



Landscape history and vegetation change in the Chiltern–Springhurst region of Victoria

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Background

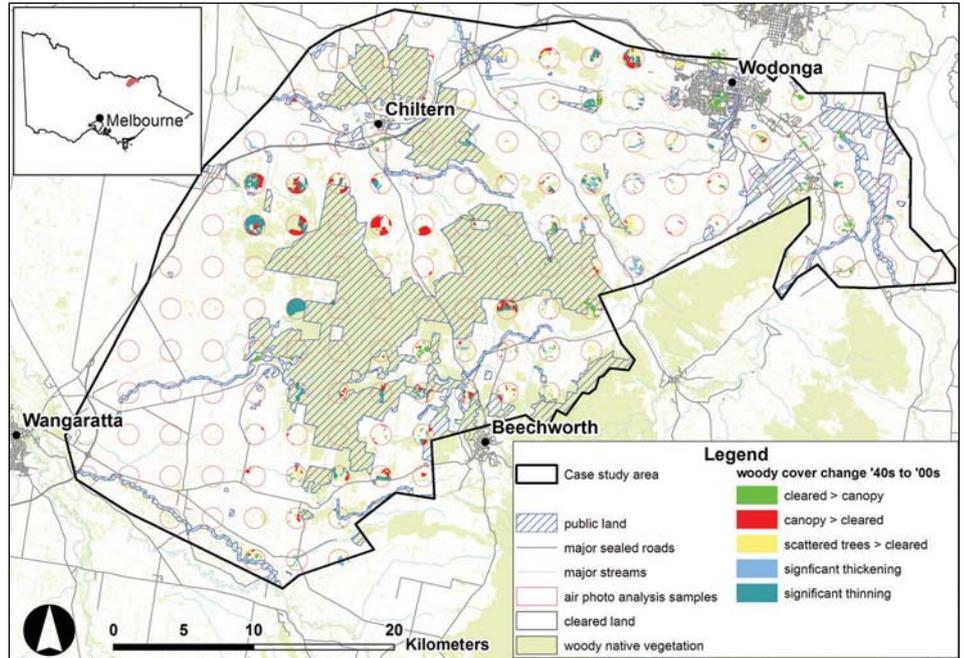
This report summarises the major activities and events thought to have influenced change in native vegetation in the Chiltern–Springhurst area of north-east Victoria [see Figure 1]. Aerial photography obtained for 1946 and 2006 indicated changes in the extent of native woody vegetation – both decreases and increases – in the Chiltern–Springhurst area.

There has been great variation in activity and events across the study area, with spatial variation according to the presence of remnant native vegetation, land tenure (e.g. private farmland compared to public nature reserves), agronomic potential (e.g. high-production cropping and sheep grazing), and historical events (e.g. areas affected by the 1983 bushfire).

Field visits and a three-hour 'landscape history workshop' were held over two days in November 2008. An important part of this method was the involvement in a guided conversation of a small group of people with considerable knowledge of the history of local land-use. The group of ten people included landholders, ecologists, environmental project managers and leaders of community-based environmental projects. The participants collectively provided a preliminary understanding of some of the major causes of change in vegetation during 1946–2006, and when these changes occurred.

Members of the project team are using this understanding to guide where they will undertake more in-depth photo analysis, site visits and interviews with landholders during 2009. This research is part of a larger national research effort known as Landscape Logic, which aims to understand the link between land and water management and environmental condition [www.landscapelogic.org.au].

Figure 1: Map of the Chiltern–Springhurst study area



Early influences on native vegetation

Although this study has focused on changes in the extent of native vegetation in the Chiltern–Springhurst area during 1946–2006, it is necessary to understand earlier influences as they provide some explanation of the native vegetation seen today.

The study area covers land traditionally owned by the indigenous people of the Waveroo language group (Wiradjuri people¹), who are believed to have managed the native vegetation to maintain food supplies, provide shelter and for cultural purposes. The decline in population of the local indigenous people led to a very different use of fire as a landscape management tool, with some areas that had previously been relatively open becoming more 'scrubby'.

