

enviroworks

SPECIAL EDITION: INVASIVE SPECIES

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Biannual environmental newsletter of the City of Cape Town

Published by the City of Cape Town Environmental Resource Management Department in partnership with a range of other City departments

Invasive species: a threat to our heritage

Getting to grips with invasive
species – no easy task!

Learn ...

Which species you
should worry about

Discover ...

How you can help
fight invasives

Act ...

Join the Spotter
Network today



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FRONT COVER:

Water hyacinth is the world's worst aquatic weed. Manual removal is one of a combination of methods available to managers.

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And the WINNER is...

The winner of the feedback competition in our previous issue is Fadzai Munyaradzi, who had the following to say about the Enviroworks special edition on Climate Change:

"Thanks for the December 2011 edition of Enviroworks. It explained what climate change is in simple language, and made it real by breaking down the implications

for Cape Town and the associated business opportunities. I also appreciated getting practical, easy to implement advice on what I as an individual can do to reduce my carbon footprint."


Congratulations, Fadzai. We trust you will enjoy your richly illustrated copy of *Observations on Environmental Change in South Africa*.

FEEDBACK from readers

Thank you for all the feedback on our previous issue. To keep the conversation going, we are offering five lucky readers a copy of *Alien and Invasive Animals: A South African Perspective* by Mike Picker and Charles Griffiths. Simply send your feedback, views and suggestions to the contact details below, and you could be one of the winners.



Write to us and stand to WIN!

 INVASIVE SPECIES SOUTH AFRICA – ISSA - <https://www.facebook.com/invasivespeciessouthafrica>

INVASIVE FISH: FRIENDS OF THE FYNBOS FISH - <https://www.facebook.com/friendsofthefynbosfish>

INVASIVE SPECIES IN CAPE TOWN: CAPE TOWN INVASIVES - <https://www.facebook.com/capetowninvasives>

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Environmental Resource Management Department, City of Cape Town, 44 Wale Street, Cape Town 8001
 PO Box 16548, Vlaeberg 8018 • Tel: 021 487 2284 • Fax: 021 487 2255 • E-mail: enviroworks@capetown.gov.za
 Website: www.capetown.gov.za/environment

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Invasive species under the spotlight

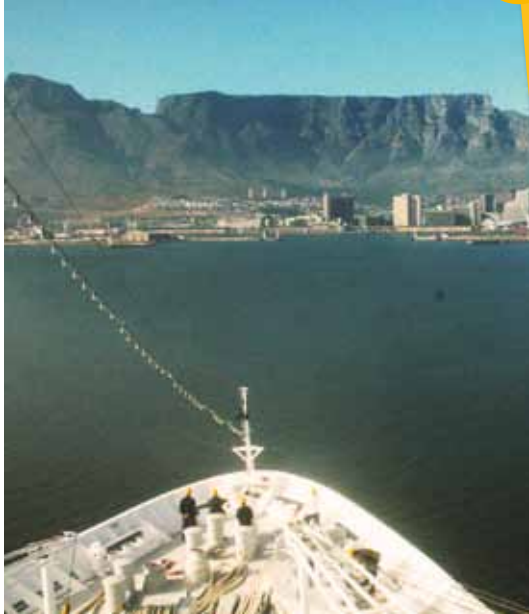
So, what are invasive species, exactly? And how did they manage to move outside their home range?

Invasive species are a global problem, with countries having to invest heavily to avoid species from other countries impacting negatively on their local ecosystems. These species are introduced primarily by humans; sometimes accidentally, while at other times very much intentionally.

Globalisation, which admittedly holds many benefits for human society, has in the last few hundred years encouraged an unprecedented movement of organisms between different parts of the world through trade, transport, travel and tourism. For example, thousands of plant species have been introduced in South Africa for various purposes such as food crops, timber, horticulture, dune stabilisation and hedge plants.

Many of the organisms introduced to areas outside their natural range are beneficial, or have little or no benefit, but there are some species about which we have to be increasingly concerned - those plant and animal species that dramatically increase their numbers in the environmental and climatic region they now share with us. With no natural enemies, invasive species have a competitive advantage over indigenous species as they are able to reproduce rapidly to spread and invade local ecosystems. They degrade the ecosystems they invade and impact negatively on our environment, economy and even our health.

Accidental introductions



House crow (*Corvus splendens*) – arrived on ships sailing down the east coast and arriving in Cape Town.

In short ...

Invasive species are plants, animals and micro-organisms that become problematic in areas in which they would not have naturally occurred.



Intentional introductions



Fennel (*Foeniculum vulgare*) – introduced for culinary purposes – now an important “garden escapee” in Cape Town, invading road verges and public open spaces.



Mallard duck (*Anas platyrhynchos*) – introduced for hunting and as pets.



Water hyacinth (*Eichhornia crassipes*) – introduced into South Africa as an ornamental plant.



Rooikrans (*Acacia cyclops*) – planted to stabilise dunes.

Why worry about invasive species?

It's easy to turn a blind eye to invasive species, in the belief that invasive species have no bearing on your life. The truth is that every individual is impacted directly or indirectly by invasive species – which means that we have a shared responsibility to manage the problem.

Water

Every one of us relies on a source of clean, fresh water to carry out our daily routine, from cleaning to cooking, drinking and watering crops. Yet invasive plants are known to impact negatively on water sources and seepage zones as well as to physically clog up rivers. Invasive plants can even dry up a water system and stop the flow of water. With South Africa already prone to drought, we cannot allow invasive plants to impact further on our water supply. If invasive plants are left to multiply, we will face more frequent water shortages and higher municipal water bills as access to water becomes more difficult and treatment more costly.

Food

Invasive species impact on the country's agricultural resources in multiple ways, potentially threatening food availability and production costs. Some invasive plants impact negatively on grasslands that support grazing. For example, *Lantana camara* poisons cattle and destroys understory species.

Biodiversity, tourism and job creation

Tourists from around the world visit South Africa to experience our unique plant and animal diversity. However, invasive species are a serious threat to this biodiversity.



In short ...

