

Biodiversity

Biodiversity is the variety of life: the different plants, animals and micro-organisms, their genes and the ecological systems of which they are a part.

Australia is one of the most diverse countries on the planet. It is home to more than one million species of plants and animals, many of which are found nowhere else in the world, with more species still being discovered. Australia's native biodiversity and the nature of our rural landscapes is under threat from habitat loss, salinity, weeds, pests, diseases, soil degradation, declining waterways, and climate change.

Why is biodiversity important?

Apart from the intrinsic value of our native wildlife and natural areas, biodiversity provides a range of "ecosystem services". Ecosystem services are the conditions and processes of natural ecosystems that sustain and fulfil human life. Ecosystem services including pollination, regulation of climate, shade and shelter, erosion control, soil fertility maintenance, natural pest control and water filtration

When a wide range of species is involved in maintaining ecosystems services, then the systems are more resilient. For example, if a diverse range of native insects pollinate plants, but some species decline in number due to drought, other more drought-tolerant species would still be able to continue pollinating both native and cultivated plants.

Many ecosystem services remain poorly understood and very difficult to reproduce artificially. Scientists are still discovering the complexity of natural ecosystems and identifying their potential material benefits, including new medicines and naturally occurring chemical compounds.

The vineyard perspective

Increasingly, systems like EurepGAP and those being developed by some of the major retailers in several markets are including measures of biodiversity conservation in their accreditation and assurance checklists. This focus on biodiversity could have implications for future exports of Australian wine, as our trading partners may give preference to those countries that can demonstrate their environmental credentials, including biodiversity conservation and management.

In February 2006, the WFA received a request for information from consultants working for the UK Dept of Environment, Food and Rural Affairs (DEFRA). The information sought related to the impact of the UK consumption of Australian wine on Australia's biodiversity. This is part of a broader report being prepared for the DEFRA about the 'environmental footprint' of products being imported into UK markets.

Biodiversity "hotspots"

The long isolation of Australia from the rest of the world and a relatively stable geology and climate are partly responsible for Australia's rich biodiversity. Australia is one of the planet's few countries that is recognised as "megadiverse" because of its extraordinary level of biodiversity, including an exceptional level of species that are found nowhere else.

A concept that has been used increasingly to identify priority areas for conservation is that of "biodiversity hotspots". At a global scale, Australia's southwest has been recognised by Conservation International as one of 34 global hotspots - the richest and most threatened reservoirs of plant and animal life on earth. For more information on global hotspots, visit www.biodiversityhotspots.org/xp/Hotspots/

Within Australia, the Department of Environment and Heritage (DEH) has identified 15 national biodiversity hotspots, ten of which overlap with Geographic Indication Zones.

Australian Wine Zones in National Biodiversity Hotspots

Geographic Indication Zone	Biodiversity Hotspot name
South West Australia	Busselton Augusta
West Australia South East Coastal	Fitzgerald River Ravensthorpe
Central Western Australia	Central and Eastern Avon Wheatbelt
Greater Perth	Geraldton to Shark Bay Sand Plains
Fleurieu	Mt Lofty / Kangaroo Island
Mt Lofty Ranges	Mt Lofty / Kangaroo Island
Limestone Coast	South East of SA and South West VIC
Western Victoria	South East of SA and South West VIC
	Victorian Volcanic Plain
Central Victoria	Victorian Volcanic Plain
North West Victoria	Victorian Volcanic Plain
Tasmania	Midlands of Tasmania
Queensland (Granite Belt)	Border Ranges North and South
	Brigalow North and South
NSW Northern Slopes	Border Ranges North and South
	Brigalow North and South
NSW Northern Rivers	Border Ranges North and South
Queensland (South Burnett)	Brigalow North and South

The Australian Government's 'Maintaining Australia's Biodiversity Hotspots Program' provides support to landholders and natural resource managers within the hotspots to improve conservation on private and leasehold land. For more information, visit www.deh.gov.au/biodiversity/hotspots/programme.html.

At a smaller scale, regional natural resource management (NRM) groups throughout Australia have also identified priority areas for biodiversity conservation and are developing strategies and projects to assist landowners to plan and manage their natural areas. Information on regional NRM groups is provided at the end of this Fact Sheet.

Biodiversity in the vineyard – what's in your soil?

