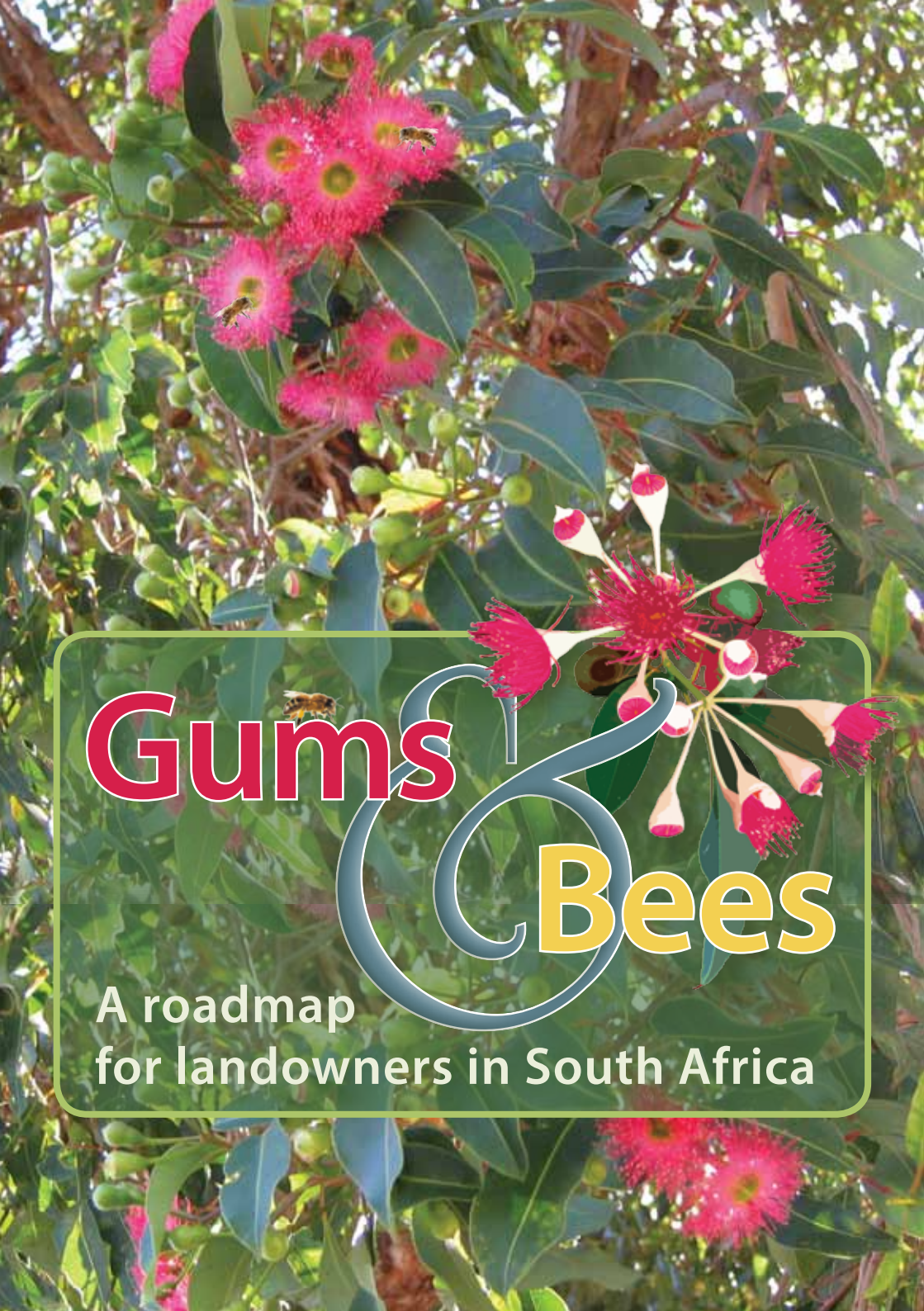
Gums & Bees
A roadmap
for landowners in South Africa

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Biodiversity for Life
South African National Biodiversity Institute

‘Gums in the correct place in the landscape’

Gums & Bees

A roadmap for landowners in South Africa

This booklet aims to help landowners protect or grow forage resources for honey bees, and understand why *Eucalyptus* trees are vital to the beekeeping and agricultural industries in South Africa.