With no natural enemies, invasive species out-compete our indigenous fauna and flora, block up our rivers, pose a fire and health risk and threaten the existence of our natural heritage.

If our natural areas are overrun by invasive species, we stand to lose millions of rands in tourism revenue, which will also have a direct negative impact on job creation.

Invasive species are a problem because they...

- Invade natural areas, turning species-rich environments into single-species monocultures.
- Affect the resilience of ecosystems to handle natural disasters such as floods.
- Compete with indigenous plants for water and light.
- Compete with indigenous animals for food and space.
- Disturb the natural balance.
- Change fire regimes by promoting or suppressing fire.
- Promote soil erosion.
- Use excessive water.
- Hybridise with indigenous species.
- Degrade water quality.
- Destroy aquatic life by forming dense aquatic weed infestations.

Health

Indian House crows (*Corvus splendens*) are known carriers of enteric diseases and can transmit those diseases through their beaks and claws to humans with whom they live in close proximity.

Dense water hyacinth (*Eichhornia crassipes*) mats are an ideal breeding habitat for mosquitoes and snails, which spread bilharzia-causing parasites [schistosomes].

Fire safety

With Cape Town naturally prone to frequent fires, it is worth noting that scientists have proved that forests or groves of invasive plants burn hotter and more intensely than a fynbos fire. Stands of invasive plants close to urban areas therefore pose a huge risk to property and human life.

Water hyacinth (*Eichhornia crassipes*) is Africa's biggest aquatic invader. Dense water hyacinth infestations impact negatively on sport and recreational activities.



More information

INVASIVE AQUATIC PLANTS: A GUIDE TO THE IDENTIFICATION OF THE MOST IMPORTANT AND POTENTIALLY DANGEROUS INVASIVE AQUATIC AND WETLAND PLANTS IN SOUTH AFRICA by Lesley Henderson and Carina J. Cilliers. Plant Protection Research Institute Handbook No 16. 2002. Published by Agricultural Research Council. ISBN 1-86849-254-0. Available from: ARC-PPRI, Private Bag X134, Pretoria, 0001. Tel: 012 808 8000 or E-mail: nipbhc@plant1.agric.za

Cape Town's biodiversity is under threat



In short ...

A large number of our unique fynbos species have already become extinct as a direct result of invasive species. This threat will increase as climate change becomes more evident.

Various invasive species will, if left unchecked, constantly increase their footprint in our city. In addition, the predictions for local climatic change (a drier and hotter Cape Town) point toward potential invasions from species that thrive in hot, dry climates.

Cape Town has the dubious distinction of being one of the earth's mega-disaster areas – those areas that are on the verge of losing a significant part of their biodiversity.

Cape Town is situated in the heart of the Cape Floristic Region (CFR), the smallest of the world's six recognised floral kingdoms, an area known for its extraordinarily high diversity and endemism and home to more than 9 000 vascular plant species, of which 69 % are endemic. The CFR is also one of the world's most richest and endangered global terrestrial ecosystems, otherwise known as a global biodiversity 'hotspot'. Table Mountain, with its UNESCO world heritage status and recently awarded status as one of the world's seven natural wonders, shares its boundaries with an urban environment, the city of Cape Town. It is estimated that there are about 2 500 indigenous plant species in Cape Town, of which 190 are known to be endemic (species that are found only here and occur nowhere else on earth). This is exceptional, as, for example, the entire United Kingdom has only just over 1 200 native plant species.

The two most important threats to this unique biodiversity of Cape Town are urban development and invasive species. Invasive plants not only displace indigenous plants, they also alter the habitat for wildlife, and impact negatively on ecosystems on which people, plants and animals depend on for their existence and well-being.



1. Mallard ducks (*Anas platyrhynchos*) interbreed with our indigenous yellow-billed ducks, threatening their genetic integrity.
2. Spanish broom (*Spartium junceum*) is an invader from the Mediterranean region.
3. Ludwigia (*Ludwigia* spp.) is smothering various water bodies around Cape Town.

Currently 13 known aquatic and semi-aquatic weed species are present in our rivers, dams and vleis in the city, threatening the health and functioning of these ecosystems. Woody invasive plants such as pine, black wattle and hakea threaten our water security in the mountain catchments from where the city receives its water supplies.

Of the 27 known amphibian species in Cape Town, two frogs are endemic to Cape Town, the Table Mountain ghost frog and the Cape Peninsula moss frog. The western leopard toad is a species endemic to Cape Town and the eastern coastline of the South-western Cape, but its numbers have declined because of urbanisation and road traffic. This icon species also faces another threat from the same family, namely the guttural toad (*Amietophrynus gutturalis*). Although the guttural toad is indigenous to South Africa, it is alien and invasive in Cape Town.

Indigenous birds are being threatened by alien plant invasions and out-of-season, runaway wild fires destroying their habitat. Mallard ducks pose a real threat to South Africa's yellow-billed duck as a result of hybridisation. Hybrids between the yellow-billed-duck and the mallard are fertile, and highly mobile. Other species also at risk of hybridisation are the African black duck, the Cape shoveler and red-billed teal.

Invasive species and climate change in Cape Town

The City of Cape Town has implemented various measures to manage the effects of climate change, for example through programmes to promote energy efficiency and reduce greenhouse gas emissions.

However, should rainfall patterns change and temperatures increase, many invasive species indigenous to dry, hot regions could become a huge problem in the Cape, as they would spread rapidly under the new conditions. Exotic garden ornamentals that currently pose no threat to the environment could also 'jump the fence' and become a threat to indigenous fynbos.

Taking action against invasive species

Looking at the various invasive species and their impact on our lives, it is reassuring to know that the City has a specialised unit to deal with this problem.

The Invasive Species Unit (which falls under the City of Cape Town's Environmental Resource Management Department) has adopted the following strategies, in line with international best practice, for invasions.

