


The Glove Box Guide to
Understanding and Improving Woodland Ecosystems in the Mid Loddon






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Project Team:
The 'Ecosystem Function in the Mid Loddon' project aims to improve knowledge and understanding of native ecosystem function and the value derived from ecosystem services for the benefit of farmers and the community as a whole.

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Contents

Clockwise L-R: Woody Habitat, Scented Sundew, Harlequin Mistletoe, Lichen

Ecological Health

An ecosystem is a naturally occurring community of plants, animals and micro-organisms interacting with one another and the surrounding environment.

Within healthy, self-sustaining ecosystems critical processes or functions are naturally regulated. Processes include soil formation & stability, nutrient cycling, water infiltration & holding capacity, pollination and seed production.

Ecosystems provide many "services" from which humans benefit. Ecosystem services flow from vegetation, soil, water systems, animals, other living organisms and the atmosphere to provide us with financial, ecological and cultural benefits.

Highly simplified agricultural landscapes and small patches of remnant vegetation often require increasing external inputs in order to maintain a given level of function. Highly functional landscapes may be better able to respond to natural & imposed disturbances such as fire & drought, or provide stable yields without requiring increased inputs.

Clockwise L-R - Lichen, Fungi, Wingless Bluebush flower, Twining Fringe Lily, Buloke Mistletoe

Understanding your patch

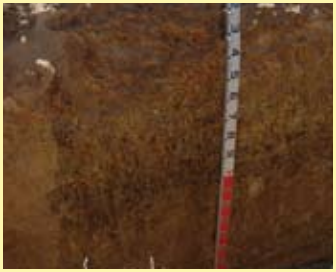
Shrubs

Gold Dust Wattle

Herbs

Ruby Saltbush

Soils



Soils

Ground layer

Ground layer

Trees

Woodland Trees

Grasses

Native Grasses

Trees - What to look for...

A mix of trees of different ages is more functional and provides more services. Mature trees reduce wind velocity, have deep roots to use groundwater and are a vital seed source. Younger trees use soil moisture for growth and provide an insect food source for fauna.

Mix of trees in age and height

Fruits, flowers and seeds are an important food source for insects, birds and small mammals.

White Box blossom

Trees with hollows

Hollows in trunks and branches provide vital shelter and breeding sites for native fauna. Hollows only occur in mature trees and can take over 100 years to form.

Trees of different heights provide structure, habitat and shelter for native fauna from wind, sun and rain.

Tree Goanna

Threats

Removal of trees results in the loss of habitat and food resources for native fauna.

Stock camping in the remnant rub and ring bark mature trees and cause nutrient enrichment which can lead to outbreaks of insects resulting in tree die-back. Stock camping also causes twigs, leaf litter and the biological soil crust to be broken up. This exposes the top soil and reduces the amount of ground cover that is vital for seed germination.

Continuous grazing by stock and pest animals results in the loss of young plants and affects seedling survival and growth. Grazing causes soil compaction and increases nutrient levels, weediness and the amount of bare ground within the patch.

Pruning of branches removes the mid-storey vegetation which is important habitat for insects and birds.

Actions you can take

- ✓ **Retain trees of all sizes, including old and dead trees**
- ✓ **Control stock access (see page 18 & 19)**
- ✓ **Fence to protect seedlings and young trees**
- ✓ **Control pest animals and plants**

✗ Stock camping

Shrubs - What to look for...

A range of shrub species means greater functional diversity. Species diversity provides native fauna with habitat and food sources year round.

A range of shrub species

Fruits, flowers and seeds are an important food source for insects, birds and small mammals.

Bushy Needlewood

A diversity of shrubs of different heights provide structure and shelter for native fauna from wind, sun and rain. Shrubs stabilise the soil and provide a seed source for regeneration.

A diversity of shrubs

Threats

Stock camping in the remnant causes twigs, leaf litter and the biological soil crust to be broken up. This exposes the top soil and reduces the amount of ground cover that is vital for seed germination.

Continuous grazing by stock and pest animals results in the loss of young plants and affects seedling survival and growth. Shrubs often have short-lived seed therefore regular grazing will eliminate grazing-sensitive shrubs quickly and permanently.

Pest plants compete with native plants for space to germinate and essential resources including nutrients and water. They can dominate a site and prevent recruitment of native plants.

Actions you can take

- ✓ **Limit stock access and strategically balance grazing for feed, shelter and conservation (see page 18 & 19)**
- ✓ **Support natural regeneration (see page 16)**
- ✓ **Retain fallen debris, as this promotes regeneration by protecting seedlings from grazing**
- ✓ **Control pest animals and plants**

✗ Weed infestation

Grasses, Rushes & Herbs - What to look for...

