



Living with mistletoe

Mistletoe Management Guidelines for the Clare and Gilbert Valleys

Facts and myths about native mistletoe

The vital role of mistletoe for wildlife

Technical notes on selective control of mistletoe

A guide to getting habitats back in balance

Important warning

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The information in this brochure is designed for Blue Gum and Peppermint Box woodlands of the Clare and Gilbert Valleys. However, the general ecological principles should be relevant elsewhere. The Native Vegetation Act (NVA) protects all mistletoe and any removal must be done in accordance with Native Vegetation Council (NVC) policies and guidelines. In most situations, formal approval of the NVC is required.

The information provided in this document has been prepared in good faith by the Mistletoe Action Group (MAG) of the Clare and Gilbert Valleys Council. This guide does not replace the Native Vegetation Act 1991 and its regulations. Neither the authors nor the organisations associated with this booklet guarantee that the information provided is complete or accurate and do not accept any responsibility for any errors or omissions in the contents.

Users should, where appropriate, seek professional advice about the conditions of the Native Vegetation Act 1991 and the exemptions under Regulation 3(1)(s) for the selective control of Box Mistletoe, from the Native Vegetation Council Secretariat and Biodiversity Assessment Section, Department for Water, Land and Biodiversity Conservation at:

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Facts about mistletoes

- **FACT** Mistletoes are native plants

Mistletoes occur around the world. The Australian mistletoes are all native to Australia.

There are 60 species of mistletoe in Australia of which 17 species occur in South Australia. Mistletoes can be found in all kinds of habitats from the desert to forests and coastlines. Seven species can be found in the Mid-North of SA.

- **FACT** Mistletoes are important for wildlife survival

Mistletoe leaves, flowers and fruits are all important food sources for native wildlife. They are a vital link in the life cycle and survival of many species.

- **FACT** Mistletoes are only semi-parasitic

Mistletoes attach to trees or shrubs and use them as a source of water and nutrients, rather than rooting in soil. They manufacture their own food (sugars), as can all plants with green leaves.

A mistletoe seed deposited on a branch of a host plant grows a 'root', which works its way through the bark of the twig. This becomes the mistletoe anchor (haustorium) in the host.



Box Mistletoe

Yellow-green leaves that are 'gum-leaf shape'. Hanging leggy red flowers in groups. Each flower is on a separate small stalk.



Harlequin Mistletoe

Pale blue-green leaves in pairs on fragile stalks. Red and green flowers held erect. PROTECTED.



Wire-leaved Mistletoe

Leaves are 'needle-like' in shape. Hanging leggy red flowers in groups. Usually grows in wattles. PROTECTED.

Myths about mistletoe

Myths about mistletoe

- **MYTH** Mistletoes always kill their host

A host tree, if healthy, can usually support, outlive, and shed the occasional mistletoe during its lifetime without harm. Trees supporting high numbers of mistletoe can become stressed as the ability of the host to supply them all with water and nutrients is overstretched. This may contribute to a decline in health with a significant loss of foliage and vigour. However, such trees are likely to have been under duress from other causes before the mistletoes established themselves in high numbers.

- **MYTH** Each kind of mistletoe can grow and live on many species



Mature mistletoe fruit contains a sticky seed

Photograph by Jean Turner

Many kinds of mistletoe can live only on one, or a few, specific host plants. Host plants for different mistletoe include Eucalyptus, Wattle, Senna, Sheoak, Tea-Tree, Grevillea, Hakea, Emu-bush, Quandong, and Sugarwood. Each species of mistletoe has its own leaf shape and cannot change these to match its host.

- **MYTH** The Mistletoe Bird causes all mistletoe infestations

Mistletoe Birds are effective in spreading mistletoe seeds. However, many other native birds, as well as feral birds including Blackbirds and Starlings, eat mistletoe fruit and seeds.

Mistletoe seeds pass through the digestive tract of a Mistletoe Bird very quickly and are still sticky when they come out. The Mistletoe Bird is distinctive in that it sits **along** a twig; 'wiping its bottom' on it, and seeds are likely to both land and stick there. Other bird species sit **across** branches and seeds may or may not fall on the branch when passed out or regurgitated.