- **Prevention** is paramount in stopping invasive species from entering the country's borders. Prevention includes implementing, regulating and enforcing national, provincial and municipal laws aimed at preventing the introduction of invasive species. Risk assessments of potentially harmful species guide preventative actions. Public education and awareness is a very important component of prevention. The more people become aware of what invasive species are and the damage they can cause, the more effective these preventative measures will be. The City works closely with national and provincial government and other conservation agencies to prevent unwanted species from entering the boundaries of the city.

- **Early Detection and Rapid Response (EDRR):** The second line of defence is detecting and removing invasive species that survived the preventative process, before they become invasive. Research and local expert knowledge guide the selection of species to be targeted for control in Cape Town. Unfortunately, some popular garden plants are now emerging as significant invasives in the city. A prominent example is red valerian, also known as kiss-me-over-the-garden-gate. Cape Town has set up Early Detection Rapid Response teams, in partnership with the National Early Detection and Rapid Response programme managed by SANBI, that are trained to identify and control newly established invasive plant species before they get out of hand.



1. Pine plantations are restricted to designated containment zones.

2. The tree of heaven (*Ailanthus altissima*) is a deciduous tree that grows 8 to 10 metres in height and needs to be controlled before it spreads in the peninsula.

- **Control** means ongoing actions to remove invasive species through an integrated control programme, using different methods. Control of invasive species is a long-term process and there are no quick fixes. Once a control programme starts, it is imperative to continue with regular follow-up operations to ensure effective control and prevent re-invasion of cleared areas.

- **Eradication** is a strategy that is often misunderstood. People often refer to standard control programmes as eradication. Eradication means that every single plant or animal must be totally removed from an area. This is only possible if every plant or animal is detected and completely removed, including all branches, leaves, seeds, flowers and roots, so that they cannot reoccur after eradication. Eradication does not happen after one or even two interventions. One should therefore refer to eradication with great caution. The only species targeted for eradication on the Peninsula are the Indian house crow (*Corvus splendens*)



In short ...

The City has adopted various strategies to manage invasive species, including the prevention, early detection and rapid response, containment, control and eradication of invasive species, as well as restoration of affected areas.

and the Australian kangaroo wattle (*Acacia paradoxa*) on Table Mountain.

- **Containment:** A good example of a containment area is a pine plantation in a mountain catchment. Pines are known to invade fynbos areas. Ongoing surveys and control of detected pine plants in the area surrounding the plantation contains the plantation and prevents it from spreading to new areas. Containment is also an option when budgets are limited. One might want to leave a dense stand of invasive plants and control the less dense areas first, simply because it costs less to keep such areas under control.

- **Restoration** should be seen as an integral part of any control programme. Restoration takes place through natural succession or active reseeding and planting. Where invasive plants were removed, they must be replaced with appropriate local plants.



More information

INVASIVE ALIEN PLANTS IN KWAZULU-NATAL – MANAGEMENT AND CONTROL. 2008. Wildlife Handbook Series.

Published by the KwaZulu-Natal Branch of The Wildlife and Environment Society of South Africa. ISBN 1 874 975 11 6.

www.wessa.org.za



Integrated weed control refers to the combination of one or more control methods. Mechanical and manual control, supported by herbicide control or fire, produces the best results. Biological control is the use of natural enemies to control large areas of dense invasive plant infestations. Biological control works best when integrated with mechanical, manual and herbicide control. Restoration is an integral part of any invasive species control programme and occurs through active reseeded, replanted or as a result of natural succession.



In short ...

Biological control involves the rearing and release of host-specific insects or viruses into populations of invasive flora.

Fighting invasives with nature

Anyone who has ever tried to clear a stand of invasive trees from their property will know that it often feels as if the problem is insurmountable, as young trees shoot up in their hundreds as soon as their 'parents' are destroyed. For this reason biological control measures are often used in combination with manual removal, to great effect.

Biocontrol is most effective when integrated with other control methods. Biocontrol of invasive flora was established in the 1980s and South Africa is a leader in this field. The introduction of host-specific insects and fungi is managed by stringent controls and legislation.



A fungus that causes galls, restricting the growth of Port Jackson, was released in 1987.

Invasive trees

In 1987, the Agricultural Research Council (ARC) introduced a gall rust fungus (*Uromycladium tepperianum*) from Australia to combat South Africa's Port Jackson (*Acacia saligna*) problem. The fungus causes galls on the leaves, stems and flowers of the plant.

In the years since its release, the fungus has dramatically slowed the spread of Port Jackson and the galls are now a familiar sight around Cape Town. More recently, a seed-feeding weevil (*Melanterius compactus*), also from Australia, was released to neutralise any seeds that might have escaped the fungus.

In an effort to stem the invasion of rooikrans (*Acacia cyclops*), the ARC released an Australian seed-feeding weevil (*Melanterius servulus*) in 1994. The weevil destroys up to 90% of the rooikrans seeds, which has a major impact on seedbanks.

A gall-forming midge (*Dasineura dielsi*) from Australia, which affects the developing pods and drastically reduces seed production, has also been released for rooikrans.

Notwithstanding the great successes achieved by integrating biocontrol into invasive plant management strategies, it is still to earn its rightful place as a method of control. The City of Cape Town's Invasive Species Unit is in the process of setting up aquatic weed biocontrol facilities at Westlake. The aim of this facility is to fully integrate biocontrol into aquatic weed management. To achieve this aim, the City works in partnership with the Agricultural Resource Council's Plant Protection Research Institute (ARC-PPRI), the Rhodes University's Department of Zoology and Entomology and the Natural Resource Management (Working for Water) programme. The vision is to involve communities, volunteers and schools to roll out the biocontrol programme over the next three years.

The following insects are used to combat aquatic invasions:

- Water hyacinth: Six species of biological control are available in South Africa against water hyacinth: Two weevils – *Neochetina eichhorniae* & *N. bruchi*, a moth – *Niphograptus albiguttalis*, a leaf-sucking mired – *Eccritotarsus catarinensis*, a mite – *Orthogalumna terebrantis* and a pathogenic fungus – *Cercospora piaropi*.
- Water lettuce: A weevil (*Neohydronomus affinis*) controls infestations within two years.
- Parrot's feather: A leaf-feeding beetle (*Lysathia* sp.) causes defoliation, stunts vegetative growth and, eventually, results in dieback of the plant.
- Giant salvinia: A weevil (*Cyrtobagous salviniae*) burrows through rhizomes and feeds on new buds, warping and stunting the plant until it eventually sinks. The larva damages the buds and leaves.



