152	57



Number of threatened species in the various IUCN categories of threat.

Forty-eight plant species within the region are threatened with extinction, with three Critically Endangered.

Conservation interventions

Only a small fraction (about 0.5%) of the Midlands Mistbelt Grassland area is statutorily conserved in reserves including Ngeli, Impendle, Blinkwater, Qudeni, Doreen Clark, Karkloof and Queen Elizabeth Park. The KwaZulu-Natal Biodiversity Stewardship Programme has been working with various private landowners in the region since 2006 with the aim of contracting these areas for conservation. Private reserves already proclaimed include Roselands and Gelykwater, while a further eight are under negotiation. Volunteers who work with the CREW Programme have been highly active in identifying sites of botanical significance for biodiversity stewardship in the mistbelt area. The SANBI Grasslands Programme, funded by the Global Environment Fund and involved with grassland biodiversity conservation initiatives since 2008, has been engaging with forestry companies in the KwaZulu-Natal mistbelt region through the Biodiversity Stewardship Programme, and a number of important grasslands are currently in the process of being declared Nature Reserves or Protected Environments.

Approximately 3% of Northern KwaZulu-Natal Mistbelt Grassland is statutorily conserved in the Ithala Game Reserve and Ntendeka Wilderness Area of Ngome State Forest. KwaZulu-Natal Biodiversity Stewardship is actively engaged in securing private land in the area for conservation.

Text and images by Isabel Johnson

Above, the majority of mistbelt grassland habitat converted to forestry plantations.

Asclepias bicuspis, Critically Endangered

Previously known from only one farm southwest of Howick. Prior to 2009, this species was considered one of the most threatened species in South Africa. Extensive surveys of suitable habitat within this species' range in late 2009 and 2010 by CREW volunteers have resulted in an additional two subpopulations being found. All three known populations have fewer than 50 mature individuals and are declining due to livestock overgrazing. The total population is estimated to be fewer than 250 plants.

Isabel Johnson

Satyrium rhodanthum, Critically Endangered

A very rare species that has lost most of its habitat to forestry plantation. Afforestation has led to the demise of the majority of it historically known populations. It is currently known from two small populations within a 20 km² range. One of these populations is threatened by housing development.

Isabel Johnson

Helichrysum citricephalum, Critically Endangered

A highly range-restricted species known from one site with fewer than 200 individuals. Part of the population was destroyed as a result of a road being widened. It is in the midst of a recently established, illegal informal settlement and the population is expected to decline further due to ongoing development and degradation of this site.

Isabel Johnson

Brachystelma ngomense, Endangered

Known from five locations within a restricted range, it has lost 34% of its habitat to afforestation since 1950. Its remaining mistbelt grassland habitat is currently used as communal rangelands and it is so severely overgrazed that a few hardy native species are beginning to dominate, completely transforming the grassland structure. There is also generally very poor fire management.

Isabel Johnson

Bowiea volubilis subsp. *volubilis,* Vulnerable

This subspecies is under severe pressure from medicinal plant harvesting over the majority of its range in South Africa. Provincial authorities estimate a minimum decline of 30% nationally. This decline has taken place over the past 30 years. The estimated decline is based on observed declines at known sites and subpopulations as well as from changes in the sizes of individual bulbs available in the muthi markets.

Isabel Johnson

Selago longiflora, Endangered

A range-restricted species known from one site in the Mpendle region of southern KwaZulu-Natal. Forestry plantations and agriculture are causing ongoing destruction of its habitat.

Isabel Johnson

Opposite, pristine mistbelt grasslands (right and bottom left) occuring between forestry plantations. Opposite top left, overgrazing by livestock also poses a significant threat to mistbelt grasslands.

Inspiring conservation of plants

Bringing change and meaning to people's lives

South Africans are passionate about nature and its diversity. Scattered amongst our vast rainbow nation are hundreds of individuals who care deeply about conserving the unique diversity of plant species present in this country. Many are ordinary citizens with no scientific training who wish to dedicate their personal time to helping conserve plants. Others are professionals employed in conservation or botanical research. These individuals have been united in their efforts to conserve plants through the Custodians of Rare and Endangered Wildflowers (CREW) Programme, which involves volunteers who monitor and help to conserve plants threatened with extinction.