Gums & Bees answers important questions such as:

- Why are *Eucalyptus* trees important to honey bees?
- Do I need to remove my *Eucalyptus* trees in terms of alien invasive species laws?
- What else can I do to help honey bees access good forage resources?

Contents

About gum trees

Where do eucalypts come from?

Eucalyptus is a diverse genus of flowering trees and shrubs belonging to the myrtle family, Myrtaceae. There are no indigenous eucalypts in South Africa.

The genus, consisting of more than 700 species, is native to Australia.

Eucalyptus is one of three similar genera that are commonly referred to as 'eucalypts', the others being *Corymbia* and *Angophora*. Many species are known as 'gum trees' because they exude copious sap from any break in the bark. The generic name is derived from the Greek words (eu) = 'well', and (kályptos) = 'covered', referring to the lids that cover the flower buds.

Numerous species of eucalypts are cultivated widely in the tropical and temperate world because of their desirable characteristics such as:

- being a fast-growing source of wood;
- producing oil used for cleaning and as a natural insecticide;
- their ability to dry out swamps, thereby reducing the risk of malaria.

Outside their natural ranges, eucalypts are both lauded for their beneficial economic impact and criticised for being 'water-guzzling' invasive aliens, leading to controversy over their total impact.

On warm days Eucalyptus *forests are sometimes shrouded in a smog-like mist of vaporised volatile organic compounds exuded by the trees. The Australian Blue Mountains take their name from the haze.*

Bees and our food

Providing flowering plants for honey bees is crucial to South Africa's food security.

Deciduous fruit, vegetable seed crops, subtropical fruit, nuts, oilseeds and berries from 87 of the leading global food crops are dependent upon animal pollination, while only 28 crops do not rely upon animal pollination.

Insect pollination is worth over R10,3 billion per annum to South Africa.

South Africa's honey bees are under threat. They face diminishing habitat and forage resources, attack by the *Varroa* mite pest and American Foulbrood disease, pollution from pesticides, and stress from being worked hard to provide a pollination service. For honey bee populations to withstand these stresses, a healthy diet is critical for a fully-functioning immune system.

Wind- or self-pollinated crops

Pollinator-dependent crops

South Africa has two bee sub-species. Top: Cape honey bee, (winter rainfall region, *Apis mellifera capensis*), bottom: African honey bee (summer rainfall region, *Apis mellifera scutellata*).

Why are gum trees important?

Beekeepers need a supply of forage (food) for their colonies throughout the year.

Gum trees, indigenous trees and shrubs, agricultural crops, urban gardens and even roadside weeds provide the pollen (protein) and nectar (carbohydrates) that honey bees need to build a strong and healthy colony.

In South Africa there are about 85 different species of introduced gum trees. Because they flower at various times of the year, they provide a constant and reliable flow of nectar and a source of pollen, making them essential to the beekeeping industry.

Fewer honey bees could mean fewer crops, limited food choices, more expensive food and fewer agricultural jobs.

'Gums in the correct place in the landscape are critical to honey bees'

New laws for invasive gum trees

The six gum species listed in South Africa as invaders need only be removed if they are not in the correct place in the landscape.

Because gum trees have a value in society for their timber, as a bee foraging resource, and their ability to provide shade and wind protection, the new regulations only require the removal of gum trees where they are invasive or have a negative environmental impact.

The listed species have been declared invasive because of their negative impact on water resources, biodiversity, erosion and increased fire risk.

The relevant legislation – the *Alien and Invasive Species Regulations* – promulgated under the National Environmental Management: Biodiversity Act, 2004 (NEMBA), was published in the Government Gazette on 1 August, 2014 and became law on 1 October, 2014.

Not all gum tree species in South Africa must be removed. Landowners are often approached by unscrupulous contractors who claim that all gums must be removed. This is not true and the often unnecessary removal of gums should be avoided.