1. Rearing insects: Pamela Fisana and Patience Ntsantsa (Invasive Species Unit) beside a pond of water lettuce (*Pistia stratiotes*) filled with water lettuce beetles (*Neohydronomus affinis*). Photo: Kay Montgomery.
2. Parrot's feather (*Myriophyllum aquaticum*) is controlled by *Lysathia* sp., a leaf-feeding beetle that becomes abundant in summer. Photo supplied by Rhodes University.
3. Water lettuce (*Pistia stratiotes*) is controlled by *Neohydronomus affinis*, a leaf-feeding and leaf-mining weevil. Photo supplied by Rhodes University.
- 4/5. Water hyacinth (*Eichhornia crassipes*) is controlled by *Neochetina bruchi* and *N. eichhorniae*, two leaf-feeding and stem-boring weevils. Photos supplied by Rhodes University.
6. Burrowing and leaf-feeding weevil *Cyrtobagous salviniae* damaging Kariba weed (*Salvinia molesta*). Photo supplied by Rhodes University.

Leading by example

Cape Town is widely regarded as the most progressive city in South Africa when it comes to managing the problem of invasive species. Here we introduce the people responsible for managing invasive species in Cape Town.

The management of invasive species in the city is the job of the Invasive Species Unit (ISU) which falls under the Environmental Resource Management Department at the City of Cape Town. Based at the Westlake Conservation Office, at the base of Ou Kaapse Weg in the southern suburbs, the ISU is managed by Louise Stafford. Invasive species management involves different management options such as prevention, early detection and rapid response, containment, control, restoration of cleared areas and, where possible, eradication.

Louise has experience in invasive species management, strategic planning, monitoring, evaluation and programme management at Cape Nature and C.A.P.E.

The ISU works closely with various other City departments such as City Parks, Transport, Roads and Stormwater, Human Settlements, Property Management, Health and Fire, as well as non-government organisations, friends groups and private sector stakeholder associations.

The ISU implements four projects: firstly, prevention, early detection and rapid response; secondly, long-term terrestrial invasive plant control; thirdly, aquatic weed control and finally, invasive animal management. All projects are supported by GIS-based data management and monitoring programmes.

Mfundo Tafeni, a graduate of Joe Slovo High School in Khayelitsha and the Cape Peninsula University of Technology (Nature Conservation) started working in the ISU in 2009 on the house crow project. Since the beginning of 2012 Mfundo has also taken over management of the Prevention and Early Detection and Rapid Response projects.

The long-term terrestrial invasive plant control project, managed by Elana Kellerman, is implemented on all land managed by the City, i.e. nature reserves, public open space and road verges.

Chandre Rhoda manages the aquatic weed project, which aims to bring aquatic weed infestations in rivers, wetlands and vleis under control,

thereby improving the important freshwater ecosystems.

Taryn Rossenrode is responsible for the GIS and data management.

Alan Martin is responsible for restoring priority areas after clearing and monitoring the effectiveness of different control methods, specifically for emerging species. This experience provides a sound background for effectively managing invasive species.

Moses Mgwali is the assistant project manager for the aquatic weed programme, where he focuses on implementing the City's River Warden programme. Three quality controllers, Sizwe Ngame, Eric Baba and Kasrils Hawkins, are responsible for daily quality assurance to make sure the teams adhere to safety regulations and use the correct clearing methods. The Expanded Public Works Programme (EPWP) clerk Shireen Pieterse, admin assistant Alvina Brand, Storeman Graham Muller and maintenance team consisting of Andries Sete and Godfrey Macheya, form the operational support team.



Sign up online as a volunteer spotter

Spotter Network

We need you!

Learn to identify targeted invader plants, plus the range of nature-friendly alternatives - available from most garden centres that can be planted in their place.



Hop wattle
Acacia stricta



Red valerian
Centranthus ruber



Spanish broom
Spartium junceum



Purple loosestrife
Lythrum salicaria



Tree of heaven
Ailanthus altissima



Pampas grass
Cortaderia selloana



Mountain cedar
Acacia elata



Red flowering tea tree
Melaleuca hypericifolia



Kangaroo wattle
Acacia paradoxa



Screw pod wattle
Acacia implexa



Montpellier broom
Genista monspessulana



Rivinia, Bloodberry
Rivina humilis



Australian cheesewood
Pittosporum undulatum



Balloon vine
Cardiospermum grandiflorum



Sweet hakea
Hakea drupacea

Cape Town Early Detection and Rapid Response (EDRR) programme



Environmental Affairs
Agriculture, Forestry and Fisheries
Water Affairs



EXPANDED PUBLIC WORKS PROGRAMME



This initiative is supported by the National EDRR Programme (managed by the South African National Biodiversity Institute) and funded by Natural Resources Management Programmes, Department of Environmental Affairs.

City of Cape Town Invasive Species Unit,
Biodiversity Management, Environmental
Resource Management Department,
Westlake Office, Tokai. Tel: 021 712 1944.
www.capetown.gov.za/environment
www.capetowninvasives.co.za

You too can be a spotter!