Inspiring conservation of plants (continued)

The Custodians of Rare and Endangered Wildflowers (CREW) was established in 2003 as a three-year pilot project in the Cape Floristic Region with six volunteer groups. Over the past decade, it has expanded into a nationally implemented programme with 20 volunteer groups in four provinces (Western Cape, KwaZulu-Natal, Mpumalanga and Eastern Cape), and has been supported financially and administratively by the South African National Biodiversity Institute (SANBI) and the Botanical Society of South Africa (BotSoc).

The success of the CREW initiative can be measured on many levels—not only in terms of its vast contribution to the conservation of the country's rich heritage of rare and threatened plants—but also in the change it has brought about in communities and in the lives of the many people involved.

"Few projects of this nature have a lifespan longer than five years, so getting to 10 is very impressive. CREW's success is due to the dedication of our network of volunteers who donate their time and resources to monitoring and conserving rare and threatened plants," says Domitilla Raimondo, CREW Programme Manager.

"The network of volunteers in South Africa is astounding," says KwaZulu-Natal CREW Node Manager, Suvarna Parbhoo. "You can call on any volunteer at any time to assist with helping in a partner programme."

The volunteers, many of whom are BotSoc members, work within their communities who live in and around South Africa's rich biodiversity hotspots. As a result, strong partnerships with schoolchildren, young plant enthusiasts and community members have been built. These partnerships have resulted in direct as well as indirect benefits for both the volunteers and the affected communities.

An immediate benefit has been the transfer of knowledge, teaching of life skills, and the broadening of horizons. Over time the interactions with local communities have become more structured and the benefits more tangible—with formal job creation, the development of tourism initiatives, workshops, as well as sustainable farming projects, and climate change and land stewardship programmes being established.

South Africa is the only country in the world with its own plant kingdom and supports three of the world's 25 biodiversity hotspots. One in every four of South Africa's plant species is rare or threatened and for the majority of these species there is no record of how they are faring in the wild. Involving members from local communities in the conservation work, spreading awareness and knowledge about the country's botanical biodiversity and the opportunities this holds for various developmental projects has become crucial to CREW's success.

"CREW aims to equip a network of volunteers from a range of socio-economic backgrounds to monitor and conserve South Africa's plant species. Volunteers are linked with local conservation agencies, and in particular with local land stewardship initiatives, to ensure the conservation of key sites for threatened plant species," explains Raimondo.

CREW has also become instrumental in piloting the employment of young members of rural communities as para-ecologists. Para-ecologists are essentially conservation assistants who receive training and support from scientists to become local experts in biodiversity, and bridge the communication gap between local and scientific communities. Funding for the employment of para-ecologists has come from SANBI's Groen Sebenza project and CREW has appointed ten para-ecologists to this end. This follows after the successful employment of nine other young community members in different regions of the country in the past decade (e.g. see notes on Groen Sebenza interns working in Pondoland).

Involving community members in conservation work is crucial, says Southern Cape CREW volunteer, Di Turner. "We communicate our passion for the plants to them, because in the long term, if the plants are going to survive, the community also has to be passionate about keeping them alive."

Collaboration with all stakeholders is equally important. "In the Southern Cape our interaction with reserve rangers has been one of the most exciting parts of doing CREW work so far," says Turner, explaining that there is a 'give-and-take' of knowledge between rangers and volunteers that is hugely beneficial to the conservation work they do. She says many young people who started out by working with CREW volunteers have gone on to job internships with conservation authorities and that it is especially rewarding to see this happen.

Another fruitful partnership has been with universities. CREW has partnered with tertiary institutions to increase local awareness and further education in local communities. The KwaZulu-Natal CREW Node, for example, entrenched a university project at the University of Zululand, University of KwaZulu-Natal and Durban University of Technology, while in the Cape students from Nelson Mandela Metropolitan University, University of Stellenbosch and Cape Town University of Technology have been exposed to plant conservation work through lectures on Red List assessment methodology and herbarium techniques.

