



THE TREE STOREY: 'DIEBACK OR GROWBACK?'

TREE HEALTH SURVEY FIELD GUIDE



INTRODUCTION

Eucalypts are an iconic part of the Australian bush and farm land, and are a vital and much loved part of our lives. Our trees are vital for wildlife too, providing food and a home for birds, insects and mammals, particularly large old trees that have hollows. Trees are part of our natural heritage and play an important role in helping to regulate our climate by providing shade and shelter from extreme weather. Under climate change the weather is likely to result in more extreme events such as heatwaves and droughts, and these may affect the health of our trees.

As our climate appears to be getting dryer, the Strathbogie Ranges Community have noticed that their trees seem to be suffering and show declining health. This survey is about measuring the health of our trees now and into the future so that we can be informed about:

1. What is the health of our trees now?
2. Are some species more or less healthy than others?
3. If tree health is in decline how fast is the decline?

With your help we can begin to answer these questions, together with scientists, and therefore take action to manage trees so that they can survive into the future.

It's easy to be involved by filling out the online survey and using this field guide to guide you through each survey question. It's quite simple so anyone can do it and the information is automatically uploaded to a central point where it can be analysed. We ask that you carry out a survey for as many trees as you like, but make sure you will have time to resurvey the trees at least every 6 months, but preferably at least once each season.

We will contact you to remind you that it is tree surveying time. By registering you agree to us contacting you for that purpose only. Your details will not be used for any other purpose.

GETTING STARTED

We ask you to initially register your interest so we can help you get started. You will need some way to keep track of your trees as you survey them over time so we recommend that you contact us so we can provide you with a number to put on each tree.

Register your interest with:

Jenny Wilson, Goulburn Broken Catchment Management Authority
e: reception@gbcma.vic.gov.au or
t: (03) 5822 7700

Now that you have registered you can download the survey as instructions below, attach the unique number to your tree, and get to know your tree(s).

USING THE APP OR WEBSITE FOR ONLINE SURVEY

1. Determine if you will have mobile data access from your device at tree survey sites:

Yes – I will have mobile data service

Scan the QR Code: OR visit www.gbcma.vic.gov.au/projects/tree-storey



To Complete a Survey through the browser:



- Open the Survey web address or Scan the QR Code
- Select... *Open in Browser*, from the two options shown above
- Complete the survey
- Submit the Survey

No – I will not have mobile data service where the trees are to be surveyed.



Prior to going into the field:

- Install the Survey123 App
- Open the Survey using either the Survey Web Address or QR Code
- Select *Open the Survey123 Field App*, from the two options shown above
- The Survey is now downloaded and can be taken in the field while offline if needed

2. To Start a Survey - Open the Survey123 Field App and Start a Survey

Note: If you get a login required message then you have gone to the general survey 123 app and not this survey. Use the Survey Web Address (using your browser) or QR Code (using your camera or QR code reader).

Before you go out in the field you will need:

- A soft tape measure or rope to measure the girth of the tree (see page 7 for details)
- A straight short stick
- This field guide
- A smart phone or ipad or tablet or laptop
- A tape measure to help measure the height of the tree (see page 6 for details)

OR you can fill in this guide and send to: GBCMA, 108 Welsford St, Shepparton, VIC 3630

+ SAFE FIELDWORK

The bush and paddocks are generally safe places but it is important to take care

- Do not do the survey in windy weather
- Make sure young children are supervised
- Take someone with you
- Do not climb around or lift logs – be aware of snakes
- Avoid contact with any caterpillars – just take photos

CHOOSING TREES TO SURVEY

When choosing a tree to survey, some things to think about:

- Can you easily and often access the tree?
- Is it a significant tree to you, because it is big and old, or you really care about it or you think it is in declining health?
- The tree can be any size – we need a range of sizes to help determine the health of all of our trees.

Below are outlines for each question you will find on the app.

If you do not have any electronic devices then you can use this field guide to answer questions and return to the contact details at the end of this guide.

Fill this out each time you go out to do a survey.

We recommend that you survey your tree(s) at least once every 6 months.

