

Mallee Scrub

Making the most of what we have:
protecting biodiversity and boosting productivity

Supporting the Biodiversity Plan of the Murray Mallee
Local Action Planning Association



MURRAY MALLEE



Long-term productivity and biodiversity in the Murray Mallee are under threat. Erosion, salinity and other forms of land degradation, drought, and pests such as environmental weeds and feral animals are all serious problems. Our challenge is to work towards a balance between our social, economic and environmental needs. The region's remnant vegetation — its mallee scrub—must be conserved, managed and improved wherever possible.

This publication highlights just some of what mallee scrub has to offer.



CHALLENGES THAT WE ALL FACE



DUE IN PART TO ADVANCES IN FARMING THE EFFECTS OF PAST ACTIVITIES CAN TAKE GENERATIONS TO BE FELT. OUR ACTIONS TODAY MAY BE BEST MADE ON THE PRESUMPTION OF WORSE TO COME.

What's happened?

More than three-quarters of the native vegetation in the Murray Mallee has been removed to make way for the agricultural production that has brought generations of economic and social benefits to the region. Unfortunately, in the process of land clearing, agriculture has had significant impacts as well. The survival of our native plants and animals as well as our farming systems are at least in part dependent on retaining as much healthy mallee scrub as possible.

The challenge for us all now is to continue to find ways of integrating natural functions and services provided by our remaining remnants into agricultural production.

What's the minimum?

Most recent studies into minimum requirements of native vegetation to provide a balance between the needs of landholders and natural systems put the figure at around one-third. In the Murray Mallee, at least half of the remaining (or 'remnant') vegetation occurs within the Billiat and Ngarkat Conservation Parks. These two reserves are widely separated and cannot alone preserve the biological diversity needed to protect our wildlife. Another 250,000 hectares of remnant vegetation on private lands and road sides plays a crucial role in maintaining biodiversity.

What's being done now?

Farming in the Murray Mallee has improved a great deal since first settlement. These days, the use of minimum tillage, direct drilling, stubble retention, clay spreading, and the increased use of and focus on perennials have come a long way to addressing the priority issues of soil erosion, water use efficiency and biodiversity.

Many farmers have blended primary production with conservation. Fencing remnant scrub, planting trees and using the land within its varied capabilities has shown practical benefits, both now and for the long term. This applied knowledge is helping to sustain production and slow the degradation of our landscapes, though it needs to happen across the region to combat the negative impact of the pests and processes that past mismanagement have hastened.

Despite these positive and at times remarkable improvements in land management in the Mallee in the last few generations, the unique native species and landscape are under enormous stress. Many native species are still in decline, with some, such as the Striated Grasswren (from the Ettrick area) threatened with extinction.

Removal of the natural 'understorey' of shrubs, grasses, fungi and leaf litter (through grazing or clearing) stops seedlings re-establishing, creates erosion and compacts soil, encourages dieback, favours weed species and in general provides far fewer benefits to the landscape and the farmer than healthy scrub. In fact, the more we simplify the composition of ecosystems such as mallee scrub, the fewer services it can provide.

What's the next step?

This publication provides a starting point for the protection and improvement of remnant vegetation. Read here about some of the region's plants and animals and consult the back cover for more information on where you can get help.

Photographs: A farmer stands alongside a direct-seeded buffer that will benefit remnant vegetation and agriculture on his property. Dune 'blowouts' (top right) are often the result of poorly managed sandy soils.



CHANGING VIEWS OF THE MALLEE

"Mallee is one of the most barren regions in the world ... there were tufts of a prickly bush, which tortured the horses and tore to rags the men's clothes about their ankles." Thomas Mitchell, Explorer

1875:

"The most wretched country I have ever seen; not a bit of grass and no water ... it is a most fearful country." Forrest, Explorer

1938:

"The wholesale destruction of timber in the Mallee, which has brought about terrific dust storms now almost threatening to drive the settlers off the land, has also been the cause of the departure of many birds." Shaw Neilson, Poet

1968:

"Grazing herds of kangaroos broke our approach ... Major Mitchell's Cockatoos exploded, reformed and wheeled to scream at the intruders. It was a real wilderness ... it is a delight to the naturalist." R. Kenyon, Naturalist

1989:

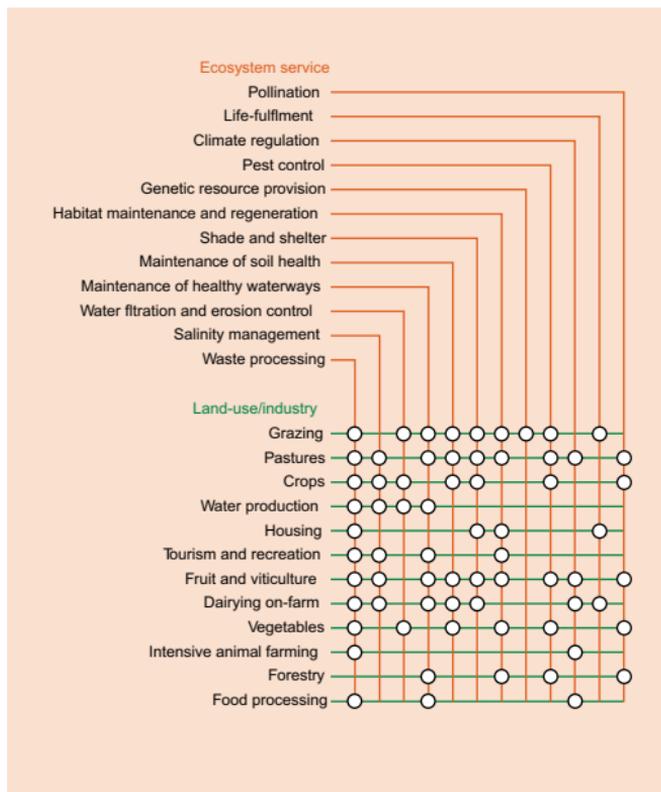
"Unfortunately the ecological diversity and role of Mallee vegetation in maintaining soil stability and regulating soil water tables and its intrinsic conservation and scientific values have historically not been understood or appreciated by the majority of Australians." Dr Malcolm Calder, Botanist

2006:

"Native vegetation offers protection for stock. This has been particularly noticeable on cold, wet days and days of high temperature. It is a home for bees which help pollinate lucerne and canola crops. It breaks down wind speeds, helping to reduce erosion. Native vegetation may also play a part in increasing rainfall." W. Hayward, Mallee farmer

WHAT HEALTHY SCRUB CAN DO FOR US

The plants, animals and all other organisms that make mallee scrub unique are known as its biodiversity. A few of the functions and support provided to us by 'biodiverse' mallee scrub—known as ecosystem services—are summarised in the diagram below.



This diagram is an interpretation of tabled information from Natural Assets: An Inventory of Ecosystem Goods and Services in the Goulburn River Catchment by Binning, Cork, Parry & Shelton, CSIRO Land and Water, Canberra, ACT.



NATURAL MALLEE SCRUB IS MADE UP OF NUMEROUS LAYERS OF PLANTS—THE MORE INTACT LAYERS THERE ARE, THE GREATER THE BENEFITS.

THE BENEFITS OF REMNANT VEGETATION

Remnant vegetation is all that is left of the original ecosystems prior to settlement, land clearing, farming and all other land uses. An ecosystem is a community of plants and animals and their natural environment. This special type of system is balanced to look after itself as well as other environments (such as farmland) through the supply of services. These services are known as 'ecosystem services'.

Ecosystem services include pollination, greenhouse gas reduction, water filtration and retention, erosion control, increased soil fertility and structure, shade and wind protection for stock.

Healthy mallee scrub is a surprisingly diverse ecosystem. Its usefulness for landholders can be maintained or improved by following practical guidelines. Below are just a few.

Property management

- Develop a whole-farm plan, making sure to identify and prioritise the natural assets. If your remnants are isolated, link them with vegetation corridors for wildlife movement and greater viability.
- Revegetate rocky outcrops and sandhills that may be limited in use for agriculture.
- Avoid fertilising, fire, cultivation and herbicides too close to remnants.

- When planting windbreaks, consider having a range of grasses, shrubs and groundcovers beneath the taller trees to maximise habitat value and reduce erosion.
- Fence off remnant vegetation and control feral weeds and animals (foxes and rabbits, in particular). Access grant funding to assist with these 'on-ground works' or protect your scrub permanently under a Heritage Agreement.
- Plant native grasses to control erosion rather than introduced pastures such as the invasive Veldt Grass.

Habitat preservation

- Where practical, leave dead trees, fallen timber and hollow logs for habitat. If a hollow-bearing tree must be removed, consider wiring the hollowed section into another tree.
- Plant woodlots to reduce the impact of freewood collection on wildlife.

- Maintain areas of native grass, even along the edges of cropping paddocks, to maximise water use, utilise as pasture, provide food for a range of birds and habitat for beneficial insects and.

Pest control

- Keep pets in at night to avoid predation on native animals.
- Close unused water points that provide for foxes, cats, goats and kangaroos.
- Optimise natural pest control by including wattlies, tea-trees and other recognised host plants into your revegetation programs to attract wasps and other beneficial insects.
- Wildlife poachers are worse than most other pest species! Help protect wildlife such as Major Mitchell's Cockatoo by joining a Neighbourhood Watch Rural program. 'Keep Out' signs may help discourage poaching.