Many people assume that biodiversity is only found on uncleared land, but in agricultural landscapes the majority of the biodiversity occurs in the soil – in the form of soil micro-organisms, bacteria, fungi, ants, earthworms and many other species. One hectare of soil in temperate regions can host:

- 20,000 kg of microscopic organisms (such as bacteria and fungi)
- 50 kg of microfauna – bigger organisms up to 2mm in length
- 20 kg of slightly larger organisms – 2-10mm
- 900 kg of organisms greater than 10mm (such as earthworms and termites)

(Bradshaw, 2001)

This soil biodiversity performs many important functions, including burrowing and mixing of the soil, breaking down organic matter and increasing the availability of nutrients. A biologically-active soil is more likely to show better structure, aeration, water infiltration, nutrient cycling and accessibility, and hence fertility, than a biologically-deficient soil.

Improving soil biodiversity

There are some simple ways to improve soil biodiversity in the vineyard:

- A permanent cover of living plants or plant litter will provide protected habitat and a food supply for soil organisms, as well as protecting plant roots from high temperature fluctuations and drying. Mulches in the vine rows and cover crops or native plants between rows will increase the organic matter (inter-row plantings can also be part of an Integrated Pest Management approach). Maintaining vegetation cover on any drainage paths will minimise soil loss and erosion.
- By minimising mechanical cultivation, soil compaction can be avoided and soil structure, aeration and drainage maintained.
- Monitoring soil for the amount of soil organic matter, the rate at which water infiltrates, and informally checking for signs of biological activity (such as the presence of earthworms in a shovel of dirt) will help to ensure that management practices are maintaining or improving soil health.
- Applying fertiliser only as part of a soil and vine management program, in response to petiole or soil testing, helps ensure that excess fertilisers don't leach into waterways or groundwater or cause changes in soil pH that would lead to reduced soil biological activity.

Native vegetation and vineyards – a natural mix

Maintaining or establishing areas of native vegetation in the vineyard has many advantages, including:

- Shade and shelter from winds (reducing evaporation from vines; minimising spray drift). Note: this may also impact on the occurrence of frost, which would also need to be considered;
- Soil protection (less erosion, improved soil health);
- Reduced salinity problem where sufficient deep-rooted plant cover remains;
- Provision of habitat for native plants and animals;
- Property values can be improved where vegetation contributes to aesthetics, and can also help to provide a pleasant cellar door experience;
- Encouraging beneficial insects and birds, or providing alternative food sources for birds that might otherwise become pests (native birds generally prefer natural sources of nectar and only feed on grapes when other food sources are not available); and
- Improved water quality where good vegetation buffers are kept around dams and stream banks.

Native vegetation in vineyards can also shade vines, but this issue can be overcome by good planning of planting sites and the types of trees and shrubs that are planted. Various forms of assistance are available to ensure that you plan and plant correctly, or that you can manage remaining native vegetation to maximise the benefits for your vineyards productivity and for your region's biodiversity. Some resources are listed at the end of this Fact Sheet.

What if my vineyard doesn't have native vegetation?

Most vineyards have areas of unproductive land that may be suitable for replanting of native vegetation. On many established vineyards, there is insufficient area to establish significant areas of native trees and shrubs, or the vineyard may have small areas of native vegetation in poor condition. Native grasses are an important part of Australia's native biodiversity and can readily be included in vineyard groundcover.

Advice is available from your regional or state biodiversity support officers (see resources at the end of this fact sheet) on the potential for replacement or improvement of native vegetation around the vineyard property. Another option is to assist in biodiversity conservation in important natural areas elsewhere in your region. By concentrating the time and resources of several landowners and community groups in conserving a locally or regionally significant area of vegetation, greater benefits

for biodiversity and for the maintenance of ecosystem services may be possible. Your regional natural resource management group, local bushcarers group or local government can advise you of the possibilities in your area.

Threatened Species and Ecosystems – what can you do?

Australia has a large number of species and ecological communities that are under threat of extinction, mostly due to land clearing and related loss of habitats. The National Land and Water Resources Audit of terrestrial biodiversity in 2002 identified 2891 threatened ecosystems and communities in Australia, as well as 1595 individual species of plants and animals that are listed under the *Environmental Protection and Biodiversity Conservation Act 1999*.

The *Environmental Protection and Biodiversity Conservation Act 1999* is national legislation. Each State and Territory in Australia also has legislation that allows listing of endangered or threatened species. The criteria used for listing at State and national levels can differ, so species and ecological communities can be listed under both State and national legislation, or under only one of these. Further information on the legislative definitions can be found at <http://www.deh.gov.au/biodiversity/threatened/index.html> which also has links to all State websites.