Grasses, rushes and herbs increase the amount of ground cover, stablise the soil and provide important habitat for native fauna such as the Fat-tailed Dunnart.

Fat-tailed Dunnart

A range of grass and herb species means greater diversity, providing a range of different habitats and food sources. A mix of summer and winter active species limit opportunities for annual weeds.

Perennial cover of native grasses

Fruits, flowers and seeds are an important food source for insects, birds and small mammals. The native fauna supported by these floral resources play a very important role in pollination.

Late-Flowered Flax Lily

Perennial cover supports healthier soils and nutrient retention.

Threats

Stock camping in the remnant increases nutrient levels and weediness. Stock camping also causes twigs, leaf litter and the biological soil crust to be broken up. This exposes the top soil and reduces the amount of ground cover that is vital for seed germination.

Grazing by stock and pest animals results in the removal of plant biomass, causes soil compaction and increases the amount of bare ground within the patch.

Pest plants compete with native plants for essential resources including nutrients, water and sunlight. They can dominate a site and may prevent recruitment of native plants.

Nutrient input is primarily from stock manure. High levels of nutrients encourage weediness and act as a barrier to the recolonisation and dominance of native perennials.

Non target herbicides and spray drift kill native species, increase germination opportunities for annual weeds and potentially pollute the soil, reducing soil health.

Actions you can take

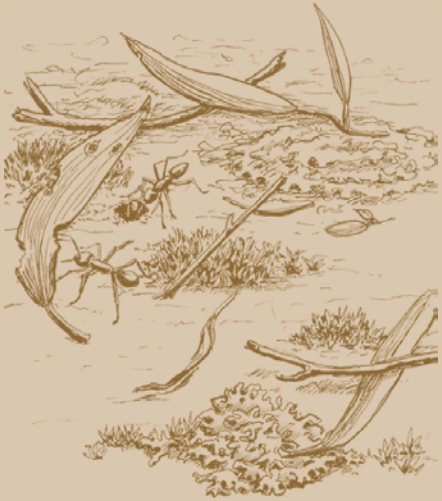
- ✓ **Limit stock access**
- ✓ **Limit grazing around flowering time (see page 20)**
- ✓ **Limit grazing to maintain some grass height**
- ✓ **Control pest animals and plants**
- ✓ **Manage the edge of the remnant (see page 18 & 19)**
- ✓ **Only undertake informed spraying**

✓ Controlling pest animals

Ground Layer & Soils - What to look for...

Leaf litter and twigs on the ground are important habitat for fungi and native fauna such as the Bush Stone-curlew and small reptiles. Leaf litter and twigs act as a resource trap, trapping wind blown sediment and seeds.

Fallen timber provides important habitat for fungi, shelter for native fauna, acts as a resource trap and can protect native plants from grazing pressure.



Retain fallen timber

The biological soil crust is the mosses, lichens, liverworts and algae that inhabit the top few millimetres of soil. The crust stabilises the soil, fixes nitrogen and carbon, regulates water infiltration and encourages seed germination.

Threats

Physical disturbance by stock trampling and vehicle traffic causes soil compaction, the breaking up and loss of the litter layer and the destruction of the biological soil crust. Disturbance exposes the top soil to loss and erosion and favours weed germination.

Pest animals such as rabbits destroy the biological soil crust by digging and expose the soil to erosion.

Removing fallen timber results in the loss of habitat for many fauna species including invertebrates, reptiles and ground dwelling mammals. Fallen timber influences the vegetation as it affects soil moisture, structure and nutrient levels while enhancing recruitment by providing protection to seedlings.

Burning to reduce leaf litter and twigs reduces the amount of ground cover and may destroy the biological soil crust.

Lack of trees and shrubs means there is less leaf litter and twigs to provide ground cover.

Actions you can take

- ✓ **Leave leaf litter and small branches on the ground**
- ✓ **Leave fallen timber**
- ✓ **Reduce soil disturbance**
- ✓ **Limit vehicle traffic**
- ✓ **Limit and manage grazing**

✗ Vehicle traffic

Bush Stone-curlews as a focus species

Up until 30 years ago, the Bush Stone-curlew was reasonably common on farms throughout the Mid Loddon.

Adult Bush Stone-curlew

Many people are familiar with their distinctive, wailing 'weer-lo' call at night. Now, numbers are thought to be limited to only a few pairs and single birds.

Curlews rely on suitable habitat for feeding, shelter and camouflage. Their diet consists of insects, reptiles, frogs, fruits and seeds.