Mallee

Canopy + sub-canopy:

scrub's tallest trees are found in the canopy and lower canopy layers. The eucalypts provide ideal conditions for smaller trees, such as Mallee Cypress Pines, shrubs, grasses, herbs, lilies and lichens to establish beneath. The canopy's Sugary Lerps, galls, scale, caterpillars and other insects provide food for many birds, such as the small Pardalotes and Wee Bills that help control pest insects. The fowers in the canopy attract nectar-feeding birds, mammals and insects that assist pollination.

Bark:

Though found at all levels, bark provides lizards, bats, small marsupials, spiders, insects and birds such as the Brown Treecreeper with essential places to sleep, breed and feed. Bark is also one of the vital components of ground litter.

Mallee shrub

Shrubs + grasses:

layers include tall and short shrubs, climbers and grasses up to a few metres in height. Wattlies, Hop Bushes, Turpentine Bushes, Bush Peas, Scrubby Pines, banksias and tea-trees are just a few examples. These layers provide structural diversity and important habitat including resting and refuge for a range of birds, from emus to wrens. Shrubs are also a food or host plant for butterfly larvae, Wasp Galls, ants and borers, and provide nectar for a range of wildlife. Tussocky grasses help to limit erosion and redistribute rainfall and sediments.

Ground + litter:

Leaves, twigs and many types of fungi, mosses and lichens protect the underlying soil from erosion. The litter layer also helps maintain soil structure, fertility and moisture levels. Soil and litter organisms play a vital role in the decomposition of organic material and help disperse seeds and spores.



singing honeyeater *Lichenostomus virescens*

Singing Honeyeaters eat nectar, insects and fruits and help to spread plants such as Berry and Ruby Saltbush. Honeyeaters glean foliage, keeping lerp and tree health in check. Grazing of naturally occurring saltbush and other understorey is a threat to this and many other Mallee bird species.

Birds will eat up to 60% of all insects in a healthy ecosystem. Magpies eat cockchafers (larvae of the scarab beetle). Whistlers eat beetles and weevils.

spiders

Huntsman spiders are a common yet diverse group of spiders with well over 90 Australian species. They will often be found under slabs of bark on trees, in rock crevices and in leafy litter. They eat insects and invertebrates. Some woodland species are ground burrow builders.



Spiders are important components of all mallee ecosystems. Some wasps lay larvae in spiders which they devour before preying on grubs and other spiders.



Major Mitchell's cockatoo *Cacatua leadbeateri*

This cockatoo requires nesting hollows usually found in old-growth mallee. Poaching of young birds (often involving cutting into hollows), illegal woodcutting, land clearing and the distance between nesting habitats and places where they feed on seeds and insects are serious issues for this species.

To nest, 30% of mammals and 20% of all birds need tree hollows which can take 200 years to form. Native animals must compete with feral bees and birds for the hollows left.



Bearded Dragon *Pogona vitticeps*

Bearded Dragons are omnivorous and consume many types of insects, small vertebrates and vegetation, including fruits and flowers. Dragons are often found sunning on fence posts or in trees. Pesticides and grazing reduce vegetation structure and threaten food availability.

Fallen logs and trees provide essential habitat for many ground-feeding lizards (such as geckos and skinks), frogs, insects and birds.

ants

Ants play a key role in ecological functions such as aerating the soil and directing energy and nutrient flows. Ants hunt and farm plant-feeding insects and aid movement of native seeds (as shown by seeds around ant nests). Ants have direct relationships with some plants, assisting in insect control.



A colony of white ants can move tonnes of plant material in a year, releasing many beneficial nutrients to the soil.



common Dunnart *Sminthopsis murina*

This tiny marsupial rests by day in a nest of dried grass and leaves. It feeds on beetles, roaches, cricket larvae and spiders. A range of other native mice and marsupials such as the Mitchell's Hopping Mouse, Fat-tailed Dunnart and Silky Mouse can be found in healthy mallee scrub.

Retaining or planting a broad range of plants including grasses, herbs, shrubs and trees will support a large range of insects and a variety of different bats.



chocolate Watted Bat *Chalinolobus morio*

Chocolate Watted Bats require tree hollows or cracks in bark. Bats can consume half their weight in insects in a single night. A colony of 1000 bats will eat more than a tonne of insects annually. Grazing and other destruction of vegetation diversity is a threat to this and other bat species.

insects

Bees and many other insects are major pollinators of native vegetation and crops. Many bee-fies lay up to 1000 eggs in knotted trees and fence posts. When they hatch, larvae enter and devour grasshoppers and plague locusts. Insects depend on diverse scrub with healthy layers of flowering vegetation.