The listing of a species, ecosystem or ecological community as 'threatened' triggers special management attention to try to ensure that the population numbers or areas of the communities don't decline further. This special management may include addressing the threatening processes (land clearing, predation by feral species, salinity, etc) as well as measures such as captive breeding or relocation of animals, and cloning or seed banking of plants.

Obviously, not allowing species and communities to reach crisis point is the smarter and more effective way of ensuring their survival, and managing all properties to minimise their impacts on the environment and maximise their biodiversity will assist native species and communities to survive.

Planning a new vineyard or expansion

Planning a new vineyard or expanding an existing one provides an opportunity to consider how best to incorporate biodiversity into a vineyard operation. In many cases, state and federal legislation will influence what you can do and how, particularly in relation to vegetation management and clearing. It's particularly important to know what biodiversity already exists on the property as an indication of any restrictions that may apply. There is also scope to access state and federal government funds for biodiversity protection works.

In some areas, local government will have additional guidelines for environmental management. For example, Cessnock City Council, in the NSW Hunter Valley has a Vineyard Development Control Plan that applies to the development of new vineyards and/or expansion of existing ones. This provides some excellent guidelines on vegetation and biodiversity management.

Taking action

There are many ways that people and companies can contribute to biodiversity conservation. The examples listed below are only a small sample, and range from initiatives taken by large companies as part of their corporate responsibilities, to the actions of individuals in improving their local biodiversity.

- **Southcorp (now Fosters Wines Estates)** formed a partnership with the Australian Conservation Foundation (ACF) to develop biodiversity guidelines and a resource kit for the company's vineyard site managers. This has led to detailed property plans for vineyards that include retention and, where necessary, restoration of native vegetation areas in accordance with identified targets for biodiversity conservation and sustainable land management. Further details and case studies can be found at http://www.southcorp.com.au/cps/rde/xchg/SID-53E7C3D8-932DF867/southcorp/style.xsl/acfalliance_cont.html
- **Threatened species conservation in WA** - Two south coast (WA) wineries provide assistance to voluntary groups supporting conservation of the Gilbert's Potoroo (Australia's most critically endangered mammal) and the Western Ground Parrot. The *South Coast Biodiversity Series* is a special wine release that features local endangered species on their

labels and raises funds for community groups undertaking conservation work. The first release, by **West Cape Howe Wines** in 2002, supported the Albany Environment Centre and the Gilbert's Potoroo Action Group who were able to purchase radio-tracking equipment to help monitor the movements of the 30 or so remaining animals at Two Peoples Bay near Albany. In 2003, **Jingalla Wines** released four wines in the biodiversity series, with proceeds also being shared by the Friends of the Western Ground Parrot who undertake surveys to monitor these critically endangered birds.

- **Greening Australia's Wine for Life Project** is a partnership between the industry and conservation organisations. Originally piloted in the Canberra area, the project provided technical support, advice and incentives to more than 20 vineyards. Funding from the National Landcare Program then allowed the program to extend to the Yarra Valley. The project includes: improving water quality (reduced sediment and nutrients) through revegetation of gullies, drainage lines and creeks; improving vegetation and habitat linkages; investigating whether water use in vineyards can be reduced by establishing native grasses in the inter row; revegetating buffers for spray drift, shelter belts, biodiversity, recharge and discharge areas; protecting and enhancing remnant vegetation and mature trees within the property; and improving biodiversity within dams, drainage lines and other water storage areas. Two demonstration sites, at **Domaine Chandon** and **Evelyn County Estate**, have been established. Further details and resource sheets are at <http://www.greeningaustralia.org.au/GA/VIC/OngroundAction/Projects/PortPhillip/wforproceedings.htm>
- **Gemtree Vineyards** in McLaren Vale are also receiving technical assistance and support (including the management of voluntary labour) from Greening Australia to develop the Gemtree Wetlands in the heart of the vineyard. The wetlands, six inter-linking dams, are being constructed and planted with biodiversity in mind. Four species of frogs native to the area are being particularly encouraged, as their health will also provide a good indicator of water quality and biological health of the system. Further information can be found at http://www.gemtreevineyards.com.au/the_wetlands.htm
- In 2005, a small vineyard in the Margaret River region, **Random Valley Organic Wines**, won a Banksia Award, one of Australia's most prestigious environmental awards. The award recognised Peter and Suzanne Little's whole-farm approach and their commitment to monitoring, understanding and managing their soils and vines within the local catchment and landscape setting. This has included rehabilitating a creek line, and creating buffer zones and wildlife corridors. The property is gazetted with the Department of Conservation and Land Management as a *Land for Wildlife* project. The Little's also provide a good example of what can be achieved through collaboration. They have worked with their Land Conservation District Committee; the Departments of Conservation and Land Management and Agriculture; Green Skills; soil scientists and others who have assisted in developing a farm plan that not only keeps their vineyard healthy and productive, but contributes to improving the health of the Upper Glenarty Catchment area. Further information can be found at http://www.randomvalley.com/random_valley.html and information on their Banksia Award is at <http://www.banksiafdn.com/>
- Many other vineyard owners contribute to biodiversity management through their work with local catchment groups and other locally-based groups. Some contact points are provided below.