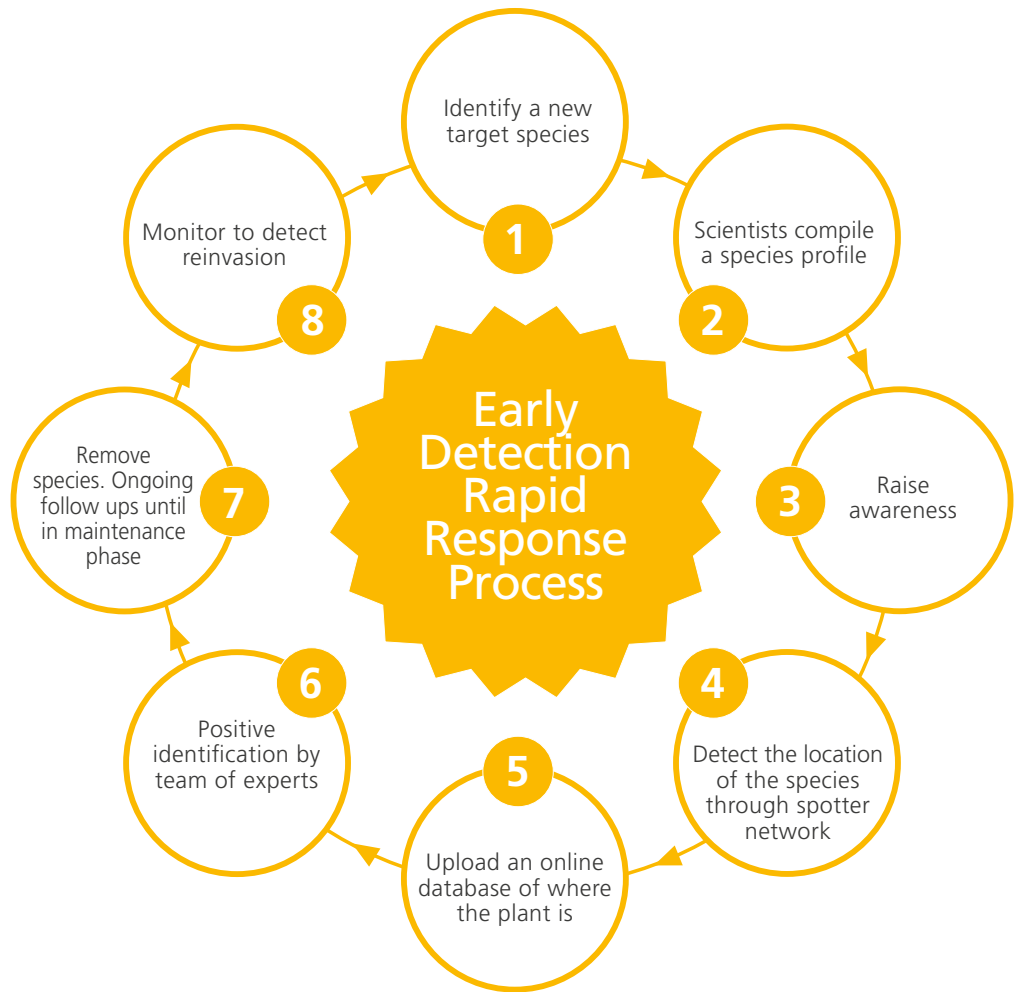
Sign up and make a difference in your community by reporting any sightings of targeted plants at www.capetowninvasives.co.za.

Behind the Early Detection and Rapid Response programme

The aim of the Early Detection and Rapid Response (EDRR) programme is to identify and remove plant invasions before they get out of control, by using rapid response teams. The City's Invasive Species Unit (ISU) is responsible for implementing this innovative programme.

The EDRR programme is funded by SANBI (National EDRR programme) and the Natural Resource Management (NRM) programmes of the Department of Environmental Affairs.

The ISU manages rapid response teams who come from marginalised communities and who are trained, equipped and deployed to remove target plant invasions. The team members are all selected under the guiding employment principles of Working for Water (WFW) and the Expanded Public Works Programme (EPWP).



Target species

A list of target species was compiled with input from the National EDRR programme (SANBI) and experts such as Dr Tony Rebelo, who has extensive knowledge of plant invasions especially on and around Table Mountain National Park. The list is not static, but gets updated as information become available. Ongoing research results in more target species being added to the list, and determining the methods most effective for controlling target species.

Target species are not, as yet, widely established in the Cape metropole. That means that there is still a chance to get the species on the list under control and even remove them completely on certain sites, but to do this we need to know where they are. This is where spotters have an important role to play.



In short ...

You can help manage invasive species by signing up to the Spotter Network and reporting any sightings of target plants. Visit www.capetowninvasives.co.za or e-mail edrr@capetown.gov.za



A rapid response team member sets out to remove a large pampas grass plant from a roadside in Constantia.

Join the Spotter Network @ www.capetowninvasives.co.za

Are you a regular hiker, an interested gardener or a concerned member of the public? The Early Detection and Rapid Response programme will be even more effective if you can help them with the locating of target species.

As many of the target species are to be found in gardens or areas often visited by hikers, friends, gardeners or nature lovers, the general public can play an active part in spotting, reporting or even removing the plants before they become established and start spreading. It is hoped that the public will become the eyes and ears for the rapid response teams on the ground.

The aim is to develop a voluntary network of 'spotters and experts' covering Cape Town and the peninsula and who will upload any sightings of EDRR target species to the newly launched website www.capetowninvasives.co.za.

The purpose of this website is:

- To raise awareness about the programme.
- To improve the capacity to detect the target species.

- To enable the general public and spotters to see where the species are, where they are controlled and what progress is being made.

How to become a Spotter

Start by signing up to become a Cape Town Spotter at www.capetowninvasives.co.za. It is simple and free. View the target list, read more about the plants, view the most recent spotter updates and track the progress of the removal of the plants on the 'map' link.

On the maps, plants are shown as dots in three colours:

Red dots: Designate a confirmed target plant.

Yellow dots: Indicate that control is underway. It remains yellow through the entire control programme to indicate the team responded to the sighting and the plant(s) are now being controlled.

Green dots: Indicate the plant is under control. The locality turns green when the target plants are regarded as under control, with no re-sprouting or reoccurrence. Teams will still monitor the site.

Plant Me Instead



2009 M-Net Idols winner and passionate plantsman, Jason Hartman, launched the National *Plant Me Instead* campaign.

There are thousands of eco-friendly water-wise plants that are not invasive to the environment. In addition to the over 25 000 indigenous plants in the country, there are an estimated 8 000 foreign plants in South Africa – of which only 360 have been declared an invasive menace to society and the environment.