Tree ID Code

We will give you a number for each tree to be gently nailed on to the tree. Each time you enter data for this tree use its unique number so that we can identify which tree you are surveying.

To begin your survey you will need to fill in:

Name of assessor _____

Property address _____

Phone number _____

Email address _____

Once you have filled this out once, these will be automatically populated for each new survey.

Date: dd/mm/yyyy _____

Fill this out each time

IDENTIFY THE TREE SPECIES

There are over 700 Eucalyptus species in Australia, but we have narrowed down the list to those that you will most likely encounter in the Strathbogrie Ranges and surrounds.

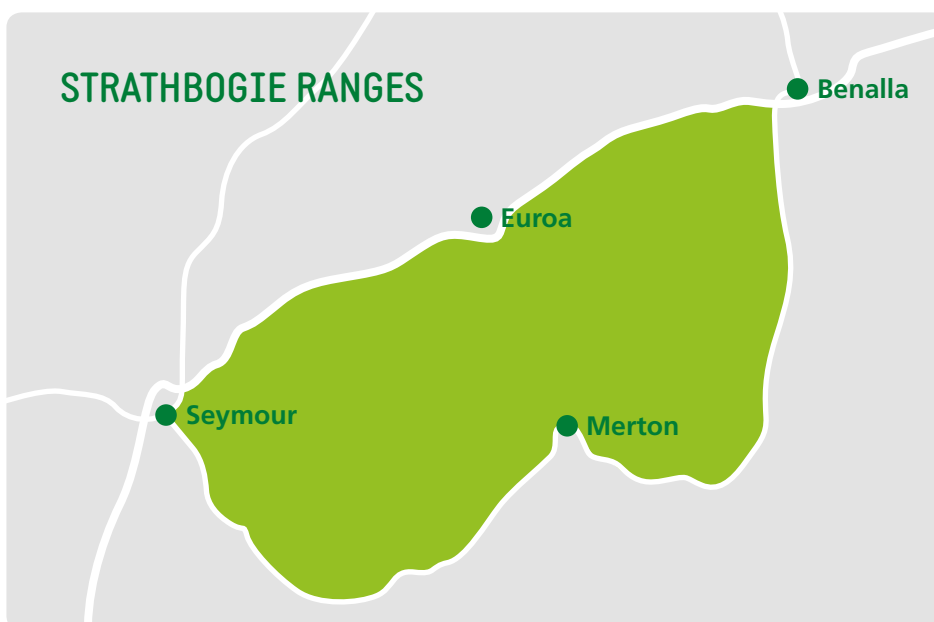
A field guide is available on registering to help you select the species of tree that you are surveying. You may have more than one species on your property. If you cannot identify the tree it may be a hybrid and so move onto a different tree, or send a photo to jennyw@gbcma.vic.gov.au or phone 5822 7700.

Key features to look for are: bark type, size and shape of leaves, and where the tree is growing in the landscape. For example River Red Gums grow where there is water all year round, and the similar Hill Red Gum only grow in dry areas, away from water. You can crush and smell the leaves and will find that peppermints have relatively soft leaves and live up to their name when crushed, and then all you have to do is decide if the leaves are small (narrow leaved peppermint) or large (broad leaved peppermint).

If you are still unsure, don't worry, when you fill out your survey and provide a photo it will be checked that you have identified the species correctly.

The species to choose from are:

<i>Eucalyptus albens</i>	White Box
<i>Eucalyptus blakelyi</i>	Hill Red gum
<i>Eucalyptus camaldulensis</i>	River Red Gum
<i>Eucalyptus camphora</i>	Mountain Swamp Gum
<i>Eucalyptus dives</i>	Broad-leaved Peppermint
<i>Eucalyptus globulus bicostata</i>	Blue Gum
<i>Eucalyptus goniocalyx</i>	Long-leaf Box
<i>Eucalyptus macrorhyncha</i>	Red Stringybark
<i>Eucalyptus melliodora</i>	Yellow Box
<i>Eucalyptus microcarpa</i>	Grey Box
<i>Eucalyptus obliqua</i>	Messmate
<i>Eucalyptus polyanthemos</i>	Red Box
<i>Eucalyptus radiata</i>	Narrow-Leaved Peppermint
<i>Eucalyptus rubida</i>	Candlebark
<i>Eucalyptus viminalis</i>	Manna Gum



TAKE A PHOTOGRAPH

You can take a photo with your electronic device as you fill in the survey and it will automatically upload or download a photo.