CREW is also closely associated with land stewardship projects, in which private landowners are encouraged to enter into conservation agreements in

CREW volunteers work closely with conservation officials to build skills in plant conservation. Right a volunteer from the Outramps CREW group shares knowledge with CapeNature field rangers in the Southern Cape.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return for various forms of assistance, like help with alien vegetation clearing, firebreaks and land management plans. The land stewardship initiative was started in the Western Cape and was so successful that the model has been implemented countrywide.

Garth Mortimer, conservation services officer with CapeNature, credits CREW with playing an instrumental role in the success of land stewardship. "CREW has been a huge asset to us at CapeNature, especially in the Upper Breede River Valley Project. They helped to negotiate contracts, create awareness, as well as build relationships with landowners."

CREW has not only worked with private landowners to encourage stewardship of highly threatened plants but has also worked with impoverished communities. Working with local communities brings its own unique challenges, says CREW Coordinator, Ismail Ebrahim. "When you are working with communities, many of them impoverished, you have to break down the barriers. There is a lot of history to be dealt with which can be a long process. You end up doing conflict resolution social work which will eventually affect conservation down the line and, although it may not look like typical conservation tasks usually on your work plan, it needs to be done for the plants to be protected."

It is this type of work that has yielded long-term benefits for the communities involved—as well as the plants. One of the best examples of socio-economic change that has been brought about by CREW has been in Mamre in the Western Cape, an area identified as key due to the high concentration of threatened plants. The community here is very poor and battles with unemployment and poverty. While engaging with members of the community, it became clear that there was a need for an information centre and tourism initiatives and CREW liaised with city councillors in creating an information bureau for Mamre, with numerous spin-offs such as a donkey trail, website development, and training of local tourist guides.

Similarly, in Nieuwoudtville in the Northern Cape, a biodiversity project that employs two young members of the community has become a model for other initiatives in the country. "It offers a way for youngsters to get involved in the conservation sector, to learn skills they wouldn't normally gain and become involved in related fields like climate change monitoring and sustainable agriculture," says Ebrahim.

The CREW team in Nieuwoudtville hosts quarterly climate change workshops with small-scale farmers to help them adapt to climate variability. In other parts of the Western Cape, a lot of work is done with cattle farmers, informal flower sellers and landowners to explain sustainable agricultural activities, showing different ways of farming and caring for the land.

"In the end, people are trying to make a living and the social issues overpower the need for conservation. People need to eat. But we need to tell them that, for instance, if you take all the flowers right now, you will only have money for now, there won't be money to be made next year. You need to plan for the future," explains Ebrahim.

Botanical Society Executive Director, Zaitoon Rabaney, says that it is this kind of 'social knitting' that inspires the Society to continue its investment in and partnership with CREW. "It is really exciting for us to be part of a win-win scenario like this where conservation and development go hand-in-hand," she says. "Historically, conservation has often found itself

Building capacity in local communities. Left, ecotourism guide in Mamre, trained by CREW, showcasing the rich biodiversity of his town to visiting tourists.

at loggerheads with local communities because it was seen to come at the cost of development, but CREW is helping to change this, one success at a time. This is a testament to the strength of CREW, its leadership and its volunteers. What always strikes me about these volunteers—citizen scientists—is the passion that they bring to their work. And it is gratifying to see that this commitment is bearing real fruit after a decade of hard work."

Botanist and former CREW Intern, Rupert Koopman, agrees that the organisation has a fantastic work ethic, which is ideal for a young intern. "The team dynamic is very interesting with everyone pulling in the same direction—that is very rare to find. It's like a family, but as everyone shares the same goals and passions, in a way it is better than family."

For many volunteers, just being part of CREW is a deeply rewarding and meaningful experience. As one volunteer with Friends of the Tygerberg

Below, training of students at tertiary institutions in plant conservation is a core part of the work of the CREW Programme.

Hills notes, “Participating in CREW leaves me with the realisation that I am doing something valuable; something that my kids and their kids will benefit from in future.”