The discovery of gold in the region brought the first wave of new settlers – Europeans and Chinese – from the 1850s to 1880s. The population grew quickly during this period, with miners, merchants, small-scale farmers and a range of government officers (e.g. Beechworth's population was estimated to be about 40,000 in 1880). Mining had

a dramatic impact on native vegetation, with large areas of trees felled for mine structures, fueling boilers, building and firewood for the expanding settlements. As the alluvial gold deposits declined, the region shifted away from reliance on mining to an agrarian-based economy.

Workshop participants mentioned that after the 1880s, many ex-miners were employed to clear native vegetation (manual ring-barking) so mixed farming–grazing enterprises could be established and expanded. While some mines were re-worked in the Chiltern–Indigo area during 1900–1910, agriculture grew in scale and importance – with clearing of native vegetation in the region continuing on a large scale until the 1960s.

Some harvesting during this period supplied sawn timber for markets in Melbourne, as well as for local use as construction timber, fencing and yards, and firewood (e.g. Springhurst butter factory sourced much of its wood supplies from south-west Springhurst), with scattered trees left as shade trees for livestock.

Increasing livestock numbers and the presence of rabbits in plague proportions meant there was extreme

grazing pressure on native vegetation – even adult trees – over most of the landscape from 1920 to the 1940s.

Changes in farming during 1946–2006

In broad terms, the level and type of agriculture in the Chiltern–Springhurst area reflects what occurred nationally – with the steady increase in farmland, mostly for livestock farming, until its peak in the mid-1970s. However, it was during the 1950s that widespread promotion and establishment of introduced pasture species (mainly Phalaris and Sub-clover) and Lucerne, together with increased applications of fertilizer (superphosphate and molybdenum, subsidised in the 1960s), led to a notable increase in the productivity and profitability of farming. Returns for wool producers in particular were buoyant for many years, although prices fluctuated from year to year [see Figure 2]. The establishment of introduced pastures during periods of high wool prices led to a decline of native grasses in pastures.

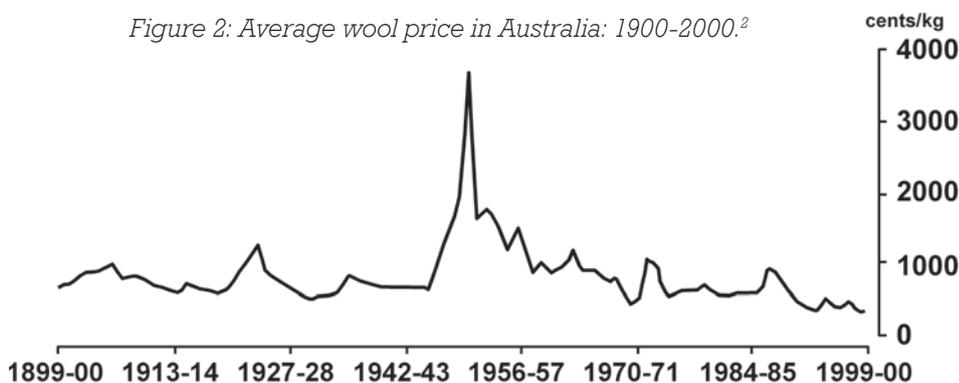
While wool production was the dominant farming enterprise in the region, areas of the flatter and fertile farmland were used for cropping and cattle (beef and dairying). The steep hills that had been cleared of native vegetation were aerially sown with phalaris in an attempt to prevent soil erosion and the spread of weeds. The conventional knowledge at the time focused on assisting farmers to expand the area of farmland and increase production. Several farmers reported how the numbers of livestock had fluctuated since the 1950s, primarily in response to wool prices and seasonal conditions.

The high wool prices during the mid-1950s led many farmers to invest in farm infrastructure (e.g. increase in drainage works) and equipment (e.g. tractors). Overall, there was considerable investment in agricultural production during the 1950s and, to a lesser degree, in the 1960s and '70s.