GPS points will be automatically populated.

MEASURE TREE HEIGHT (METRES)

You will need two people and this field guide in paper form to measure tree height. You will need two people for this.

1. The first person stands next to the tree trunk.
2. The second person takes this field guide and walks back away from the tree, holding this page at arm's length. Line the top of the tree up with the top of this page and the bottom of the tree to the bottom of this page.
3. Guide the person at the tree to hold the marker stick horizontally so it matches the 10% mark at the bottom of this page (or 5% mark for large trees).
4. Once the person at the tree has found the right height then get them to measure the distance from the ground to the height identified.
5. This measurement will give you 10% of the height, so multiply the height figure by ten to give you the actual height of the tree (or by 20 if you used the 5% mark).



10%

5%

MEASURE TREE CIRCUMFERENCE (CENTREMETRES)

Eucalypts can grow quite quickly depending on the weather and the health of the tree. Therefore it is important that we measure the girth of the tree to see if it is changing, and that we do this consistently each time we measure the tree.

Measure the circumference of your tree using your tape measure or rope at 1.3 metres from the ground. The tape should always be held at the same height around the circumference, even on leaning trees.



If you are interested, once you know the circumference you can estimate the tree age using the formula:

Circumference (in millimetres) divided by 3.14 and then multiply that number by 3.5

While this is a rough estimation it is interesting to know just how old some of our trees are!

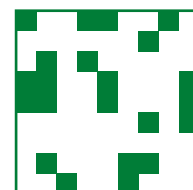
ESTIMATE FOLIAGE COVER

The amount of leaf area can be a good indicator of tree health, as generally the more leaves the healthier the tree (although the 'usual' amount can vary between different species).

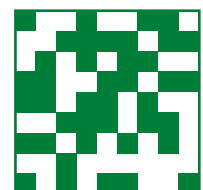
To measure foliage cover stand under the tree and look up. Estimate how much of the view is made up of leaves, or how much is sky if you find that easier. Choose the closest fit from the five options here.



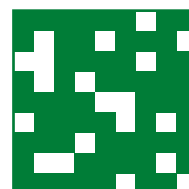
No leaves



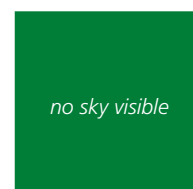
25%



50%



75%



All leaves

ESTIMATE THE NUMBER OF DEAD BRANCHES

This refers mostly to the death of the more structural branches or limbs, rather than a few smaller random branches. The death of large numbers of smaller branches may also be notable.



None



Few



Some



Many



Dead

TREE LOCATION



Isolated paddock tree



In a clump of paddock trees



Tree within a remnant woodland or forest



Roadside tree



Park or garden tree

SURROUNDING LAND USE

More than one can be selected:

- Paddock, sheep grazing
- Paddock, cows
- Paddock other stock (eg alpacas)
- Remnant bush
- Grain or hay crop
- Horticulture eg grapes, cherries
- Paddock tree but no stock or agricultural enterprise
- Remnant bush grazed by stock
- Other

TREE HEALTH

This section identifies some of the factors that can affect tree health. These can often be interconnected and a result of stress. We can tell if trees are unhealthy because trees show 'dieback'.

Dieback occurs when trees are stressed, and this can happen through a range of interconnected pressures. For example, clearing native vegetation for stock grazing, and leaving just a few paddock trees results in stock camping under trees, which causes soil compaction making it more difficult for water to penetrate the soil.

In addition, there are increased nutrients from manure, which can stress a tree and result in increased insect attack as tree leaves have increased sugar levels. These sugary leaves can in turn feed more insects, which attack the leaves reducing the ability of the tree to photosynthesis.