Photograph by Brian Furby

The male Mistletoe Bird (females have a paler red breast)

Every part of the mistletoe is used in nature

All plants lose bits of bark, leaves, flowers, pollen, nectar and seeds to wildlife without any overall long-term damage.

Leaves

Caterpillars (larvae) of 'White' and the colourful and rare 'Azure' butterflies feed on mistletoe leaves. The butterflies lay their eggs near mistletoe clumps and their caterpillars can strip a significant proportion of leaves from the host mistletoe before pupating.

Flower nectar

Many birds including White-plumed, White-naped, Crescent, and Singing Honeyeaters and the Eastern Spinebill eat mistletoe nectar. Many mistletoe species flower in summer and autumn when other nectar sources are scarce and are an essential energy source 'out of season'. In return, birds pollinate the flowers, helping ensure fruit for other wildlife later in the year. The nectar is also important for many insects including native bees and moths.

Fruit

The Mistletoe Bird and the Painted Honeyeater depend heavily on mistletoe fruit as their main food source. Indeed, a range of over 30 birds, including Honeyeaters, Wattlebirds, Rosellas, Silvereyes, and Emus eat the fruit. The caterpillars of various insects eat their way into the fruit as a food source.



Photograph by Brian Furry

The mistletoe clump

A number of small birds shelter and build nests in the canopy of mistletoe. These include Diamond Firetail Finches and the Painted Honeyeater.



Photograph by John Cheate

Possums eating mistletoe leaves in food preference experiment

Brushtail Possums and Ringtail Possums eat a substantial amount of mistletoe foliage because the leaves are more succulent, more nutritious, and less toxic than gum leaves.

Why does Box Mistletoe seem to be increasing?

There is no simple answer. The natural environment has changed significantly over the past 150 years and each change affects something. An overabundance of Box Mistletoe may be an indicator of a habitat out of balance. The best understandings of habitat experts at this time suggest the following reasons:

Loss of intact habitat and native understorey

Widespread clearing of vegetation, especially woodlands, has reduced the total number of native trees living in a balanced habitat with native understorey plants. The natural control agents of mistletoe, which would have lived amongst this understorey, are also missing.

Many existing mature trees are old and isolated

Many paddock trees are now 200-300 years old, less vigorous, and more susceptible to stress. Few new young trees are coming up to replace old trees. The open landscape favours birds which use mistletoe.

Change in bushfire patterns

Bushfires help control mistletoe, but the normal pattern of bushfires has changed. Hot burns kill mistletoe, while eucalypts can re-sprout from their trunk and branches. Cool fires also set back mistletoe growth enabling the host to regain vigour.

Serious decline in possum numbers

Possums eat mistletoe leaves and flowers. As possum numbers decline, fewer mistletoe clumps, flowers and fruits of mistletoe are being eaten or 'pruned' and kept in check.

Changed land management

Many gum trees are now in paddocks used for cropping, grazing, and horticulture. They are under stress from increased nutrients in fertiliser applications and dung in stock camps, and are often affected by insecticide and herbicide drift.



A single mistletoe in a tree is not an environmental problem



A 'stump' on a healthy gum tree where its mistletoe has been outlived and rejected.

Mistletoe is not a death sentence!

A healthy tree can support a mistletoe with no long-term adverse effects. It is often possible to see 'stumps' on eucalypt branches where a mistletoe has died and fallen off while the host lives on.

Scattered mistletoe in native vegetation is not a problem

Scattered mistletoe in some trees in a patch of native vegetation is part of the normal give-and-take in the web of life. Most habitats support light to moderate levels of mistletoe which can be a positive factor for wildlife rather than a threat.

Many mistletoes in a lot of trees in an area may be a problem

When there are many mistletoes in most trees in an area, it may be a cause for concern because:

- Individual trees can become stressed and may not recover, leading to tree decline in an area, an issue which will impact on wildlife survival.
- There are not enough young trees to replace the old trees that succumb to the extra stress of mistletoe.

It is important to know that excessive mistletoes are usually a symptom of a problem, not the cause.



Photograph by Jenn Tesoriero

Photograph by Jenn Tesoriero

Managing Box Mistletoe - short term tactics

Mistletoes have a very important ecological role. This can get out of balance when they are overabundant. Short-term emergency actions can be taken to reduce the impact of mistletoes on individual trees and prevent the premature widespread death of mature trees.