CREW continues to grow and spread its good work around the country—it has just opened a new branch in the Eastern Cape. Raimondo says that they are optimistic that, in the decade ahead, they can grow their activities so that CREW can continue to protect plants by involving more and more people across the country as environmental pressures continue to mount and threaten South Africa’s plant diversity.

“We are truly fortunate to have an ever-expanding network of volunteers to help us look after South Africa’s incredible biodiversity,” says Raimondo.

Text by Natasha Arendorf (Rothko PR Marketing Design)

Right, building community engatement with biodiversity conservation is central to the CREW Programme. Work with low income communities takes place in the Northern Cape, Western Cape and throughout the Eastern Cape.

Minding the flora of Mpumalanga

The Mpumalanga Plant Specialist Group has become an invaluable part of the CREW Programme, combining enthusiasm and experience in a committed effort to protect and conserve rare and endangered plants in the province.

The Mpumalanga Plant Specialist Group (PSG) has been involved in botanical work in Mpumalanga for 18 years. Formed in an attempt to encourage plant enthusiasts to learn more about plants, the PSG has always been a very practical, hands-on group whose members are all encouraged—some may say coerced—to participate. PSG's strength lies in scheduled monthly outings and meetings to learn about plants through lectures on plant identification prepared by the members themselves.

When the group was approached by CREW to start focusing their botanical outings on finding threatened species, the PSG was only too happy to include CREW work amongst the array of botanical conservation work they are involved in.

The PSG is very adventurous, enjoying visits to poorly botanised areas of the province. The data they have collected over the past 18 years has been invaluable for planning areas required for conservation. Mpumalanga has the best Conservation Plan in the country and one of the main criteria the plan uses to identify priority areas for biodiversity conservation is the information on where threatened and rare plant species occur. The data collected by PSG has also been used extensively by SANBI's Threatened Species Programme for keeping the Red List status of plants up to date. With the increasing pressure on Mpumalanga's biodiversity from the mining sector, and with the urgency to protect certain areas from the threat of mining, the PSG has recently shifted its focus towards specific botanically rich areas that have prospecting applications pending, or are in need of formal protection from any mining intentions. However, no matter what the focus, the group strives to find a balance between serving a conservation function while similarly visiting areas that are botanically exciting.

"As we celebrate CREW's 10th anniversary and salute the indefatigable CREW leadership team, PSG is happy that we have achieved a balance between our traditional compilation of plant lists for interesting areas and the more focussed search for threatened species requiring further study," says PSG member, Mervyn Lötter. "The whole group basks in the satisfaction of locating a rare plant and it more than makes up for the inevitable times when we return empty-handed. However, CREW serves an outstanding role in the conservation of South Africa's rare plants and we, the PSG, are happy to be a small part of it all."

Text by Natasha Arendorf (Rothko PR Marketing Design)

Still tramping after all of these years

The CREW Outramps group in the Southern Cape has gained something of a reputation over the years—not only for their hard work, but for their sense of adventure and intrepid spirit as well.

The Outramps group is one of the best-known CREW teams—not only because of its members' hard work and intrepid sense of adventure—but also because of its unforgettably unique name. Di Turner, group founder, explains that the name takes a little bit from the 'Out' for the Outeniqua Mountains, as well as their habit of tramping all over the mountains in the Southern Cape.

"It also makes a snide reference to our age," says Turner who fondly remembers the small hiking group that set out to map all the proteas in the Southern Cape as one of the early participants in the Protea Atlas Project. "These were halcyon days of mountains and plants and very good friends. The group won many awards, as Tony Rebelo drove us on to reach greater heights."

She was moved to start a CREW group in 2004 following an inspiring workshop at Potberg. Since then, the group has gone from strength to strength. "We are very hardworking and monitor about 150 sites a year. In 2011, we found 75 Red Listed plants with threatened statuses that were entirely new to us." One of these was the Critically Endangered *Gladiolus fourcadei*.

The Outramps group has been involved in many conservation initiatives in the area, notably in the Gouritz and Garden Route region. The group has a great relationship with local plant experts like Jan and AnneLise Vlok and also interacts closely with SANParks and CapeNature rangers, helping to train interns and sharing vital knowledge. "It is a give and give relationship, they give as do we."