The availability of tractors meant that farmers could cultivate much greater areas for both pasture improvement (e.g. spreading superphosphate) and fodder conservation (e.g. hay production). Larger farm machinery made tree-removal easier, and also more desirable, as paddock trees tended to impede the movement of larger machinery. Stubble burning also contributed to a noticeable decline in paddock trees, as trees that burned were often removed soon after.

However, since the 1980s there has

Figure 2: Average wool price in Australia: 1900–2000.²



been a declining terms of trade for most wool producers. Also, during the past decade there has been an increasing cost for many inputs (e.g. fertilizers, fuel) with decreasing farm-gate returns, together with increasing land prices – with rural land now often selling beyond its accepted agronomic value.

Since the early-1990s, there has been a noticeable increase in the number of small high-value rural properties sold to 'lifestylers' or 'hobby farmers', who are often willing to pay more for rural land than its perceived agronomic value. There has also been an increase in the diversity of farm enterprises, such as commercial vineyards, olive groves, horticultural operations (e.g. lettuce, strawberries) and horse studs.

For many farmers, the poor returns for conventional livestock enterprises (wool, meat) and continued dry seasons has meant de-stocking much of the region's marginal farmland. Consequently, there has been an increase in the regeneration of native vegetation in de-stocked areas. Some workshop participants noted that the combination of declining use of superphosphate, reduced cropping and lower livestock numbers has led to an increase in native tree regeneration and recolonisation by native grasses since the mid-1990s.

However, workshop participants also suggested that while there may have been an increase in the area of native vegetation, there has been a loss in the quality of native vegetation (decline in biodiversity) over this period. The main indications of this decline were increasing weed cover, decreasing habitat for birds and other native animals, and the continued loss of large paddock trees throughout the area. One participant reported that paddock trees remain particularly vulnerable to decline, with a steady loss due to pressure from livestock and removal for firewood. It was also reported that there is little regeneration of understorey vegetation on the plains and soil erosion occurring on localised sites.

Other industries such as the supply of power poles, re-alignment and expansion of major roads, and gravel pits and quarries for road construction, were also reported to have contributed to clearing of native vegetation during the 1960s to the 1990s.

Government policies and programs reported to have had an impact on native vegetation (decrease and increase) included:

- requirement by government and banks (holding mortgages) for landholders with government-issued leases to convert bush to permanent farmland from the 1880s to the 1930s
- income tax deductions for expenses related to clearing native vegetation from farmland (ending in the 1970s)
- establishment of 'soldier settlement' properties after World War 2³
- subsidized cost to encourage use of superphosphate during the 1960s
- sowing of phalaris and planting willows and poplars for erosion control during the 1950s to 1980s
- commencement of the state/national Landcare program in the late-1980s – raising awareness of native vegetation and provision of plants and materials
- introduction of state legislation to restrict clearing of native vegetation in 1989
- promotion of whole-farm planning.

A changing community

During the Depression, many unemployed people came from Melbourne to Chiltern to work in the region's timber industry (harvesting, milling, transporting). Also, the influx of immigrants following World War 2 led to many migrants being employed in the region as farm labourers, with some later establishing small farming properties. However, the region's farming communities began to decline noticeably after the 1970s.

The Victorian Department of Soil Conservation (DSC) had been active in the region since the 1950s – with its

focus on working with farmers to control soil erosion. DSC staff were also able to offer farmers subsidised materials (fencing, grass seed) and on-ground works (rock structures) to control soil erosion, an early version of the Land Protection Incentive Scheme. Poplars and willows were still being recommended to control riverbank and gully erosion until the 1980s.

Workshop participants reported that in the 1960s, schools began to promote an environmental awareness amongst students, which was supported in the 1970s by local projects to revegetate along creeks and the larger scale native plantings by the Albury–Wodonga Development Corporation (e.g. around Leneva, Barnawartha and Baranduda). Several Farm Tree and later Landcare groups were formed in the 1980s. These groups fostered an awareness and interest in planting native species (not necessarily local) on farms – for livestock shade and shelter, for native wildlife habitat, and for erosion control. By the 1990s this had evolved into widespread interest in planting and protecting local native species (including understorey species), and more recently an interest in local wildlife. Following from increased awareness in native vegetation management initially created by Farm Tree and Landcare groups and the influx of 'lifestylers', there was considerable interest in joining DSE's Land for Wildlife network during the 1990s. More recently, there has been interest in the conservation covenants promoted by Trust for Nature.

