The Wimmera Mallee Ecosystem Function Project

Fact Sheet 3

Points of interest:

- **Field work**
- **Key findings to date**
  - **Remnant size**
  - **Grazing pressure**
  - **Nutrient levels**
  - **Edge effect**
- **Take home messages**
- **Where to from here?**

The Wimmera Mallee Ecosystem Function Project aims to further understand and improve the ecological function of native vegetation in the landscape.

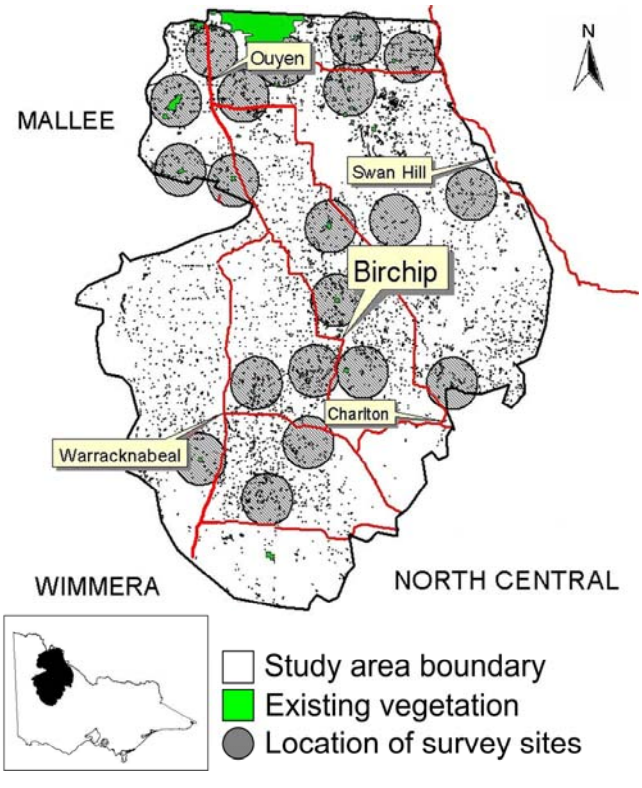
In the agricultural landscape there is very little native vegetation cover remaining. These remnants are typically fragmented, isolated and highly degraded making them susceptible to threats from erosion, weeds, chemical and fertiliser contamination and continuous grazing.

It is vital that further degradation of these remnants is prevented and that vegetation cover is increased. Native vegetation performs important ecological functions such as soil formation and stabilisation, nutrient cycling and water infiltration; services that many people take for granted.

The project, a collaboration between the Birchip Cropping Group (BCG), the Arthur Rylah Institute (ARI) and CSIRO's Sustainable Ecosystems, investigates how to sustainably manage native vegetation within the agricultural landscape. The project has involved a landscape overview, two major field surveys involving over 70 landholders, a workshop identifying local ecosystem services and the publication of fact sheets and articles.

Degraded remnant in poor condition with no understorey and very little ground cover.

Mallee woodland remnant with understorey and a good ground cover of litter, logs and soil crusts.



The project study area in north-west Victoria encompasses areas of the North Central, Mallee and Wimmera Catchment Management Authorities. The circles on the map highlight the locations of surveys in 2005.

BCG
73 Cumming Ave
PO Box 85
Birchip Vic 3483
P: 03 5492 2787
F: 03 5492 2753
E: info@bcg.org.au
www.bcg.org.au

Conducting a field survey, assessing ground cover along the transect.

1st year in the field...

A landscape overview of ecological function of native vegetation was conducted using historical data, aerial photographs, face to face interviews and field surveys.

The field surveys were conducted by ARI researchers in 2005 to assess the condition and threats to 60 randomly selected remnants. The surveys included small (<3ha), medium (5-10ha) and large (>20ha) remnants.

Each survey recorded the vegetation cover and structure, soil stability, water infiltration, nutrient cycling and grazing intensity. Soil samples were taken in each remnant and the adjacent paddock to identify any transfer of nutrients between the paddock and the remnant.

"The majority of remnant vegetation remains as small patches on private land where they are valued primarily as stock shelters."

The untidy appearance of fallen timber and grass tussocks indicate a well managed remnant in good condition.

2nd year in the field...

The first year's field work showed that small grazed remnants were highly degraded. The second year of field work in 2006 focused on the potential of a remnant to respond to stock exclusion.

The majority of smaller remnants in the study area are primarily valued as stock shelters.