To make matters worse, the small insectivorous birds that would normally keep the insects under control are not around because of the lack of a shrubby understory.

In addition, trees are no longer buffered from strong winds by other trees, soils are exposed to heat, and trees are more likely to suffer limb loss and drying soils. There are also other interactions that we know less about, such as how fungi and soil microbes are affected by clearing and stock grazing.

All these pressures can result in tree dieback, signs of which include dead branches, brown leaves and excessive mistletoe. Therefore, this part of the survey identifies the degree of all of these stressors.

MISTLETOE

Mistletoe is an important part of our bush and there are at least two birds, such as the mistletoe bird and one butterfly that rely on mistletoe exclusively. However, if there is lots of mistletoe in a tree it can be a sign of stress and may eventually kill the tree. In some seasons it can be easier to see than others, but once you get your eye in you will be seeing it everywhere! It is often more green than the tree and hangs in a large clump.



Minor



Moderate



Severe

LERPS

Lerps, leaf skeletonisers, and leaf miners are all insects that cause brown or dead patches in the leaf. In some trees in some years, they can turn the whole canopy brown. Lerps show themselves as browning of the leaves as the small waxy insects suck the chlorophyll from the leaves. They prefer River Red Gums in particular.



Minor



Moderate



Severe

BEETLES AND CATERPILLARS

These can be more difficult to see but in large numbers can affect tree health.

- None
- Minor
- moderate
- Severe
- Uncertain



STORM OR FIRE DAMAGE

More than one can be selected

- Broken limbs
- Fallen branches
- Lightning strikes
- Bushfire scarring
- None



Storm damage



Lightning strike



Bushfire



Epicormic growth after fire

NEARBY VEGETATION

The surrounding land use and the area directly around the tree can also provide information about current, and likely, future, tree health.

- The tree has been fenced to prevent stock access
- Fallen branches remain under the tree (enough branches to protect at least some of the vegetation around the tree from grazing)
- Understory shrubs present
- Stock camp - Manure build up
- Rubbing and bark stripped from the trunk
- Grass only



Fallen Timber beneath tree



Tree fenced to exclude stock



Cattle stripping bark from trunk



Stock camp with manure

GROUND SURFACE UNDER TREE



Bare soil



Grass (*Native, introduced, mixed or unsure*)



Fallen leaves/twigs

NATURAL RECRUITMENT

Our big old trees will not live forever and therefore it is important that they are being replaced by new generations of trees. The number of different ages of trees is important to measure so we know if there are going to be trees in that area into the future.



TREE SEEDLINGS

Less than 30cm in height, growing beyond drip line and within 20m of tree.

- None Less than 10 More than 10



TREE SAPLINGS

Up to 3 metres in height, growing beyond the drip line and within 20m of tree.

- None Less than 10 More than 10

NOTES / FURTHER COMMENTS

Add any comments about general tree health to refer to next time you monitor this tree. Notes could include whether you think the tree is more or less healthy than you have thought in the past. If there are hollows, or fungi associations, or anything else you find of interest (see over page for some suggestions).