Plant Me Instead is a campaign that celebrates the planting of region appropriate, water-wise plants as opposed to illegal invasive plants. On a regional level, this might mean rehabilitating land after the removal of invasive plants, whilst in your garden it refers to replacing all the invasive plants with more appropriate plants.

The campaign flags good plants with stickers and yellow t-bars and is run in 26 garden centres across Cape Town. In this way, it seeks to link the problem of invasive plants to a more positive message of what to plant after you have removed invasive plants.

Plant Me Instead is funded by Natural Resource Management (NRM) programmes and managed by the South African Nursery Association (SANA) and South African Landscaper's Institute (SALI).

Invasive species control creates jobs

The natural environment is a powerful ally in the country's efforts to create jobs and a better life for its people. Through invasive species management, many thousands of jobs have been created since 1995.

The City of Cape Town is aligned to Natural Resource Management (NRM) programmes of the Department of Environmental Affairs, which include Working for Water (WFW), Working for Wetlands and Working on Fire. NRM programmes spearhead South Africa's invasive species initiatives and are aligned with the Expanded Public Works Programme (EPWP).

Since its inception in 1995, the WFW programme has cleared more than two million hectares of invasive plants, providing jobs and training for more than 25 000 people a year from among the most marginalised sectors of society.

The EPWP principles ensure that job creation is targeted at poorer local communities, with 60% of the work going to women, 30% to the youth and 2% to the disabled.

The rands and 'sense' of invasive clearing

In 2011, scientists calculated that the water lost as a result of invasive alien plants annually was worth R6.5 billion. Without the intervention of WFW, this figure would have amounted to a staggering loss of R41.7 billion. Scientists also found that around 4% of registered water in mountain catchments and riparian zones is being lost as a result of invasive alien trees. If left unchecked, this loss could increase to 16%.



Invasive species management creates jobs.

In short ...

The City has turned the threat of invasive species into an opportunity by creating local jobs through invasive species management.



Sandisiwe Mbangasa from Westlake – Living in a local community with her two young children, Sandisiwe is employed on a team that is removing invasives such as *Canna indica* and *Ricinus* from the Upper Westlake River, near Pollsmoor Prison.



Gabriel Bosser from Nooitgedacht – Gabriel had polio as a child. He worked for a picture-framer for 34 years, after which he was unemployed for two years. He is employed as the first aider and supervisor for the aquatic weeds team at Princess Vlei.



Nathan Fourie from Ocean View – Nathan has a three year diploma in drama and has a grandmother to support. He works on a river team currently deployed in the Lower Westlake and Princess Kasteel areas.



More information

Working for Water programme: www.dwaf.gov.za/wfw
 Early Detection and Rapid Response in the City of Cape Town: www.capetown.gov.za/EDRR

Mayor honours Kader Asmal

Over 400 people from Cape Town's most vulnerable sectors of society are now employed in a special integrated catchment management project established and launched in memory of Professor Kader Asmal, the father of the Working for Water (WFW) job creation programme, as part of the Mayoral Special Jobs Programme.

The Kader Asmal Integrated Catchment Management Project is a partnership between the City of Cape Town and the Natural Resources Management (NRM) programmes, and is funded by the Mayor's special Expanded Public Works Programme (EPWP). In addition to improving the river ecosystem health and functioning around the City of Cape Town, it also aims to alleviate poverty through the creation of local jobs.

There are 20 major catchments in the greater Cape Town area. The majority of the rivers and wetlands in the catchments have been invaded by alien plants and are badly polluted. The current situation not only impacts on ecosystem functioning, but also poses potential health risks. In addition, polluted rivers are aesthetically unpleasant and prevent residents from enjoying recreational water activities. As such, urgent intervention is required to turn this situation around.

The project is planned to take place in three phases. The first phase are high-impact interventions and involve removing litter and invasive plants. There will also be initiatives to address the source of the pollution and raise awareness amongst residents of the problems associated with pollution in rivers.

The second phase will focus on the maintenance of the catchments. During this phase the cleared areas will be followed up according to scheduled interventions to prevent reinvasion and keep pollution in check.

Phase three involves the introduction of a river warden system to detect pollution and monitor alien plant infestations. Teams will be brought in to respond quickly to the problems, thereby offering a sustainable way forward for the health of the rivers and providing longer term access to job opportunities.

Healthy rivers are more resilient to floods and droughts. Moreover, they are attractive to visitors, offer residents a place to practise water sports and demonstrate improved service delivery.



Graham Muller, a previously unemployed nature conservation officer from Mitchells Plain with three children to support, joined the project and became the City's Invasive Species Unit storeman in 2010.



In short ...

The Kader Asmal Integrated Catchment Management Project aims to employ 400 people over the next three years to improve the river ecosystem health and functioning in Cape Town.



An aquatic team works on clearing water hyacinth (*Eichhornia crassipes*) manually from the Princess Vlei area.

Invasive clearing in Cape Town

Black River

Lying at the intersection of the N2 and N1 highways, the Black River, with its dense aquatic weed invasion, is an example of inter-departmental collaboration. Water hyacinth doubles its growth every 8 to 14 days at the height of summer and requires

ongoing control. A combination of herbicide application, manual removal and mechanical removal (using large machinery) has been adopted for this 5 km-long river.

The Black River is an inter-departmental project and the Invasive

Species Unit (ISU) works closely with the City's Transport, and Roads and Stormwater Departments, as well as with friends stakeholder groups who focus on tributaries to the Black River.

To manage the invasion, the Black River has been divided up into five management sections. Booms made from recycled vegetable bag cloth and empty two litre plastic bottles have been placed across the river to cordon off the water hyacinth into different sections. The booms prevent the wind from blowing the water hyacinth along the river and make it easier for the teams to remove the water hyacinth manually, section by section.



Khayelitsha

Sections of the EersteKuijs River as well as wetlands alongside high-density housing suburbs in Khayelitsha were the focus of an inter-departmental project between the departments of Transport, Roads and Stormwater, City Parks and the ISU.

Being used as a dumping site for old tyres, tins and sewage, the wetlands in Khayelitsha were badly polluted, with

high nutrient levels in the water. Water hyacinth had taken over the open water areas of the wetlands.