Wasps are enormously helpful in biological control of insect pests which damage plants. They are also the primary pollinators of many native orchids.



eastern tree skink *Egernia striolata*

Tree skinks live in the cracks and crevices of trees, but require fallen timber on the ground where they forage for beetles, cockroaches and other insects. Grazed scrub and the collection of mallee roots and other 'frewood' present the biggest threats to this species.



Larger lizards, such as Shingle Backs and Blue Tongues eat snails and assist with the spread of fleshy native plants such as pigface and Ruby Saltbush.



Wrens

These small, energetic birds live amidst the scrubby undergrowth and feed on insects and seeds. Most wrens require some understorey for shelter and foraging. Clearing, grazing, fire and feral cats threaten these species, with the Mallee Emu-wren listed as vulnerable.

The fragmentation of remnant vegetation can leave nowhere for birds to go in the event of a bushfire. Wildlife corridors such as windbreaks improve chances of survival.

In addition to Malleefowl, other important ground-dwelling birds include the endangered Bush Stone Curlew and the vulnerable Painted Button Quail.

Malleefowl *Leipoa ocellata*

This large ground-dwelling bird eats herbs, seeds and invertebrates. Malleefowl are currently endangered in the Murray Mallee and require large areas of long-unburnt and intact habitat (leaf litter and shrubs). Threats include lack of connected habitats, grazed scrub, competition, foxes and fire.



Echidna feeding habits provide natural pest control. One study found that echidna scats contained 37% Scarab Beetle larvae, 56% ants and 7% termites.

short-beaked echidna *Tachyglossus aculeatus*

Echidnas require fallen timber or wood containing a range of insects. The removal of 'frewood' reduces food availability. The fragmentation of remnant vegetation restricts the movement of echidnas, often seen as roadkill in the Mallee due to their slow pace and use of roadside vegetation corridors.



WHERE YOU CAN GET HELP

The Murray Mallee Local Action Planning Association can provide funding under its Mallee Futures program to assist landholders with a range of on-ground activities such as fencing remnant vegetation, revegetation, perennial pasture establishment, feral animal and plant control, erosion works and product blocks (such as quondongs, broom bush, timber, cut fowers). Assistance can also be provided to land management groups to access funding or to undertake research projects, as well as providing training opportunities on a range of subjects such as seed collection, revegetation, whole-farm planning, climate risk management, use of Global Positioning Systems, school education and feedlotting.

PO Box 2056 Murray Bridge SA 5253
Telephone (08) 8531 2066 Facsimile (08) 8532 5300
Web www.malleefutures.org.au
Email mmlap@internode.on.net

South Australian Murray-Darling Basin Natural Resources Management Board

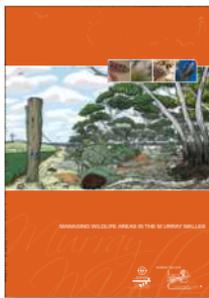
Murray Bridge office PO Box 2343 Murray Bridge SA 5253
Telephone (08) 8532 1432
Web www.samdbnrm.sa.gov.au

Department for Environment and Heritage (DEH)

Berri office PO Box 231 Berri SA 5343
Telephone (08) 8595 2111
Web www.environment.sa.gov.au

Funding for this publication has been provided by the South Australian Murray-Darling Basin Natural Resources Management Board and the Murray Mallee Local Action Planning (MMLAP) Association. The MMLAP Association thanks Ben Simon for his substantial project management role. Thanks also to members of the Association's Board and the Biodiversity Plan steering committee for guidance and feedback; Nigel Willoughby and Jody Gates for their input into this resource, especially in relation to the profiled plant and animal species; Wayne Hayward for providing a farmer's perspective; and the team at Ecocreative for their many hours of hard work. We also acknowledge inspiration provided by published information on ecosystem services by Land & Water Australia, Birds Australia, CSIRO Ecosystem Services and the NHT Bush magazine.

Additional photographs kindly provided by Andrew Bennett (Common Dunnart); David Cook (Major Mitchell's Cockatoo, Superb Fairy-wren & Singing Honeyeater); Lindy Lumsden (Chocolate Wattled Bat); Archie McArthur, SA Museum (ants); Keith Payne (Malleefowl and dune blowout); Peter Robertson (Bearded Dragon & Tree Skink); Matthew Wright-Simon, Ecocreative (Huntsman Spider & wasp bee).



This brochure is the companion publication to the MMLAP Biodiversity Plan. This plan can be freely obtained from the MMLAP Association.



This publication is printed with vegetable inks on paper made from 15% post-consumer waste, 20% pre-consumer waste and pulp from sustainable forestry. Both the paper mill and printer operate under certified environmental management systems.

ecocreative.

This brochure's graphic design, illustration, research, writing, editorial services and production management by Ecocreative. <www.ecocreative.com.au>