Interacting with local community members and young rangers is one of the highlights of the project for Turner, who says that CREW members enjoy sharing their knowledge and love for rare and endangered plants with especially youngsters starting out in their conservation careers. She says that when these interns then move on to formal positions with conservation bodies, it is incredibly rewarding. Unfortunately, most of the Outramps group members have been getting on in years. The group is now actively seeking younger members to ensure that their important work continues in the Southern Cape. Turner herself has had two knee replacements, has no Achilles tendon in the left leg and a repaired infra-patellar tendon in the right knee. "I walk on crutches, but I still walk! We do get to the top of the mountains. It just takes us a little longer."

This is the spirit and the passion that has been driving the Outramps group for years and makes them such valued members of the CREW family.

Text by Natasha Arendorf (Rothko PR Marketing Design)

Protecting Pondoland

The CREW team in Pondoland is doing vitally important work in one of the world's important biodiversity hotspots.

Pondoland may be a little-known area bordering the Indian Ocean in the Eastern Cape but it is one of the most important biodiversity areas in the country. As part of the Maputaland-Pondoland-Albany hotspot, the area boasts about 1 500 species, and represents a principal centre of endemic plant diversity in southern Africa.

CREW first began work in the area in 2008, making contact with an existing team of enthusiastic amateur botanists with a deep love of, and appreciation for, the unique flora of this region, the Thursday group. The Thursday walks were initiated by Hugh Nicholson in the 1960s and continue to this day, now led by Tony Abbott, whose dedicated mentoring is encouraging another generation of keen amateur botanists.

The team is responsible for several projects, including the monitoring of three grassland patches, the compilation of species lists, monitoring forest patches, and contributing specimens to herbaria throughout the country. They also assist with training para-ecologists from the Eastern Cape section of Pondoland in plant identification and field sampling.

Pondoland CREW member Kate Grieve explains, "In the largely pristine section of Pondoland in the Eastern Cape, there is still a dearth of knowledge on the distribution of species in this area. Due to the potential future threats of the N2 highway project and possible mining, it is vital that the biodiversity in this area is documented accurately to guide sustainable development." She says the CREW Programme has also initiated the para-ecologist project to engage communities to conduct biodiversity monitoring. An additional threat to the biodiversity of the Eastern Cape portion of Pondoland is the overharvesting of medicinal plants. Under the leadership of Sinegugu Zukulu, the para-ecologists are working with herbalists to document medicinal plants important to the AmaPondo culture and the impact of muthi collectors.

Other important work done by CREW in this area includes the photographic documentation and capturing into a digital database approximately 13 000 plant specimens from KwaZulu-Natal housed in the Umtamvuna Nature Reserve herbarium. They are also producing a quick guide to the special plants of the Umtamvuna Nature Reserve and a photographic resource on endemic species.

The work of this CREW group is particularly important, as the lower south coast of KwaZulu-Natal is an area heavily developed by agriculture, silviculture and urban sprawl. Regular surveys and monitoring of the environment is necessary to ensure the survival of threatened plants.

Although their work is challenging and there seems hardly enough time to get everything done, Grieve says the commitment of the Pondoland CREW team ensures that they do get to the range of conservation work that needs to be done.

Text by Natasha Arendorf (Rothko PR Marketing Design)

No project too big or too small

The Friends of the Tygerberg Hills CREW team may have started out as a small group of amateur botany enthusiasts, but over the years they have become a force to be reckoned with.

One of Cape Town's hardest working CREW teams is the Friends of the Tygerberg Hills (FOTH). Since 2003, this group has worked tirelessly to protect and conserve rare and endangered plants in the highly threatened fynbos environment in and around the City of Cape Town.

They initially started in the Tygerberg Hills, doing sampling and finding threatened plant populations. Over the years, they have become proficient in plant identification and became involved in a range of conservation activities across the city.

Hedi Stummer proudly reveals how the FOTH have developed sampling practises that have been adopted by other CREW groups—such as that sampling has to be done regularly and that the same sites have to be visited frequently both in peak and off-peak seasons.

