

# PIECING TOGETHER THE PATCHES

CSIRO Plant Industry scientists are using high-tech genetic markers and ecological monitoring to identify threats to the viability of native grasslands, woodlands and heathlands.

This project aims to develop landscape design and remnant vegetation management principles that will maximise the genetic and ecological health of native plant populations within agricultural landscapes.



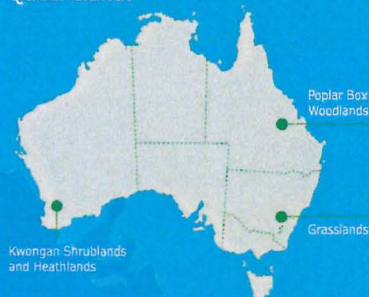
## REMNANTS AT RISK

Many of the remaining areas of Australia's grasslands, heathlands and woodlands exist only in small isolated patches making them vulnerable to further degradation.

Plants in small patches are more exposed to ecological and genetic threats such as loss of pollinators that prevents seed set, and inbreeding that reduces fitness. These biological problems can limit the viability of remnant populations compromising their conservation value and usefulness as sources of seed for local revegetation.

## AROUND AUSTRALIA

The study is being conducted in three locations: the grasslands and grassy woodlands of southeastern NSW, the kwongan shrublands and heathlands of the Dongolocking region in southern WA and the poplar box woodlands in Queensland.

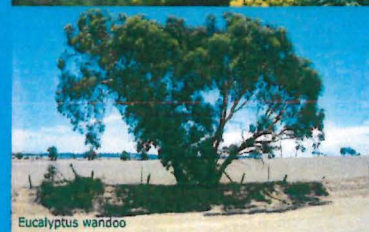


## DATA

High-resolution molecular genetic analysis together with demographic monitoring and computer simulation models will be used to predict the viability of plant populations at the sites.

Six species will be studied that represent a number of broad classes of plants with varied pollination and dispersal methods and that are dominant elements of the remnant vegetation.

What is found out about these species can be applied broadly to similar common species throughout Australia.

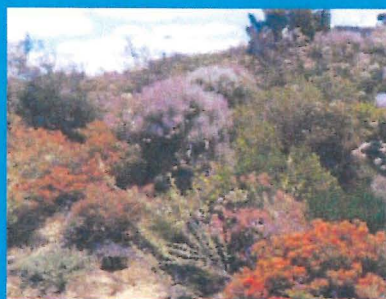


## MANAGEMENT AND CONSERVATION

Landscape design guidelines for the improved conservation of the grasslands, heathlands and woodlands will be developed from this research. The guidelines will help to better target management efforts saving important conservation dollars.



CSIRO Plant Industry scientists are using high-tech genetic markers and ecological monitoring to identify genetic threats to native grasslands, woodlands and heathlands. The goal of this new research is to develop landscape design and remnant vegetation management principles that will maximise the genetic and ecological health of native plant populations within agricultural landscapes.



## PIECING TOGETHER THE PATCHES

### REMNANTS AT RISK

Grasslands and heathlands are two of the most endangered ecosystems in Australia. An estimated two per cent of temperate native grassland is left in South East Australia – the rest has been cleared for agriculture and urban development. Grasslands provide an ecosystem for native grasses and herbs as well as many animals such as the rare legless lizard. They are also important components of native pasture grazing systems.

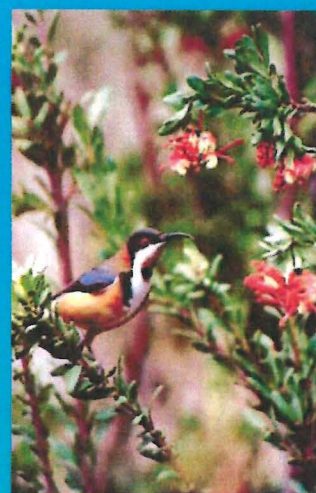
Heathlands in Western Australia are also under threat – having been largely cleared for wheat production. A unique assortment of plants including many banksias, dryandras and acacias are found only in the heathlands and, like grasslands, provide important habitats for many of our native birds and animals.

Many of the areas of grassland and heathland that remain in Australia are in small isolated patches making them vulnerable to further degradation. When isolated in small patches plants are exposed to a range of genetic and ecological threats such as loss of pollinators that prevents seed set, and inbreeding that reduces fitness. These biological problems can limit the viability of these populations and reduce their value as locally adapted seed sources for revegetation.

### BUILDING BLOCKS

Dr Andrew Young and his team at CSIRO Plant Industry are combining the use of high-resolution molecular genetic analysis with demographic monitoring and computer simulation models to examine the viability of plant populations in remnant vegetation with the aim of improving management practices to better conserve them.

Previous research on rare and endangered plant species by the same research group has shown that genetic issues underpin a lot of the other changes that occur in remnant plant populations reducing their ability to survive. In this new research initiative the scope of investigation is being expanded to encompass common species such as Eucalypts and Acacias, which are dominant elements of remnant vegetation communities. These species provide much of the structural complexity that makes remnant vegetation important habitat for wildlife.







## EAST TO WEST

Through collaboration with scientists from the Department of Conservation and Land Management in Western Australia, the study is being conducted in two contrasting landscapes: the grasslands and grassy woodlands of southeastern NSW and the kwongan shrublands and heathlands of the Dongolocking region in southern WA. Five study species have been selected including herbs, shrubs and trees. These have been chosen to represent a number of broad classes of plants with varied pollination and dispersal methods so that what is found out about these species may be applied broadly to similar species throughout Australia.

## BETTER MANAGEMENT AND CONSERVATION

Based on previous research and data from this project, CSIRO scientists will be able to correlate the genetic and ecological health of plant populations with more easily measured characteristics of remnant vegetation such as size, isolation and disturbance. This will allow the development of landscape design and management guidelines for the improved conservation of some of Australia's most degraded vegetation communities. The overall goal is to ensure the long-term persistence of grassland and heathland communities within our agricultural landscapes. Dr Young and his team hope that the management guidelines developed from this project will greatly assist conservation of remnant patches of grassland and heathlands. The guidelines will also help to better target conservation efforts saving important conservation dollars.



## CONSERVATION PARTNERS

Dr Young's group is part of the Centre for Plant Biodiversity Research - a joint venture between CSIRO Plant Industry and Environment Australia. This research is part of a new partnership between CSIRO Plant Industry and the Department of Conservation and Land Management WA as part of the Native Vegetation Research and Development Program managed by Land and Water Australia.



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