Aquatic teams were moved into the EersteKuijs River in September 2011 and later moved into the Khayelitsha wetlands, working on this project throughout the summer. They started by removing tons of rubbish and large quantities of water hyacinth.

The teams use ropes to collect the water hyacinth and then remove the biomass manually, using large canvas sheets. Booms were used to cordon off cleared areas to prevent reinvasion by water hyacinth. The teams are monitoring the different management reaches to remove any reoccurring invasive plants before they re-establish themselves.



More information

INVADED: THE BIOLOGICAL INVASION OF SOUTH AFRICA by Leonie Joubert. 2009. Published by Wits University Press. ISBN 978-1-86814-478-5.

Interested in joining a hack or 'Friends' group? Contact WESSA at Tel: 021 701 1397 or www.wessa.org.za

Clovelly

'Not in my backyard' (NIMBY) is the name of a hack group in Clovelly that is tackling invasives. They are particularly sensitive about the red valerian (*Centranthus ruber*), which has jumped the garden fence.

"Our group walks along the Clovelly road looking at the road verges, whilst the experts explain why invasive plants pose a threat to our biodiversity and how best we can control them," says organiser, Penny Price.

"In future, we would like to meet once a quarter, mostly for mountain hacking. The demand in our area is to support the work of the City of Cape Town and Table Mountain National

Park's invasive clearing teams, by keeping the regrowth under control". "The hack group needs to scramble up the front of Trappieskop to a small cove of Port Jackson re-

growth that has fallen under the radar. We need to cut and apply herbicide to this re-sprouting, with help and advice from specialists," she says.



Pagasvlei

Pagasvlei is another superb example of an inter-departmental project involving the ISU, City Parks and Transport, Roads and Stormwater departments. It also required an integrated management approach on emerging, aquatic and terrestrial invaders.

Pagasvlei pond is a small water body of some 35 m² in the Sand River catchment, situated in a greenbelt in Constantia. Although the pond has a high recreational value for fishers and hikers, it is also a breeding area for the endangered western leopard toad (*Amietophrynus pantherinus*).

The pond was densely invaded with water hyacinth (*Eichhornia crassipes*), impacting on water quality and the breeding of the western leopard toad, as well as creating a haven for mosquitoes to breed. The surrounding area was infested with established invasives such as the Brazilian pepper tree,

stink bean, syringa and *Canna indica*, as well as emerging pampas grass, Spanish broom and fennel.

In November 2010, a team of ten people worked for 20 days to manually remove water hyacinth as well as established and emerging invasives. Biomass was moved away from the water body, left to dry on canvas and transported to solid waste refuse areas. The site is closely monitored to avoid reinvasion.



Up in flames

There is a very close relationship between invasive plants and fynbos fires.

Fynbos has natural burning cycles that maintain species diversity. Alien woody plants that invade fynbos areas can change the natural fire regime by increasing the fuel load, which results in an increase in fire severity.

This increased severity can destroy indigenous seed banks and degrade the soil structure, leading to erosion. Alien woody plants are also adapted to fire, so they sprout after fires and grow faster than fynbos plants, quickly shading them out. Fynbos species may then not have time to flower and set seed before the next fire, resulting in their elimination.

Investigations into fires on the Cape Peninsula suggest that close proximity of stands of invasive alien trees such as Port Jackson (*Acacia saligna*) and rooikrans (*Acacia cyclops*) is a common factor for many of the houses that were destroyed during intense fires on the peninsula in 2000 and 2004.

Having said that, fire remains a critical component of integrated invasive plant management. Fire can be used to burn dense alien plant infestations, or to reduce the fuel load by burning brush piles following clearing operations. Conducting an ecological burn after clearing, thereby removing a pile of fuel, can stimulate the germination of the indigenous seed bank.

Experience has also shown that whilst wildfires in natural fynbos are often relatively quick, and easier to manage, fires in dense stands of invasive plants burn longer and more fiercely, generating vast amounts of heat and preventing fire fighters from getting near to the huge flames. The control of invasive plants is therefore not only important in saving our unique and irreplaceable biodiversity, but also imperative in preventing the loss of lives and property.

The Dido Valley controlled burns were conducted by the City of Cape Town, in collaboration with Table Mountain National Park (TMNP), the local Fire Protection Association (FPA), City Fire Department, Environmental Resource Management, Volunteer Wildfire Services, and a specialised fire team from NCC environmental services.

Controlled brush pile burns are only conducted when weather conditions are suitable and strict protocols are followed to ensure the safety of properties and livelihoods. In 2011, controlled brush pile burns took place in the Blaauwberg Nature Reserve during September and a month later in Dido Valley.

The Dido Valley controlled burn took place to remove piles created from cutting dense thickets of invasive plants that had been cleared in an area earmarked for a housing development by the City's

In short ...

Stands of invasive vegetation have high fuel loads and greatly increase the severity of fires. Controlled burns prevent standing and cleared brush piles of invasive vegetation from becoming a fire hazard.

Human Settlements Directorate. Neighbouring landowners and residents were informed of the planned burn and the South African Navy was also on standby to monitor the burn areas on their boundary.

Stimulating indigenous flora

Whilst research has shown that controlled burns remove the fire hazard posed by dead invasive plant material, fire is also an essential management strategy in promoting the regeneration of local indigenous flora.

The heat produced and chemicals released during a fire stimulate the germination of indigenous seed banks that rely on fire to germinate. Moreover, removal of the insulating vegetation cover exposes the top layer of the soil to sunlight and cold night temperatures, creating the large diurnal temperature range that is also a required germination cue for certain species. Fire also releases nutrients trapped within the vegetation, which then return to the soil to be taken up by the regenerating plants.

On the invasive species front, fire stimulates seed release from pines and hakeas and seed germination in acacias, such as Port Jackson. Alien plant regeneration is brought under control during repeated visits by the ISU to areas where controlled burns have taken place, with follow-up control operations scheduled where necessary.

