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# THE VALUE OF UNDERSTOREY VEGETATION

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## Introduction

Winter and Spring is the time of year when the open forests, woodlands and wallum of south-east Queensland come alive with colour, to the delight of locals and visitors. The yellows of wattles often predominate, notably such widespread and common species as the Brisbane (fringed) wattle. The Hibbertias, Pultenaeas (bush peas) and Banksias also display different shades of yellow. There are the striking blues and purples of Hoveas, Patersonias and Hardenbergia, the red of dusky coral pea and white of rice flowers and wedding bush. The foliage of the oaks turns varied hues of brown to red. The plants of the understorey range from small trees down to delicate herbs and scramblers. Apart from their beauty, these plants add a great amount of interest to our bushland, our roadsides and native gardens and remind us how much of our plant species diversity is found in the understorey.

This Note gives a general description of the important role understorey plants play in natural ecosystems as well as their value to farmers and other private landholders. In addition, problems associated with the decline of understorey vegetation are discussed and various methods of protecting or restoring the understorey are described.

## What is understorey vegetation?

The understorey includes the herbs, grasses, shrubs, mosses, lichens and small trees that occupy the vegetation layers below the canopy of taller trees. Some habitats have mixtures of these plants, whilst others, such as grassy woodlands, have mostly grasses and few shrubs. There can be much greater plant species diversity within the understorey compared with the overstorey where (except in rainforest) there are commonly not more than a half dozen or so eucalypts and other larger tree species in a patch of bush compared with dozens of species in the understorey. Because plant species diversity is generally much higher in the understorey the diversity of fauna will usually be higher here as well.

## The disappearing layer

There are many ways in which the understorey can be lost or degraded:

- clearing or thinning of the of larger trees will change the microclimate in the understorey, letting in more light and favouring opportunistic weed species
- where the understorey itself is disturbed weed invasion usually follows (but an intact understorey will be more resistant to weed invasion)
- an inappropriate fire regime (too frequent or too infrequent for the vegetation type) will result in some species being lost from the understorey
- grazing by cattle, horses or goats will degrade the understorey by trampling plants, soil compression, spreading weeds and preventing natural regeneration from occurring
- "tidying up" of the understorey to create a park-like setting of mown grass and scattered larger trees will create a hostile environment for fauna (though some opportunistic and often undesirable species may benefit)

Much of the bushland in south-east Queensland suffers from a cleared or degraded understorey due either to neglect or a desire to maintain a park-like property which is maintained by slasher or ride-on mower at considerable cost to the landholder in money and time.

## The values of understorey vegetation

Understorey vegetation plays a very important role in maintaining a balance in natural ecosystems. Its value to land managers is often underestimated as it can contribute to economic, social and environmental goals, both in the short and long term.

Many of the symptoms of dieback, such as leaf loss, increased numbers of aggressive communal birds, such as noisy miners and large populations of pest insects can be traced to loss of understorey as one potential cause.



*Understorey plants represent some 90% of the plant biodiversity of native vegetation. Their impact on wildlife species is similar in magnitude.*

## Natural pest control

The understorey provides habitat for predators which can assist in natural pest control. For example, a number of wasp species parasitise the larvae of leaf-eating beetles such as Christmas beetles. The adult wasps feed on nectar and protein from native trees and shrubs such as wattles. Lack of understorey plants decreases nectar sources and consequently the wasps cannot survive in these cleared areas. The larvae and adults of other beetles and flies also feed on Christmas beetle grubs but require shelter by day in leaf and bark litter and do not thrive in open cleared pastures.<sup>1</sup> The understorey needs to be composed of a sufficient range of plant species to allow many different insects to complete all stages of their life cycle: egg, larva, pupa, adult. The loss of understorey has also reduced the number of insectivorous birds that feed on insect pests. Thornbills eat small beetles, ants and caterpillars, as do robins and fairy-wrens. Cuckoos are well known predators of hairy caterpillars, including stinging cup moth larvae and even sawfly larvae. Mammals such as bandicoots and gliders also feed on various insects and their larvae.<sup>2</sup> Noisy miners, native birds that live in colonies and aggressively exclude small insectivorous birds from their territory favour areas where the understorey has been opened up. It is possible that this may, in some cases, result in greater insect stress on trees, possibly even resulting in tree dieback.

## Wildlife habitat

Understorey plants provide a great diversity of habitats for many of our native animals such as gliders, lizards, small bush birds and invertebrates. Fairy wrens build their nests in prickly dense shrubs. After young wrens leave the nest they spend another week hiding in

the dense understorey. Some lizards prey on the insects that live in understorey vegetation. Frogs often hide in leaf debris or on fern fronds whilst tadpoles avoid predators beneath bank side vegetation. Honeyeaters feed on nectar from flowers of understorey plants as do many types of insects such as butterflies wasps and ants. Even the much maligned bracken fern provides valuable habitat for birds such as the brown thornbill and white-browed scrubwren.

