

# Woodlands meet a grave demise

Two hundred years ago, vast areas of land across northern Victoria, the western slopes and plains of New South Wales and southern Queensland were home to open, grassy woodlands. White box, yellow box or grey box trees (respectively *Eucalyptus albens*, *E. melliodora* and *E. microcarpa*) thrived, and under them grew an abundance of native grasses, and wildflowers.

Early European explorers were impressed by these lush meadows, describing them as park-like and 'covered with thick grass and gay flowers'. As the trees were well spaced it was possible to introduce flocks of sheep and cattle without even needing to clear the land. And so began the dramatic loss of a unique assemblage of native species. In its stead, we now have vast wheat fields and paddocks sown with introduced grasses.

To find out how much of the original vegetation remains, CSIRO botanists Dr Suzanne Prober and Dr Kevin Thiele, while working at the Centre for Plant Biodiversity Research at CSIRO Plant Industry, surveyed the white box woodlands throughout the range on the south and central west slopes of New South Wales. They estimate that only about 0.01% of the original grassy white box woodlands exists in a relatively pristine state.

Where are these untouched examples of this important native ecosystem: a national park perhaps? No, the 'top' four sites, containing both tree cover and diverse native understorey, are in cemeteries (two bits of less than five hectares each), on a road strip about 300 metres long, and within a travelling stock reserve. Another ideal place to find native vegetation is along railway easements. And that, sadly, completes the list of places where you're likely to find what was once one of the most extensive native ecosystems in south-eastern Australia.

The decline of the white box woodlands is not a simple case of early agriculturalists laying waste the land by clearing all the trees. On the contrary, the trees were often left standing while stock were allowed to graze the lush understorey. Prober and Thiele confirmed that grazing has caused most of the extensive changes in the original understorey. They found that very light grazing can stimulate some native species while others fall into rapid decline. Any further stress from grazing and a whole suite of native species is quickly lost from the area.



Only a fraction of the original grassy white box woodlands remain.

These are plants that are simply not adapted to being grazed by cattle and sheep. As the diversity of the understorey species declines, introduced weeds, which can tolerate higher levels of grazing, move in. These fiercely competitive weeds finish off what was left of the native understorey. Nowadays, the white box woodlands are reduced to tiny scattered fragments.

However, it would be wrong to give the impression that many species are on the verge of extinction because of this loss. Most of the understorey plants exist elsewhere, as do the trees (although most are mature and there are few new saplings); what is at threat is not particular species, but an assemblage of interacting species that together form a unique ecosystem. It is the ecosystem that we must try to conserve.

## Keeping what's left

Keeping intact an ecosystem may often require different tactics from conserving a single species. The ethical reasons are of course the same, but there may be other reasons too. In this case, the native ecosystem allows us to know what the country was like before European settlement and so provides a benchmark to help us assess the changes that have occurred since. For example, we can compare soil structure and hydrology in these preserved areas with the agricultural land all around. Such comparisons may be crucial to understanding land degeneration in the region.

But what's the best way of keeping the remnants? By studying the biodiversity of the woodlands and the genetics of white box trees in some of the fragments, the two scientists have devised a conservation strategy for this particular ecosystem. They found that the surviving white box woodlands are remarkably uniform, even on widely differing soil types and in different climatic zones. White box populations are genetically fairly similar to each other right across the tree's natural range, but within the populations, the genetic diversity of white box (the differences between individual trees) is higher than for any other eucalypt yet tested. In general, the smaller the size of a white box remnant, the lower its genetic diversity.

The detailed surveys showed a large number of low quality sites (where native diversity is less and weed invasion more apparent) and a few high quality remnants. The sites are under a variety of different land tenures. On the basis of their information, the scientists propose that the best way to conserve what's left would be to create a new type of reserve consisting of small, high quality sites scattered across NSW, supplemented by larger, lower quality fragments. These would be linked administratively by the agreement of the various authorities (including private individuals) responsible for the land.

There's no reason that tenure need be transferred to a single body, so the traditional 'national park' concept would not apply. Local people would be involved in looking after their own patch of white box woodland, whether it be in a cemetery, along a roadside or on their own property. Weeds would be removed and, if necessary, stock excluded from the more vulnerable sites. The scientists are also assessing the best ways of managing the good sites and restoring the more degraded ones.

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