Retain Bush Stone-curlew habitat

Curlews dwell, nest and forage on the ground and are more active at night. Birds remain in the same territory and live for up to 30 years.

Nesting Bush Stone-curlew

Curlews prefer lowland grassy woodland areas and riparian forests with few or no shrubs.

Threats

Loss of preferred habitat such as lowland grassy woodlands and riparian forests, with few or no shrubs. Burning to reduce litter and twigs on the ground and removing fallen timber for firewood reduces curlew habitat.

Predation by foxes, dogs and cats.

Grazing animals that can trample nests and cause loss of leaf litter and native vegetation.

Actions you can take

- ✓ **Leave leaf litter and small branches in remnant patches, especially under trees**
- ✓ **Limit fertiliser and agricultural sprays such as insecticides around remnants**
- ✓ **Control pest animals such as foxes and contain dogs and cats**
- ✓ **Fence remnant patches to manage grazing**
- ✓ **Plant or protect native vegetation such as trees, shrubs and grasses**
- ✓ **Provide predator proof nesting areas where possible**

✓ Predator proof nesting area

Your patch in the landscape

The landscapes of the Mid Loddon are highly fragmented, with remnant patches isolated in a mosaic of cropped and grazed paddocks. The native vegetation and fauna that define these remnants are vulnerable because of this isolation, especially in the face of a changing climate.

The best action to ensure native species survival is to improve landscape connectivity.

Connectivity within the landscape means different things for different species– but most importantly it allows for movement of resources between patches and migration of native fauna.

Generous corridors of native vegetation help native fauna avoid open country. Maintaining trees in paddocks will help other native fauna like bats as they can roost in open areas.

Large intact remnants are highly valued but small remnants and paddock trees are important too!

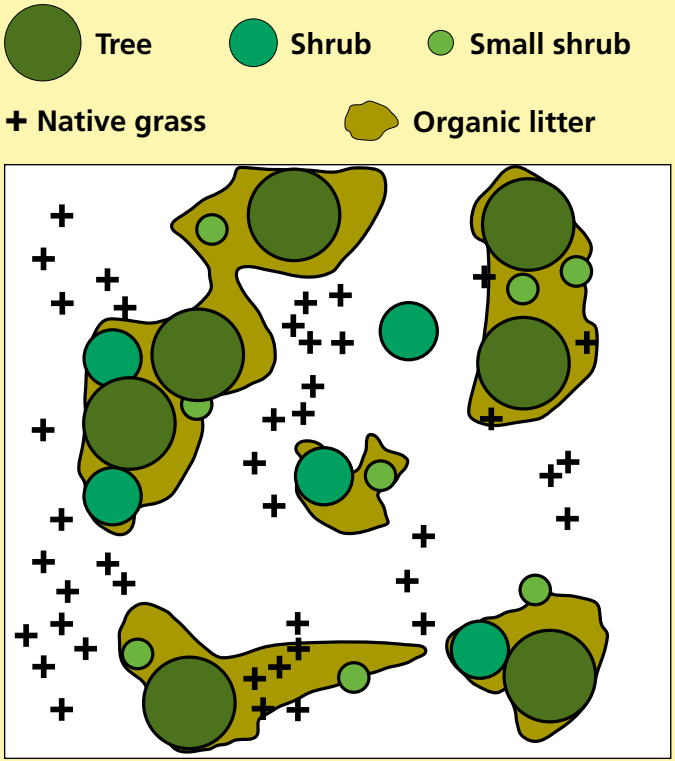
Connected vegetation

Native vegetation was once continuous but after intensive clearing patches have become small **isolated** islands.

Isolated islands of vegetation

An aerial view of your patch

Open woodlands are naturally 'patchy', consisting of islands of trees and litter and open areas with grasses, mosses and lichens.



Open areas within the patch use relatively little water and help increase the amount of effective rainfall available to support the patches of trees.

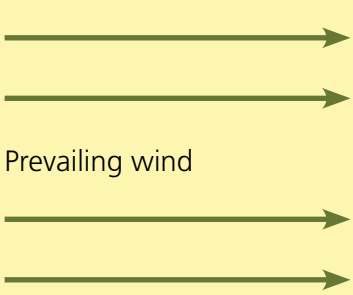
The spaces in between trees and shrubs are just as important as the dominant plants themselves.