Since the early-1990s, there has also been an increasing interest in encouraging and managing native grasses as pastures, particularly in the drier hills (generated by research led by Meredith Mitchell, DPI Rutherglen).

Fire, flood and drought – catalysts of change

Critical environmental events that affected native vegetation in the area include wildfires, wet periods and

drought. The fires of 1949 and 1952 (Barnawartha–Mt Franklin area) and 1983 and 2003 (Eldorado–Mt Pilot area) were mentioned as critical events that changed the native vegetation. Controlled burns in the late-1990s were reported to have been successful in regenerating native understorey. However, while there has been good germination of wattles (*Acacia* spp.) and native peas (*Pultenaea* spp.) from more recent controlled burns, the dry seasons has meant few of these plants have survived.

The study area has experienced highly variable rainfall during 1900–2000 [see Figure 3], as is common in many parts of Australia. Two very wet periods were noted: 1956–57 and 1970–71, when there was noticeable regeneration of woody native vegetation. Conversely, droughts during 1967, 1982–83 and the mid-2000s reportedly led to a decline in Red Stringybark (*Eucalyptus macrorhyncha*) that tends to grow on the drier hills.

These droughts were also reported to be catalysts for the exit from commercial agriculture by a significant number of farmers, allowing a noticeable influx of 'lifestyle' rural landholders (mainly in the vicinity of towns). For the remaining farmers, the declining profitability of many farm businesses and frequent dry seasons have left many with little capacity to undertake revegetation or vegetation protection works. Conversely, the years following drought were associated with significant spontaneous regeneration of native tree and tall shrub species.

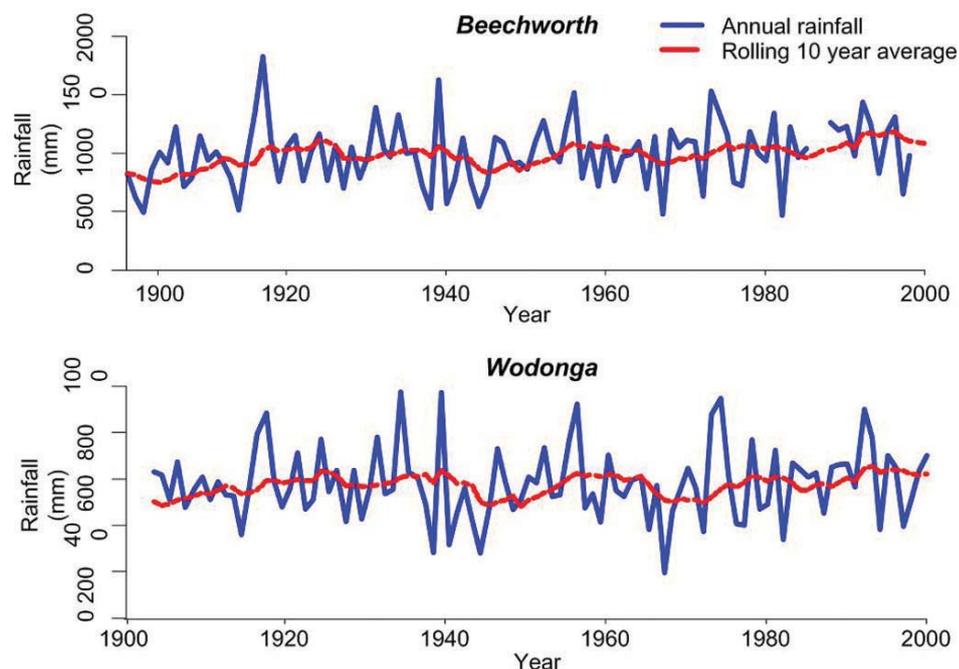
Pest animals and plants

The pressure from rabbits on native vegetation was intense during from the 1920s to 1940s, with reports that large areas of the landscape were ravaged as rabbits ate any available vegetation – changing the composition of vegetation communities, with species preferred by rabbits disappearing.