Gum trees growing in riparian areas are classified as Category 1b. Under these circumstances the trees need to be removed.

Five steps to evaluating gums

Step 1 *Gums not requiring any intervention*

Which biome do you live in?

If your land is within the Nama Karoo, Succulent Karoo or Desert biomes, eucalypts are exempt from removal. See Biome map on: bgis.sanbi.org

Are the trees within cultivated land?

If the gums are within cultivated land and are at least 50 metres away from untransformed or natural land (natural land may not be cleared to achieve this) they do not need to be removed.

Are the gum trees close to a farm homestead?

If the gums are within 50 metres of the main house on a farm, they are exempt from removal.

Is the tree trunk diameter greater than 400mm?

Gum trees in urban areas are exempt from removal if their trunk diameter is more than 400mm (at 1000mm height) at the time of publishing of the Regulations (1 October, 2014).

Are the gum trees in a formal plantation?

If the gums are an existing formal plantation, no intervention is required.

NOTE: All gum trees in riparian areas must be removed, even if any of the above are true. Listed gums in Protected Areas (nature reserves, national parks) or in ecosystems identified for conservation should also be removed.

Popular, non-listed gum trees

Look out for these non-listed, useful gum trees, favoured by beekeepers in South Africa.

Red flowering gum
(*Corymbia ficifolia*)

Grey ironbark
(Eucalyptus paniculata)

Yellow box
(Eucalyptus melliodora)

Black ironbark
(Eucalyptus sideroxylon)

Step 2 ***Gums requiring removal***

Eucalyptus trees within a 'riparian area' (i.e. within 32m of the edge of a river, lake, dam, wetland or estuary, or within the 1:100 year floodline, whichever is the greater), must be removed. This is necessary to prevent their establishment downstream, and impacts on water, sedimentation and on biodiversity.

Gums in Protected Areas (declared national parks, provincial reserves, mountain catchment areas and private nature reserves) must be removed. Discretion can be applied for non-invading species that add value to a Protected Area – e.g. shade for parking or historical value.

Eucalypts, particularly listed species, must also be removed if they are within a Listed Ecosystem or an ecosystem identified for conservation in terms of Bioregional or Biodiversity Management Plans.

Step 3 *Identify your listed gum species*

If the above two steps have been applied, and you are still unsure, you will then need to identify your gum species, because intervention will be required for the six listed species in most circumstances.

How can I identify the gum trees on my land?

Distinguishing between *Eucalyptus* species can be very difficult. Ideally you need to find dry fruit and flower buds beneath the tree, as well as see the fresh, mature flower buds on the tree to be able to identify the species. A close-up look at the bark of both juvenile and mature trees will also assist identification in some cases, as the bark of the species varies according to the age of the tree.

Use our Quick Key in the pages that follow to identify your gum trees, in order to determine whether they are listed and require management and/or permits.

All landowners are responsible for controlling the spread of gum trees on their land. If a tree is invading, seedling trees will be growing around the established trees and care should be taken to control their spread before it becomes unmanageable.

Identification key for gums

Select Option A or Option B and follow the lines to the next set of options.

1A

3 buds/umbel

2A

Capsule 9–11mm wide

Corymbia maculata

2B

Capsule up to 7mm (rarely 9mm) wide

Eucalyptus viminalis

1B

7 or more buds per umbel (or their buds scars if buds are aborted/broken off)

3A

Valves included

3B

Valves exserted

See page 12

Listed species

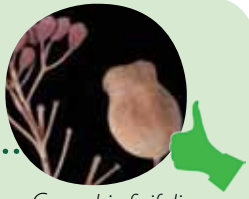
Non-listed species

Identification key for gums

4A Inflorescence terminal

5A 
Bark soft and flaky

Capsule 30–35mm wide


Corymbia ficifolia

5B 
Bark hard and deeply fissured (ironbark)

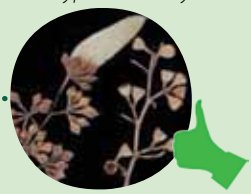
Capsule 5–16mm wide


Eucalyptus paniculata

6A Bark hard and deeply fissured (ironbark), very dark throughout, or young branches white


Eucalyptus sideroxylon

7A Capsule up to 7mm long


Eucalyptus melliodora

4B Inflorescence axillary

6B Bark smooth, or if rough, then not deeply furrowed and dark

7B Capsule > 7mm long

8A Capsule globose


Eucalyptus diversicolor

8B Capsule urn– or barrel–shaped


Eucalyptus cladocalyx

Note: This Quick Key does not include all gum species. It helps identify the 6 listed species and includes 14 of the species important to beekeepers.