5 easy ways to get started on conserving biodiversity

- Find out what you already have. Your regional NRM group, local government or State/Territory conservation department will help you with advice on identifying the species and communities on your property.
- Find out what's important in your area (rare, special species or habitats). Your regional NRM group will have identified these.
- Include biodiversity conservation as part of your total vineyard management plan. Set some simple goals for protecting what's there or restoring some habitat.
- Observe and record what you see and do.
- Seek help or advice using the resources listed, or see what your neighbours are doing and compare notes.

References

- ACF-Southcorp Alliance (2005) "The Nature of Our Business (Draft)". Australian Conservation Foundation and Fosters Wine Estates. Greening Australia. Proceedings from Wine for Life Information Sessions.
<http://www.greeningaustralia.org.au/GA/VIC/OngroundAction/Projects/PortPhillip/wforproceedings.htm>. (Accessed December 2005)
 Wendy Bradshaw (2001) "Critters and Crops – the critical connection" Greening Australia Western Australia

Where to find more information and advice on managing your vineyard's biodiversity

- Biodiversity resource guides (national and for each State and Territory) have been developed as part of the national Environmental Management Systems training kit. These contain a listing of biodiversity information, support services and contacts. See <http://www.daff.gov.au/content/output.cfm?ObjectID=80C8A625-D643-43CF-80CBEFE6119F44CB>
- For information on Threatened Species and Communities and what you can do to help, or what you need to know about legislative and other responsibilities if you are planning new vineyard developments, check the website for your State or Territory government department of conservation:
 - ACT: <http://www.environment.act.gov.au/>
 - NSW: <http://www.environment.nsw.gov.au/index.htm>
 - NT: <http://www.ipe.nt.gov.au/>
 - QLD: <http://www.epa.qld.gov.au/>
 - SA: <http://www.denr.sa.gov.au/index.html>
 - TAS: <http://www.parks.tas.gov.au/nature.html>
 - VIC: <http://www.dse.vic.gov.au/>
 - WA: <http://www.calm.wa.gov.au/>
- Information on regional natural resource management groups, and links to programs and possible incentives available within your region, can be found at <http://www.nrm.gov.au/index.html>. This site also has links to regionally and locally-based facilitators who can assist with advice and support.
- There are several schemes offering incentives for private land to be managed for conservation. The website addresses listed above will lead you to information on what's available in your State. For example, you can access a summary of WA incentive schemes from the Department of Conservation and Land Management's web site at <http://www.calm.wa.gov.au/>. Various Tasmanian schemes can be accessed through the Bushcare Tasmania site at <http://www.bushcare.tas.gov.au/> and in SA, the Urban Forestry Biodiversity Program <http://www.urbanforest.on.net/main.htm> includes technical support as well as community funding available through the Million Trees program.
- Community groups may also gain access to small grants through the Australian Government Envirofund. These grants provide up to \$50,000 (GST inclusive) to small-scale projects aimed at conserving biodiversity and promoting sustainable resource use. The Envirofund supports on-ground actions by groups and individuals to target local problems. Find out more through your regional natural resource management group (use link above) or <http://www.nht.gov.au/index.html>
- Greening Australia has offices in each State and Territory and provides specialist technical advice on many aspects of revegetation, restoration of rivers, wetlands and bushland, and also works in partnership with a range of other organisations to improve Australia's biodiversity. Their web site includes a link to "Exchange" – Greening Australia's National Vegetation Knowledge Service that aims to bridge the gap between scientific research and the knowledge and technical information needs of users.
 Under Exchange you can find information on native vegetation management, farm forestry, fact sheets and case studies, links to research organisations and Bush Tracks Online - a searchable database of natural resource management publications. <http://www.greeningaustralia.org.au/GA/NAT/>
- The WWF also provides assistance for biodiversity conservation. <http://www.wwf.org.au/>

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