While rabbits were commonly hunted for fur and meat during this period, it was the release of myxomatosis in the mid-1950s in the region which was particularly effective in reducing the rabbit population. With the reduced pressure from rabbits and buoyant wool prices around this time, many farmers began to invest in improving their pastures. Several people at the workshop reported that myxomatosis was particularly effective at killing rabbits in rocky (inaccessible) areas during the 1950s, which then allowed greater regeneration of native vegetation. However, rabbits had re-emerged in the 1980s and have remained a considerable problem in the region.

Several people reported that wild dogs have been a problem for sheep farmers since the 1980s, particularly those adjoining large areas of native forest. It was also reported that kangaroos were quite rare in the region during the 1940s, but had become relatively common since the 1980s. The combination of grazing pressure from kangaroos and recent dry seasons was mentioned by one participant to be having a severe impact on the quality of forest vegetation.

Figure 3: Annual rainfall and rolling 10-year average rainfall for Beechworth & Wodonga 1900–2000.



- 1 Horton, D.R. (1994) The Encyclopaedia of Aboriginal Australia, Aboriginal Studies Press for the Australian Institute of Aboriginal and Torres Strait Islander Studies, Canberra, ACT.
- 2 Australian Bureau of Statistics (2001) Australian Agricultural: Agricultural Commodities Produced – historical data. ABS publication 7113, Canberra, ACT.
3. 'The Virtual Exhibition', Department of Primary Industries, Victoria www.nre.vic.gov.au/virtualexhibition/settle/index.htm.

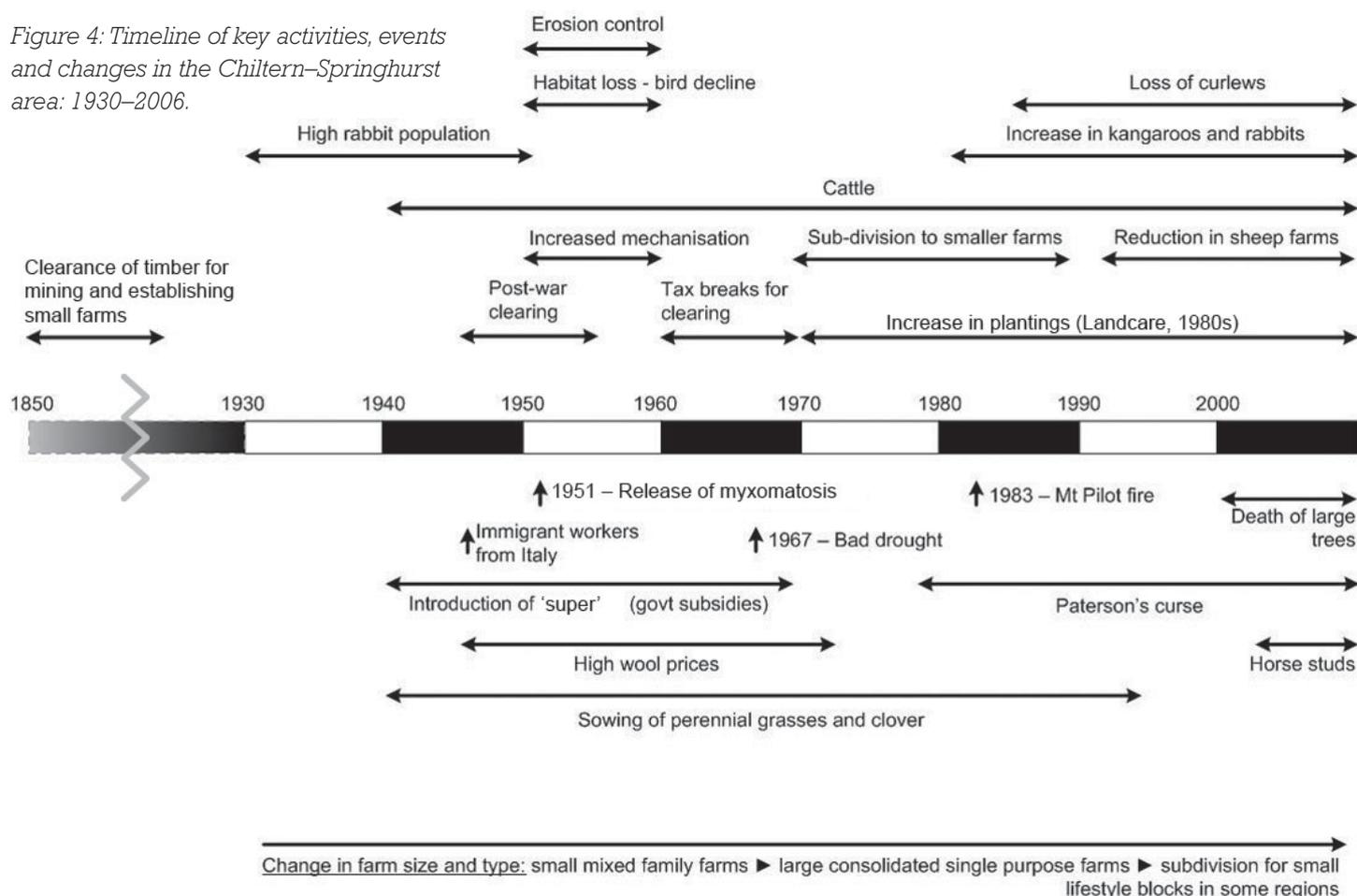
Prominent weeds emerged in the 1980s (St John's Wort, Patterson's Curse) and early-2000s (Wild Oats, Chilean Needle Grass) – which continue to spread in the region. It was suggested that there has been less enforcement of weed control by authorities during the past decade (the local Land Protection authorities were reported as being effective in the 1950s to 1970s).