The project team wanted to know if stock was excluded from these remnants what the potential would be for the remnant to respond and recover once the grazing pressure had been removed.

Landholders were also interviewed to understand the history of the remnants and the past grazing regime.

"How can native vegetation cover be increased in the most efficient way without threatening the viability of the farming business?"

Woodland with high crust cover

Dense cover of lichens

*The **biological soil crust** makes up only the top few millimetres on top of the soil but it is home to many living organisms which include mosses, lichens, liverworts and algae. By stabilising the soil and contributing cover and roughness to the soil surface the crust reduces the risk of wind and water erosion, regulates water infiltration, and provides habitat to a diverse group of invertebrates such as ants and beetles. Soil crusts are also good indicators of soil health and a key player in site rehabilitation.*

Key findings

Remnant size

The size of a remnant was found to influence ecological function. Generally the larger the remnant the greater the ecological function.

Large remnants have an interior which is protected from degrading influences such as nutrients and weeds. Small remnants are subject to edge effects and are typically more degraded.

Small remnants generally have:

- higher weed cover
- very low native vegetation understorey cover
- low levels of litter cover
- low levels of fallen timber on the ground

Although size does matter in terms of basic ecological function, size itself is not as important as how the remnant is managed. Small remnants are typically used as stock shelters and grazed every 1-3 years, large remnants are grazed far less often and not at an equivalent intensity. By reducing the degradation caused by high stocking rates, basic ecological function would increase in smaller remnants.

Lone paddock trees are under intense pressure.

Sheep grazing causes twigs, litter and the soil crust to be broken up and blown off, exposing the top soil.

Grazing pressure

Remnants with high grazing pressure had higher soil phosphorus, weed and bare ground cover while remnants with low grazing pressure had higher diversity and greater native species cover. The frequency and intensity of grazing effects nutrient levels, weediness, and most importantly, native species recruitment. Recruitment of seedlings is essential to ensure a remnants future survival.

Nutrient levels

Higher nutrient levels occur in small remnants and remnants that are heavily grazed. Levels are often as high as those in surrounding paddocks indicating substantial nutrient enrichment due to fertiliser movement and sheep manure.

The primary cause of increased nutrient levels is stock manure. The windward edges are also more exposed to nutrient run off, weed invasion and wind effect.

"There are concerns about the long term survival of small remnants and how the native vegetation cover can be increased in the most efficient way without threatening the viability of farming businesses."

A remnant and a cultivated paddock separated by a fence. Crop fertilisers can easily be transported into the remnant.

Edge effects

Edge effects are where one type of land use impacts upon the adjacent land, in this case the native vegetation.

Found to be greater on the windward edge, edge effects are the result of strong SW-NW prevailing winds.

The edge of the remnant is at greater risk of degradation from the adjacent land use. As a result the edge has a higher weed cover and a lower cover and diversity of mosses and lichens.

Take home messages

- All remnants can add value to production by contributing to soil stabilisation, water infiltration and nutrient cycling.
- Uncontrolled livestock access is the greatest threat to the ecological function of a remnant as livestock prevent regeneration of native species and increase nutrient levels.
- Remnants require longer periods without stock access to allow seedlings to germinate and grow beyond the reach of livestock.
- Revegetation and targeted tree planting on the exposed windward edge of the remnant will provide a buffer from the wind effect.
- Efforts to expand the native vegetation area will be more successful on the protected leeward side of the remnant as the existing remnant will offer protection from threats.

Learning to read the landscape by looking at simple indicators of soil and vegetation health.

Native plant recruitment, small Bulokes establishing.

Where to from here?

The project now moves into the final phase with demonstration sites being established. The sites will demonstrate how to read the landscape, how to look for improvements in a remnant and how to manage a remnant for enhanced ecological function into the future.

A glovebox guide combining the project findings will be produced. The guide will assist farmers to track the health and function of their remnant vegetation and revegetation projects.

Contact us if you would like more information.
Jodie Odgers
'Making Conservation Pay'
Birchip Cropping Group
Ph. 03 5492 2787
Fax. 03 5492 2753
info@bcg.org.au or visit the website www.bcg.org.au

Printed on 100% recycled paper

Project supported by:

Natural Heritage Trust
Helping Communities Helping Australia

In partnership with:

BCG shared solutions
Arthur Rylah Institute for Environmental Research
State Government Victoria
NORTH CENTRAL Catchment Management Authority
mallee catchment management authority