"Our range quickly expanded from the Tygerberg Hills and over the past few years we have been focusing on Joostenberg, the West Coast, Paarl and Stellenbosch," explains Stummer. The group has become an important ally for the City of Cape Town's Nature Conservation division, helping with biodiversity assessments and surveying new areas for Stewardship Programmes.

A specific case study that FOTH is closely involved in is the Dassenberg Coastal Corridor Partnership (DCCP), a corridor of highly threatened natural vegetation, which borders the Atlantis, Mamre, Pella, Riverlands and Chatsworth communities. This region has been identified as one of the two most important climate change adaption corridors in the Western Cape by a Table Mountain Fund-WWF study and is one of the highest priority conservation areas in the country. The area has extremely high levels of biodiversity and endemic plants and it is estimated that more than 200 threatened plant species occur here.

This DCCP conservation initiative aims to look at the protection and consolidation of the incredible natural heritage in the region while maximising associated social and economic opportunities. The concept strives for a balanced approach as the success of the initiative is dependent on unlocking social and economic opportunities while focussing on a more inclusive, people and community orientated approach.

"Through our long-standing partnership with the City of Cape Town, the FOTH was invited to assist with the implementation of the Dassenberg Coastal Corridor Partnership. This has entailed visiting properties identified for stewardship and conducting surveys," says Stummer who adds that the group feels honoured to contribute to this important project.

Over the years, the FOTH has become deeply involved with various conservation efforts in and around the city. No project is too big or too small. From saving a piece of veld designated to become a car park at a school, to larger initiatives like the DCCP.

"Even though our primary focus is on the actual vegetation, it feels good when we contribute to local communities and are able to teach children and adults about biodiversity and conservation," says Stummer.

Text by Natasha Arendorf (Rothko PR Marketing Design)


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Breaking the mould: from shopkeeper to conservationist and passionate about plants

If CREW Coordinator Ismail Ebrahim's family had their way, he would have been a shopkeeper just like his father.

Ismail Ebrahim (36) has been a member of CREW since its early beginnings as a small fynbos project in the Western Cape. As the organisation has grown, he has also grown with it, bringing his passion for rare and endangered plants as well as his administrative acumen to help coordinate various CREW projects in the Western Cape and around the country.

However, the road that led Ebrahim to CREW was rather long and winding and if it were up to his parents, he would have gone into the family's shopkeeping business instead. Ebrahim remembers that there was little time for hiking or nature excursions during his childhood on the Cape Flats. "My father encouraged me to study but I wasn't really that keen. Eventually I decided to study horticulture with the idea of establishing a nursery-type business on a smallholding that we had in Phillippi," remembers Ebrahim.

As part of his studies, he was involved in an internship programme at the Kirstenbosch National Botanical Garden, where he met Tony Rebelo and helped with the conservation of fynbos as part of the Protea Atlas Project. It was here that his love for the conservation of rare plants was born and nurtured.

When the Protea Atlas Project was completed, he briefly tried his hand at the family business, but soon returned to conservation work, helping out on various projects until the launch of CREW in 2003.

"I have been fortunate, the CREW Programme is far-reaching and I get to be involved in a range of activities including hard-core botany, working with people and communities, project management, and facilitating cross-cutting partnerships between programmes," says Ebrahim.When asked what he enjoys most about his job, he says, "The interaction with amazing and passionate people and of course, the special plants we get to see. One becomes addicted to looking for rare plants; it is always a challenge to find these rare jewels, many of which have not been found for decades or even centauries."

Ebrahim's favourite plant is *Moraea insolens*, which grows only in a small, restricted area near Caledon in the Western Cape. "After a fire, it flowers quite abundantly. It is the most spectacular thing you've ever seen, an insane scarlet colour, really stunningly beautiful!" For Ebrahim, one of the highlights of working with CREW has been finding a new population of *Moraea insolens*—something he compares to finding a unicorn.

Ebrahim, who has four siblings and is married with two children of his own, says his family now refer to him as 'the conservation guy' and says in some ways they envy him in his job. "I see many incredible places and special plants. Sharing this with my family makes them realise how passionate I am about my work. They support me whole-heartedly."