Conclusion

Influences on the extent of native vegetation can be immediate (e.g. conversion to cropping) or incremental (e.g. native species favoured by decline in use of fertiliser), and direct (e.g. revegetation or seed sowing) or indirect (e.g. control of rabbits, change in demographics). Furthermore, some influences might be highly visible (e.g. clearing for town settlements) while other influences might only be significant in aggregate (e.g. drought plus decline in farm profitability). Observable changes in land-use and specific events have been recorded on a timeline [refer to Figure 4], however it should be noted that these may not be the only, nor necessarily the primary, influences on changes in native vegetation during the 1946–2006 period.

More detailed research by the project team in 2009 will seek to enhance the understanding of the major

Figure 4: Timeline of key activities, events and changes in the Chiltern–Springhurst area: 1930–2006.



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LANDSCAPE LOGIC is a research hub under the Commonwealth Environmental Research Facilities scheme, supported by the Department of Environment, Water Heritage and the Arts. It is a partnership between:

- six regional organisations – the North Central, North East & Goulburn–Broken Catchment Management Authorities in Victoria and the North, South and Cradle Coast Natural Resource Management organisations in Tasmania;
- five research institutions – University of Tasmania, Australian National University, RMIT University, Charles Sturt University and CSIRO; and
- state land management agencies in Tasmania and Victoria – the Tasmanian Department of Primary Industries & Water, Forestry Tasmania and the

Victorian Department of Sustainability & Environment.

The purpose of Landscape Logic is to work in partnership with regional natural resource managers to develop decision-making approaches that improve the effectiveness of environmental management.

Landscape Logic aims to:

1. Develop better ways to organise existing knowledge and assumptions about links between land management actions and environmental outcomes.
2. Improve our understanding of the links between land management actions and environmental outcomes through historical studies of the effects of private and public investment on water quality and native vegetation condition.

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influences on changes in the extent of native vegetation in the Chiltern–Springhurst study area.

For more information about the study described in this report please contact Dr David Duncan, Department

of Sustainability and Environment [email: david.duncan@dse.vic.gov.au; tel: (03) 9450 8750]. Alternatively, if you would like to know more about the research supported by Landscape Logic, visit www.landscapelogic.org.au