3B

Valves exserted

9A

umbel stalk > 5mm wide

11A

2 umbels per axil,
10–15 buds per umbel

9B

umbel stalk < 5mm wide

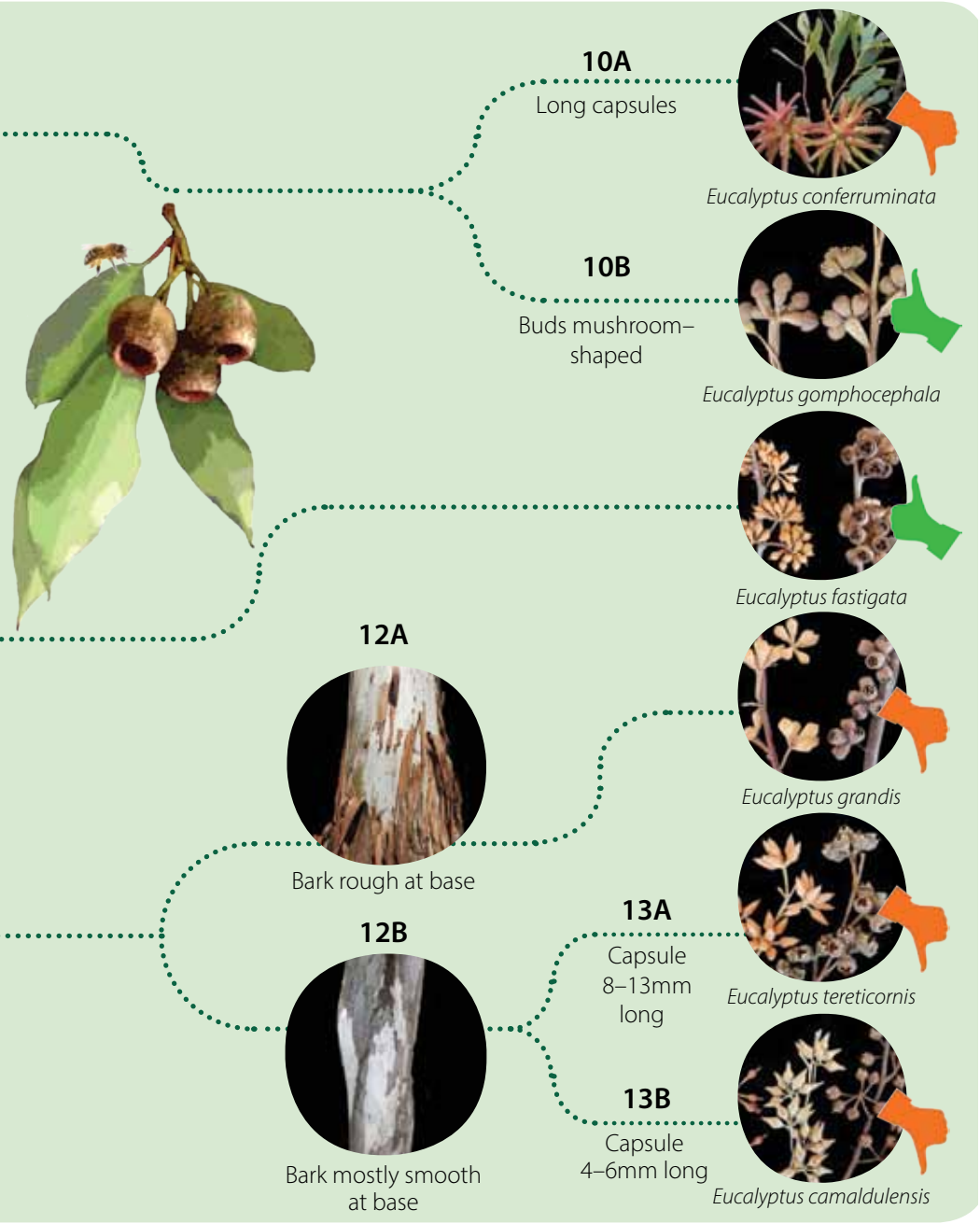
11B

1 umbel per axil, mostly 7 buds, some usually broken off, leaving scar.

Further *Eucalyptus* identification guides that will help you include:

Johannsmeier, MF., 2015, *Beeplants of South Africa*, South African National Biodiversity Institute, Pretoria (IN PRESS).

Brooker, I. & Kleinig, D., 1996, *Eucalyptus. An illustrated guide to identification*, Reed Books (1996) or Reed New Holland (1999). ISBN: 1 876334 36 3



www.anbg.gov.au/cpbr/cd-keys/euclid3/euclidsample/html/index.htm is an online *Eucalyptus* identification guide for Australia.

South Africa's Institute for Commercial Forestry Research **www.icfr.ukzn.ac.za** can potentially help with identifications for a fee, and are hoping to bring out a *Eucalyptus* field guide / identification key in the near future.

There is a useful key in the SAPIA newsletter #12 – available online at **www.agis.agric.za/wip/**

Listed gum trees

In certain landscapes, the six gum species listed as invasive must be controlled as laid down in the national regulations for invasive species. Even they can, in certain circumstances, be maintained by permit (see Step 4).