Fire permits were obtained before this controlled burn at Dido Valley on 11 October 2011. Teams conducting controlled burn comprise nature conservation staff trained in fire-fighting.



Giving our animals a chance

The City of Cape Town has three management programmes for invasive animals that threaten the existence of local species.

Guttural toads (*Amietophrynus gutturalis*) potentially pose a serious threat to the survival of our endemic, endangered western leopard toad (*Amietophrynus pantherinus*), as they compete for habitat, resources and breeding grounds.

Guttural toads were found in Constantia in recent years and currently occur in about five square kilometres in the Constantia Valley area, where they are known to breed in garden ponds. If this

population is allowed to continue spreading along the greenbelts there is a very real threat that they may in future colonise all major Cape Town water bodies, with potentially disastrous consequences.

Guttural toads are easily confused with the endemic leopard toad and the public is urged not to remove any toads, but rather to contact the Invasive Species Unit if they suspect that there are guttural toads in their gardens.

Guttural toad



House crows



There are two million Indian house crows (*Corvus splendens*) in Dar-es-Salaam, where they are a major problem for local authorities. This invasive species has spread south from East Africa into the metropolitan areas of Cape Town, Durban and Richard's Bay. The Cape Town population is the most southerly recorded population and has the potential to spread from here to the West Coast of Africa.

Indian house crows are aggressive and opportunistic feeders and have negative impacts on indigenous bird and animal populations, agricultural crops and domestic poultry. House crows also pose a threat to human health, as they are intestinal carriers of at least eight human enteric diseases.

In 2008, the Cape Town population was estimated to be in the range of 10 000 birds and urgent measures were needed to prevent the number from increasing further. The City launched an intensive eradication programme in partnership with BirdLife SA, the National Resource Management (NRM) programmes and the South African National Biodiversity Institute (SANBI), which all meet under the auspices of the National Problem Bird Forum, which is chaired by the Endangered Wildlife Trust (EWT).

The aim is to complete eradication by 2017. Thereafter an Early Detection and Rapid Response (EDRR) programme will be implemented to detect and remove any new arrivals before they establish.

The City of Cape Town follows the National Mallard Strategy for South Africa. According to Professor Phil Hockey of the Percy FitzPatrick Institute of African Ornithology, the mallard is a relatively recent colonist and appears to be in the early stages of a large scale invasion. Hockey regards the mallard as the most threatening invasive bird species in the country today.

To implement the country's mallard strategy, Cape Town's Invasive Species Unit works closely with BirdLife South Africa, the C.A.P.E Invasive Animal Working Group, Natural Resource

Management (NRM) programmes, Ezemvelo KZN Wildlife and the South African National Biodiversity Institute (SANBI) – which all meet under the auspices of the National Problem Bird Forum, currently chaired by the Endangered Wildlife Trust (EWT).

Mallard hotspots in Cape Town include Marina Da Gama (where there are an estimated 800 mallards), Sonstraal Dam in Durbanville and water bodies on golf courses and housing estates across the city.

Mallard duck



In short ...

The City is currently managing three invasive animals that threaten the existence of local species, namely the guttural toad, house crow and mallard duck.

Nuisance species

Capetonians complain about various bird species in the urban environment, but most of these are indigenous and there are no plans to control them.

The City's Invasive Species Unit receives regular complaints about nuisance bird species in neighbourhoods across Cape Town, and requests to control these. It is important to understand that control programmes cannot simply be instituted at will. Any control programme by the City is based on scientific input, risk assessment and collective decision-making.

The species of concern can be termed 'range-expanding species'. These are species that naturally occur in South Africa (in other words, they are indigenous), but are now populating new areas, where they may have varied impacts.

Ultimately, the presence of these new arrivals is merely a symptom of human-induced changes to the landscape. The birds are opportunistic and move where they find suitable habitats and ample food. Golf courses, sports fields, lawns and large exotic trees are all habitats that never naturally occurred in Cape Town. These new habitats have quickly been colonised by a host of opportunistic species.

Pied crow (*Corvus albus*)

The pied crow is a large glossy black bird with a white breast. Their numbers are on the increase in many urban areas. They are known to roost in invasive Australian wattle (*Acacia* spp.) and gum (*Eucalyptus* spp.) thickets in the Western Cape. Their numbers are aided by the availability of food. Nests are often located in invasive trees such as pine and blue gum.

A SHOWY NUISANCE

The common peacock (*Pavo cristatus*) is a well-known domestic bird renowned for the attractive semi-circular tail fan display of the male birds. The birds are naturally found in Pakistan and throughout most of India to Sri Lanka.

Feral (wild) populations occur on Robben Island and on the outskirts of Cape Town, on plots and farmsteads. The Robben Island population is self-sustaining and they rely on the dense stands of invasive Australian wattles, pine and blue-gum trees for shelter and roosting.

Hadedda ibis (*Bostrychia hagedash*)

The hadeda ibis is a distinctive, large bird with a long, curved beak. It is primarily black to brownish-grey and the rump and upper tail coverts have a metallic green sheen to them. It was absent from Cape Town until the late 1980's, but by the late 1990's had become a common breeding resident.

Egyptian goose (*Alopochena aegyptiaca*)

The Egyptian goose is an indigenous species that has been able to expand its range and numbers largely due to the building of dams, lakes and urban waterways. Egyptian geese have a chestnut brown head and back with lighter grey sides. They are reported to use other birds' nests to breed on occasion, after evicting the original occupants.

Guinea fowl (*Numida meleagris*)

Guinea fowl were introduced to the Western Cape in the late 1800s. Increased numbers of guinea fowl have had a negative impact on fynbos vegetation as they feed on seeds, fruits, bulbs as well as young shoots.



Pied crow



Hadedda ibis



Egyptian geese



Guinea fowl

They can also displace the Cape spurfowl in disturbed areas. Notwithstanding, there is no City policy to remove guinea fowl.



More information

City of Cape Town Invasive Species Unit: www.capetown.gov.za/invasivespecies
 Learn more about invasives in South Africa: www.invasives.org.za
 Learn more about invasives in Cape Town: www.capetowninvasives.co.za