## Protecting and enriching the soil

The understorey is vitally important to the stability of the soil surface. The presence of an understorey, along with leaf debris, softens the impact of rainfall and reduces runoff both by acting as a physical barrier to surface water and by contributing to soil porosity. Understorey plants are a source of organic material that sustains living organisms in the soil. They also act as a thermal insulator and protect the soil from extremes of heat and cold as well as from strong winds.<sup>3</sup>

The understorey often includes species such as wattles and casuarinas that contribute to soil fertility. These plants support microorganisms in nodules on their roots which fix nitrogen from air in the soil, converting it to a form that can be taken up by other plants. Through leaf fall and death of the plants, the nutrients are returned to the soil. The addition of organic material to the soil in the form of humus also provides for a healthier soil.<sup>4</sup>

## Biodiversity and genetic resources

In some Australian ecosystems understorey plants account for over ninety percent of total plant species diversity! Biodiversity is directly reliant on maintaining the genetic resources of the whole ecosystem and the processes which sustain it, including the understorey plants. For a diversity of animals there must be a diversity of vegetation - different foliage types, qualities of light, a range of heights and sizes. A variety of plant forms and species must be present in order that an ecosystem can be sustained. Maintaining genetic diversity provides a buffer against climate change and allows adaptation to a more rapidly changing environment. Understorey plants may provide valuable genetic resources that could be used in scientific and technological applications such as developing new crops or drugs.

## Shade and shelter for stock and crops

Native vegetation can be used to provide shelter to protect stock and crops from exposure to extreme weather. When planning revegetation work many landholders think first and foremost of trees but many more benefits come from using a variety of plants including shrubs and groundcovers. Stock access to shelter can increase milk production and liveweight gains while crop yields have increased after wind breaks were established. Shrubs should be included in shelterbelts to avoid gaps beneath trees that may cause a wind tunnel effect.

## Other values

As sources of honey and pollen, the understorey plants are often vital to beekeepers. Low trees and shrubs can be important sources of emergency feed for stock. Be aware that some species are poisonous. The beauty of understorey species, particularly when in flower, can add to the landscape appeal of the area for social activities, such as picnics, as well as providing a more pleasant working environment. This in turn can be reflected in improved land values and increased tourism. Many understorey species form the basis for a growing commercial native flower industry. They have great potential in horticulture because many are attractive to humans and wildlife and are at eye level.

## What you can do to retain or re-establish the understorey

The re-establishment of the understorey vegetation is an important step in the reinstatement of a healthy ecosystem. Improved

management or re-establishment of understorey species may help entice the return of wildlife by providing food, shelter and breeding sites. 'Tidying up' a property by removing these essential habitats will lead to a loss of wildlife.

## Conserve what remains

If you are fortunate enough to have understorey still present on your property there are a number of ways you can help to conserve it. Identify areas of remaining understorey, such as in paddocks that have not been greatly disturbed, along roadside verges, on hilltops and beside creeks. Identify threats and, where possible take steps to remove them. For example, if stock are present a fence may be needed as stock may destroy the understorey by browsing, trampling, soil compaction and via nutrient build up from manure. Weed and pest animal control may also be desirable but before eliminating all weeds from the understorey investigate what animal species may be relying on them for shelter. Gradual removal and replacement with suitable native species will cause less disruption for fauna. Appropriate fire management for the vegetation type and location can also help to maintain species diversity. You will need to monitor changes in species composition and structure of the understorey to determine what impact your burning regime is having. For example, more frequent fire may encourage an open grassy understorey while less frequent fire may result in a denser shrubby understorey or one which is dominated by eucalypt regrowth. Each will be attractive to different fauna species so fire management needs to be worked out on a case by case basis.

## Encourage the return of the understorey

If the understorey vegetation only recently disappeared from your property, there may still be a seed bank in the soil. Again fencing, an ecologically appropriate burning regime, pest animal and weed control will encourage the return of the understorey species. Alternatively, select areas of your property close to understorey remnants, manage to encourage regeneration and wait for natural dispersal to occur. Consider the benefits of re-establishing a native understorey in an area which is currently mowed or slashed. Once established, maintenance will be minimal (compared with the work and expense of mowing) and the habitat value will be restored.

## Planting or direct seeding

In some circumstances where prospects for natural regeneration appear poor, planting or direct seeding may be the only alternative. You can grow your own seedlings or obtain plants from a local nursery but always try to obtain plants from your local area and with as much genetic diversity as possible. It is preferable to collect small amounts of seed from many individual plants rather than a lot of seed from just one or two plants. Strive for a good diversity of species including those which may not be so attractive (to humans) as well as those which are inconspicuous or harder to propagate.

### Acknowledgment:

Text and selected illustrations relating to this technical note was sourced from the Department of Natural Resources and Environment, Victoria: Land for Wildlife Program.

### References and further reading

<sup>1</sup>Beckmann, R., (1989/90) Rural Dieback: Restoring the Balance. *Ecos*, 62, pp 8-15.

<sup>2</sup>Heatwole, H. and Lowman, M., (1986) *Dieback: Death of an Australian Landscape*, Reed.

<sup>3</sup>Seabrook, J., (1994). Growing Understorey Seed. Greening WA. 58pp.

<sup>4</sup>Greening Australia (pamphlet) *The Understorey*

See Land for Wildlife South-east Queensland Note No. 1 'Reference List' for further reading and references