1 River red gum (*Eucalyptus camaldulensis*)

2 Spider gum (*Eucalyptus conferruminata*)

3 Sugar gum *(Eucalyptus cladocalyx)*

4 Karri *(Eucalyptus diversicolor)*

5 Saligna gum *(Eucalyptus grandis)*

The common name Saligna or Rose gum is used in South Africa. Elsewhere *Eucalyptus grandis* is called the Flooded gum. The common name for *Eucalyptus saligna* is the Sydney blue gum.

6 Forest red gum *(Eucalyptus tereticornis)*

Step 4 *Permits for listed species*

If the gum tree species on your property is a listed invasive species or hybrid thereof, and is not exempted by the provisions in Step 1, but is used as part of a plantation, woodlot, bee-forage area, wind-row or to line avenues, you may still maintain these gum trees. However, you must apply for a permit to demarcate them as Category 2 invasive species under the NEMBA AIS Regulations.

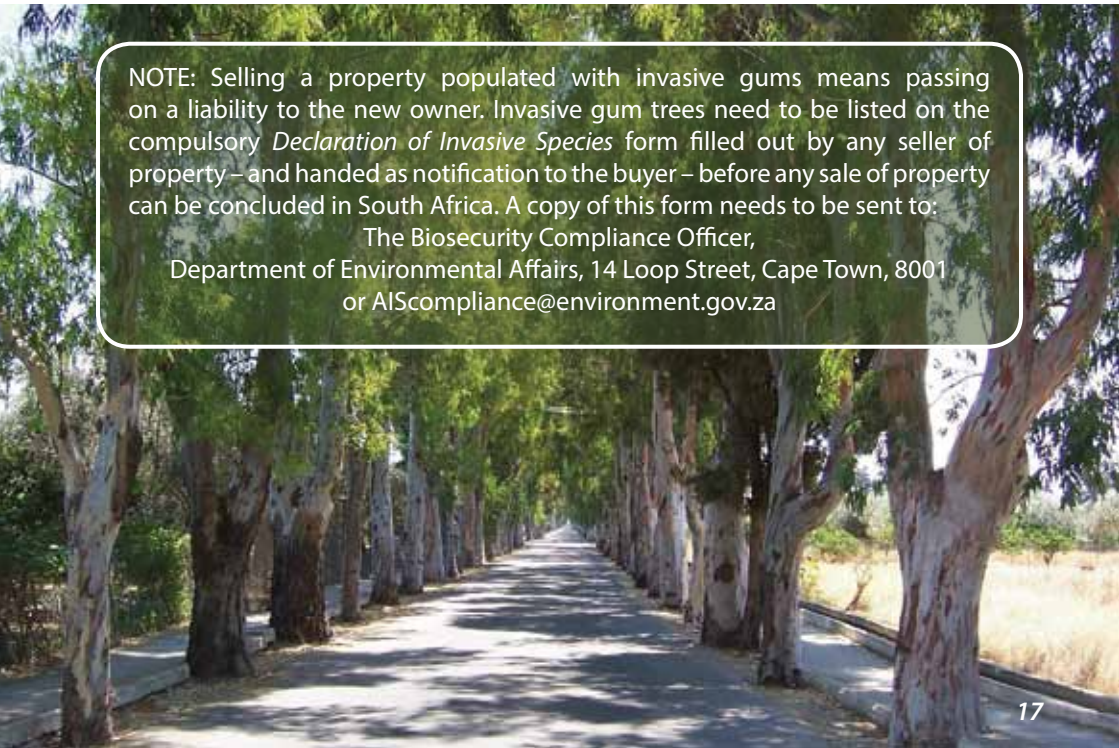
Category 2 listed invasive species require a permit to carry out a restricted activity. The restricted activities most relevant to landowners include '*having in possession*'; '*growing, breeding, propagating*'; and '*spreading or allowing the spread of*'.