Research shows that removal of mistletoe from moderately to severely infested trees will give them relief from the overall stress burden and allow individual trees to reinvigorate.

These actions only buy time and must be combined with long-term remedies.

Short-term emergency actions to buy time

- **Step one: selective lopping where permitted**

Assess the level of infestation. Trees must be moderately to severely infested and showing signs of stress before action can be taken. See the NVC guidelines summary and photographs on page 11.

If the assessment, in accordance with NVA regulations and NVC guidelines, allows for the removal of some Box Mistletoe, undertake the lopping as outlined in the guidelines.

Mistletoes influence the growth of the host by suppressing both sugar production in leaves and regeneration of shoots below the mistletoe. Mistletoes at the ends of branches have most impact.

Regenerate host trees by selective lopping of mistletoe close to the point of attachment. Leave as much of the tree as possible. Every tree limb has potential as wildlife food or shelter. Even dead gum trees are important for wildlife, supplying hollows for protection and nesting.

The infested trees should be photographed before and after lopping from a fixed point (photopoint monitoring) to monitor change in condition over time.



Male mistletoe bird at nest.

Managing Box Mistletoe - long term strategies

In the long term, it is important to restore the ecological balance that will control the number and effect of Box Mistletoe naturally. It is important to regenerate bushland so that there are several generations of trees present (seedlings, juveniles, saplings, mature, old, standing dead). It is also important to improve the general environmental conditions near the trees.

Long-term remedies to help fix the problem

- **Step two: retain bush blocks**

Retain and protect all existing native habitat with fencing, and manage weeds. An improved ecosystem puts less stress on individual trees, retains hollows, and provides alternative food plants for birds that eat mistletoe fruit as well as for other natural control agents.

- **Step three: fence trees from stock**

Protect existing trees from stock with fencing to minimise nutrient build up.

- **Step four: naturally regenerate saplings**

Fence groups of existing trees to allow for natural regrowth of tree seedlings and understorey.

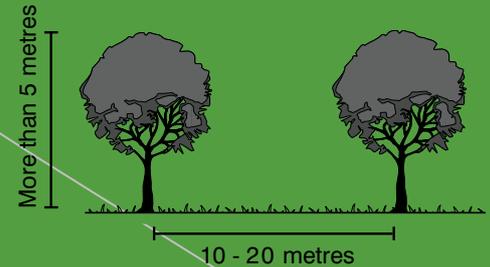
- **Step five: replant understorey**

In the fenced groups of trees, replant the understorey with local species.

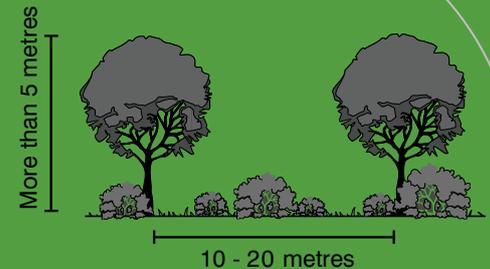
- **Step six: buffer and link bush blocks**

Replant areas of local native vegetation to buffer existing habitat or to join two nearby areas.

Photograph the vegetation and trees in the fenced area from a fixed point (photopoint monitoring) to monitor changes over time.



Now: Only mature trees exist with no understorey



The long-term goal: Groups of trees are fenced, new trees regenerate naturally or are planted and understorey plants are re-introduced.

Grassy woodlands were the original natural habitat

Much of the Clare and Gilbert Valleys was originally native grassy woodland. However, less than 3% of natural woodland habitat remains today.

Birds and other wildlife depend on grassy habitats

Grassy habitats are essential for some wildlife. The openness of grassy woodlands provide low perches for native birds to watch for insects and a supply of food for birds which specialise in eating grass seeds. Reptiles and insects move around to feed and breed in spaces between native grass tussocks.

Key ideas to consider when replanting woodlands. Look before you plant!

Are there native grasses and other understorey plants present? If so,

- natural regeneration may be more successful than planting
- encourage the native grasses and understorey to spread and supplement with scattered tubestock

- if planting, avoid site preparation methods that will damage the existing understorey (spraying, scraping, ripping, and / or cultivation)

Use only native species that naturally occur in your local area.