Text by Natasha Arendorf (Rothko PR Marketing Design)


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Addicted to the CREW Programme

For KwaZulu-Natal CREW Node Manager, Suvarna Parbhoo, getting involved in conservation was a lucky happenstance that changed her life.

Suvarna Parbhoo (31) grew up in a close-knit loving Hindu family in Durban. Whilst growing up, she was instilled with the knowledge to love and respect nature. In her adult life she has taken this love further by devoting her life to the conservation of threatened species in particular. As the manager of the KwaZulu-Natal CREW Node, her work is complex and diverse but she enjoys the interactions with, and the various conservation agencies in the province.

"I got into conservation purely by luck," remembers Suvarna. Back in 2006, she was awarded a six month contract with SANBI at the Durban herbarium as a threatened species data-capturer. A chance meeting with CREW Programme Manager, Domitilla Raimondo, during this time led to her introduction to the CREW Programme.

Suvarna undoubtedly loves her job and tackles the administrative hurdles that are part of the position with gusto. "We are a very dynamic team. There are always new challenges and opportunities for growth. I just got addicted to the CREW Programme and the supportive colleagues I work with, and have gone through various role changes within the programme."

Initially appointed as the CREW Summer-rainfall Coordinator based in Pretoria, Suvarna was determined to return to her home province where she took on the position of KwaZulu-Natal CREW Node Coordinator. She developed her skills rapidly and within three years took on the management of the KwaZulu-Natal CREW Node.

"I've been quite fortunate to work with previous KwaZulu-Natal CREW Node Manager, Isabel Johnson, as her passion for plants in particular has rubbed off on me and helped me realise that I can do this!"

Suvarna has a natural way with people and thrives on the various continually expanding facets of CREW work. She focuses on growing the network of CREW volunteers and linking volunteers with conservation agencies to ensure that 'on the ground conservation' happens. She values the people she works with, saying, "The network of CREW volunteers throughout South Africa is astounding. You can call on any volunteer at any time to assist with a conservation project."

"The best part of the job? Networking with a variety of people and travelling to botanically interesting places!" says Suvarna without a moment's hesitation.

Text by Natasha Arendorf (Rothko PR Marketing Design)

A fynbos connoisseur

CapeNature Botanist, Rupert Koopman, cares deeply about the environment and more specifically, fynbos. It is a love that is rooted in his love for nature that was nurtured by his father and grandparents.

When he was a child, botanist Rupert Koopman (33), who grew up on the Cape Flats, had a light bulb moment. He knew he wanted to spend a big part of his life outdoors. His biology teacher father and grandparents were all avid gardeners and enjoyed quiet walks in nature. It was because of them that Koopman had been surrounded by plants and flowers from a relatively early age.

"As kids, my parents took us to interesting places and we did a lot of hiking. So by the time I went to university, I knew I wanted to study something which would compel me to be outdoors. I liked fynbos back then, but in an abstract sort of way. It wasn't a career option," he recalls.

Rupert discovered the CREW Programme at the 2003 Fynbos Forum. At the time he was uncertain about the direction his career was going in and he was impressed by the conservation (including CREW) people he encountered. He established contact and eventually became an intern with CREW before working as an environmental consultant and then a Table Mountain Fund sponsored SANBI/CapeNature job placement intern. He went on to make the transition to CapeNature, where he currently works as a botanist.

Today, his love for fynbos is anything but abstract. He describes these natural shrublands as 'connoisseur vegetation' but admits that to many people an area of renosterveld or fynbos may not look like much. "Unless you have a little bit of insight, it will be a closed book to most." He explains that in a 10 × 10 m square area of fynbos, there can be up to 120 species. "We are world leaders in terms of the numbers of endemic species per unit area," he says.

He says that because of the time spent with CREW, he has developed a unique interest in rare and threatened plants. Koopman still has close ties with the CREW team and in fact still shares an office with them. "An important thing about CREW is that they are very passionate and have a fantastic work ethic, which, as an intern, gets you off on the right foot. It's a kind of love affair really."