Although the permit will allow you to maintain the specimens in the demarcated area, you will have to clear them outside of those areas. You will also be accountable should your gum trees spread into a neighbouring property.

Applicants applying for a permit to carry out a restricted activity involving Category 2 species need to compile a risk assessment report that will accompany their permit application. Permit applications and queries to **AISpermits@environment.gov.za**.

Download a permit application for your Category 2 gum tree species from:
www.environment.gov.za/documents/forms or **www.invasives.org.za**

NOTE: Selling a property populated with invasive gums means passing on a liability to the new owner. Invasive gum trees need to be listed on the compulsory *Declaration of Invasive Species* form filled out by any seller of property – and handed as notification to the buyer – before any sale of property can be concluded in South Africa. A copy of this form needs to be sent to:
The Biosecurity Compliance Officer,
Department of Environmental Affairs, 14 Loop Street, Cape Town, 8001
or AIScompliance@environment.gov.za



Step 5 ***Removing invasive gum trees***

If you prefer to remove your gum trees rather than apply for a Category 2 demarcation permit, consider these tips:

- Before you start, weigh up the costs of removing the *Eucalyptus versus* the benefits of honey bee forage resources to your area.

Honey bees are highly dependent on all *Eucalyptus*.

- Use a contractor linked to the Eco-Furniture Programme. They will remove your invasive trees for local community Eco-Furniture factories who make school desks for marginalised communities. Email **info@invasives.org.za** for more information.
- Avoid unscrupulous contractors who incorrectly insist that ***all*** gum trees must be removed, as they plan to profit from the wood harvest and often leave a damaged landscape.

The best methods for removing gums include:

- Uproot young gum trees with a basal stem less than 45mm in diameter;
- Ringbark large trees by removing a ring of bark 25cm wide. Peel the bark to just below ground level. Dead trees fall over. Remove them before they are dangerous;
- Knock off any coppices that appear on stumps before they shoot;
- Avoid the use of herbicides wherever possible;
- Note that biological control is not an option for gum trees.

Creating honey bee foraging areas

Landowners play an important role in providing habitat and forage for honey bees.

How you can help honey bees on your property.

Access

Allow access to registered beekeepers. A list of local beekeeping associations is available on ***www.sabio.org.za***

Protect hives

Work with beekeepers to ensure that beehive sites are secure and inaccessible to vandals. One of the big challenges for beekeepers in South Africa is that their hives are damaged and/or stolen.

Use chemicals responsibly

Honey bees will visit any flowering crop (especially the very attractive ones like canola, lucerne, sunflowers, citrus) as well as other flowers and weeds. Please take this into account when spraying chemicals – consult the label and adhere to its instructions. Be careful of chemicals when gardening too.

