

# Landscape-scale restoration: ecological thinning in Victoria's Box-Ironbark system

## Background

Victoria's Box-Ironbark forests and woodlands have been modified substantially as a consequence of land management practices which have occurred since European settlement.

Mining, timber-cutting, grazing and land-clearing have resulted in:

- ❖ over-storey comprising mostly young, uniformly-sized trees
- ❖ large, hollow-bearing trees are under-represented
- ❖ a loss of biodiversity across the system.

In 2002, a new system of conservation reserves was established to protect these fragmented remnants. Parks Victoria is the agency responsible for the management of Box-Ironbark parks and reserves:

- ❖ the primary management objective is maintenance of a mosaic of box-ironbark forest types across the landscape
- ❖ the aim of this is to support a diversity of habitats to provide long-term protection for the fauna and flora that characterise the system and maintain its function.



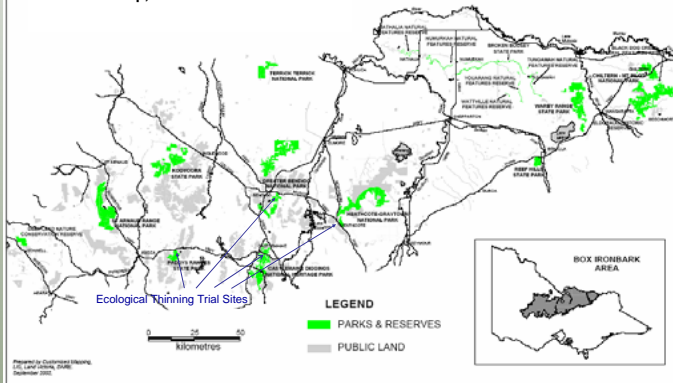
Figs 2a, 2b. 'Before' and 'After' thinning to *Isolated* treatment specifications at the same site in the Castlemaine Diggings National Heritage Park (Fig. 1). Arrows point to a Grey Box (*Eucalyptus microcarpa*) tree retained in the plot.

## Monitoring Projects

Monitoring is being undertaken by Parks Victoria's Research Partners, Dept. Sustainability and Environment (*Arthur Rylah Institute Environmental Research*) and University of Ballarat (*Centre for Environmental Management*), in a range of biodiversity projects:

- ❖ Forest Structure: Forest mensuration
- ❖ Forest structure: Key Fauna Habitat - tree attributes
- ❖ Forest structure: Key fauna habitat - litter components
- ❖ Forest Structure: Floristic Survey
- ❖ Ecosystem Function: Selected vertebrate survey
- ❖ Ecosystem Function: Invertebrate survey.

Fig. 1: Box-Ironbark Parks & Reserves, and Ecological Thinning Trial Sites locality map, Central Victoria



## Adaptive Experimental Management

As part of its adaptive experimental management approach, Parks Victoria has commenced implementation of a long-term ecological management trial to examine:

- ❖ whether reducing the density of canopy trees expedites the development of older-growth characteristics of these forests (e.g. large, hollow-bearing trees)
- ❖ the response of a range of forest structure, ecosystem function and biodiversity variables to thinning and debris manipulation.

## Experimental Design

The Box-Ironbark Ecological Thinning Trial has been established in central Victoria (Fig. 1) with multiple treatments (including controls) designed to represent future management practices (Table 1):

- ❖ four *Ecological Thinning* treatment plots replicated at four sites (30 ha)
- ❖ three *Coarse-Woody-Debris Retention* treatment sub-plots (1 ha).

Table 1. Descriptions of thinning debris-retention treatments for the Box-Ironbark Ecological Thinning Trial

TREATMENTS	PROCEDURE
<b>Thinning</b>	(replicated by site)
<i>Isolated</i>	All trees within the estimated 'zone of influence' of the selected tree are removed (see Fig. 3 and Fig. 2b)
<i>Patchy</i> (x2) low & medium densities	Creating a patchy effect by retaining some trees in clumps in the 'zone of influence' and thinning out surrounding trees (see Fig. 4)
<i>Control</i>	No thinning treatment is applied
<b>Coarse-Woody-Debris Retention</b>	(nested sub-plots replicated x 3 and randomly distributed in thinning plot)
<i>0% (no) Retention</i>	Remove 100% felled trunk/ branch material (> 6cm)
<i>50% Retention</i>	Remove 50% felled trunk/ branch material (> 6cm)
<i>100% Retention (Control)</i>	Retain all felled trunk/ branch material

## Project Objectives

Determine whether ecological thinning can be used to accelerate the development of older growth conditions of ecosystem function, forest structure and habitat diversity:

- ❖ by investigating thinning methodologies that could be applied
- ❖ by investigating where, when and how often thinning could be applied
- ❖ by investigating the issues that indirectly may enhance the effectiveness of ecological thinning.

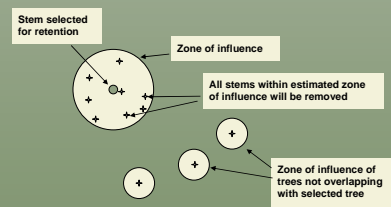


Fig. 3: Isolated thinning treatment diagram

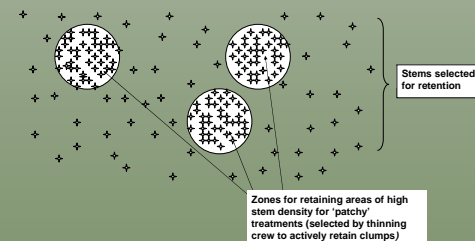


Fig. 4: Patchy thinning treatment diagram

## Progress & Future Directions

- ❖ Experimental infrastructure and monitoring programs are well established and treatment implementation will finish by December 2006;
- ❖ Pre-thinning monitoring surveys have been completed. Post-thinning monitoring is planned over several years allowing 12 months after treatments are completed;
- ❖ Stage 1 monitoring will finish in late 2007 contributing to the draft EMS;
- ❖ It is acknowledged that it will take a long time to detect responses in the ecosystem and habitat change.

## More Information

- ❖ Parks Victoria encourages partnerships with other organisations for community and research activities as part of the Box-Ironbark Ecological Thinning Trial.
- ❖ For further information contact 131963 or look up <[http://www.parkweb.vic.gov.au/1park\\_boxironbark.cfm](http://www.parkweb.vic.gov.au/1park_boxironbark.cfm)>