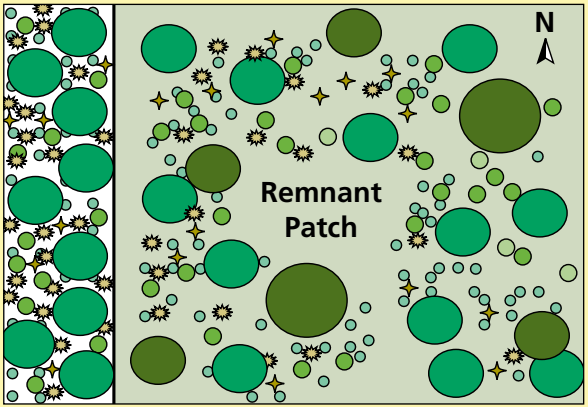
Be careful if planting additional trees into natural canopy gaps, as there may not be enough resources to go around!

Creating a vegetation buffer may help to improve the health of your patch. Buffers may be planted with native species or forage species to provide alternative shelter and grazing opportunities (see page 18 &19).

Creating a vegetation buffer using native species

A buffer cuts down the amount of wind blown nutrients, weed seed, chemicals and sediment entering the remnant patch.





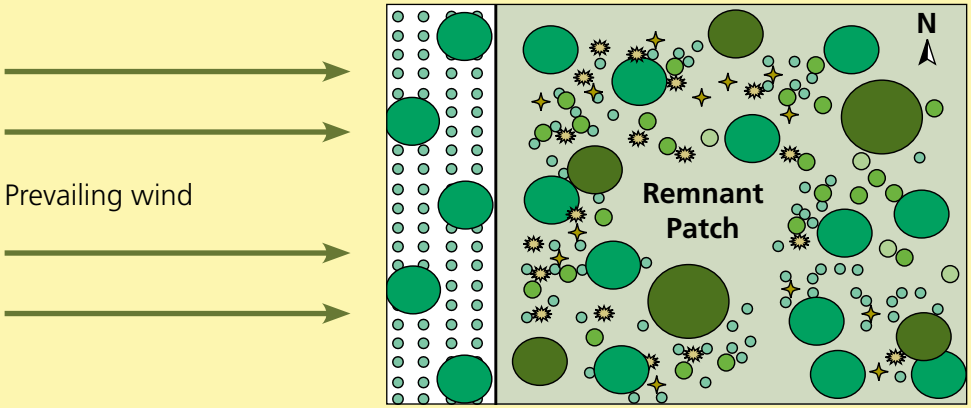
Planting or sowing native species in the buffer will provide seed for regeneration and additional habitat for fauna.

Within the remnant, place fallen branches over native tree and shrub seedlings. Be sure not to crush or damage seedlings, the branches are to provide them with enough protection to get them through to sapling height.

- **Plant or sow a 20 metre wide buffer on the windward side of the remnant. This is usually the western side.**
- **Plant with native trees, shrubs and grasses.**
- **High density plantings will slow the growth of trees, but may provide a more effective wind buffer.**

Creating a vegetation buffer using fodder species

A buffer cuts down the amount of wind blown nutrients, weed seed, chemicals and sediment entering the remnant patch.



Within the remnant, place fallen branches over native tree and shrub seedlings. Be sure not to crush or damage seedlings. The branches are to provide them with enough protection to get them through to sapling height.

- **Plant or sow a 20 metre wide buffer of forage on the windward side of the remnant. A potential forage species is Old Man Saltbush *(Atriplex nummularia)*.**
- **Mix some trees into the planting in order to achieve a height similar to the remnant tree height.**

Grazing

The most significant threat to regeneration of native species in a remnant is livestock access. Livestock grazing can lead to the loss of species, prevent woody plant recruitment and result in a shift in vegetation from perennial to annual dominance.

Aims of a grazing regime in your patch:

- Encourage native species regeneration
- Improve vegetation structure size and diversity
- Reduce nutrient enrichment from stock
- Reduce annual weediness
- Minimise loss of ground cover and exposure of soils to erosion
- Promote summer growing native grasses and herbs

✘ Heavily grazed remnant with no understorey and bare ground

✓ Managed remnant with good understorey and groundcover

Typical grazing regimes often mean stock have access to native woodland patches over spring and summer, creating stock camps under trees. Over time, continuous grazing will cause the selective removal of spring and summer active native grasses and other native species including mosses, lichens, orchids, lilies, ground cover plants and shrubbery.

Good management of grazing pressure and careful timing can retain a range of native flora and balance conservation with stock needs.

Retain native perennial grasses (Windmill grass)

Using native grasses to manage grazing in your patch

Identify the native grasses in your patch and encourage their regeneration by resting your patch during the growing season and flowering. This is usually from spring to early autumn. Some common native grasses are –

Wallaby grasses – fine leaved grass, winter active but remains green year round, sensitive to glyphosate, mature seed heads 'fluffy', flowering spring-autumn.