POSSIBLE COMMENT ISSUES



Ivy strangling tree



Inappropriate fencing techniques



Nesting Boxes and habitat hollows



Human intervention



Fungal associations



Unexplained dieback



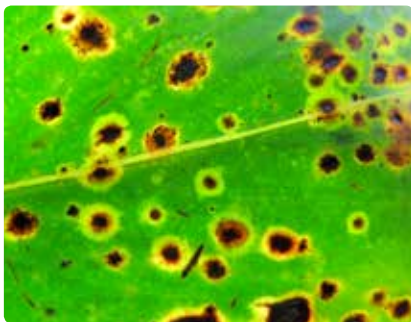
Early settlers - Ned Kelly's mailbox



Flowering events and pollinators



Lumps and bumps



Leaf disease



Cultural heritage significance

PADDOCK TREE ADDITIONAL INFORMATION

TO AID IDENTIFICATION

Species	Common Name	Max height	Rainfall requirements	Site Preference	Flowering Time	Seeds Mature
<i>Eucalyptus albens</i>	White Box	25m	400-700mm	Fertile soils	January - June	Summer-Autumn
<i>Eucalyptus blakelyi</i>	Hill Red Gum	20m	300-500mm	Moderately fertile soils	August - January	February - June
<i>Eucalyptus camaldulensis</i>	River Red Gum	40m	<1000mm	Alluvial soils	Variable	March - September
<i>Eucalyptus camphora</i>	Mountain Swamp Gum	20m	>600mm	Moist soils	March - April	March - June
<i>Eucalyptus dalrympleana</i>	Mountain Gum	40m	>800mm	Moist soils	March - May	All year
<i>Eucalyptus dives</i>	Broad-leaved Peppermint	20m	>600mm	Well drained soils	October - December	All year
<i>Eucalyptus globulus bicostata</i>	Blue Gum	45m	700-1200mm	Fertile soils	September - January	January - June
<i>Eucalyptus goniacalyx</i>	Long-leaf Box	15m	>500mm	Dry rocky slopes	March - August	All year
<i>Eucalyptus macrorhyncha</i>	Red Stringybark	35m	>400mm	Fertile well drained soils	January - April	Summer
<i>Eucalyptus melliodora</i>	Yellow Box	30m	400-1000mm	Fertile well drained soils	September - February	November - April
<i>Eucalyptus microcarpa</i>	Grey Box	25m	400-1000mm	Heavy soils	February - July	November - August
<i>Eucalyptus obliqua</i>	Messmate	45m	>700mm	Well drained soils	January - March	Most times
<i>Eucalyptus ovata</i>	Swamp Gum	20m	>700mm	Swamps and creek flats	March - November	October - March
<i>Eucalyptus polyanthemus</i>	Red Box	20m	>400mm	Well drained soils	September - January	December - September
<i>Eucalyptus radiata</i>	Narrow-leaved Peppermint	40m	>650mm	Wide range of soils	October - January	August - April
<i>Eucalyptus rubida</i>	Candlebark	35m	>700mm	Moderately fertile soils	November - February	January - September
<i>Eucalyptus viminalis</i>	Manna Gum	50m	>650mm	Moist well drained soils	Summer	September - March



FOR FURTHER INFORMATION CONTACT:

Dr. Jen Wilson, Strategic Landscape Planner
Goulburn Broken Catchment Management Authority
168 Welsford Street, PO Box 1752, Shepparton 3632
t. (03) 5822 7715 **f.** (03) 5831 6254 **m.** 0459 023 690
e. jennyw@gbcma.vic.gov.au **w.** www.gbcma.vic.gov.au

ACKNOWLEDGEMENTS

This project to survey the health of our trees was initiated by the community of the Strathbogie Ranges through a series of workshops that identified what the community loves about living in the Strathbogie Ranges and how we can maintain what we value into the future as we consider climate change.

In particular, the Goulburn Broken CMA would like to recognize the valuable contribution to this project by the workshop group: Alistair Tame; Ben Tate; Bertram Lobert; Bruce Wehner; Carole Hammond; Chelsea Cherry; Des Ryan; Eloise Seymour; Erwin Weinmann; Fiona Johnson; Fiona Lloyd; Garry McDonald; Gaye Sutherland; Helen Scott; Janet Hagen; Jeff Washusen; John Curtis; Jonathan Hayman; Karen Brisbane; Karyn Bosomworth; Kate Brunt; Kerri Robson; Lucas Russell; Luke Stannard; Marcus Stewart; Melanie Anderson; Penny Algar; Phil Whitten; Shirl Saywell; Snow Barlow; Susan Sleigh. All photos by Janet Hagen Strathbogie Ranges Conservation Management Network except aerial photos by Alistair Tame. This project is supported by the Goulburn Broken Catchment Management Authority through funding from the Victorian Government's 'Our Catchments Our Community' program.

We acknowledge the Traditional Owners of the land on which we work and pay our respects to their Elders; past, present and future.