Mimic the natural structure of grassy woodlands - aim for an open look.

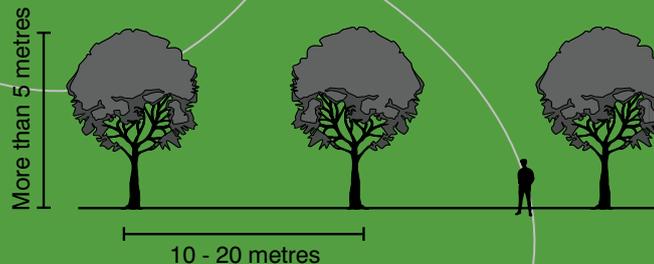
- use mainly native grasses, herbs and other low understorey plants
- plant trees at least 10 metres apart.
- plant shrubs in small groves, not at regular intervals.

Seek professional bush management and revegetation advice.

Bigger is better

If possible, work together with neighbours to protect and regenerate a larger area than you could fence by yourself. Habitats increase in value for wildlife with increased size.

Although all areas of native vegetation are important for wildlife, many birds and other wildlife species require an area of at least 10 ha of native bush to successfully breed and raise young.



Woodlands are areas where the trees are at least 5m tall and are widely spaced, between 10m-20m apart, so that their canopies shade less than 25% of the ground in the middle of the day. Grassy woodlands are “see through woodlands” with many grasses, wildflowers and only a few large shrubs. (See Spring Gully Conservation Park for example.)

NVC Guidelines for Box Mistletoe Control

These NVC guidelines are for short-term actions to prolong the lives of mature trees and should be undertaken in conjunction with native vegetation protection and revegetation work.

In general, removal of mistletoe requires endorsement by the Native Vegetation Council except where:

The trees are in a township

OR

mistletoe clumps will be cut from 10 trees or less

AND

the trees are not in native vegetation with intact understorey

AND

the trees have significant dieback as indicated as Class 2 and Class 3 in the following photographs

AND

the removal of mistletoe clumps has a minimal effect on tree limbs and branches especially those with nesting hollows. Lopping must concentrate on Box Mistletoe and leave as much of the host tree as possible.



Low level infestation: no mistletoe can be removed
Class 1: tree apparently healthy, no significant loss of tree foliage (less than 30% loss)



Moderate level infestation: 70% of the mistletoe clumps can be removed
Class 2: tree with some signs of stress, up to 30%-40% thinning of tree foliage with no other apparent reason other than mistletoe burden



High-level infestation: all mistletoe clumps can be removed

Class 3: tree stressed, numerous mistletoe clumps clearly visible, over 40% thinning or dieback of tree foliage has occurred

Photographs courtesy of Native Vegetation Council

NOTE: These lopping guidelines *apply only to Box Mistletoe*.

The Mistletoe Action Group

The Mistletoe Action Group has been involved since 2000 in a scientifically based program approved by the NVC to manage Box Mistletoe in the Clare and Gilbert Valleys. This includes experiments in fencing woodland remnants, selective lopping, and revegetation of understorey near remnant trees, along with photopoint monitoring and an education program about living with mistletoe.

Further information

A diverse habitat is likely to be a healthy ecosystem. For example, some butterfly larvae feed on mistletoe leaves but the adult butterflies rely on nectar from different understorey plants.

The rare Genoveva Azure Butterfly requires both mistletoe and a species of Sugar Ant for survival. At night, the caterpillars are herded up the host tree trunk to feed on mistletoe leaves, and guarded by the ants. During the day, the caterpillars are moved to the protection of the Sugar Ant nest to rest. The Sugar Ant eats the exudate of the caterpillars in return for the protection.



Photograph by Roger Grund

The Genoveva Azure (male)

For more information on butterflies and mistletoe see:
http://users.chariot.net.au/~rbg/mistletoe_ds.htm

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Acronyms

NVA Native Vegetation Act 1991

NVC Native Vegetation Council



Natural
Heritage
Trust

Helping Communities
Helping Australia

A Commonwealth Government Initiative

CLARE & GILBERT VALLEYS COUNCIL