Choose indigenous bee-friendly plants

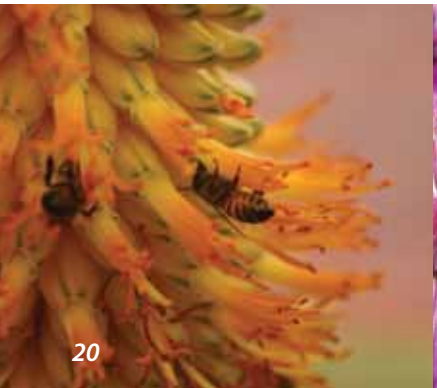
Promote foraging sites

Protect your natural vegetation by incorporating pollinator habitat or forage concerns into land-clearing authorizations (avoid unnecessary clearing of virgin land), environmental impact assessment processes, landuse planning policies and tools, and agricultural best practice.

Plant bee-friendly plants

- Consider planting indigenous bee-friendly plants when gardening, planting windbreaks or when rehabilitating land. Be sure to plant species that are appropriate to your area and flower at different times of the year. Check with your local nursery for subspecies or varieties that occur in your area to avoid invasive problems or hybridisations with veld species in the vicinity. Search bee-friendly plants on ***www.sanbi.org.***
- Consider planting complementary crop plants (lavender, basil) or fodder crops (clover, vetch). Also rotate land with legumes crops, as these are all important honey bee forage. Do not unnecessarily spray or remove weeds that are attractive to bees (wild radish, cosmos).
- Consider planting *Eucalyptus* trees on marginal land. Planting gums in rows along roads or between fields will establish forage for honey bees, and provide shade for livestock and firewood. Remember that the regulations will apply if planting any of the listed species, and permits may be required. Gums should be planted a fair distance apart to give the canopy space to flower.

A lack of good quality and variety of forage can lead to unhealthy honey bee colonies.



Working for Water

Restoring healthy ecosystems for honey bees

Established in 1995, Working for Water (WfW) is managed by Environmental Programmes, Department of Environmental Affairs. As a poverty relief programme, WfW employs over 30 000 poor people from marginalised communities to remove invasive species for the benefit of agriculture, biodiversity and ecosystem restoration across South Africa.

Acknowledged as one of the most successful integrated land management programmes in the world, WfW aims to improve the integrity of South Africa's natural resources by detecting and controlling emerging invasive species and managing the impact of established invasive species. A major biosecurity initiative also aims to protect the health and safety of all South Africans and the welfare of the environment by preventing the introduction of invasive species through the country's airports, harbours and border posts.

During 2013-2014, WfW-affiliated teams cleared 639 621 hectares infested with invasive species, rehabilitated 19 580 hectares, restored 105 wetlands, removed aquatic invasives from 195 000 hectares of water surface, did 1900 biological control releases and implemented fire-breaks across 95 523 hectares to suppress 90% of all wildfires.

The costs of biological invasions are substantial. Listed invasive *Eucalyptus* species adversely affect sensitive watercourses, pose an elevated fire risk to honey bee foraging areas and along with invasive phytophthora-related diseases, pose a huge threat to bee foraging areas planted up with non-invasive *Eucalyptus* species.

The WfW programme seeks to prevent ruinous eco-damage in honey bee foraging areas by clearing invasive species, implementing biocontrol programmes and restoring the functioning of natural ecosystems.

This booklet contributes to the outcomes of the GEF Global Pollination Project and the Honeybee Forage Project, both implemented by the South African National Biodiversity Institute (SANBI) between 2010 and 2014.

The GEF Global Pollination Project (Conservation and Management of Pollinators for Sustainable Agriculture through an Ecosystem Approach) was implemented in seven developing countries and executed by the Food and Agriculture Organization (FAO) of the United Nations, with financing from the Global Environment Facility (GEF) and implementation support from the United Nations Environment Programme (UNEP).

The Honeybee Forage Project was a national project in South Africa funded by the Working for Water Programme, Environment Programmes, Department of Environmental Affairs.

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