In his current position with Cape Nature, he is able to perform various roles—from sitting on ministerial task teams to going out into the field and assisting with Stewardship Programmes. He specifically enjoys working with and meeting interesting people, as well as spreading awareness about conservation.

"People don't understand how special their land is and how restricted some plants are to certain areas. Conservation is not historically good at interacting with people—the old way was to put up a fence and to keep people out. I like to think it is changing now."

He explains that dealing with local communities and landowners requires special skills, and he says he is learning all the time. Teaching people about biodiversity and agricultural sustainability and the cultivation of medicinal plants for example, are projects he cares about deeply. "Maybe in five years' time we will have better answers. We are becoming more flexible in talking to people and communities about how things can be improved."

Text by Natasha Arendorf (Rothko PR Marketing Design)

Wanting to give something back

CREW has been much more than a job opportunity for Vatiswa Zikishe—it has become a journey of self-discovery and personal development.

Vatiswa Zikishe (34) grew up on a dairy farm near Stutterheim in the Eastern Cape without much by way of career prospects or any kind of guidance counselling. After matric, she got a job at a fast food chain, as a cleaner, but her intrepid nature and organisational skills quickly became apparent as she rose through the ranks, eventually being made supervisor.

At the age of 25, she applied for a CapeNature learnership programme and was enrolled in a ranger programme. Being chosen as one of only 25 people out of 500 applicants is something she still remembers and is grateful for. "I really felt this was meant to be. Up to this stage, I had not known that you could make a career out of nature and I felt very privileged."

After completing the programme, she was chosen for another mentorship programme and started working for CapeNature, meeting the Outramps CREW volunteer groups and learning about rare and endangered plants.

Zikishe joined CREW in 2007, starting out with the processing of plants, collecting and capturing data. She spent five years gaining experience with CREW, learning the ropes and preparing for her current position of manager of the CREW branch in the Eastern Cape.

She is very grateful to the CREW team for the valuable work experience she picked up—but also credits the organisation with giving her the opportunity to develop on a more personal level as well. Through CREW, she has learned more about herself, developed confidence in her abilities and has set personal goals for her future. She has also found that she loves plants, especially identifying and classifying them.

"When I think about CREW, I think about self-discovery. Through CREW I have discovered more about myself, and working with them has helped me find my passion," she says.

"I have learned to work on my own and have developed confidence." She explains that in her first position with the CREW Programme when she was based in the Western Cape, she dealt with volunteers and people with a deep knowledge and appreciation for rare and endangered plants. Now, in the Eastern Cape, where she is managing a range of young community members working to monitor biodiversity, the situation is very different. In many communities here, people are poor and struggling to make ends meet, completely unaware of the need for conservation.

"A lot of my work is about education. Some people feel we are coming to steal the land and the knowledge, they know nothing about conservation. So we have to break down this stigma and tell them what science and conservation is all about," says Zikishe.

She is working especially with young people and finds this enormously challenging—and rewarding. "I am going to try very hard to teach them what I was taught, so they can also make something of themselves one day. I would like to bring them to success."

Text by Natasha Arendorf (Rothko PR Marketing Design)


X-WAY

Postscript

This book showcases only 100 of South Africa's 2 553 plant species threatened with extinction. Monitoring and conserving all of threatened plants in this country is a major conservation challenge and requires both extensive manpower and funding. South Africa has a strong network of botanists in place to conserve plants as a result of both the professional botanists and the citizen scientist who work as part of the Custodians of Rare and Endangered Wildflowers (CREW) Programme. Finances are required to support the on the ground conservation work of this network as well as to enable education work on plant conservation with school and university learners to take place. Those interested in supporting the conservation of threatened plants in South Africa can contact the Botanical Society: info@botanicalsociety.org.za.

South Africa has the highest documented number of extinct plant species of any country in the world. As a result of human destruction of natural areas for agriculture and urban development, as well as the spread of invasive alien plants and illegal harvesting of plants for horticultural and medicinal trade, 2 553 plant species are currently threatened with extinction. This publication focuses on 100 of these plants, some of which are on the brink of extinction, with the aims of highlighting the factors threatening their survival and raising awareness of the actions required for their conservation.

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