Kangaroo grass – deep rooted tussocky grass, summer active, flowering spring-autumn.

Spear grasses – tall, rough tufted grass, remains green year round, seeds have sharp points and curly awns, flowering spring-autumn.

Top to bottom: Wallaby grass, Kangaroo grass, Supple Spear grass

To promote native species you should

- Only allow stock access from autumn until the winter break
- Remove or reduce grazing during the growing season until the grass has dropped seed
- When grazing your remnant patch, vary the stocking rate and the length of grazing times each year, appropriate to size and structure of the area.

Tips to remember when grazing your remnant woodland patch

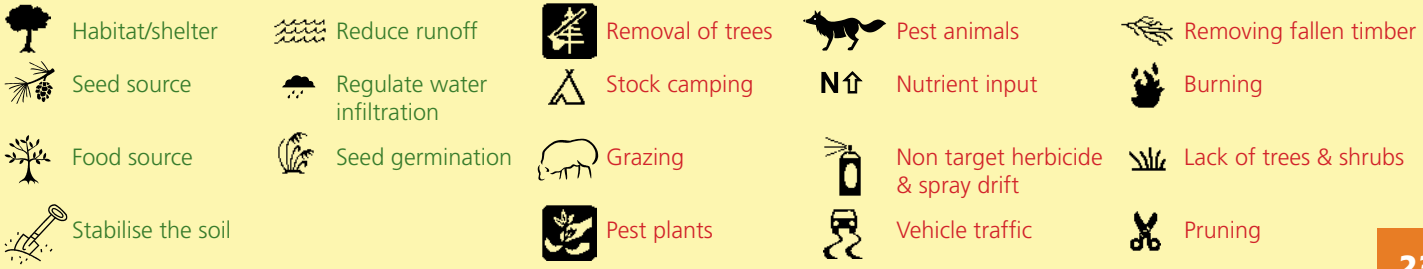
- Inspect soil surface and biological crust to ensure soil disturbances is not excessive
- Rest your patch by excluding all stock if you are able, if not, selectively graze your remnant patch at a short term, high density rate. Rest longer in late breaking years
- Maintain a level of perennial cover and minimize soil exposure.

Remnant health checklist

Layer	Do you have?	Y/N	Benefits	Threats	Actions you can take
Trees	Trees of different ages Trees of different heights Fruit & flowers Hollows in trunks & branches				Keep trees of all sizes Limit stock access Fence to protect seedlings Retain old & dead trees
Shrubs	Range of shrub species Shrubs of different heights A diversity of shrubs Fruit & flowers				Limit stock access Managed grazing regime Revegetate with natives Support natural regeneration Control pest plants & animals
Grasses & Herbs	Lots of grasses, rushes & herbs Range of grass & herb species Perennial cover				Limit stock access Limit grazing around flowering time Control grazing to maintain grass height

Layer	Do you have?	Y/N	Benefits	Threats	Actions you can take
Grasses	Fruit & flowers			N⇧	Control pest animals & plants Manage the edge of your remnant Undertake informed spraying
Ground Layer & Soils	Leaf litter & small branches on the ground Small amount of bare ground Fallen timber Biological soil crust				Reduce soil disturbance Limit vehicle traffic Manage grazing according to soil type Low stocking rates Leave fallen timber Leave leaf litter & small branches on the ground

Benefit & threat symbols



For more information...

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Department of Sustainability and Environment
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Loddon Shire
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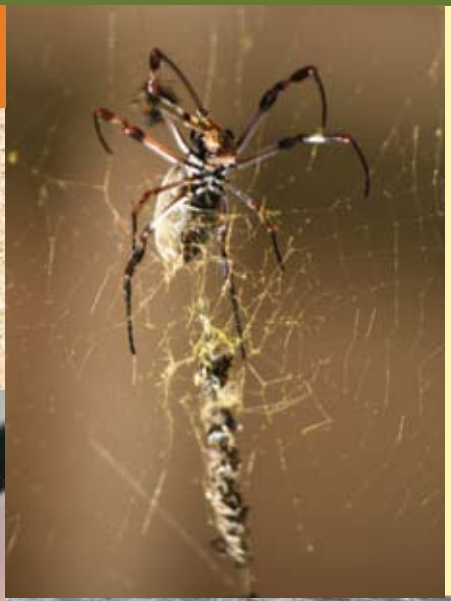
Woodland Fauna



Clockwise from left: Brush-tailed Phascogale, Tree Goanna, Swift Parrot, Bronze-olive Legless Lizard, Golden Orb Spider, Pobblebonk, Yellow Banded Dart, Kookaburras.

Above: White Box Woodland. Left: White Box blossom.